Cascades Butterfly Project

National Park Service
U.S. Department of the Interior

North Cascades National Park Service Complex
Mount Rainier National Park

The Cascades Butterfly Project:

Survey Routes, Standard Operating Procedures, and Field Forms






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Abstract

The Cascades Butterfly Project (CBP) is a long-term monitoring program in which citizen scientists and National Park Service biologists monitor butterfly abundances and plant phenology in subalpine meadows of the Cascade Mountains. This report is a companion document to "The Cascades Butterfly Project: A Protocol for Monitoring Subalpine Butterflies and Plant Phenology in the Cascade Mountains of Washington" Natural Resource Report NPS/NOCA/NRR—2017/1440 https://irma.nps.gov/DataStore/Reference/Profile/2240282. The Protocol presents the projects broad goals and history of the project and this report contains descriptions of survey sites, the Standard Operating Procedures (SOPs) for field data collection and butterfly data entry into an on-line data base.

The CBP was initiated in 2011 with broad goals to understand the influence of climate change on high-elevation ecosystems, document changes in species distributions and abundances, communicate these impacts to the public, and provide these data to inform protection of National Park Service and U.S. Forest Service lands.

Acknowledgments

I would like to thank all the volunteers, interns, and National Park Service biologists who have field tested the protocol and data sheets – the Cascades Butterfly Project has been, and remains, a group effort. Dr. John McLaughlin developed the initial butterfly data sheets and standard operating procedures; every field surveyor has provided valuable suggestions on format of data sheets or details that should be included on the instructions. Melanie Weiss, Cathy Clark, Ayako Okuyama-Donofree, Mike Donofree, Elena Bianco, Rob Slater , Irene Perry, and Mark Perry have volunteered with the Cascades Butterfly Program from the first year or two and have provided valuable expertise on field methods and butterfly identification and some wonderful photos. Tanner Humphries, Michelle Toshack, Ana Casillas Brownson, and Jedediah Tressler have edited data sheets and field methods and provided thoughtful suggestions that have markedly improved our program. Natalya Antonova has developed all the maps in the document and provided instruction on field mapping of survey routes. Finally, Lise Grace has provided all the finishing touches on this report and the Cascades Butterfly Protocol: she has not only formatted and edited the reports but has been a sounding board and advisor on all written documents.

List of Terms

Citizen Scientist: a member of the public who volunteers to collaborate with scientists to collect scientific data following a prescribed methodology.

Date of (butterfly) emergence: the date of emergence is the date on which a butterfly pupa emerges from its chrysalis.

Date of (butterfly) first observation: first date when butterflies are documented along our survey route. Our goal is to document date of emergence, but depending on our ability to access the site (i.e., snow, staffing, road or trail conditions), our date of first observation may be later than the actual emergence date.

Observer: the person walking the route who is responsible for sighting butterflies that will be recorded as part of the survey. Often this person is the primary person responsible for identifying butterflies, but others participating in the survey can also assist.

Peak Abundance: the date when the highest total number of butterflies or highest number of one species is documented along a survey route.

Phenology: the study the timing of periodic plant or animal life cycle events such as flowering, seed set, hibernation, butterfly metamorphosis, breeding times. The timing of many of these life cycle events is triggered by climate and three abiotic factors that influence climate: sunlight, precipitation, and temperature.

Phenophase: a stage in a life cycle that can be observed and monitored. In the CBP, we monitor four phenophases in plants: **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit).For butterflies, we only monitor the adult phenophase.

Recorder: the person responsible for recording observations on data sheets, during the survey.

Route: an entire monitoring transect from beginning to end. In the CBP there are 10 survey routes, each is 1km in length and divided into five 200 m sections labeled as A, B, C, D, and E. The 10 survey routes are: Cascade Pass (CP), Easy Pass (EP), Maple Pass (MP), Sauk Mountain (SM), Skyline Divide (SD), Mazama Ridge (MR), Naches Loop (NL), Spray Park (SP), Sunrise Rim (SR); Skyscraper Mountain (SS).

Site: An area of interest for monitoring that contains one or more routes. In the CBP, we have four sites: Mount Rainier National Park (MORA), North Cascades National Park (NOCA), Mount Baker-Snoqualmie National Forest (MBS), and Okanogan-Wenatchee National Forest (OWNF). Each site contains multiple routes.

Univoltine: a butterfly, or other species, that produces one brood of offspring per year.

VIP: National Park Service acronym for Volunteer in the Park

Introduction

The Cascades Butterfly Project was initiated in 2011 as a long-term monitoring program to document effects of climate change on pollinators and plants in subalpine ecosystems of the Cascade Mountains in Washington State. Our mission is to engage Citizen Scientists in the collection of quantitative data on the abundance and distribution of subalpine butterflies and plant phenology and to provide these data to inform and guide the protection of national parks and forests in the Cascade Range of Washington. This report is a companion document to "The Cascades Butterfly Monitoring Project: A Protocol for Monitoring Subalpine Butterflies and Plant Phenology in the Cascade Mountains of Washington" (Rochefort and McLaughlin 2017). The Protocol document provides an overview of the Cascades Butterfly Project (CBP) and this report contains route descriptions, data forms, and survey directions or standard operating procedures (SOPs) that may require revisions more frequently than the Protocol. Current survey route locations should not have annual changes, but data sheets have been developed for each route with preprinted species lists based on frequently seen butterflies and focal plant species and these may change with time. Our goal was to make data recording on surveys easy with preprinted species lists, but each year we have noticed different butterfly species and plant survey methods are still being revised at this time – both of which may result in annual revisions. It is our hope that with time more survey routes may be added to this project in low elevation habitats as well as subalpine areas.

Survey Routes

Ten butterfly survey routes located in North Cascades National Park (NOCA), Mount Baker-Snoqualmie National Forest (MBS), Okanogan-Wenatchee National Forest (OWNF), and Mount Rainier National Park (MORA) (Figure 1, Table 1, Appendix A, B). Each survey route is 1km in length and is subdivided into five 200m sections: A, B, C, D, and E (Figure 2). Butterfly abundances are monitored using the Pollard Walk Method (Pollard 1977, Pollard and Yates 1993). Monitoring surveys are conducted at least weekly during the summer; summer begins as soon as our routes are accessible (following snow melt) and continues until cold temperatures limit butterfly activity. Generally, our surveys have been conducted from mid-June until mid-September, but with climate warming this season may be expanded. Butterflies are tallied and plant phenophases recorded by survey route segment. Butterflies are always surveyed in the same direction on the survey route: segment A then B then C then D then E (SOP 1). Plant phenophase can be surveyed in either direction; it will depend on the number of people conducting the survey and the number of butterflies observed as to whether both surveys can be completed in one passing of the route (SOP 2).

Butterfly data is entered into an on-line database hosted on the PollardBase site (www.pollardbase.org) accessible to citizen scientists. This database is the product of collaboration between Dr. Leslie Ries, Georgetown University, and Kelly Lotts and Thomas Naberhaus of Butterflies of North America (SOP 3). At this time, we have documented 51 butterfly species during our surveys (Table 2). Plant phenology data is currently entered by National Park Service (NPS) employees into Excel workbooks; in the future these data may also be entered in the PollardBase database (see Table 3 for a list of plants species surveyed by route).

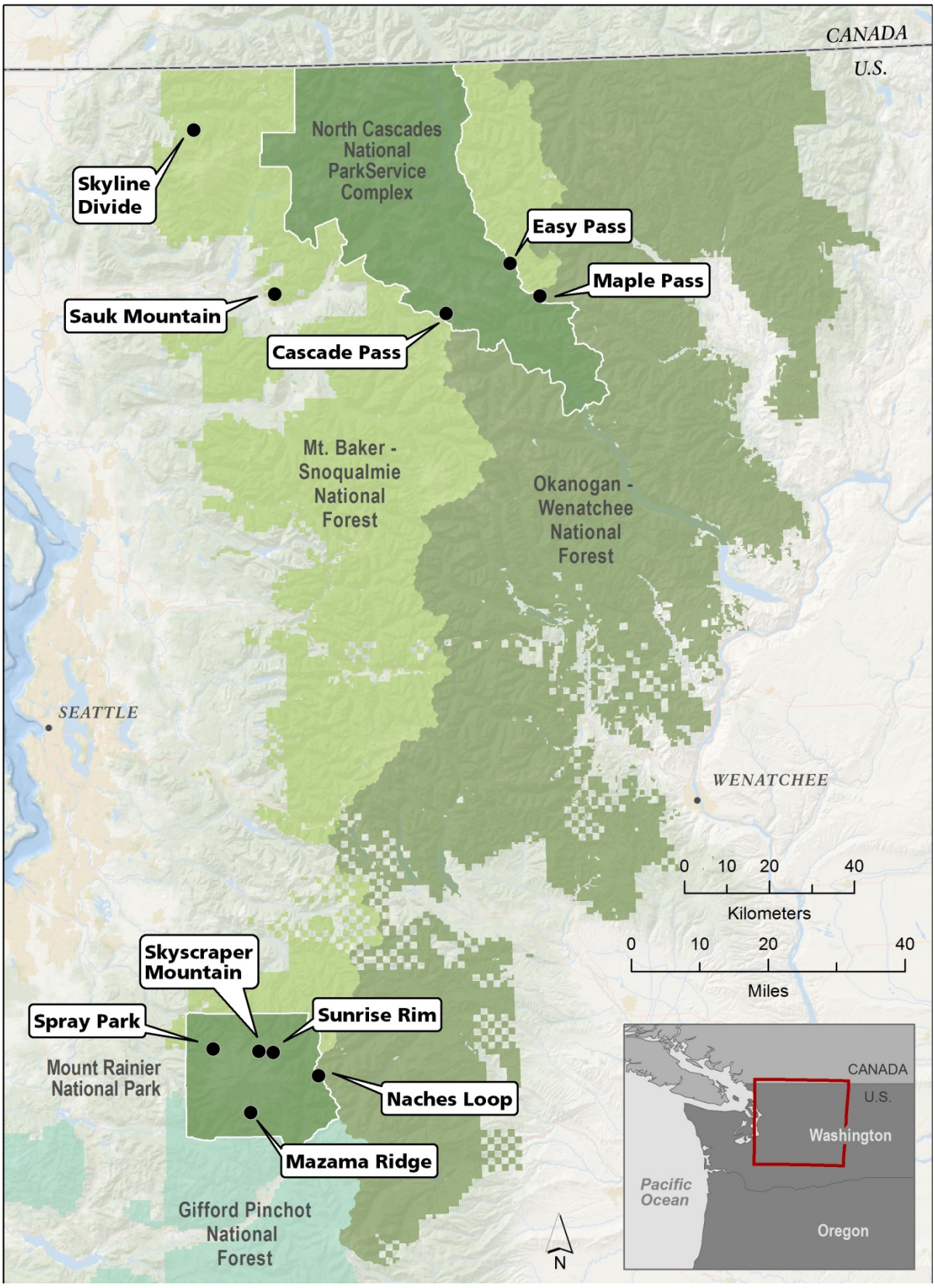


Figure 1. Locations of 10 Cascade Butterfly project survey routes.

Table 1. Distance to survey routes and elevation gain along survey route.

Location	Trailhead	Distance to Start, km (mile)	Elevation at Start, m (ft)	Elevation Gain on Survey Route, m (ft)
Mount Baker-Snoqualmie National Forest				
Sauk Mountain	Sauk Mountain	2.9 (1.8)	1585 (5,200)	260 (853)
Skyline Divide	Skyline Divide	3.9 (2.4)	1,798 (5,900)	767 (2,516)
Mount Rainier National Park				
Skyscraper Mountain	Sunrise	3.0 (3.7)	2,063 (6,770)	112 (370)
Sunrise Rim	Sunrise	0.2 (0.1)	1,934 (6,343)	30 (98)
Naches Loop	Tipsoo Lake	0.6 (0.4)	1,615 (5,300)	183 (600)
Mazama Ridge	4th Crossing	1.1 (0.7)	1,765 (5,790)	360 (1,180)
Spray Park	Mowich Lake Campground	4.8 (3.0)	1,768 (5,800)	488 (1,600)
North Cascades National Park				
Cascade Pass	Cascade Pass	6.0 (3.7)	1,665 (5,461)	530 (1,740)
Easy Pass	Easy Pass	5.6 (3.5)	1,970 (6,500)	850 (2,800)
Okanogan-Wenatchee National Forest				
Maple Pass	Rainy Pass	5.6 (3.5)	1,940 (6,360)	550 (1,800)



Figure 2. Section marker placed in the trail tread to indicate beginning of each section.

Table 2. Butterflies documented on each survey route.

Species	Common Name	NOCA[1]		OW[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SS[2]	SP[2]	SR[2]
Hesperiidae											
Carterocephalus palaemon	Arctic Skipper		x								
Erynnis persius	Persius Duskywing						x				
Hesperia comma	Common Branded Skipper		x	x							
Hesperiidae sp	Unidentified Skipper	x	x	x	x	x					
Ochlodes sylvanoides	Woodland Skipper				x			x			
Lycaenidae											
Agriades glandon	Arctic Blue		x		x				x		
Callophrys augustinus	Brown Elfin				x						
Callophrys mossii	Moss' Elfin				x						
Celastrina echo	Echo Blue						x				
Glaucopsyche lygdamus	Silvery Blue	x	x	x	x	x	x	x	x	x	x
Lycaena helloides	Purplish Copper	x	x	x	x	x		x			
Lycaena heteronea	Blue Copper		x						x		
Lycaena mariposa	Mariposa Copper	x	x	x	x	x	x	x	x	x	x
Lycaeninae sp.	Unidentified Copper	x	x		x	x	x	x	x	x	x
Plebejus acmon	Acmon Blue										x
Plebejus anna	Anna's Blue	x	x	x	x	x	x	x	x	x	x
Plebejus icarioides	Boisduval's (Common) Blue	x	x	x	x	x	x	x	x	x	x
Plebejus lupini	Lupine Blue		x			x		x	x		
Plebejus saepiolus	Greenish Blue						x				

[1] Site abbreviations are: NOCA = North Cascades National Park, MBS= Mount baker-Snoqualmie National Forest, OWN = Okanogan-Wenatchee Nation Forest, MORA = Mount Rainier National Park

[2] Route abbreviations are: CP = Cascade Pass, EP = Easy Pass, MP = Maple Pass, SM = Sauk Mountain, SD = Skyline Divide, MR = Mazama Ridge, NL = Naches Loop, SP = Spray Park, SR = Sunrise Rim; SS = Skyscraper Mountain

Table 2 (continued). Butterflies documented on each survey route.

Species	Common Name	NOCA[1]		OW[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SS[2]	SP[2]	SR[2]
Polyommatinatinae sp.	Unidentified Blue	x	x	x	x	x	x	x	x	x	x
Strymon melinus	Gray Hairstreak						x				
Theclinae sp.	Unidentified Hairstreak/Elfin				x						
Nymphalidae											
Aglais milberti	Milbert's Tortoiseshell	x	x	x	x	x		x	x	x	x
Boloria chariclea	Arctic Fritillary	x	x	x		x	x	x	x	x	x
Boloria epithore	Western Meadow Fritillary	x	x	x	x	x	x	x	x		
Boloria sp.	Unidentified Lesser Fritillary	x	x	x	x		x	x	x	x	x
Chlosyne palla	Northern Checkerspot			x							
Erebia epipsodea	Common Alpine		x								
Erebia vidleri	Vidler's Alpine	x	x	x	x	x					
Euphydryas colon/anicia	Snowberry or Anicia Checkerspot	x	x	x		x		x	x		x
Euphydryas editha	Edith's Checkerspot	x	x	x			x	x	x	x	x
Euphydryas sp.	Unidentified Euphydryas checkerspot	x	x	x	x	x		x	x		x
Euphydryas/Chlosyne sp	Unidentified Checkerspot	x	x	x	x	x	x	x	x		x
Heliconinae sp.	Unidentified Fritillary	x	x	x	x	x	x	x	x	x	x
Limenitis lorquini	Lorquin's Admiral	x		x	x						
Nymphalis antiopa	Mourning Cloak			x			x			x	
Oeneis chryxus	Chryxus Arctic		x								
Oeneis nevadensis	Great Arctic							x			
Phyciodes mylitta	Mylitta Crescent				x						
Phyciodes pulchella	Field Crescent								x		x

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Table 2 (continued). Butterflies documented on each survey route.

Species	Common Name	NOCA[1]		OW[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SS[2]	SP[2]	SR[2]
Polygonia faunus	Green Comma	x						x			
Polygonia gracilis	Hoary Comma	x	x	x	x	x	x	x	x	x	x
Polygonia satyrus	Satyr Comma	x	x	x	x		x		x	x	x
Polygonia sp.	Unidentified Comma	x	x		x	x	x	x		x	
Speyeria coronis	Coronis Fritillary							x			
Speyeria hydaspe	Hydaspe Fritillary	x	x	x	x	x	x	x			x
Speyeria mormonia	Mormon Fritillary	x	x	x	x	x	x	x	x	x	x
Speyeria sp.	Unidentified Greater Fritillary	x	x	x	x	x	x	x	x	x	x
Vanessa atalanta	Red Admiral	x	x								
Vanessa cardui	Painted Lady					x					
Vanessa sp.	Unidentified Lady		x			x	x	x			
Papilionidae											
Papilio eurymedon	Pale Swallowtail		x		x						
Papilio indra	Indra Swallowtail			x							
Papilio zelicaon	Anise Swallowtail		x	x	x	x	x	x	x	x	x
Papilioninae sp.	Unidentified Swallowtail		x	x	x	x	x	x	x	x	x
Parnassius clodius	Clodius Parnassian	x	x	x	x	x		x	x		
Parnassius smintheus	Mountain Parnassian		x	x	x			x			
Parnassius sp.	Unidentified Parnassian				x		x	x			
Pieridae											
Anthocharis sara	Sara's Orangetip		x	x	x						x
Coliadinae sp.	Unidentified Sulphur			x			x		x	x	

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Table 2 (continued). Butterflies documented on each survey route.

Species	Common Name	NOCA[1]		OW[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SS[2]	SP[2]	SR[2]
Colias eurytheme	Orange Sulphur		x	x							
Colias philodice	Clouded Sulphur		x	x			x		x		x
Neophasia menapia	Pine White	x			x	x					
Pierinae sp.	Unidentified White	x	x	x	x	x	x	x	x	x	x
Pieris marginalis	Margined White	x			x	x					
Pieris rapae	Cabbage White										x
Pontia occidentalis	Western White	x	x	x	x	x			x	x	
Butterfly *sp.*	Unidentified Butterfly	x	x	x	x	x	x	x	x	x	x

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Table 3. Plant species surveyed at each site.

Scientific Name	Common Name	NOCA[1]		OWN[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SP[2]	SR[2]	SS[2]
Achillea millefolium	Yarrow		X	X	X	X				X	X
Anaphalis margaritacea	Pearly Everlasting	X	X		X			X			
Anemone occidentalis	Western Anemone		X	X			X	X		X	X
Antennaria media	Rocky Mountain Pussytoes		X	X	X						
Arnica latifolia	Mountain Arnica	X	X	X	X	X	X	X		X	
Bistorta bistortoides	American Bistort	X	X		X	X	X	X	X	X	X
Cassiope mertensiana	White Heather	X		X		X	X		X		X
Castilleja hispida	Harsh Indian Paintbrush	X	X	X	X					X	
Castilleja parviflora var. *albida*	White Indian Paintbrush	X	X	X		X					
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						X	X	X	X	X
Cirsium edule	Edible Thistle	X	X		X						
Erigeron peregrinus	Subalpine Daisy	X	X	X	X	X	X	X	X	X	X
Eriogonum pyrolifolium	Alpine Buckwheat					X					
Erythronium grandiflorum	Glacier Lily	X	X	X	X	X					
Erythronium montanum	Avalanche Lily						X	X	X		
Eucephalus ledophyllus	Cascade Aster		X		X		X	X		X	
Gentiana calycosa	Mountain Bog Gentian		X	X			X		X		X
Heracleum maximum	Cow Parsnip	X	X		X						
Ligusticum grayi	Gray's Lovage			X			X	X		X	
Lilium columbianum	Tiger Lily				X						
Lomatium dissectum	Fern-leaved Desert Parsely		X	X	X						
Lomatium martindalei	Cascade Desert Parsley				X	X					

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Table 3 (continued). Plant species surveyed at each site.

Scientific Name	Common Name	NOCA[1]		OWN[1]	MBS[1]		MORA[1]				
		CP[2]	EP[2]	MP[2]	SM[2]	SD[2]	MR[2]	NL[2]	SP[2]	SR[2]	SS[2]
Luetkea pectinata	Partridgefoot	X	X	X		X					
Lupinus latifolius	Broadleaf Lupine	X	X	X	X	X	X	X	X	X	X
Lupinus lepidus	Pacific Lupine										X
Oreostemma alpigenum	Alpine Aster						X		X		X
Pedicularis bracteosa	Bracted Lousewort	X	X	X	X	X	X	X	X	X	X
Pedicularis rainierensis	Mt. Rainier Lousewort						X		X		X
Penstemon serrulatus	Coast Penstemon	X			X					X	
Penstemon procerus	Small-flowered Penstemon	X	X	X		X					X
Phlox diffusa	Phlox	X	X	X	X	X	X	X		X	X
Phyllodoce empetriformes	Pink Heather	X	X	X		X	X	X	X	X	X
Polemonium pulcherrimum	Jacob's Ladder	X						X		X	
Potentilla flabellifolia	High Mountain Cinquefoil	X	X	X		X	X	X	X	X	X
Rhododendron albiflorum	White Rhododendron		X					X			
Sedum divergens	Pacific stonecrop				X						
Sedum oreganum	Oregon Stonecrop		X	X							
Spiraea densiflora	Mountain Spirea	X	X					X			
Vaccinium deliciosum	Cascade Huckleberry	X	X	X	X	X	X	X	X	X	X
Valeriana sitchensis	Sitka Valerian	X	X	X	X	X	X	X		X	
Veratrum viride	False Hellebore	X	X		X	X	X	X		X	
Veronica cusickii	Cusick's Speedwell	X	X	X			X	X	X	X	X
Viola sempervirens	Yellow Violet				X						

[1] Site abbreviations are: NOCA = North Cascades National Park, MBS= Mount baker-Snoqualmie National Forest, OWN = Okanogan-Wenatchee Nation Forest, MORA = Mount Rainier National Park

[2] Route abbreviations are: CP = Cascade Pass, EP = Easy Pass, MP = Maple Pass, SM = Sauk Mountain, SD = Skyline Divide, MR = Mazama Ridge, NL = Naches Loop, SP = Spray Park, SR = Sunrise Rim; SS = Skyscraper Mountain

Mount Baker- Snoqualmie National Forest

Sauk Mountain Route (SAMO)

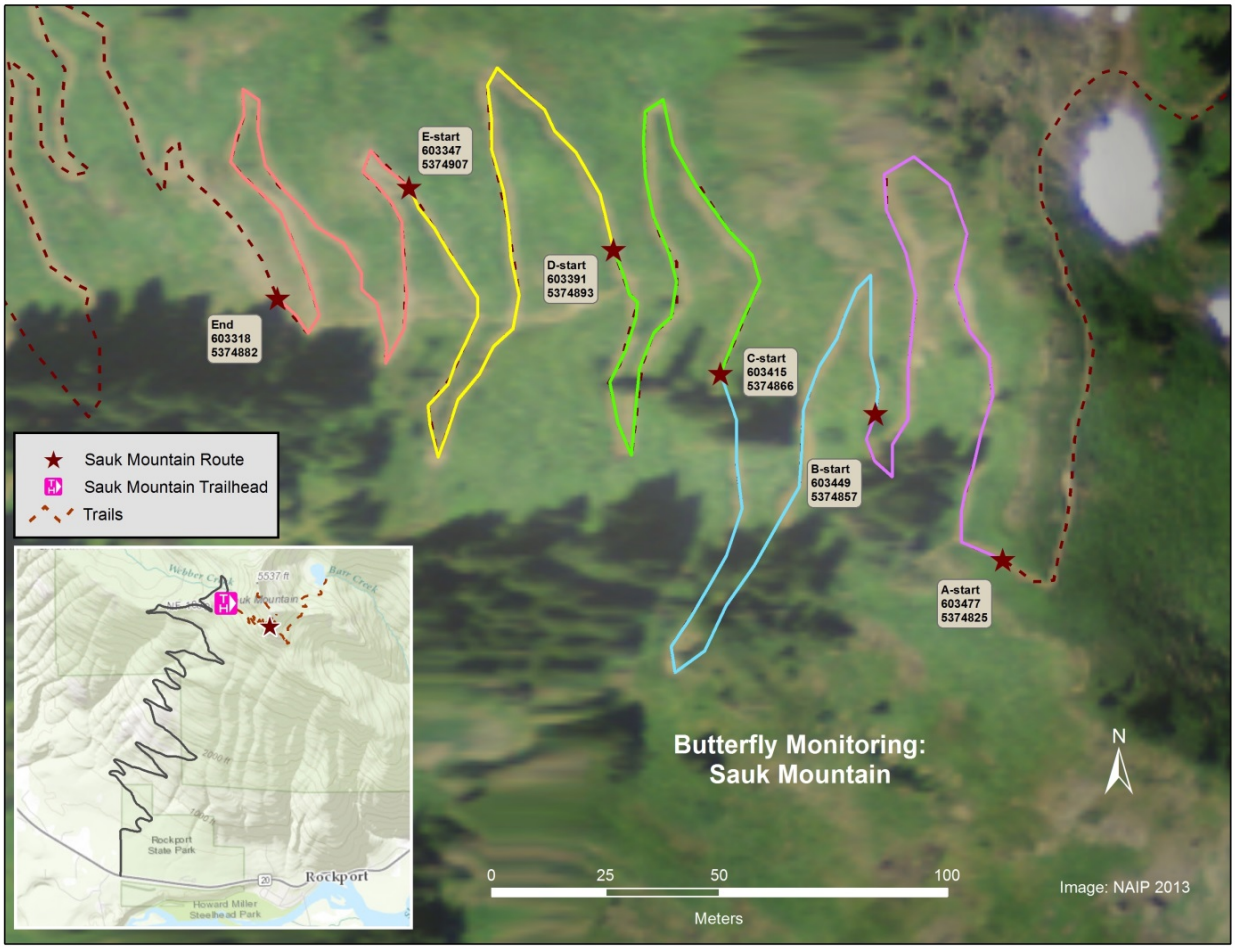


Figure 3. Sauk Mountain Route map illustrating segment locations.

The Sauk Mountain Route is located on the Sauk Mountain Trail in Concrete, WA (Figure 3). The trail is located on the western side of Sauk and is generally the first route to melt out each spring. Surveys have been conducted since 2011, 26 butterflies species documented (only Easy Pass has more with 27), and the highest total counts and daily counts of all ten routes. In 2015, 361 butterflies were documented on July 7 and 358 on July 15. In 2014, 330 butterflies were documented on August 19 (Figure 4). The five most abundance butterflies are Anna's Blues, Clodius Parnassian, Mormon Fritillary, Western Meadow Fritillary, and Sarah's Orangetip. Twenty-three plant species are currently being monitored.

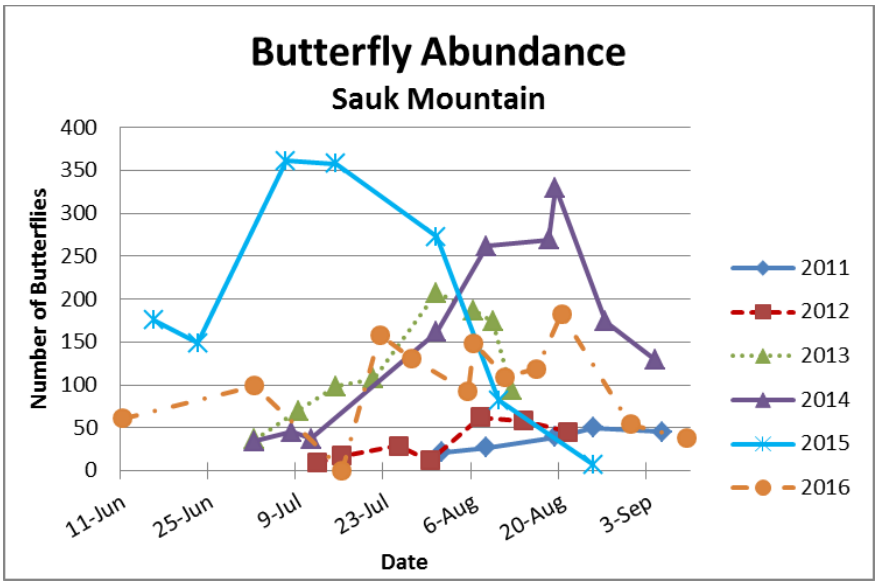


Figure 4. Butterfly abundance documented at Sauk Mountain, 2011-2016.

The Sauk Mountain Trail is located on the Sauk Mountain Road (Forest Service Road 1030) which is about 36 miles east of I-5 off of SR20. Sauk Mountain Road is just before Rockport State Park on your left. Then travel 7.9 miles up a dirt road to the parking lot; you do not need any parking pass for this site. It is the closest route in the northern Cascades to a road and is just a moderate hike (1.8 miles) from the parking lot. The butterfly survey starts at the saddle and continues downhill so, you can conduct the plant phenology survey as you walk up to the saddle and this will make the journey up the switchbacks (about 25) a little easier.

The entire route is in a subalpine meadow with just small portions of sections A, B, and C passing through trees. Photos of each section beginning may help if markers are removed and are shown below (Figure 5)



Figure 5. Section A (top left), B (top right), C (bottom left), and D (bottom right) starting points. People in photos are using American sign language to indicate the section.



Figure 5 (continued). Section E (left), and Route End (right).

Mount Baker- Snoqualmie National Forest

Skyline Divide

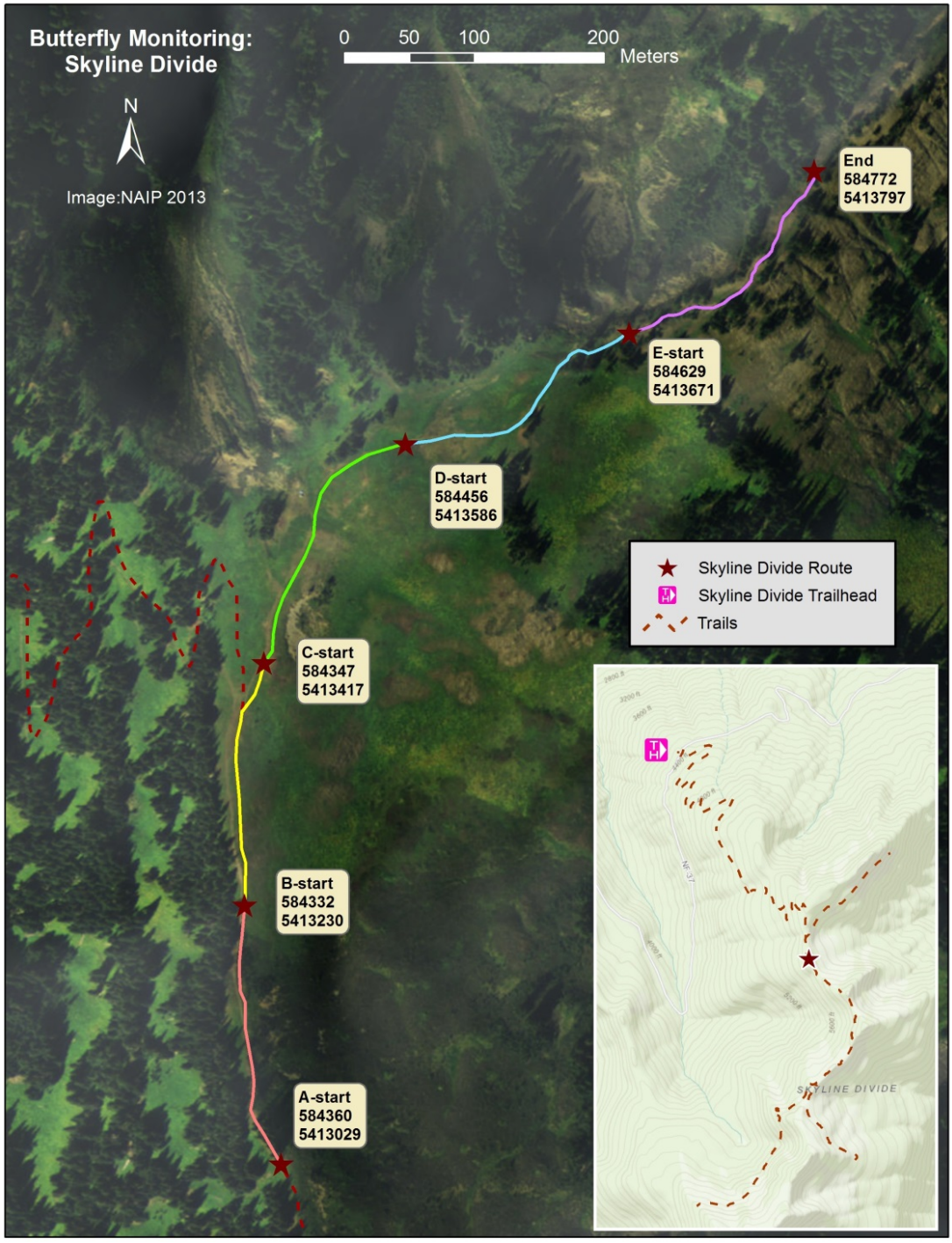


Figure 6. Skyline Divide map illustrating segment locations.

The Skyline Divide Route is another long drive up gravel Forest Service Road, but the views of Mount Baker are reminiscent of views of Mount Rainier on the Spray Park or Naches Loop Routes.

The route has been surveyed since 2012, 19 butterfly species have been documented and high butterfly counts of 125 were recorded on July 15, 2015 and 106 on August 23, 2014 (Figure 7). The five most frequently documented butterflies are Mormon Fritillary, Anna's Blue, Arctic Fritillary, Hydaspe Fritillary, and Anise Swallowtail.

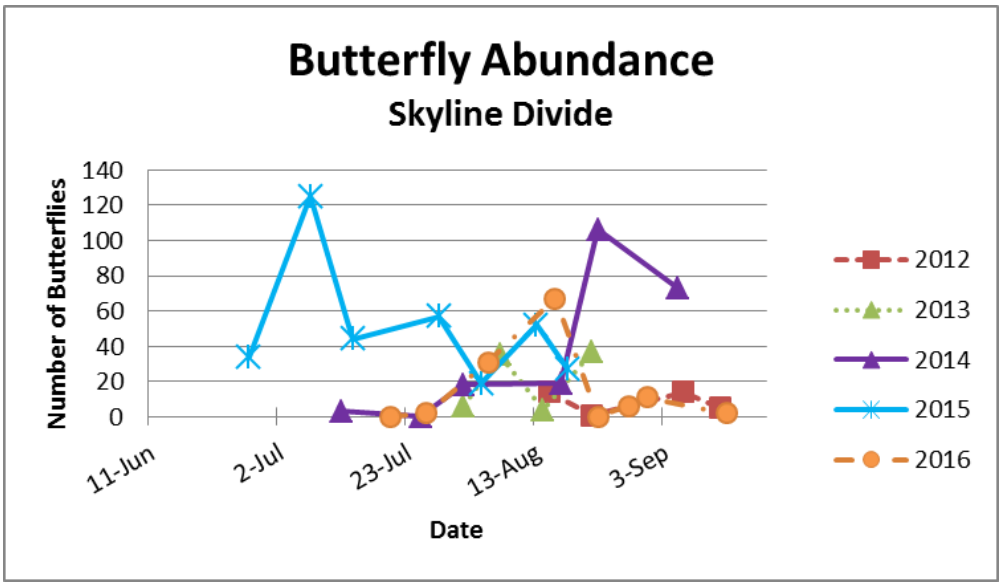


Figure 7. Butterfly abundance documented at Skyline Divide, 2012-2016.

The route is accessed from Forest Service Road 37 which is located about 35 miles east of Bellingham on State Route 542. Forest Service Road 37 is a 12.8 mile gravel road and then you hike about 2 miles and 1.600' in elevation through a Silver Fir Forest. When you break out into the meadow, you will be in section B so turn right to find the beginning of the route (Figures 6, 8). This route is more a south to north direction rather the up or down in elevation.



Figure 8. Segment A (top left), B (top right), C (bottom left), and D (bottom right) starting points on Skyline Divide.



Figure 8 (continued). Segment E (left) starting points and the End (right) on Skyline Divide.

North Cascades National Park

Cascade Pass

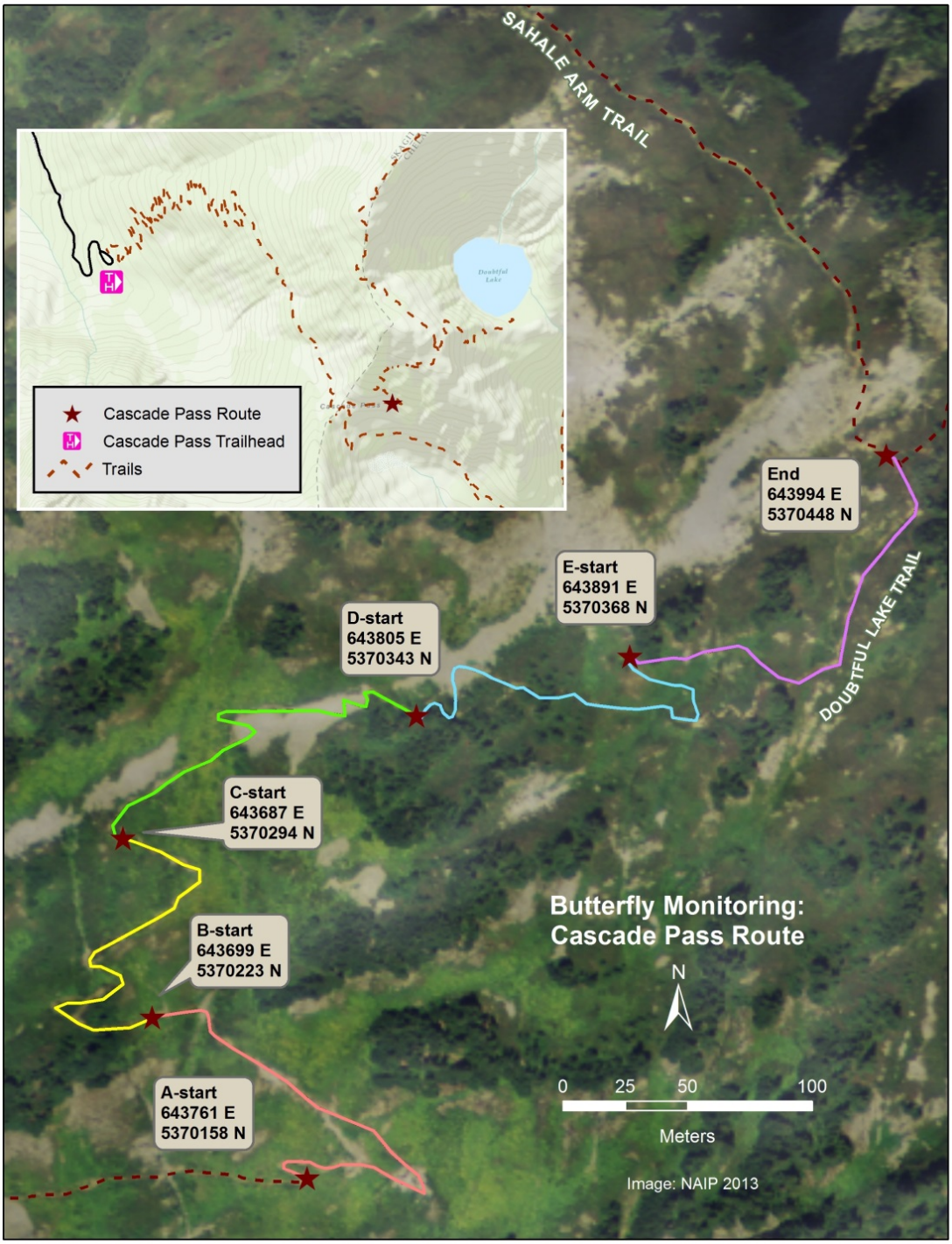


Figure 9. Cascade Pass Route map illustrating segment locations.

The Cascade Pass Route is located along the switchbacks above Cascade Pass was on the route to Sahale Arm and established in 2012 (Figure 9). In 2015 and 2016, the park trail crew improved the tread and grade of the switchbacks requiring a slight relocation of the trail. In 2016, the Butterfly Route was relocated along the switchbacks and the direction was changed so that section A is at the lowest elevation and butterfly surveys are conducted going uphill Butterfly surveys have document 22 species at Cascade Pass with counts above 100 in July of 2015 and August of 2016 (Figure 10). The most frequently seen species are Mormon Fritillary, Mariposa Copper, Arctic Fritillary, Anicia Checkerspot, and Anna's Blue (Figure 11).

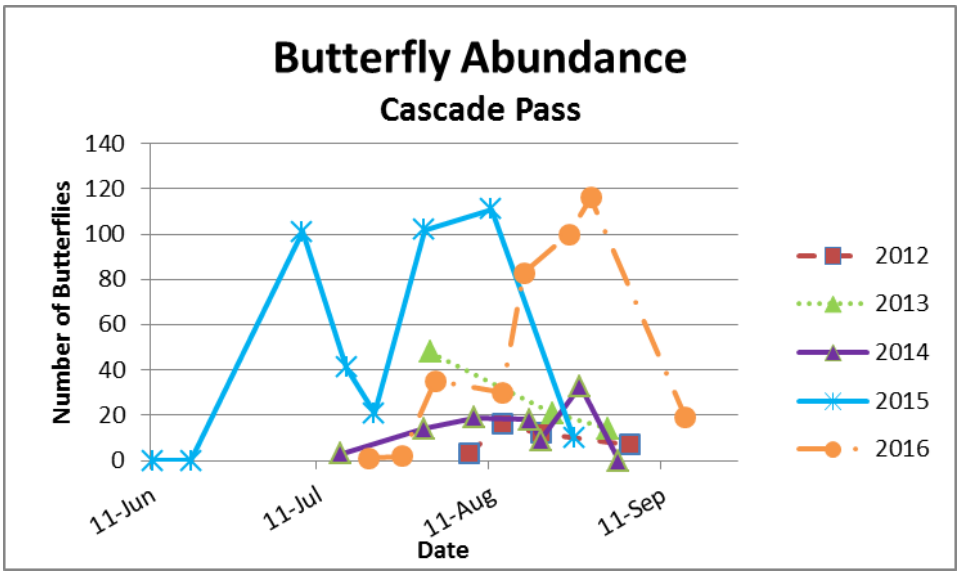


Figure 10. Butterfly abundance documented at Cascade Pass, , 2012-2016.



Figure 11. Broadleaf Lupine (*Lupinus latifolius*) (left) and Arctic Fritillary (*Boloria chariclea*).

Access to the survey route is via the Cascade Pass Trailhead at the end of the Cascade River Road. The Cascade River Road is a 23 mile predominantly gravel road that spurs off of SR 20 in Marblemount. The parking lot at the end of the road is at about 3,600’ in elevation; the road takes about an hour to drive. After about a 4 mile and 1,800’ climb through the forest to Cascade Pass, you are almost at the base of the route to Sahale Arm and the Doubtful Lake Trail. The butterfly survey is conducted going up the switchbacks and it is often easiest to do the plant surveys on the way down (Figure 12).



Figure 12. The beginning of section A (top) and section B (bottom).



Figure 12 (continued). The beginning of section C (top) and section D (bottom).





Figure 12 (continued). The beginning of section E (top) and the End of the route, just beyond the turnoff to Doubtful Lake (bottom).

North Cascades National Park

Easy Pass

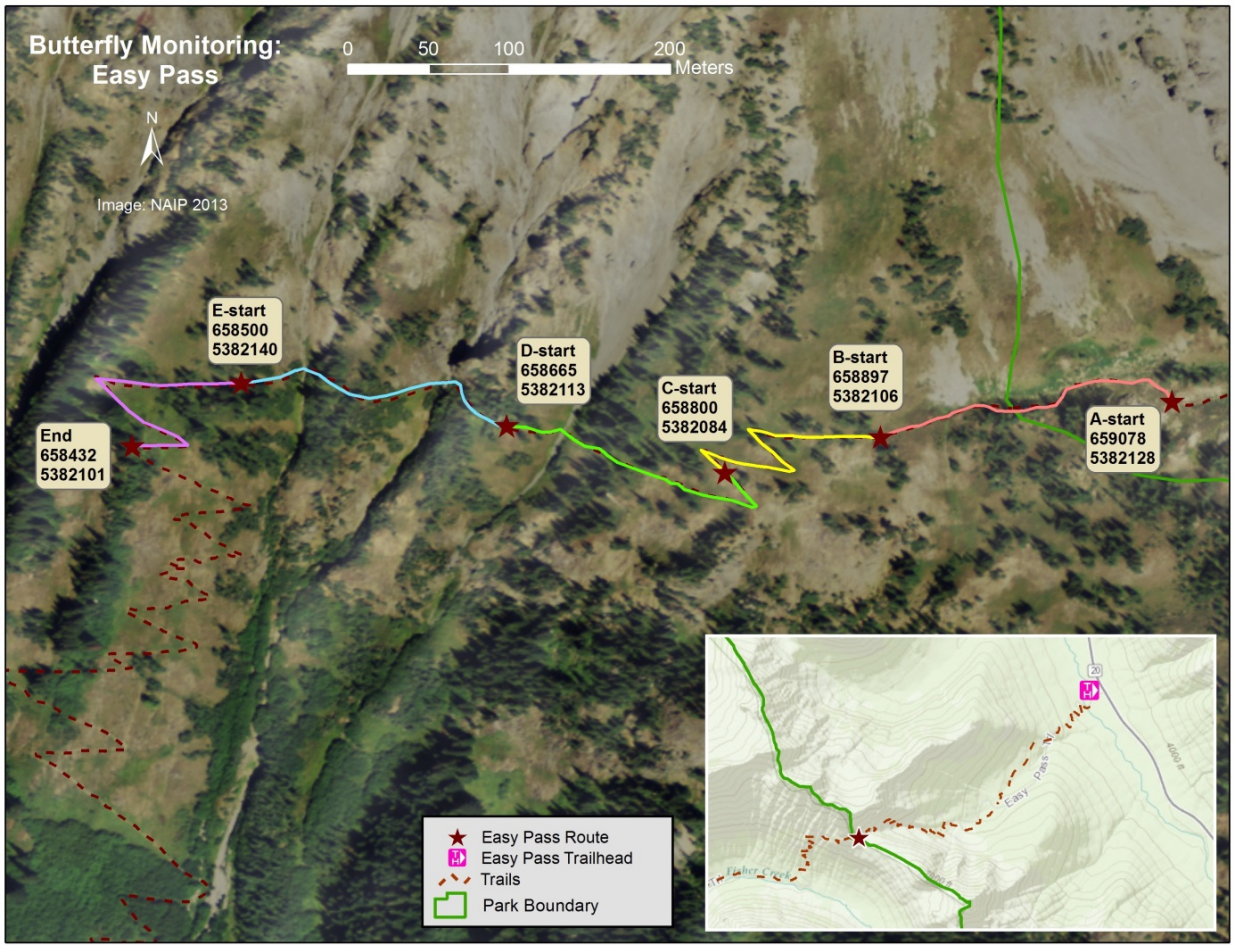


Figure 13. Map of Easy Pass survey route illustrating section locations.

The Easy Pass route was established in 2011 and has the highest butterfly diversity recorded (31 species). The highest butterfly count was recorded on July 14, 2015 (169); high counts in other years ranged from 93 – 118 in the last week of July to first week of August (Figures 13, 14). The top five butterfly species observed were: Anna's Blue, Arctic Fritillary, Boisduval's Blue, Mariposa Copper, and Mormon Fritillary. The route traverses heath shrub and lush herbaceous communities which has resulted in a long list of species (26) for plant phenology surveys.

This is the most arduous North Cascades route to access, but the views and butterfly diversity are worth the effort. The Easy Pass Trailhead is located on a short spur road between mileposts 151 and 152 on SR 20 (about 45 miles east of Marblemount). The trailhead is at 3,700' elevation and the trail to the Pass is about 3.5 miles and almost 3,000' up in elevation across talus slopes. The Cascades Butterfly Route starts just after the National Park boundary sign and descends a series of switchbacks (Figure 15).

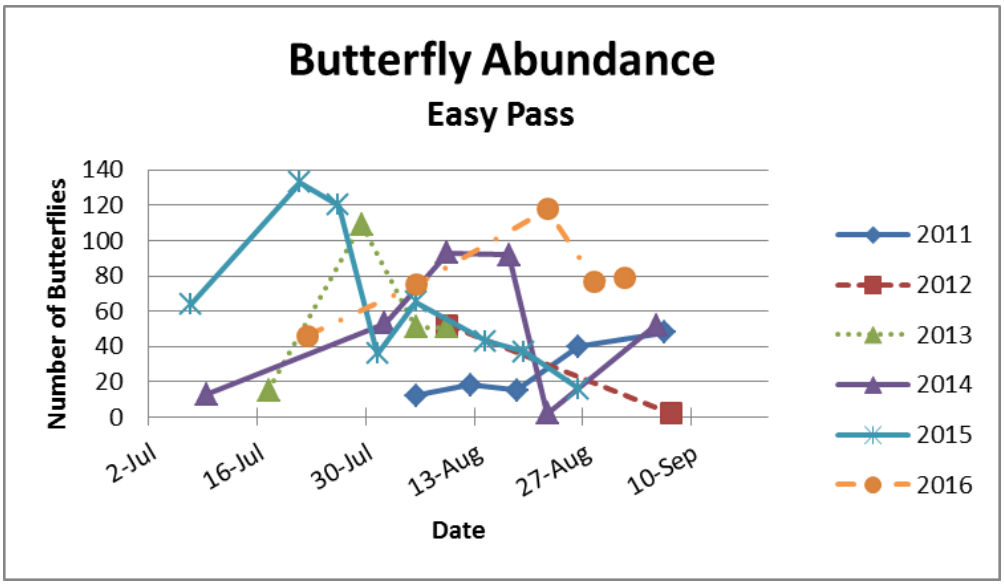


Figure 14. Butterfly abundance, by week, recorded at Easy Pass, 2011-2016.



Figure 15. Section A (left) and B (right) starting points on the Easy Pass Butterfly Surevy Route.



Figure 15 (continued). Section C (top) and D (bottom) starts on the Easy Pass Survey Route.



Figure 15 (continued). Section E star (left) and the End of the Easy Pass Route (right) at the end of a switchback.

Okanogan-Wenatchee National Forest

Maple Pass

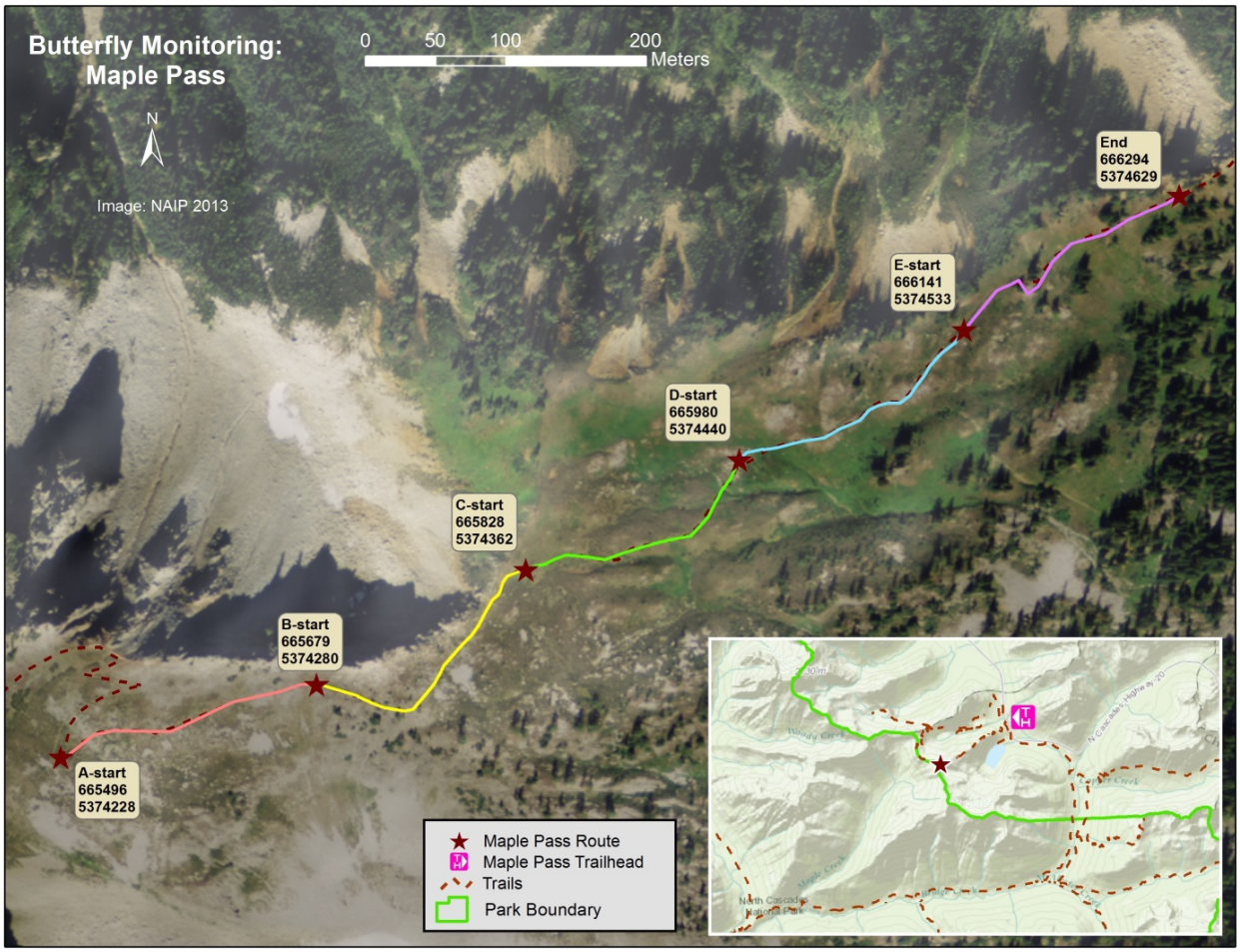


Figure 16. Map illustrating Maple Pass survey route and section locations

The Maple Pass survey route is in a beautiful subalpine meadow just east of the North Cascades boundary into Okanogan-Wenatchee National Forest. The route meanders through a subalpine meadow dotted with Whitebark Pine. Subalpine Fir, and Alpine Larch. Pink and white mountain heather, white and harsh Indian paintbrush, penstemons, and sedums add to the diverse understory. Although this route has had some of the lowest butterfly densities (high counts range from 20-39), butterfly diversity is the second highest – 27 species (between Easy Pass with 31 and Sauk Mountain with 26) (Figures 16, 17). The five most abundant butterflies are Arctic Fritillary, Anna's Blue, Milbert's Tortoiseshell, Western White, and Anicia Checkerspot. Twenty-three plants species are monitored for plant phenology.

Maple Pass is accessed from SR 20, about 51 miles east of Marblemount near milepost 158 and park in the Rainy Pass parking lot and head to Maple Pass. The Maple Pass trail has a loop at the top and if you have enough people to do the plant phenology and butterflies at the same time, you can do the

loop counter clockwise surveying butterflies as you descend. If time is too short to do the entire loop, do plants as you ascend and butterflies on your descent.

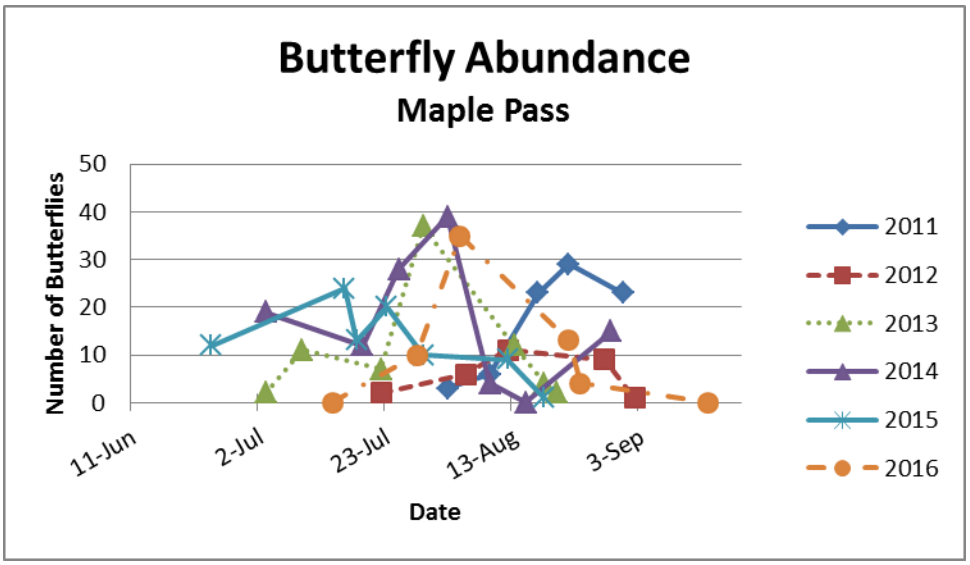


Figure 17. Butterfly abundance documented at Maple Pass, 2011-2016.

Mount Rainier National Park

Mazama Ridge

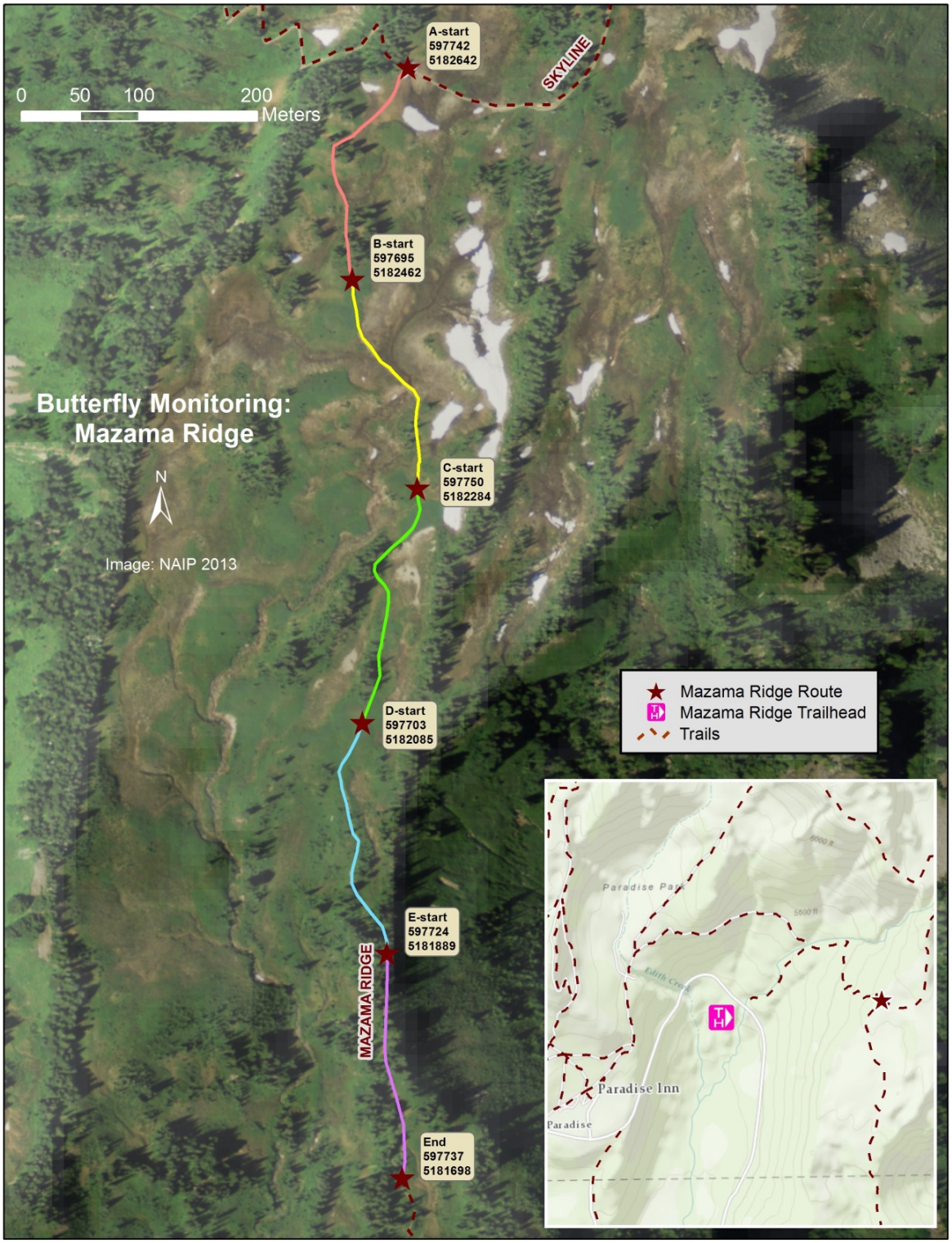


Figure 18. Map illustrating Mazama Ridge survey route and section locations.

The Mazama Ridge Survey Route was established in 2011 is located on the Skyline Trail starting at the junction with the Fourth Crossing and extending toward the Lakes Trail. Once you complete the climb up the Fourth Crossing switchbacks, the trail meanders along some gentle hills and low points which frequently hold snow during July (Figure 18). This route typically has very low butterfly abundances (<50), but high counts were recorded in July of 2015 (197 on July 2 and 242 on July 6) and August 2016 (87 of August 18) (Figure 19). The five most abundant butterflies observed are Arctic Fritillary, Silvery Blue, Anna's Blue, Mormon Fritillary, and Anise Swallowtail. Twenty-one plants are monitored along this route.

Access to this route is up the Fourth Crossing Trail (about 0.7 miles) and the best spot to park is along the Valley Road by the trailhead (Figure 20).

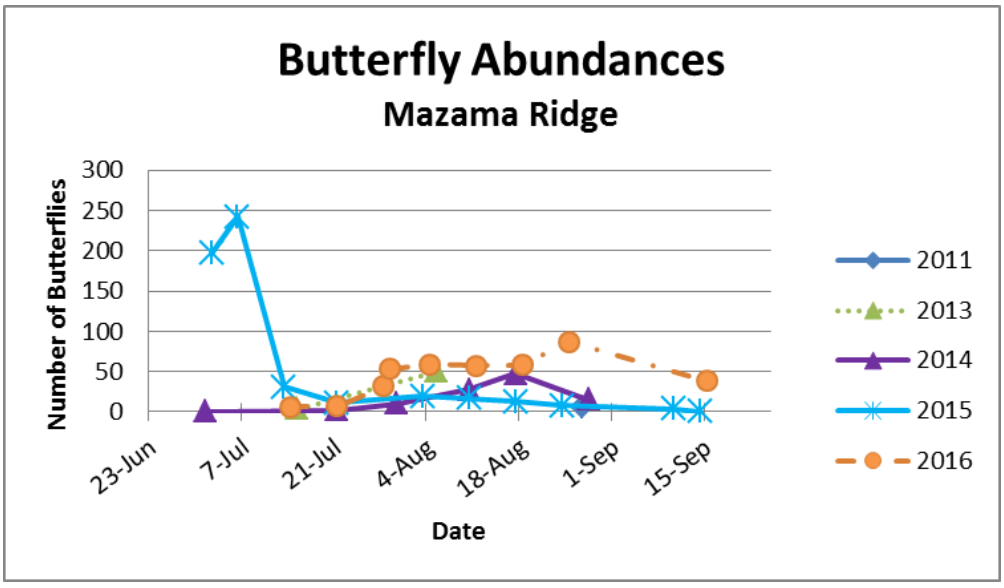


Figure 19. Butterfly abundances documented during surveys on Mazama Ridge, 2011-2016.



Figure 20. Photos of section starting points: top row: A (left), B (right); middle row: A (left), B (right), bottom row: E (left and route End (right) on the Mazama Ridge survey route.

Mount Rainier National Park

Naches Loop

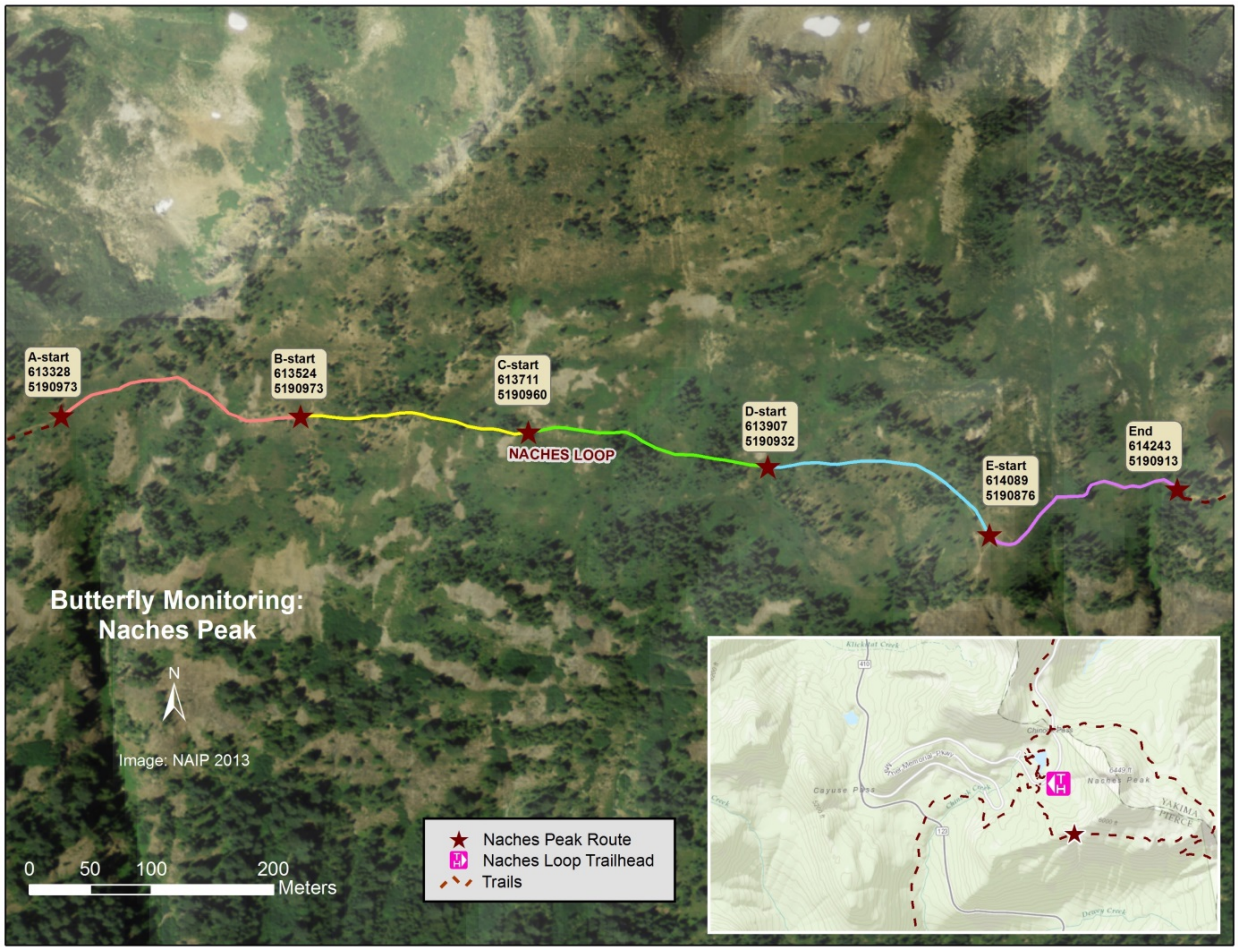


Figure 21. Map illustrating Naches Loop survey route and section locations.

The Naches Loop survey route was established in 2011 and has been referred to as both the Naches Peak and Naches Loop survey route. The survey route is on the southern portion of the Naches Peak Loop Trail; the trail is walked counterclockwise starting just 0.4 miles from the road. Parking is available at the Tipsoo Lake parking lot (Mount Rainier National Park) or from the Okanogan-Wenatchee National Forest parking lot on SR 123 just north of Chinook Pass (Figure 21). Both parking sites require a site pass (National Park or USFS). Butterfly abundances are generally less than 100 and peak annual abundances of 96 (July 8, 2015), 82 (July 1, 2015, and 59 (August 19, 2016) were documented during surveys. Anna's Blue, Silvery Blue, Boisduval's Blue, Mormon Fritillary, and Clodius Parnassian have been the five most abundant butterfly species recorded on this route (Figures 22, 23). Twenty-one plant species are being surveyed.

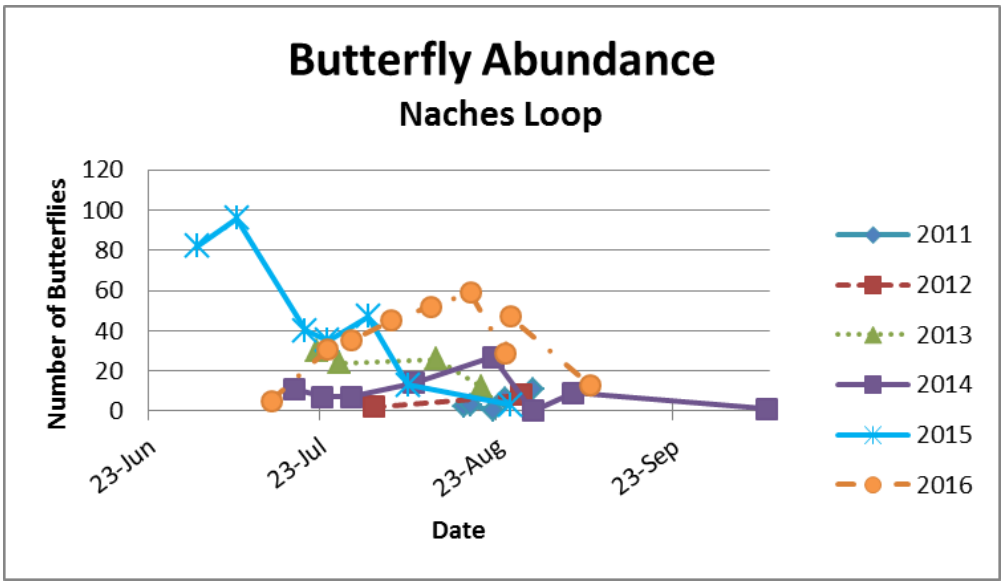


Figure 22. Butterfly abundance documented between 2011-2016 on the Naches Loop survey route.



Figure 23. Section starts along the Naches Loop survey route: top row: A (left), B (right); middle row: C (left, looking back), D (right looking back); bottom row: E (left) and End (right).

Mount Rainier National Park

Skyscraper Mountain

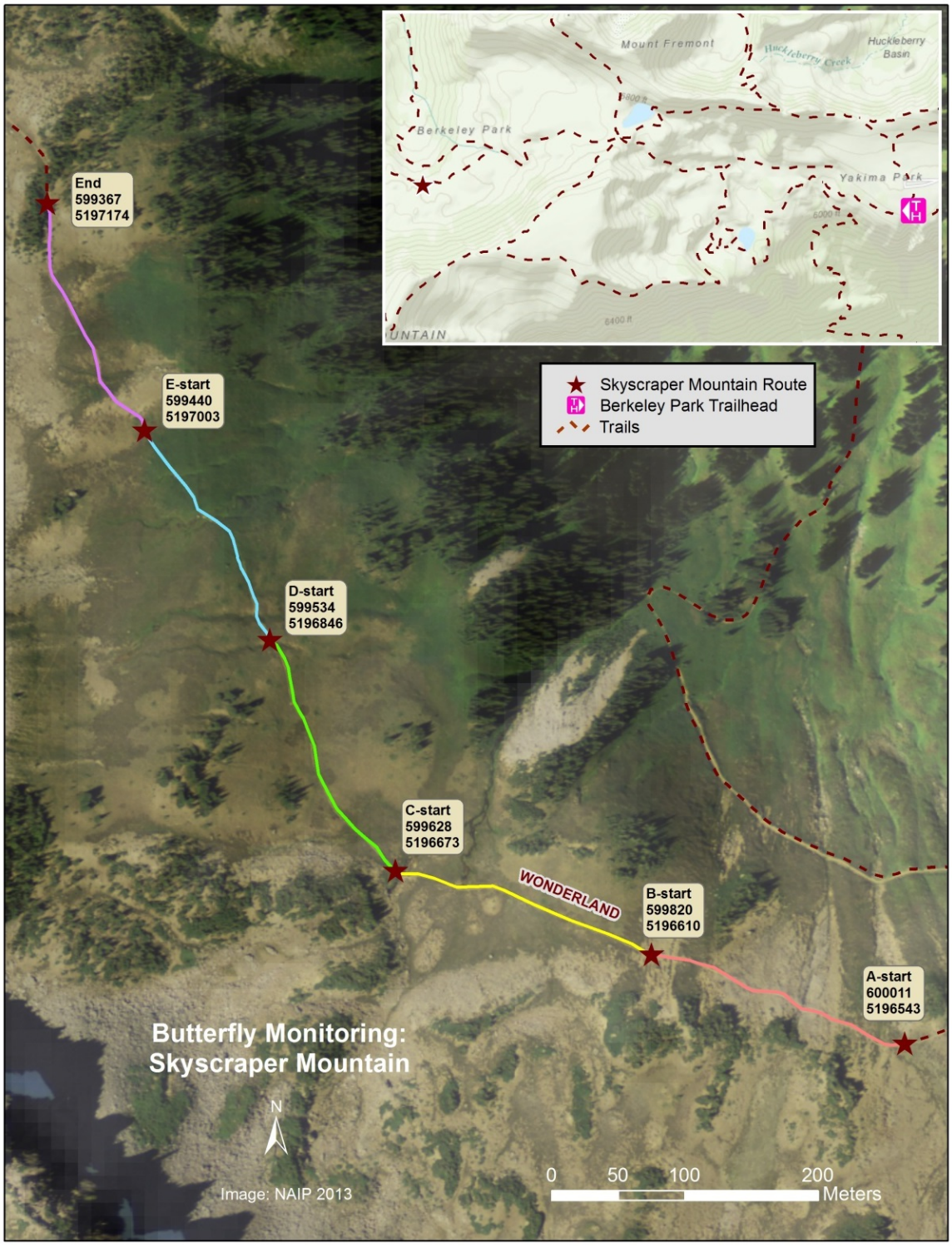


Figure 24. Map illustrating Skyscraper Mountain survey route and section locations.

The Skyscraper Mountain survey route was established in 2011 and originally the Berkeley Park survey route because it was in the Berkeley USGS topographic quadrat map. The name was changed in 2015 to more accurately reflect its location on the flank of Skyscraper Mountain (Figure 24). At the same time, we reversed the direction of surveys so that section A is located at the lowest elevation and closest distance to the trailhead. This change was made because in 2014, and 2015, surveyors often found that the weather was changing as they walked the route and if they waited to start the survey at the highest elevation, winds were often too high to meet butterfly standards. So, butterflies are surveyed on the way up the "hill". Twenty butterfly species have been documented on this route and as on other routes, we documented early peaks in abundance in 2015 (Figures 25, 26).

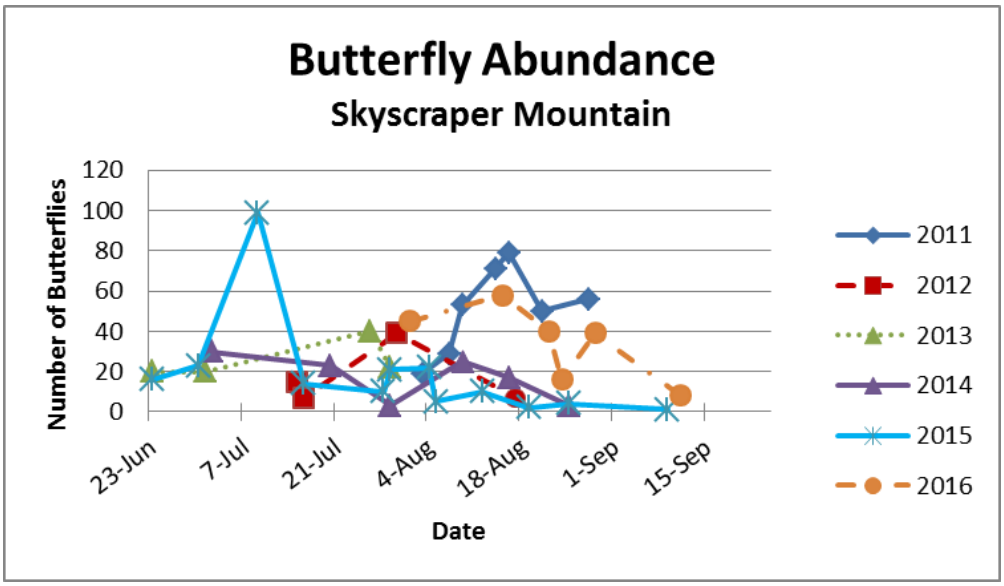


Figure 25. Butterfly abundance documented on the Skyscraper Mountain survey route, 2011 – 2016.



Figure 26. Section starts along the Skyscraper Mountain survey route: top row: A (left), B (right); middle row: C (left), D (right); bottom row: E (left) and End (right).

Mount Rainier National Park

Spray Park

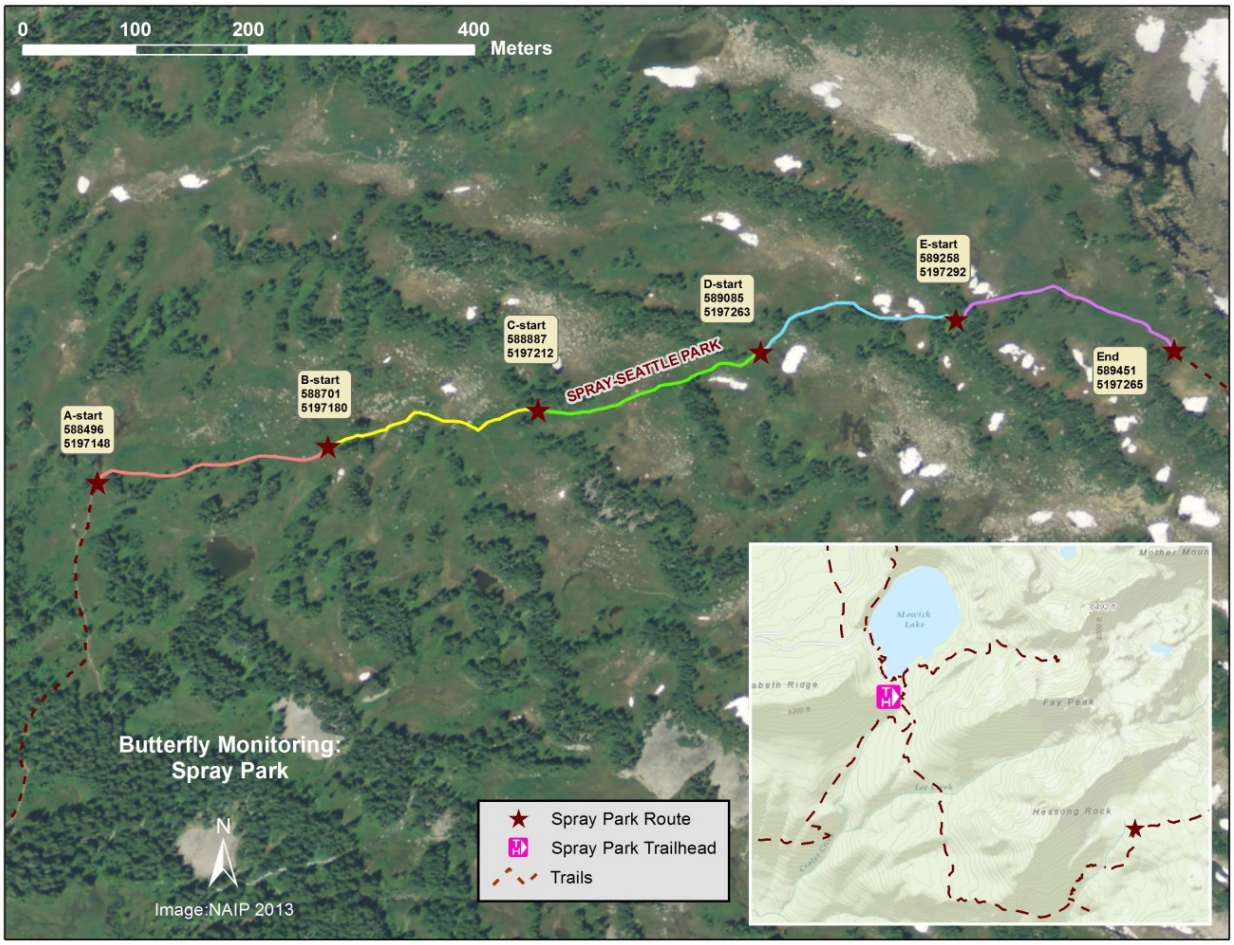


Figure 27. Map illustrating Spray Park survey route and locations of survey sections.

The Spray Park survey route was established in 2011, but was only surveyed two times in 2011 and one time in 2012 due to late snowmelt or limited staff and volunteers (Figure 27). Since 201, we have been able to conduct surveys at least five times per season so our butterfly abundance estimates and species lists have improved. Currently, we have documented 14 butterfly species with relatively low abundances, but high counts of 72 in 2015 (July 7) and 44 in 2016 (August 24). The top five species we have documented are Arctic Fritillary, Anise Swallowtail, Silvery Blue, Mormon Fritillary, and Boisduval's Blue (Figures 28, 29).

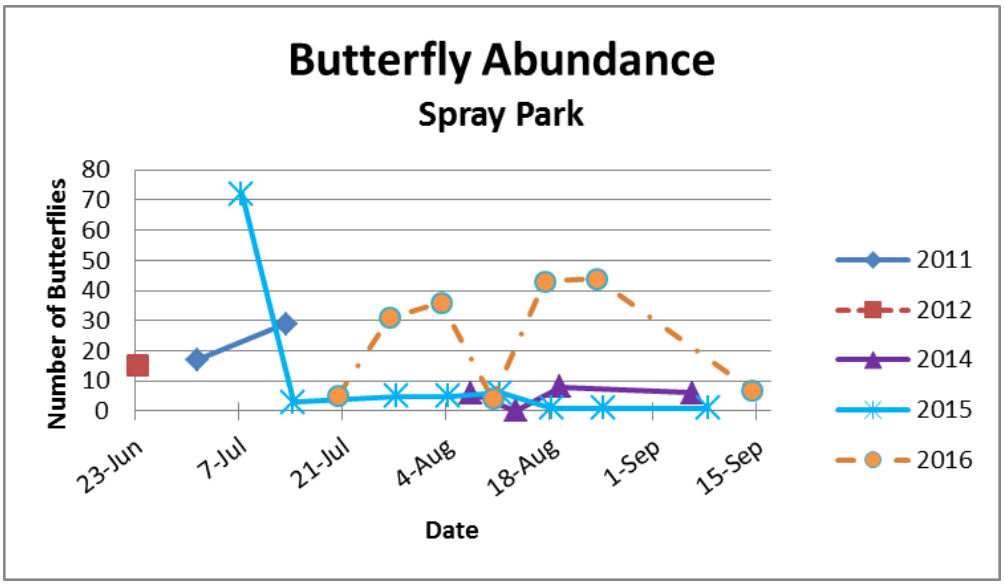


Figure 28. Butterfly abundance documented on the Spray Park survey route, 2011-2016.



Figure 29. Section starts along the Spray Park survey route: top row: A (left), B (right); middle row: C (left), D (right); bottom row: E (left) and End (right).

Mount Rainier National Park

Sunrise Rim

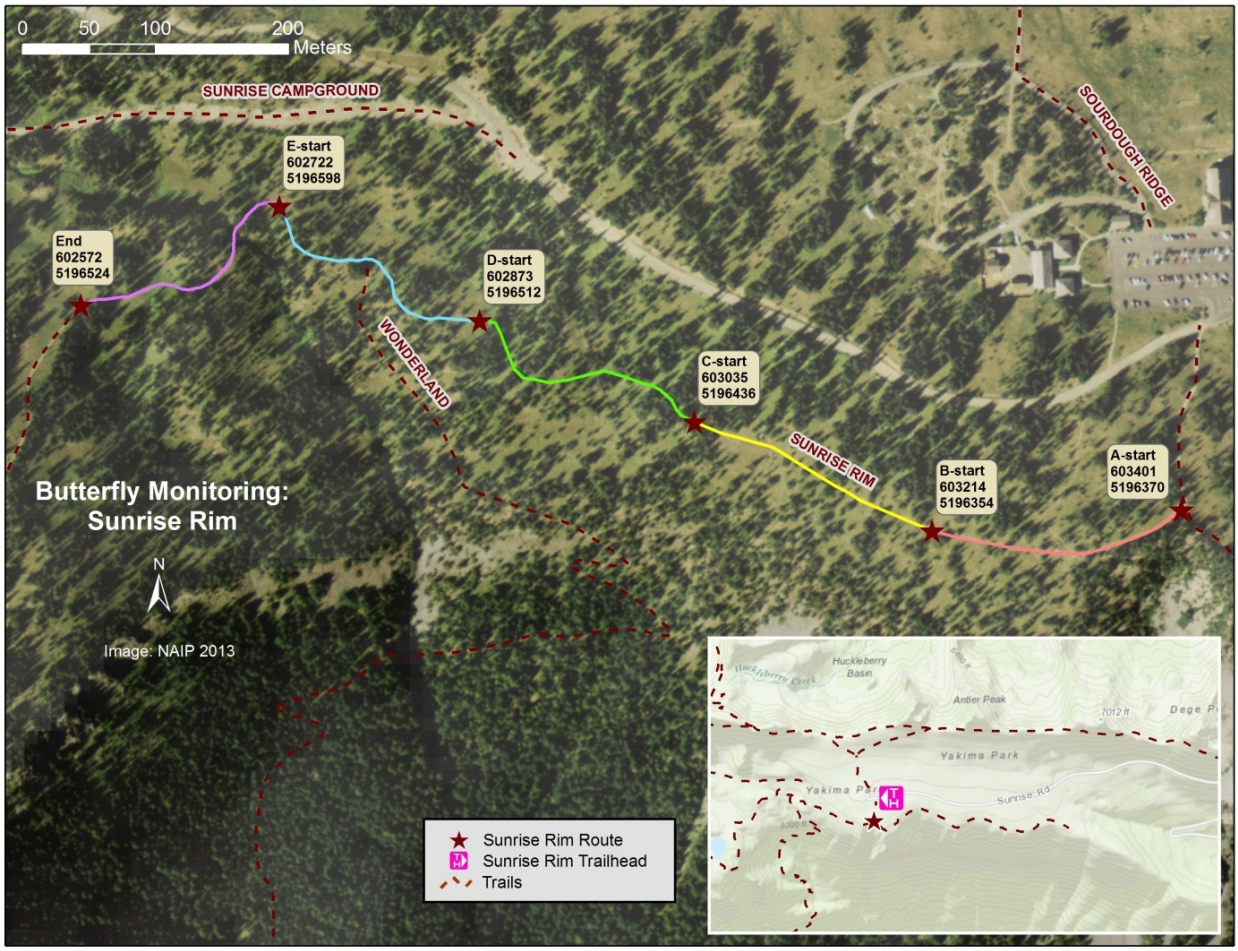


Figure 30. Map illustrating Sunrise Rim survey route and section locations.

The Sunrise Rim survey route was established in 2014 to provide a survey route that was in the *Festuca viridula- Lupinus latifolius* (Green Fescue- Broadleaf Lupine) plant association and a route that was easily accessible (Figure 29). Butterfly abundances are generally under 30, but like other survey routes our highest counts were recorded in early 2015 On June 30, 2015, we documented 113 butterflies and the following week 71; in 2016 our highest count was 90 on August 16 (Figure 31). This is a great route to learn to differentiate the checkerspots and blues as our six most abundant butterflies are Edith's Checkerspot, Boisduval's Blue, Mormon Fritillary, Anna's Blue, Snowberry Checkerspot, and Silvery Blue (Figure 32).

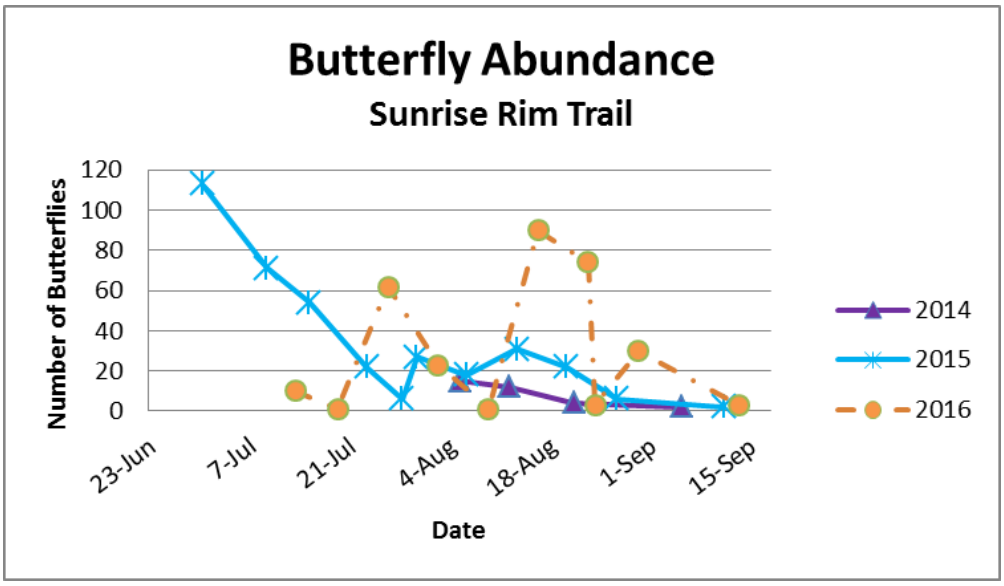


Figure 31. Butterfly abundance documented on the Sunrise Rim survey route, 2014-2016.



Figure 32. Section starts along the Sunrise Rim survey route: top row: A (left), B (right); middle row: C (left), D (right); bottom row: E (left) and End (right).

SOP 1: Monitoring Butterfly Abundance

Revision History Log

Revision Date	Author	Changes Made	Reason for Change

Overview

This SOP describes the methods used to monitor butterfly abundance along the ten Cascade Butterfly Project survey routes in North Cascades National Park, Mt. Baker-Snoqualmie National Forest, Okanogan-Wenatchee National Forest, and Mount Rainier National Park. Subalpine and alpine ecosystems are extremely sensitive to warming climates because species within them are adapted to cold winters, deep snowpack, and short summers with warm temperatures. Climate scientists project that rising temperatures will result in earlier snow melt and longer, drier summers in the Pacific Northwest. These changes may result in earlier butterfly emergence or changes in abundance and distribution of butterflies. We are monitoring butterflies to document trends in species abundance, distribution, and emergence as climate change.

Butterfly species composition and relative abundances are monitored use the Pollard Walk method. Butterfly survey routes have been established along maintained trails, each survey routes is subdivided into five 200m sections (A, B,C,D, E) and six markers are placed in the trail to indicate the beginning and end of each section (Figure 1). Surveys are generally conducted by a minimum of two people and up to five or six people; two people are the minimum for safety. One person is the observer and the second is the recorder; if more people are available, they can assist with plant surveys, identifying butterflies, communication about the program with people encountered on the trail.

The observer walks along the route at a slow pace, about 7 minutes per 100m and often referred to as the “wedding march” or “here comes the bride” pace. The observer visually scans a 5m x 5m x 5m imaginary box (i.e., 5m from the ground up, 5m ahead of her/him, 2.5 m to the left, and 2.5 m to the right). Each butterfly that flies through the box is identified to species and tallied by section. The observer is the only person who can designate which butterflies are counted during the survey, but the recorder or others in the survey crew may help identify or catch the butterfly. Butterfly crews carry nets and use catch and release methods to identify butterflies to species (see Appendix A for a list of butterflies that have been observed on each route). When catching a butterfly with the net, make sure to follow through on a sweeping motion (like swinging a baseball bat) and then double back to capture the butterfly in your net. For example, if you swing from right to left, then continue your motion in an arc and circle back to the right. This motion will cause the butterfly to move toward the end or top of your net and flip the next over to keep the butterfly in the net. Early season

training will be conducted to practice netting techniques and transfer of butterflies to insect inspection jars.

If butterflies cannot be identified to species, they are recorded to the nearest group (e.g., Blues, Whites, or as a last resort, unidentified butterfly). Each route is walked in the same direction each time (section A, then B, C, D, and E; see Appendix D) and each route has a data sheet with preprinted butterfly species based on previous surveys. However, all butterfly species are recorded even if the species is not on the data sheet and data sheets are reviewed annually and updated reflecting new species observations.



Figure 1. Volunteers conducting a survey, recording data on data sheets, examining Hydaspe Fritillary in inspection jar (left to right, top row. Route marker and Mormon Fritillary in inspection jar (left to right).

Equipment

- Butterfly Net
- Insect inspection jar
- Thermometer (Fahrenheit)
- Butterfly Guide
- Binoculars: some people become very proficient at butterfly identification through binoculars. The best binoculars for butterfly i.d. are close focusing (6-8’ range at a

maximum), with a power between 7 and 10, and brightness to allow good i.d. (this is the second number in binocular description (e.g., 7 x **42**).

- Camera: is helpful for uploading to Bamona or a photograph can be used after the survey to confirm your i.d.
- GPS Unit: needed to confirm marker locations, and if need be, replace the markers along transect. Currently the unit used is a Garmin 64.
- Data sheet and clipboard: Individual data sheets have been developed for each survey route with the monitored plant species. Coordinates for each of the six marker location will be included at the bottom of each sheet.
- Data forms should be copied on Rite-in-the-rain or a similar water resistant paper (Figure 2).

Completing the Data Form

Surveys are conducted when conditions are optimal for butterfly movement. We try to only conduct surveys when weather meets these conditions:

- Restrict recording to middle of day, between 1045 and 1545 PDT
- Temperature must be $\geq$ 55 °F (13°C) in sunny weather or $\geq$ 62°F (17°C) in cloudy weather

If you arrive at the survey site and the temperature is below the recommended threshold, you can still collect butterfly data anyway (since you trekked all that way) and you can collect plant phenology data – just remember to record the weather conditions.

Site: The national park or forest where the survey is conducted (this should already be filled in)

Route: Name of the survey route (this should already be filled in)

Date: Month, day and year the sampling occurred

Start Time: enter when you start the survey in regular time (e.g., 1:00pm)

End Time: enter when you end the survey in regular time (e.g., 3:00pm)

Break Time: if you take a break during the survey, enter the total number of minutes. Only count time as a break if it is more than 5 minutes. Breaks could be spending 15 minutes to talk to visitors. Try to schedule lunch before or after the survey rather than in the middle of it. The time you take to catch a butterfly is not a break, but if you have to sit down and look through your butterfly guide for 10-15 minutes, this is a break.

Observer: Enter the full first and last name of the observer

Recorder: Enter the full first and last name of the recorder

Other Participants: Enter the full first and last name of other individuals assisting with the survey

Survey Start

Sky: Look above you and check one description of the sky: clear, mostly clear, partly cloudy, mostly cloudy, overcast, or hazy

Wind: Wind is recorded by the following categories and correlate with Beaufort Wind Scale: calm, relatively still, moderately windy, windy and very windy (Table 1)

Temperature: Record the temperature in degrees Fahrenheit

Table 1. Summary of categories used to document wind speed

Wind category	Beaufort number	Wind speed (mi/hr)	Description
Calm	0	<1	Calm; smoke rises vertically
Relatively Still	1	1-3	Light air; smoke drifts
Moderately Windy	2	4-7	Light breeze; wind felt on face; leaves rustle
Windy	3	8-12	Gentle breeze; flags extended; leaves and twigs in constant motion
Very Windy	4	13-18	Moderate breeze; loose paper rises; dust rises; small branches move
Not able to survey	If the wind is so strong that you cannot survey, enter a note about this in the Survey Notes box on the second page of the data sheet		

Before you begin the survey, check the Route Description (Appendix D) to make sure you know which direction to survey the route. We always survey from A to B to C to D to E.

Butterfly Tallies: Tally each butterfly that flies through the Observers box by species. If you cannot identify the butterfly to species, tally it to group, and if you cannot identify it to group, select Unidentified Butterfly (Figure 2).

When you finish conducting your survey, fill out weather conditions, survey end time, and break time:

Survey End

Sky: Look above you and check one description of the sky: clear, mostly clear, partly cloudy, mostly cloudy, overcast, or hazy

Wind: Wind is recorded by the following categories and correlate with Beaufort Wind Scale: calm, relatively still, moderately windy, windy and very windy (Table 1)

Temperature: Record the temperature in degrees Fahrenheit

Visitor Contacts: Tally the number of visitors that you talk to about the program while you are in the field; this can include people you encounter while you are hiking to/from the site, during the survey, or even in the parking lot

Survey Notes: enter any pertinent notes such as if you could not complete the survey, if water or snow was covering one section, any incidental butterfly species that you observed close to the survey route that you did not see on the survey route.

Check over the data sheet to make sure all entries are legible and complete and have the observer or a person other than the recorder check over the data sheet and initial in the Field check section of the "Office Use Only" section in the upper right portion of the data sheet.

Office use only:

Field checked by/date: After completing the survey and before leaving the field site, a person other than the recorder should check the data sheet to make sure that all data is entered. Once they have checked the data sheet, they should enter their initials and date

Entered by/date: Initials and date to indicate when and by whom the data were entered into the database

Updated by/date: Initials and date to indicate when and by whom the field data were updated after returning from the field

Approved by/date: Initials and date to indicate when and by whom the data were verified for accuracy in the database

Office use only	*(use initials and mm/dd/yy)*		
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Baker-Snoqualmie National Forest **Route:** Sauk Mountain
Date: 6/8/16 **Start Time:** 1:52 pm **End Time:** 3:08 pm **Break Time:** 0
Observer: Regina Rochefort **Recorder:** Shelley Klvz
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☒ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☒ Windy: ☐ Very Windy: ☐
Temperature (°F): 65°
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☒ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☒ Windy: ☐ Very Windy: ☐
Temperature (°F): 69°
Visitor Contacts: ~~HH~~ IIII total: 9

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Arctic Blue	*Agriades glandon*					
	Boisduval's Blue	*Plebejus icarioides*					
	Echo Blue	*Celastrina echo*			(4)	(1)	(2)
	Silvery Blue	*Glaucopsyche lygdamus*		1 (1)	~~HH~~ III	I	II
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Brown Elfin	*Callophrys augustinus*					
	Moss' Elfin	*Callophrys mossii*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
	Unidentified Hairstreak/ Elfin	*Theclinae sp.*					

Section Coordinates (UTM E, UTM N): A (603477, 5374825); B (603449, 5374857); C (603415, 5374866); D (603391, 5374893); E (603347, 5374907); End (603318, 5374882)

May 22, 2017

Figure 2. Butterfly data sheet for Sauk Mountain.

Cascades Butterfly Project Monitoring Data Sheet

Sauk Mountain Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Field Crescent	*Phyciodes pulchella*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Lorquin's Admiral	*Limenitis lorquini*					
	Milbert's Tortoiseshell	*Aglais glandon*			1 (1)		
	Mormon Fritillary	*Speyeria mormonia*					
	Mylitta Crescent	*Phyciodes mylitta*					
	Satyr Comma	*Polygonia satyrus*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*	6 (1)	11 (2)	14 (9)	15 (10)	4 (4)
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*		11 (2)	1 (1)	1 (1)	
	Pale Swallowtail	*Papilio eurymedon*					
	Clodius Parnassian	*Parnassius clodius*				1 (1)	
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Orange Sulphur	*Colias eurytheme*					
	Sara's Orangetip	*Anthocharis sara*					
	Margined White	*Pieris marginalis*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*				1 (1)	

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

Figure 2 (continued). Butterfly data sheet for Sauk Mountain.

SOP 2: Monitoring Plant Phenology

Revision History Log

Revision Date	Author	Changes Made	Reason for Change

Overview

This SOP describes the methods used to monitor plant phenology along the ten Cascade Butterfly Project survey routes in North Cascades National Park, Mt. Baker-Snoqualmie National Forest, Okanogan-Wenatchee National Forest, and Mount Rainier National Park. Subalpine meadows are one of the ecosystems to be most affected by climate change. The timing of recurring plant life cycle events such as budburst, flowering, or fruit development is a sensitive indicator of climate change and is expected to shift to with rising temperatures.

Plant phenology is monitored weekly along the ten butterfly survey routes. Each route has a set number of species that are listed on the route data sheet (Figure 1). The observer estimates the phenophase and abundance of each species by section. The area for the estimation is the 2.5m on either side of the trail that also serves as the base of the butterfly survey box. Plant observations can be made by the butterfly recorder or a third person while the butterfly survey is conducted or on a separate walk of the survey route. Unlike butterfly surveys, there are no requirements for time of day, temperature, or precipitation for plant surveys so, if observers arrive at a survey route and it starts to rain, they can still monitor plant phenology. Another difference from the butterfly survey is that multiple observers can discuss and determine the most accurate phenophase and abundance along each section. It is sometimes difficult to estimate what the abundance category or phenophase is for one species along a 200m stretch of trail so, discussion and consensus is helpful. While butterfly abundance is estimates are stated as unit effort (one person)/ distance or area/ time, plant estimates are just calculated as per unit area.

The phenophase categories that we use are:

- X: did not observe the species on the section
- V: vegetative, plants present but not yet in flower
- E: early, at least one plant has flowers
- M: middle, most plants (50% or more) have flowers
- L: late, most plants (more than 50%) have flowers that are wilted or in fruit

Abundance categories are estimated when a phenophase category is E, M, or L:

- 1 for 1-10 flowers

- 2 for 11-50 flowers or flowering stalks
- 3 for 51 or more flowers or flowering stalks

Equipment

- GPS Unit: needed to confirm marker locations, and if need be, replace the markers along transect. Currently the unit used is a Garmin 64.
- Data sheet and clipboard: Individual data sheets have been developed for each survey route with the monitored plant species. Coordinates for each of the six marker location will be included at the bottom of each sheet.
- Data sheets should be copied on Rite-in-the-rain or a similar water resistant paper (Figure1).

Completing the Data Form

Data sheets are available for each survey route and should be filled in completely on the day of the survey. One technician in each crew will be responsible for ensuring that all data fields are filled in.

Site: The national park or forest where the survey is conducted (this should already be filled in)

Route: Name of the survey route (this should already be filled in)

Observers: Enter the full first and last name of individuals sampling the survey route

Date: Month, day and year the sampling occurred.

Plant Species: Data forms are specific for each survey route and each route has a "target" plant list. However, each target plant may not occur on each section of the route. If a block is shaded for a specific species and route section, then the species has not been observed in this section during previous surveys and data entry is not needed for this section.
Phenology: Record the phenophase of species by section, each box must have an entry (unless it is shaded):

- X: did not observe the species on the section
- V: vegetative, plants present but not yet in flower
- E: early, at least one plant has flowers
- M: middle, most plants (50% or more) have flowers
- L: late, most plants (more than 50%) have flowers that are wilted or in fruit

Abundance: Abundance is estimate, by category, whenever the phenophase is E, M, or L:

- 0: none
- 1: 1-10 flowers or flowering stalks.
- 2: 11-50 flowers or flowering stalks
- 3: Greater than 50 flowers or flowering stalks

Abundance estimates are entered in the same box as the phenophase (Figure 1).

When you finish conducting your survey, check over the data sheet to be sure it is completely filled out and fill out a portion of the "Office use only" box in the upper right corner of the form.

Office use only:

Field checked by/date: After completing the survey and before leaving the field site, a person other than the recorder should check the data sheet to make sure that all data is entered. Once they have checked the data sheet, they should enter their initials and date

Entered by/date: Initials and date to indicate when and by whom the data were entered into the database

Updated by/date: Initials and date to indicate when and by whom the field data were updated after returning from the field

Approved by/date: Initials and date to indicate when and by whom the data were verified for accuracy in the database

Office use only *(use initials and mm/dd/yy)*			
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: North Cascades National Park **Route:** Cascade Pass

Observers: Jenny Shrum, Eddie Silaruga **Date:** 8/17/16

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Anaphalis margaritacea	Pearly Everlasting	E1	E1				
Arnica latifolia	Mountain Arnica	L2	L2	M3	M3	M3	
Bistorta bistortoides	American Bistort	M2	L2	M3	M3	M3	
Cassiope mertensiana	White Heather				X	L2	
Castilleja hispida	Harsh Indian Paintbrush	M3					
Castilleja parviflora var. albida	White Indian Paintbrush	M2	M1		X	M2	
Cirsium edule	Edible Thistle	M2	M1				
Erigeron peregrinus	Subalpine Daisy	L1	L1	M2	L1	M2	
Erythronium grandiflorum	Glacier Lily (yellow)	L1	X	X	X	X	
Heracleum maximum	Cow Parsnip	L1					
Luetkea pectinata	Partridgefoot	L1	X	M2	M2	M3	
Lupinus latifolius	Broadleaf Lupine	X	L2	M1	M3	M3	
Pedicularis bracteosa	Bracted Lousewort	X	X	L1	L1	L1	
Penstemon procerus	Small-flowered Penstemon	L1					
Penstemon serrulatus	Coast Penstemon	M3	L1				
Phlox diffusa	Spreading Phlox	L2	L2	L2	L2		
Phyllodoce empetriformes	Pink Heather	X	L2	L2	L2	L2	
Polemonium pulcherrimum	Jacob's Ladder	L1					
Potentilla flabellifolia	High Mountain Cinquefoil	L1	L1	L1	L1	L1	
Spiraea densiflora	Subalpine Spirea	L1	L1	L1			
Vaccinium deliciosum	Cascade Huckleberry	L1	L1	L1	L1	L1	
Valeriana sitchensis	Sitka Valerian	L1	L1	L1	M3	M2	
Veratrum viride	False Hellebore	E1	E1	E1	X	E2	

Section Coordinates (UTM E, UTM N): A (643763, 5370158); B (643698, 5370225); C (643685, 5370293); D (643802, 5370340); E (643890, 5370368); End (643993, 5370449)

January 29, 2017

Figure 1. Plant phenology data sheet for Cascade Pass.

Notes on Phenophase and Abundance Estimates

Counting abundances on flowers vs. flowering stalks

Our goal is to make counting flowers and estimating phenophases as easy, repeatable, and fast as possible. If individual flowers are easily visible such as on Glacier Lily, Pink Heather, Subalpine Daisy then each flower is counted. If florets are on a stalk such as in False Hellebore or *Pedicularis* species then each stalk is counted (see examples in Figures 2-4).



Figure 2. *Phyllodoce empetriformes*, Pink Heather (abundance = 2); *Erythronium grandiflorum*, Glacier Lily (abundance = 1); *Gentiana calycosa*, Mountain Bog Gentian (abundance = 1), all in flower, left to right.



Figure 3. *Veratrum viride*, False Hellebore: vegetative, in flower (abundance =1), and in fruit (left to right).



Figure 4. *Lupinus latifolius*, Broadleaf lupine, in flower (abundance class 1), and in fruit (abundance of flowers = 0), and *Penstemon procerus*, Small-flowered Penstemon (abundance = 1) and *Luetkea pectinata*, Partridge Foot (abundance class 2 because 11 stems are visible), left to right.

SOP 3: Butterfly Data Entry

Revision History Log

Revision Date	Author	Changes Made	Reason for Change

Overview

This SOP describes how to enter butterfly abundance data for the Cascades Butterfly Project. The CBP database is a partnership with Dr. Leslie Ries, Georgetown University, and Kelly Lotts and Thomas Naberhaus of Butterflies of North America. Our database is available on the PollardBase site (www.pollardbase.org). Currently only the butterfly data is eneterd at this site, but in the next couple of years, the site will be expanded to support data entry from the plant phenology monitoring.

Establishing a User Account for the Cascade Butterfly Project

The first step on data entry is to request create an account for the CBP with the PollardBase database. Figures 1 and 2 show the entry screens for requesting your account with the Cascades Butterfly Project. Once you select a username, your request will appear on the Program Lead's data entry screen. Once the Program Lead approves you as a user of the PollardBase database, you will be able to logon.

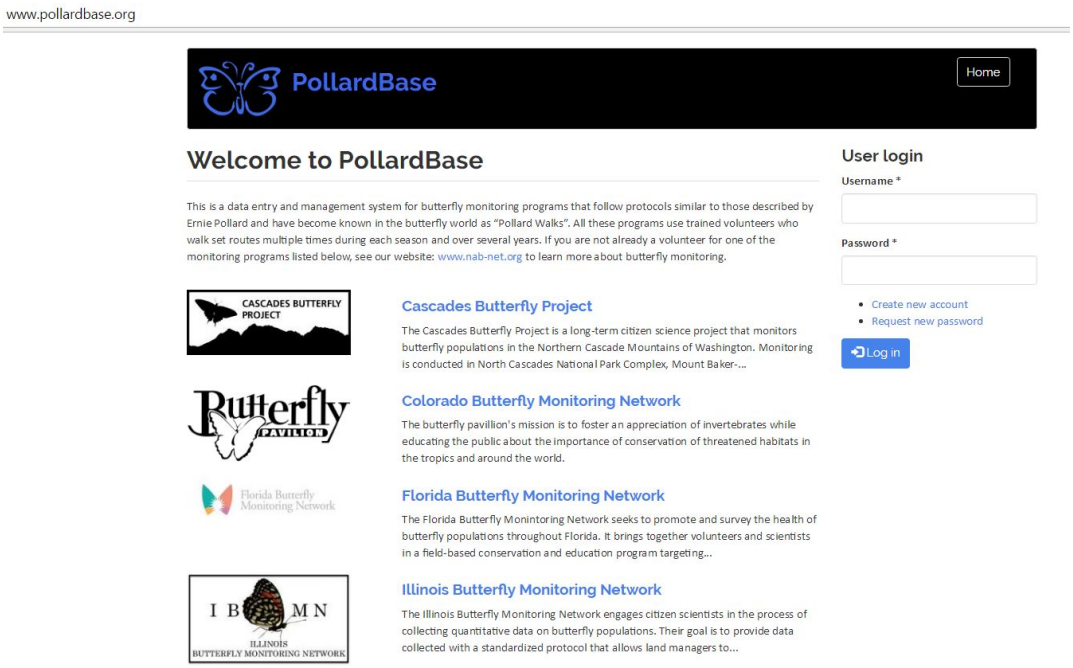


Figure 1. Account request site for PollardBase database.

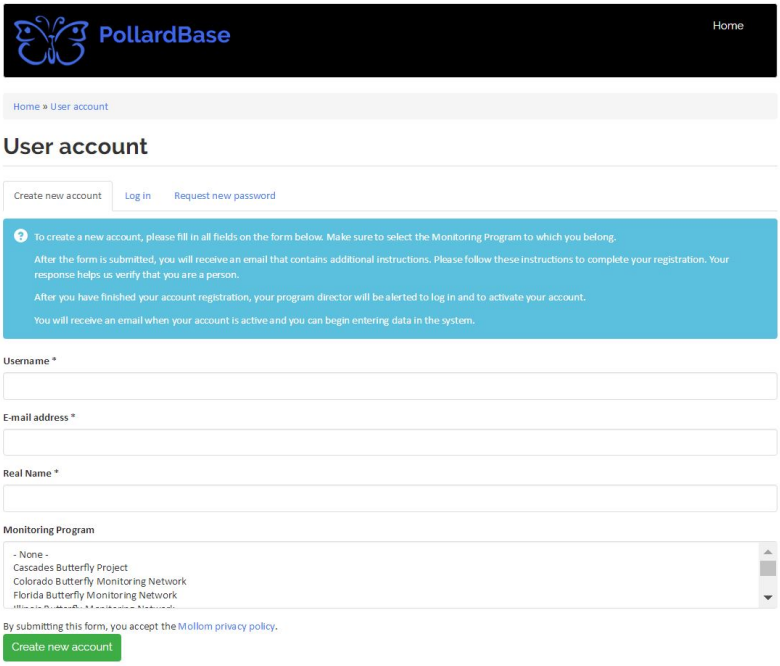


Figure 2. PollardBase screen for selecting a user name and the Cascade Butterfly Project Monitoring Program.

Data Entry

Once you have created an account and been approved as a member of the CBP, you will be able to select the Cascades Butterfly Project from the Project list (Figure 3). You can then click on the Cascades Butterfly Project and you will see all our routes. You can filter the list by county or site or scroll through the entire list. Once you find the route you have data for, you can click on the "Report a survey for this route" (Figure 4). As you become more familiar with the site you can select your favorite routes.

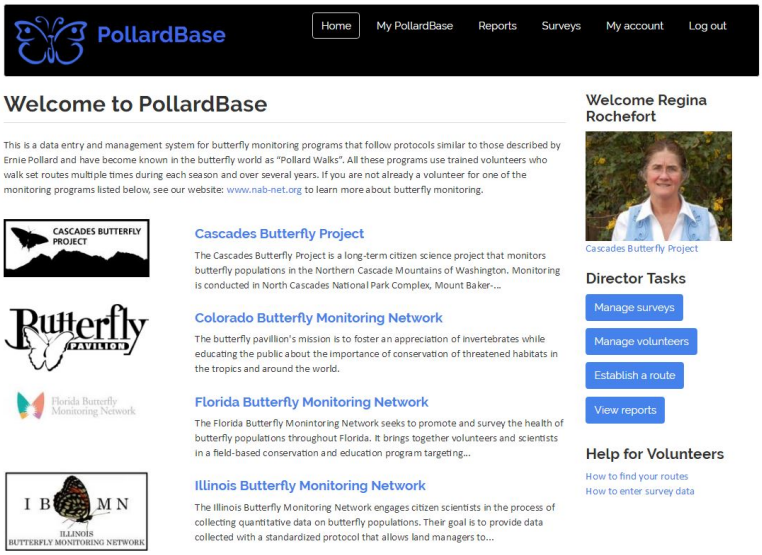


Figure 3. Screen to select Cascades Butterfly Project for data entry.

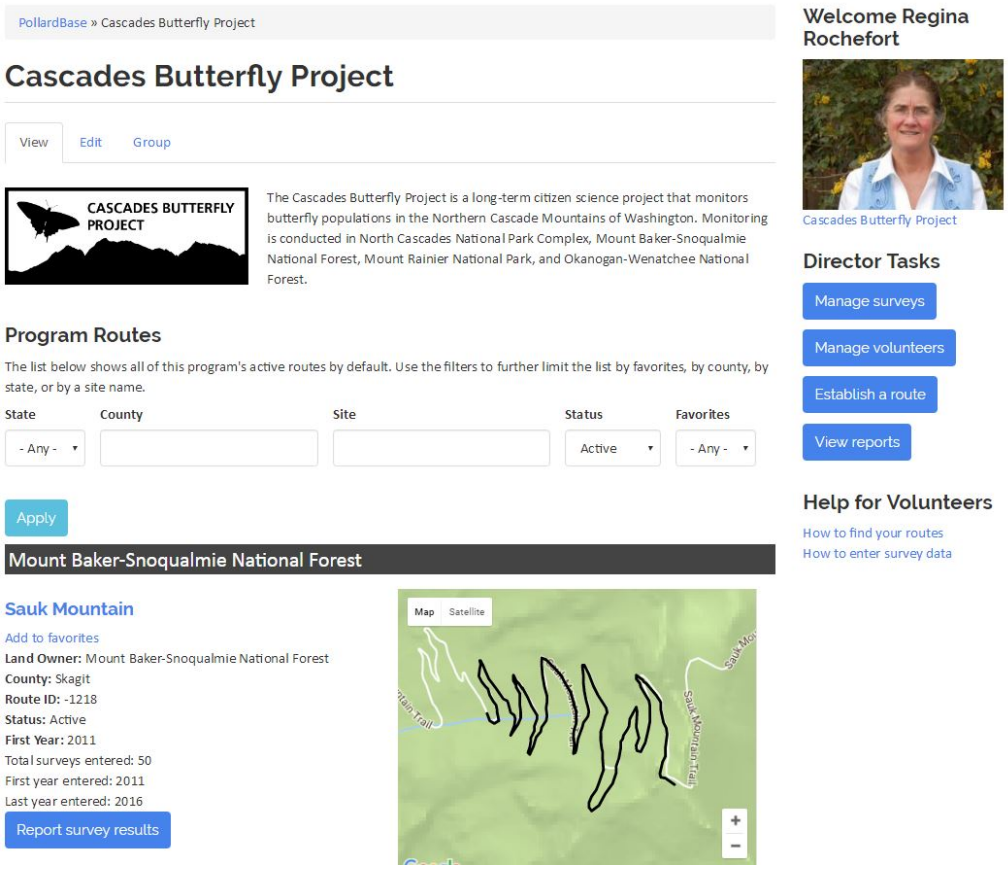


Figure 4. Screen illustrating survey routes and button to enter survey data (on this example to enter data for the Sauk Mountain survey route).

Once you click on the “Report survey results”, you will see a data entry screen with tabs corresponding to our data sheets (Figure 5). After entering your data, you will be able to preview it and make corrections if you notice any errors. If you have any photos of the site or butterflies, you can enter them into the database under images.

After completion of data entry and previewing, you will not be able to go back to look at your data. Mail your data sheet into the Program Lead and she/he will check your data entry against your data sheet and make any necessary corrections. If you think you made an error, just notify the Program Lead.

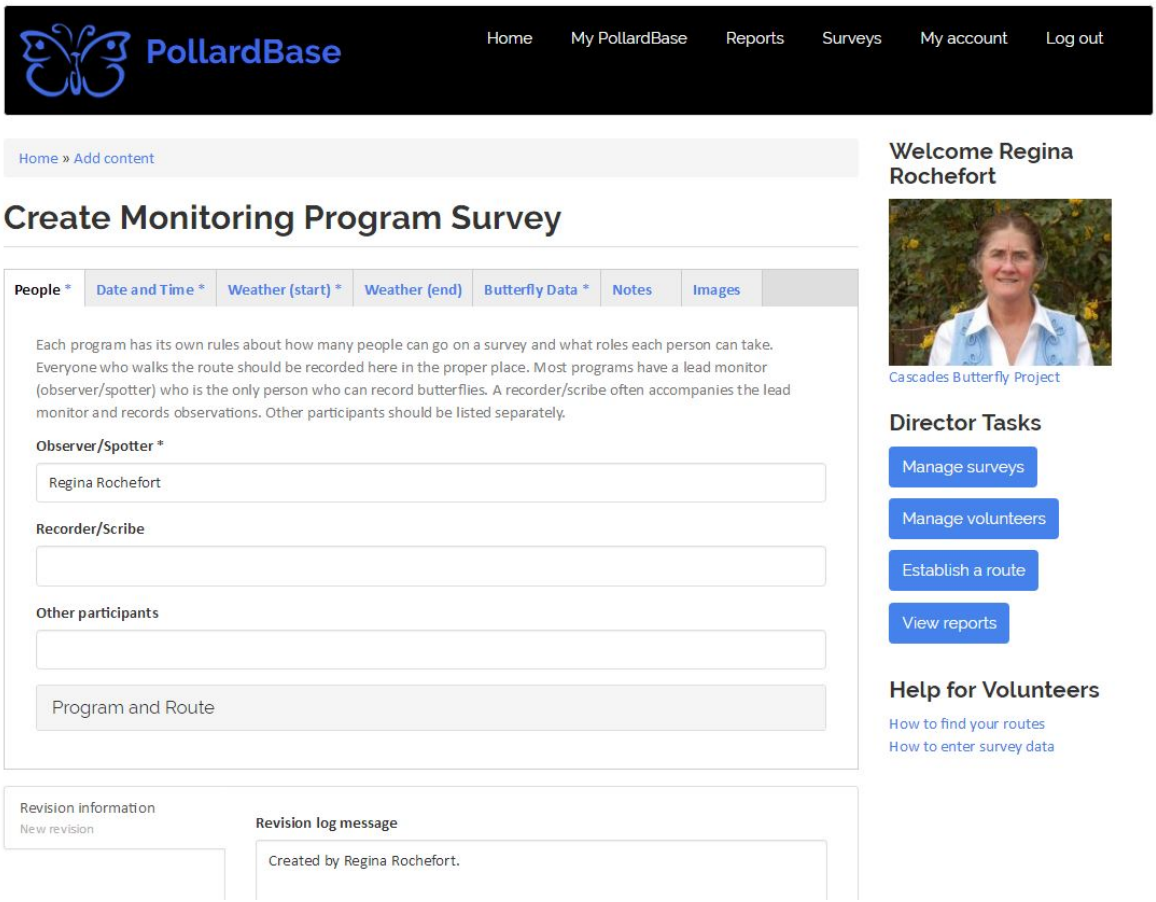


Figure 5. Data entry screen for Cascades Butterfly Project illustrating tabs for each portion of the data sheet.

Literature Cited

Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. *Biological Conservation* 24:317-328.

Pollard, E., and T. J. Yates. 1993. Monitoring butterflies for ecology and conservation. Chapman & Hall, London, UK.

Rochefort, R. M., and J. F. McLaughlin. 2017. The Cascades Butterfly Project: A protocol for monitoring subalpine butterflies and plant phenology in the Cascade Mountains of Washington. Natural Resource Report NPS/NOCA/NRR—2017/1440. National Park Service, Fort Collins, Colorado.

Appendix A. Coordinates for Survey Route in North Cascades National Park, Mount Baker-Snoqualmie National Forest, and Okanogan-Wenatchee National Forest

Route	Section	UTM E (m) (NAD83)	UTM N (m) (NAD83)	Latitude (WGS 84)	Longitude (WGS 84)	Elevation (m)
Cascade Pass	A (start)	0643761	5370158	48.468111	-121.055087	1665.4
	B (start)	0643699	5370223	48.468707	-121.055908	1694.5
	C (start)	0643687	5370294	48.469356	-121.056040	1748.9
	D (start)	0643805	5370343	48.469772	-121.054429	1796.7
	E (start)	0643891	5370368	48.469967	-121.053261	1830.7
	End of Transect	0643994	5370448	48.470670	-121.051840	1859.0
Easy Pass	A (start)	0659078	5382128	48.572036	-120.843448	1996.9
	B (start)	0658897	5382106	48.571884	-120.845908	1998.1
	C (start)	0658800	5382084	48.571711	-120.847225	1967.4
	D (start)	0658665	5382113	48.572005	-120.849051	1927.5
	E (start)	0658500	5382140	48.572289	-120.851273	1907.3
	End of Transect	0658432	5382101	48.571953	-120.852205	1864.7
Maple Pass	A (start)	0665496	5374228	48.499359	-120.759641	2075.4
	B (start)	0665679	5374280	48.499777	-120.757151	2048.1
	C (start)	0665828	5374362	48.500474	-120.755103	2022.7
	D (start)	0665980	5374440	48.501139	-120.753012	1999.2
	E (start)	0666141	5374533	48.501929	-120.750805	1975.3
	End of Transect	0666294	5374629	48.502751	-120.748694	1946.2
Sauk Mountain	A (start)	0603477	5374825	48.518005	-121.598723	1588.2
	B (start)	0603449	5374857	48.518298	-121.599094	1568.8
	C (start)	0603415	5374866	48.518382	-121.599552	1551.2
	D (start)	0603391	5374893	48.518631	-121.599864	1539.1
	E (start)	0603347	5374907	48.518761	-121.600468	1496.4
	End of Transect	0603318	5374882	48.518547	-121.600864	1465.8
Skyline Divide	A (start)	0584360	5413029	48.864487	-121.849743	1772.2
	B (start)	0584332	5413230	48.866291	-121.850085	1759.1
	C (start)	0584347	5413417	48.867973	-121.849841	1779.1
	D (start)	0584456	5413586	48.869476	-121.848319	1794.5
	E (start)	0584629	5413671	48.870221	-121.845944	1774.1
	End of Transect	0584772	5413797	48.871330	-121.843971	1779.2

Appendix B. Coordinates for Survey Routes in Mount Rainier National Park

Route	Section	UTM E (m) (NAD83)	UTM N (m) (NAD83)	Latitude (WGS 84)	Longitude (WGS 84)	Elevation (m)
Naches Peak	A (start)	0613328	5190973	46.862641	-121.513143	1737
	B (start)	0613524	5190973	46.862606	-121.510569	1754
	C (start)	0613711	5190960	46.862455	-121.508120	1771
	D (start)	0613907	5190932	46.862168	-121.505553	1775
	E (start)	0614089	5190876	46.861633	-121.503184	1795
	End of Transect	0614243	5190913	46.861943	-121.501154	1773
Skyscraper Mountain	A (start)	0600011	5196543	46.914888	-121.686589	1935
	B (start)	0599820	5196610	46.915518	-121.689072	1932
	C (start)	0599628	5196673	46.916111	-121.691580	1926
	D (start)	0599534	5196846	46.917683	-121.692782	1952
	E (start)	0599440	5197003	46.919112	-121.693984	1974
	End of Transect	0599367	5197174	46.920657	-121.694904	1997
Mazama Ridge	A (start)	0597742	5182642	46.790160	-121.719352	1762
	B (start)	0597695	5182462	46.788545	-121.720013	1747
	C (start)	0597750	5182284	46.786941	-121.719327	1741
	D (start)	0597703	5182085	46.785154	-121.719981	1725
	E (start)	0597724	5181889	46.783391	-121.719749	1696
	End of Transect	0597737	5181698	46.781669	-121.719619	1680
Spray Park	A (start)	0588496	5197148	46.921959	-121.837651	1742
	B (start)	0588701	5197180	46.922223	-121.834958	1765
	C (start)	0588887	5197212	46.922485	-121.832507	1795
	D (start)	0589085	5197263	46.922922	-121.829903	1830
	E (start)	0589258	5197292	46.923160	-121.827624	1858
	End of Transect	0589451	5197265	46.922888	-121.825087	1874
Sunrise	A (start)	0603401	5196370	46.912807	-121.642111	1934
	B (start)	0603214	5196354	46.912694	-121.64458	1920
	C (start)	0603035	5196436	46.913461	-121.646913	1906
	D (start)	0602873	5196512	46.914172	-121.64902	1897
	E (start)	0602722	5196598	46.91497	-121.650983	1904
	End of Transect	0602572	5196524	46.914324	-121.652961	1903

Appendix C. Butterfly Data Sheets

Mount Baker – Snoqualmie National Forest

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Baker-Snoqualmie National Forest **Route:** Sauk Mountain
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
Common Name		Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Arctic Blue	*Agriades glandon*					
	Boisduval's Blue	*Plebejus icarioides*					
	Echo Blue	*Celastrina echo*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Brown Elfin	*Callophrys augustinus*					
	Moss' Elfin	*Callophrys mossii*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
	Unidentified Hairstreak/ Elfin	*Theclinae sp.*					

Section Coordinates (UTM E, UTM N): A (603477, 5374825); B (603449, 5374857); C (603415, 5374866); D (603391, 5374893); E (603347, 5374907); End (603318, 5374882)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Sauk Mountain Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Field Crescent	*Phyciodes pulchella*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Lorquin's Admiral	*Limenitis lorquini*					
	Milbert's Tortoiseshell	*Aglais glandon*					
	Mormon Fritillary	*Speyeria mormonia*					
	Mylitta Crescent	*Phyciodes mylitta*					
	Satyr Comma	*Polygonia satyrus*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Pale Swallowtail	*Papilio eurymedon*					
	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Orange Sulphur	*Colias eurytheme*					
	Sara's Orangetip	*Anthocharis sara*					
	Margined White	*Pieris marginalis*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

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CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Baker-Snoqualmie National Forest **Route:** Skyline Divide

Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____

Observer: _____ **Recorder:** _____

Other Participants: _____

Survey Start:

Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐

Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐

Temperature (°F): _____

Survey End:

Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐

Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐

Temperature (°F): _____

Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Lupine Blue	*Plebejus lupini*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (584360, 5413029); B (584332, 5413230); C (584347, 5413417); D (584456, 5413586); E (584629, 5413671); End (584772, 5413797)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Skyline Divide Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Painted Lady	*Vanessa cardui*					
	Satyr Comma	*Polygonia satyrus*					
	Anicia/ Snowberry Checkerspot	*Euphydryas anicia/ colon*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lady	*Vanessa sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Margined White	*Pieris marginalis*					
	Pine White	*Neophasia menapia*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

North Cascades National Park

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Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: North Cascades National Park Service Complex **Route:** Cascade Pass
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Unidentified Blue	*Polyommatinae sp.*					
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Green Comma	*Polygonia faunus*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Lorquin's Admiral	*Limenitis lorquini*					
	Milbert's Tortoiseshell	*Aglais milberti*					

Section Coordinates (UTM E, UTM N): A (643763, 5370158); B (643698, 5370225); C (643685, 5370293); D (643802, 5370340); E (643890, 5370368); End (643993, 5370449)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Cascade Pass Survey Route

Butterflies			Number of Butterflies Per Section				
Common Name		Scientific Name	A	B	C	D	E
	Mormon Fritillary	*Speyeria mormonia*					
	Red Admiral	*Vanessa atalanta*					
	Satyr Comma	*Polygonia satyrus*					
	Anicia/ Snowberry Checkerspot	*Euphydryas anicia/ colon*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lady	*Vanessa sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
Pieridae	Margined White	*Pieris marginalis*					
	Pine White	*Neophasia menapia*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

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Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: North Cascades National Park Service Complex **Route:** Easy Pass

Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____

Observer: _____ **Recorder:** _____

Other Participants: _____

Survey Start:

Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐

Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐

Temperature (°F): _____

Survey End:

Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐

Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐

Temperature (°F): _____

Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Arctic Skipper	*Carterocephalus*					
	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Arctic Blue	*Agriades glandon*					
	Boisduval's Blue	*Plebejus icarioides*					
	Lupine Blue	*Plebejus lupini*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Blue Copper	*Lycaena heteronea*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (659078, 5382128); B (658897, 5382106); C (658800, 5382084); D (658665, 5382113); E (658500, 5382140); End (658432, 5382101)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Easy Pass Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Chryxus Arctic	*Oeneis chryxus*					
	Edith's Checkerspot	*Euphydryas editha*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Red Admiral	*Vanessa atalanta*					
	Satyr Comma	*Polygonia satyrus*					
	Anicia/ Snowberry Checkerspot	*Euphydryas anicia/ colon*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Orange Sulphur	*Colias eurytheme*					
	Sara's Orangetip	*Anthocharis sara*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

Okanogan – Wenatchee National Forest

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Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Okanogan-Wenatchee National Forest **Route:** Maple Pass
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper	*Hesperia comma*					
	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helloides*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Lorquin's Admiral	*Limenitis lorquini*					

Section Coordinates (UTM E, UTM N): A (665496, 5374228); B (665679, 5374280); C (665828, 5374362); D (665980, 5374440); E (666141, 5374533); End (666294, 5374629)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Maple Pass Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Mourning Cloak	*Nymphalis antiopa*					
	Satyr Comma	*Polygonia satyrus*					
	Anicia/ Snowberry Checkerspot	*Euphydryas anicia/ colon*					
	Vidler's Alpine	*Erebia vidleri*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Indra Swallowtail	*Papilio indra*					
	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Orange Sulphur	*Colias eurytheme*					
	Sara's Orangetip	*Anthocharis sara*					
	Margined White	*Pieris marginalis*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

Mount Rainier National Park

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CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Rainier National Park **Route:** Mazama Ridge
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Persius Duskywing	*Erynnis persius*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Echo Blue	*Celastrina echo*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Gray Hairstreak	*Strymon melinus*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (0597742, 5182642), B (0597695, 5182462), C (0597750, 5182284), D (0597703, 5182085), E (0597724, 5181889), End (0597737, 5181698)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Mazama Ridge Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Mormon Fritillary	*Speyeria mormonia*					
	Mourning Cloak	*Nymphalis antiopa*					
	Satyr Comma	*Polygonia satyrus*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Western White	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

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Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Rainier National Park **Route:** Naches Loop
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Woodland Skipper	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Echo Blue	*Celastrina echo*					
	Lupine Blue	*Plebejus lupini*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Purplish Copper	*Lycaena helliodes*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (0613328, 5190973), B (0613524, 5190973), C (0613711, 5190960), D (0613907, 5190932), E (0614089, 5190876), End (0614243, 5190913)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Naches Loop Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Coronis Fritillary	*Speyeria coronis*					
	Edith's Checkerspot	*Euphydryas editha*					
	Great Arctic	*Oeneis nevadensis*					
	Green Comma	*Polygonia faunus*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Snowberry/ Ancia Checkerspot	*Euphydryas colon/ anicia*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Clodius Parnassian	*Parnassus clodius*					
	Mountain Parnassian	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Sara's Orangetip	*Anthocharis sara*					
	Clouded Sulphur	*Colias philodice*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Rainier National Park **Route:** Skyscraper Mountain
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae							
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Arctic Blue	*Agriades glandon*					
	Boisduval's Blue	*Plebejus icarioides*					
	Lupine Blue	*Plebejus lupini*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Blue Copper	*Lycaena heteronea*					
	Mariposa Copper	*Lycaena mariposa*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (0600011, 5196543); B (0599820, 5196610); C (0599628, 5196673); D (0599534, 5196846); E (0599440, 5197003); End (0599367, 5197174)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Skyscraper Mountain Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Field Crescent	*Phyciodes pulchella*					
	Hoary Comma	*Polygonia gracilis*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Satyr Comma	*Polygonia satyrus*					
	Snowberry/ Ancia Checkerspot	*Euphydryas colon/ anicia*					
	Western Meadow Fritillary	*Boloria epithore*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Clodius Parnassian	*Parnassus clodius*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur	*Colias philodice*					
	Western White	*Pontia occidentalis*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

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Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Rainier National Park **Route:** Spray Park
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae							
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (0588496, 5197148), B (0588701, 5197180), C (0588887, 5197212), D (0589085, 5197263), E (0589258, 5197292), End (0589451, 5197265)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Spray Park Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Hoary Comma	*Polygonia gracilis*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Mourning Cloak	*Nymphalis antiopa*					
	Satyr Comma	*Polygonia satyrus*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Western White	*Pontia occidentalis*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 22, 2017

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Species Detections

Site: Mount Rainier National Park **Route:** Sunrise Rim
Date: _____ **Start Time:** _____ **End Time:** _____ **Break Time:** _____
Observer: _____ **Recorder:** _____
Other Participants: _____
Survey Start:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Survey End:
Sky: Clear: ☐ Mostly Clear: ☐ Partly Cloudy: ☐ Mostly Cloudy: ☐ Overcast: ☐ Hazy: ☐
Wind: Calm: ☐ Relatively Still: ☐ Moderately Windy: ☐ Windy: ☐ Very Windy: ☐
Temperature (°F): _____
Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae							
	Unidentified Skipper	*Hesperiidae sp.*					
Lycaenidae	Acmon Blue	*Plebejus acmon*					
	Anna's Blue	*Plebejus anna*					
	Boisduval's Blue	*Plebejus icarioides*					
	Silvery Blue	*Glaucopsyche lygdamus*					
	Mariposa Copper	*Lycaena mariposa*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					

Section Coordinates (UTM E, UTM N): A (0603401, 5196370), B (0603214, 5196354), C (0603035, 5196436), D (0602873, 5196512), E (0602722, 5196598), End (0602572, 5196524)

May 22, 2017

Cascades Butterfly Project Monitoring Data Sheet

Sunrise Rim Survey Route

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Nymphalidae	Arctic Fritillary	*Boloria chariclea*					
	Edith's Checkerspot	*Euphydryas editha*					
	Field Crescent	*Phyciodes pulchella*					
	Hoary Comma	*Polygonia gracilis*					
	Hydaspe Fritillary	*Speyeria hydaspe*					
	Milbert's Tortoiseshell	*Aglais milberti*					
	Mormon Fritillary	*Speyeria mormonia*					
	Satyr Comma	*Polygonia satyrus*					
	Snowberry/ Anicia Checkerspot	*Euphydras colon/anicia*					
	Unidentified Checkerspot	*Euphydras/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
Papilionidae	Anise Swallowtail	*Papilio zelicaon*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Cabbage White	*Pieris rapae*					
	Clouded Sulfur	*Colias philodice*					
	Sara's Orangetip	*Anthocharis sara*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae sp.*					
	Unknown Butterfly	*Butterfly sp.*					

Survey Notes (Percent snow cover in section, changing weather conditions, could not complete route/section, interesting butterfly observations outside of your survey box, etc.):

Mail completed data sheets to: North Cascades National Park Service Complex, Attention: Regina Rochefort, 810 State Route 20, Sedro-Woolley, WA 98284

May 12, 2017

Appendix D. Plant Phenology Data Sheets

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Baker-Snoqualmie National Forest **Route:** Sauk Mountain

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5m survey box, enter the **phenophase** of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (50% or more plants have flowers that have wilted or are in fruit). *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M, or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 viable flowers or flowering stalks, and **3** for 51 or more viable flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Anaphalis margaritacea	Pearly Everlasting						
Aquilegia formosa	Red Columbine						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Castilleja hispida	Harsh Indian Paintbrush						
Cirsium edule	Edible Thistle						
Erigeron peregrinus	Subalpine Daisy						
Erythronium grandiflorum	Glacier Lily (yellow)						
Eucephalus ledophyllus	Cascade Aster						
Heracleum maximum	Cow Parsnip						
Lilium columbianum	Tiger Lily						
Lomatium dissectum	Fern-leaved Desert Parsley						
Lomatium martindalei	Cascade Desert Parsley						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon serrulatus	Coast Penstemon						
Phlox diffusa	Spreading Phlox						
Sedum divergens	Pacific Stonecrop						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						
Viola sempervirens	Evergreen Violet (yellow)						

Section Coordinates (UTM E, UTM N): A (603477, 5374825); B (603449, 5374857); C (603415, 5374866); D (603391, 5374893); E (603347, 5374907); End (603318, 5374882)

January 29, 2017

Office use only	*(use initials and mm/dd/yy)*		
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Baker-Snoqualmie National Forest **Route:** Skyline Divide

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M, or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 viable flowers or flowering stalks, and **3** for 51 or more viable flowers or flowering stalks.

Plant Species		**Section (each 200m long)**					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Cassiope mertensiana	White Heather						
Castilleja parviflora var. albida	White Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Eriogonum pyrolifolium	Alpine Buckwheat						
Erythronium grandiflorum	Glacier Lily (yellow)						
Lomatium martindalei	Cascade Desert Parsley						
Luetkea pectinata	Partridgefoot						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabellifolia	High Mountain Cinquefoil						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						

Section Coordinates (UTM E, UTM N): A (584360, 5413029); B (584332, 5413230); C (584347, 5413417); D (584456, 5413586); E (584629, 5413671); End (584772, 5413797)

January 29, 2017

North Cascades National Park

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: North Cascades National Park **Route:** Cascade Pass

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Anaphalis margaritacea	Pearly Everlasting						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Cassiope mertensiana	White Heather						
Castilleja hispida	Harsh Indian Paintbrush						
Castilleja parviflora var. albida	White Indian Paintbrush						
Cirsium edule	Edible Thistle						
Erigeron peregrinus	Subalpine Daisy						
Erythronium grandiflorum	Glacier Lily (yellow)						
Heracleum maximum	Cow Parsnip						
Luetkea pectinata	Partridgefoot						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Penstemon serrulatus	Coast Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Polemonium pulcherrimum	Jacob's Ladder						
Potentilla flabellifolia	High Mountain Cinquefoil						
Spiraea densiflora	Subalpine Spirea						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						

Section Coordinates (UTM E, UTM N): A (643763, 5370158); B (643698, 5370225); C (643685, 5370293); D (643802, 5370340); E (643890, 5370368); End (643993, 5370449)

January 29, 2017

Office use only	*(use initials and mm/dd/yy)*		
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: North Cascades National Park **Route:** Easy Pass

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Anaphalis margaritacea	Pearly Everlasting						
Anemone occidentalis	Western Anemone						
Antennaria media	Rocky Mountain Pussytoes						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Castilleja hispida	Harsh Indian Paintbrush						
Cirsium edule	Edible Thistle						
Erigeron peregrinus	Subalpine Daisy						
Erythronium grandiflorum	Glacier Lily (yellow)						
Eucephalus ledophyllus	Cascade Aster						
Gentiana calycosa	Mountain Bog Gentian						
Heracleum maximum	Cow Parsnip						
Lomatium dissectum	Fern-leaved Desert Parsley						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabellifolia	High Mountain Cinquefoil						
Rhododendron albiflorum	White Rhododendron						
Sedum oreganum	Oregon Stonecrop						
Spiraea densiflora	Subalpine Spirea						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						

Section Coordinates (UTM E, UTM N): A (659078, 5382128); B (658897, 5382106); C (658800, 5382084); D (658665, 5382113); E (658500, 5382140); End (658432, 5382101)

January 29, 2017

Okanogan – Wenatchee National Forest

Office use only	*(use initials and mm/dd/yy)*		
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Okanogan-Wenatchee National Forest **Route:** Maple Pass

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Anemone occidentalis	Western Anemone						
Antennaria media	Rocky Mountain Pussytoes						
Arnica latifolia	Mountain Arnica						
Cassiope mertensiana	White Heather						
Castilleja hispida	Harsh Indian Paintbrush						
Castilleja parviflora var. albida	White Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Erythronium grandiflorum	Glacier Lily (yellow)						
Ligusticum grayi	Gray's Lovage						
Lomatium dissectum	Fern-leaved Desert Parsley						
Luetkea pectinata	Partridgefoot						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabellifolia	High Mountain Cinquefoil						
Sedum oreganum	Oregon Stonecrop						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						

[Section Coordinates (UTM E, UTM N): A (665496, 5374228); B (665679, 5374280); C (665828, 5374362); D (665980, 5374440); E (666141, 5374533); End (666294, 5374629)

January 29, 2017

Mount Rainier National Park

Office use only (use initials and mm/dd/yy)
Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Rainier National Park **Route:** Mazama Ridge

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: 1 for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Anemone occidentalis	Western Anemone						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Cassiope mertensiana	White Mountain Heather						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Erythronium montanum	Avalanche Lily (white)						
Eucephalus ledophyllus	Cascade Aster						
Gentiana calycosa	Mountain Bog Gentian						
Ligusticum grayi	Gray's Lovage						
Lupinus latifolius	Broadleaf Lupine						
Oreostemma alpigenum	Alpine Aster						
Pedicularis bracteosa	Bracted Lousewort						
Pedicularis rainierensis	Mt. Rainier Lousewort						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabelifolia	High Mountain Cinquefoil						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						

Section Coordinates (UTM E, UTM N): A (0597742, 5182642), B (0597695, 5182462), C (0597750, 5182284), D (0597703, 5182085), E (0597724, 5181889), End (0597737, 5181698)

December 6, 2016

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Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Rainier National Park **Route:** Naches Loop

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		**Section (each 200m long)**					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Anaphalis margaritacea	Pearly Everlasting						
Anemone occidentalis	Western Anemone						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Erythronium montanum	Avalanche Lily (white)						
Eucephalus ledophyllus	Cascade Aster						
Ligusticum grayi	Gray's Lovage						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Polemonium pulcherrium	Jacob's Ladder						
Potentilla flabellifolia	High Mountain Cinquefoil						
Rhododendron albiflorum	White Rhododendron						
Spirea densiflora	Dense Spirea						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						

Section Coordinates (UTM E, UTM N): A (0597742, 5182642), B (0597695, 5182462), C (0597750, 5182284), D (0597703, 5182085), E (0597724, 5181889), End (0597737, 5181698)

December 6, 2016

Office use only *(use initials and mm/dd/yy)*			
Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Rainier National Park **Route:** Skyscraper Mountain

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: 1 for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		**Section (each 200m long)**					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Anemone occidentalis	Western Anemone						
Bistorta bistortoides	American Bistort						
Cassiope mertensiana	White Heather						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Gentiana calycosa	Mountain Bog Gentian						
Lupinus latifolius	Broadleaf Lupine						
Lupinus lepidus	Dwarf Lupine						
Oreostema alpigenum	Alpine Aster						
Pedicularis bracteosa	Bracted Lousewort						
Pedicularis rainierensis	Mt. Rainier Lousewort						
Penstemon procerus	Small-Flowered Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabellifolia	High Mountain Cinquefoil						
Vaccinium deliciosum	Cascade Huckleberry						

Section Coordinates (UTM E, UTM N): A (0600011, 5196543); B (0599820, 5196610); C (0599628, 5196673); D (0599534, 5196846); E (0599440, 5197003); End (0599367, 5197174)

December 6, 2016

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Field Checked by: _____	date: _____	Updated by: _____	date: _____
Entered by: _____	date: _____	Approved by: _____	date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site: Mount Rainier National Park **Route:** Spray Park

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Bistorta bistortoides	American Bistort						
Cassiope mertensiana	White Mountain Heather						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Erythronium montanum	Avalanche Lily (white)						
Gentiana calycosa	Mountain Bog Gentian						
Lupinus latifolius	Broadleaf Lupine						
Oreostemma alpigenum	Alpine Aster						
Pedicularis bracteosa	Bracted Lousewort						
Pedicularis rainierensis	Mt. Rainier Lousewort						
Phyllodoce empetriformes	Pink Heather						
Potentilla flabellifolia	High Mountain Cinquefoil						
Vaccinium deliciosum	Cascade Huckleberry						

Section Coordinates (UTM E, UTM N): A (0588496, 5197148), B (0588701, 5197180), C (0588887, 5197212), D (0589085, 5197263), E (0589258, 5197292), End (0589451, 5197265)

December 6, 2016

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Field Checked by: _____ date: _____ Updated by: _____ date: _____
Entered by: _____ date: _____ Approved by: _____ date: _____

CASCADES BUTTERFLY PROJECT

Butterfly Monitoring Plant Phenology

Site Mount Rainier National Park **Route**: Sunrise Rim

Observers: _____ **Date:** _____

PLANT PHENOLOGY OBSERVATIONS

For each section of the route within the 5 meter survey box, enter the phenophase of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (at least one plant with flowers), **M** for middle (50% or more plants have flowers), or **L** for late (more than 50% of the plants have flowers that have wilted or are in fruit) *Shaded boxes indicate sections where the species has not been observed and no data needs to be entered.*

Enter a flower abundance estimate when the phenophase is E, M or L: **1** for 1- 10 viable flowers or flowering stalks, **2** for 11-50 flowers or flowering stalks, and **3** for 51 or more flowers or flowering stalks.

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**
Achillea millefolium	Yarrow						
Anemone occidentalis	Western Anemone						
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Castilleja hispida	Harsh Indian Paintbrush						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Eucephalus ledophyllus	Cascade Aster						
Ligusticum grayi	Gray's Lovage						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon serrulatus	Cascade Penstemon						
Phlox diffusa	Spreading Phlox						
Phyllodoce empetriformes	Pink Heather						
Polemonium pulcherrim	Jacob's Ladder						
Potentilla flabellifolia	High Mountain Cinquefoil						
Vaccinium deliciosum	Cascade Huckleberry						
Valeriana sitchensis	Sitka Valerian						
Veratrum viride	False Hellebore						
Veronica cusickii	Cusick's Speedwell						
OTHER: (*You may list other species you know below*)							

Section Coordinates (UTM E, UTM N): A (0603401, 5196370), B (0603214, 5196354), C (0603035, 5196436), D (0602873, 5196512), E (0602722, 5196598), End (0602572, 5196524)

December 6, 2016


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PROJECT