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, version 2.0






Regina M. Rochefort
North Cascades National Park Service Complex
810 State Route 20
Sedro-Woolley, WA 98284

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Abstract

This document contains survey site descriptions and Standard Operating Procedures (SOPs) for field data collection and data entry for the Cascades Butterfly Project (CBP). The CBP is a long-term monitoring program in which community scientists and National Park Service biologists monitor butterfly abundances and plant phenology in subalpine meadows of the Cascade Mountains. CBP surveys were 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 (NPS) and U.S. Forest Service lands.

The CBP Protocol presents broad goals and a history of the project and is available on the NPS Data Store: "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 original version of the SOPs was published in 2017; version 2.0 has been updated based on our experiences over the last six years.

Acknowledgments

I would like to thank all the volunteers, interns, and NPS 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. Over the last decade, we have had over 300 volunteers involved in this project and each person has contributed to our success. Tanner Humphries, Ana Casillas Brownson, Michelle Toshack, Eddie Silahua, Tucker Grigsby, Kathy Acosta, Alex Brito, Jedediah Tressler, James Heintz, David Droppers, and Michelle Wong were NPS biologists or interns who worked on the project in its early years 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 both versions of 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 formatting and presenting information in all written documents.

List of Terms

Community 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.

Trail cards: field note cards developed for each survey route to aid in relocation of segments. Each note card has a photo of the beginning of the segment (with recognizable landmarks), coordinates (UTM and Latitude/longitude), and a description of the location of the segment beginning.

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 Community 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 (https://pollardbase.org/cbp/) accessible to citizen scientists. This database has been funded and developed under the direction of Dr. Leslie Ries, Georgetown University (SOP 3). At this time, we have documented 59 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).

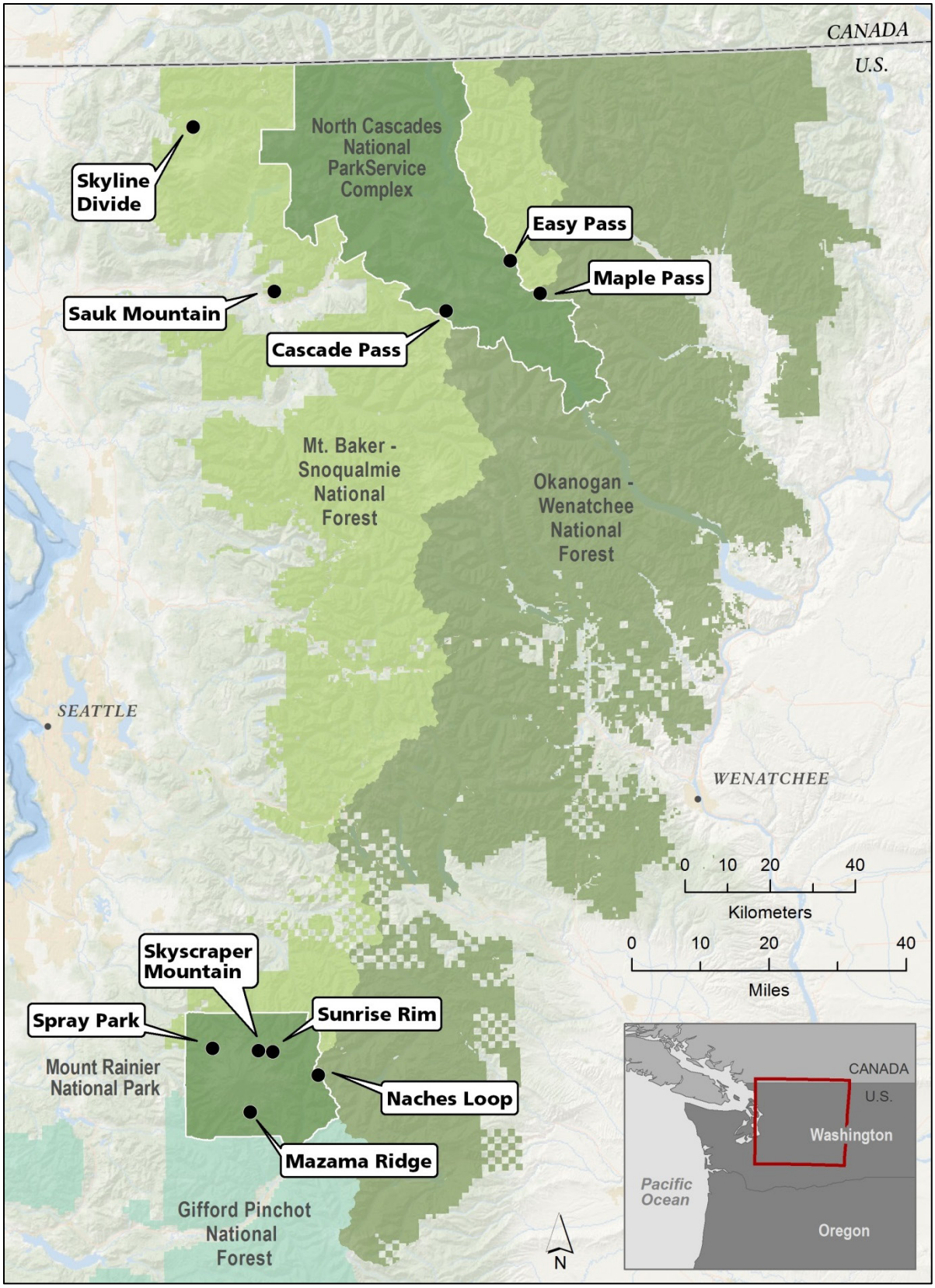


Figure 1. Locations of 10 Cascade Butterfly project survey routes.

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

Land Manager	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.

Family	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	*Erynnis persius*	Persius Duskywing	–	–	–	–	–	X	X	–	–	–
	Carterocephalus palaemon	Arctic Skipper	–	X	–	–	–	–	–	–	–	–
	Hesperia juba	Juba Skipper	–	–	–	–	–	–	–	–	–	X
	Hesperia comma	Common Branded Skipper	–	X	X	X	–	–	–	–	–	–
	Ochlodes sylvanoides	Woodland Skipper	–	–	–	X	X	–	X	–	–	–
	Pyrgus ruralis	Two-banded Checkered Skipper	–	–	–	–	–	–	–	X	–	X
Papilionidae	*Parnassius clodius*	Clodius Parnassian	X	X	X	X	X	–	X	X	X	–
	Parnassius smintheus	Mountain Parnassian	X	X	X	X	X	X	X	–	–	–
	Papilio zelicaon	Anise Swallowtail	–	X	X	X	X	X	X	X	X	X
	Papilio indra	Indra Swallowtail	–	–	X	–	–	–	–	–	–	–
	Papilio rutulus	Western Tiger Swallowtail	–	–	–	X	–	–	X	–	–	X
	Papilio eurymedon	Pale Swallowtail	–	X	–	X	X	–	–	–	–	–
Pieridae	*Colias philodice*	Clouded Sulphur	–	X	X	–	–	X	–	X	–	X
	Colias eurytheme	Orange Sulphur	X	X	X	–	–	–	X	–	–	X
	Anthocharis julia	Julia's Orangetip	X	X	X	X	X	–	–	–	–	X
	Neophasia menapia	Pine White	X	–	–	X	X	–	–	–	–	X
	Pieris marginalis	Margined White	X	–	–	X	X	–	–	–	X	–
	Pieris rapae	Cabbage White	–	–	–	X	X	–	–	–	–	X
	Pontia beckerii	Becker's White	–	–	–	–	–	–	X	X	–	–
	Pontia occidentalis	Western White	X	X	X	X	X	X	X	X	X	X
Lycaenidae	*Lycaena heteronea*	Blue Copper	–	X	X	–	–	X	–	X	–	–
	Lycaena helloides	Purplish Copper	X	X	X	X	X	X	X	–	–	–
	Lycaena mariposa	Mariposa Copper	X	X	X	X	X	X	X	X	X	X
	Callophrys augustinus	Brown Elfin	–	X	–	X	–	–	–	–	X	–

Family	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]
	Callophrys mossii	Moss' Elfin	–	–	–	X	–	–	–	–	–	–
	Strymon melinus	Gray Hairstreak	–	–	–	–	–	X	–	–	–	–
	Celastrina echo	Echo Blue	–	–	–	X	–	X	–	–	–	X
	Glaucopsyche lygdamus	Silvery Blue	X	X	X	X	X	X	X	X	X	X
	Plebejus saepiolus	Greenish Blue	–	–	–	–	–	X	–	–	–	X
	Icaricia icarioides	Boisduval's (Common) Blue	X	X	X	X	X	X	X	X	X	X
	Plebejus lupini / Acmon	Lupine Blue/ Acmon	–	X	–	–	X	–	X	X	–	X
	Plebejus anna	Anna's Blue	X	X	X	X	X	X	X	X	X	X
	Agriades glandon	Arctic Blue	–	X	X	X	–	–	–	X	–	X
Nymphalidae	*Boloria epithore*	Western Meadow Fritillary	X	X	X	X	X	X	X	X	–	X
	Boloria chariclea	Arctic Fritillary	X	X	X	X	X	X	X	X	X	X
	Speyeria coronis	Coronis Fritillary	–	–	–	–	–	X	X	X	X	X
	Speyeria hydaspe	Hydaspe Fritillary	X	X	X	X	X	X	X	–	X	X
	Speyeria mormonia	Mormon Fritillary	X	X	X	X	X	X	X	X	X	X
	Limenitis lorquini	Lorquin's Admiral	X	–	X	X	–	X	X	–	–	–
	Vanessa cardui	Painted Lady	X	X	X	X	X	X	X	X	X	–
	Vanessa atalanta	Red Admiral	X	X	–	–	–	–	–	–	–	X
	Aglais milberti	Milbert's Tortoiseshell	X	X	X	X	X	X	X	X	X	X
	Nymphalis californica	California Tortoiseshell	–	X	X	–	X	X	X	X	X	X
	Nymphalis antiopa	Mourning Cloak	–	–	X	–	–	X	–	–	X	–
	Polygonia satyrus	Satyr Comma	X	X	X	X	–	X	–	X	X	X
	Polygonia gracilis	Hoary Comma	X	X	X	X	X	X	X	X	X	X
	Polygonia faunus	Green Comma	X	–	–	–	–	–	X	–	–	–
	Euphydryas editha	Edith's Checkerspot	X	X	X	–	–	X	X	X	X	X
	Euphydryas colon	Snowberry Checkerspot	–	–	–	–	–	–	X	X	–	X
	Euphydryas anicia	Anicia Checkerspot	X	X	X	X	X	–	–	–	–	–

Family	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]
	Chlosyne hoffmanni	Hoffman's Checkerspot	–	–	–	–	–	–	X	–	–	–
	Chlosyne palla	Northern Checkerspot	–	–	X	–	–	–	–	–	–	–
	Phyciodes mylitta	Mylitta Crescent	–	–	–	X	–	–	–	–	–	X
	Phyciodes pulchella	Field Crescent	–	–	–	X	–	–	–	X	–	X
	Cercyonis pegala	Common Wood Nymph	–	–	–	–	–	–	–	–	X	X
	Erebia vidleri	Vidler's Alpine	X	X	X	X	X	–	–	–	–	–
	Erebia epipsodea	Common/ Butler's Alpine	–	X	–	–	–	–	–	–	–	–
	Oeneis chryxus	Chryxus Arctic	–	X	–	–	–	–	–	–	–	–
	Oeneis nevadensis	Great Arctic	–	–	–	–	–	–	X	–	–	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 3. Plant species surveyed at each site.

Scientific Name	Common Name	NOCA, MBS, OWN[1]					MORA[1]				
		CP[2]	EP	MP	SM	SD	MR	NL	SP	SR	SS
Achillea millefolium	Yarrow	–	X	–	–	–	–	–	–	X	X
Anaphalis margaritacea	Pearly Everlasting	X	X	–	X	–	–	X	–	–	–
Arnica latifolia	Mountain Arnica	–	–	–	–	X	–	X	–	–	–
Bistorta bistortoides	American Bistort	X	X	–	X	X	X	X	X	X	X
Castilleja miniata	Scarlet Paintbrush	–	X	X	–	–	–	–	–	X	–
Castilleja parviflora var. *albida*	White Indian Paintbrush	X	–	X	–	X	–	–	–	–	–
Castilleja parviflora var. *oreopola*	Magenta Indian Paintbrush	–	–	–	–	–	X	X	X	X	X
Cirsium edule	Edible Thistle	X	X	–	X	–	–	–	–	–	–
Dicentra formosa	Bleeding Hearts	–	–	–	X	–	–	–	–	–	–
Erigeron glacialis	Subalpine Daisy	X	X[3]	X[3]	X	–	–	–	–	–	–
Erigeron peregrinus	Subalpine Daisy	X	X	X	–	X	X	X	X	X	X
Eriogonum pyrolifolium	Alpine Buckwheat	–	–	–	–	X	–	–	–	–	–
Eucephalus engelmanni	Cascade Aster	–	X	–	X	–	–	–	–	–	–
Eucephalus ledophyllus	Cascade Aster	–	X	–	–	–	X	X	–	X	–
Gentiana calycosa	Mountain Bog Gentian	–	–	–	–	–	X	–	X	–	X
Heracleum maximum	Cow Parsnip	–	–	–	X	–	–	–	–	–	–
Ligusticum grayi	Gray's Lovage	–	–	X	–	–	X	X	–	X	–
Lomatium brandegeei	Brandegee's Desert Parsley	–	X[3]	X	–	–	–	–	–	–	–
Lomatium multifidum or *L. dissectum*	Fern-Leaved Desert Parsley	–	X[3]	–	X	–	–	–	–	–	–
Lomatium martindalei	Cascade Desert Parsley	–	–	–	–	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

Scientific Name	Common Name	NOCA, MBS, OWN[1]					MORA[1]				
		CP[2]	EP	MP	SM	SD	MR	NL	SP	SR	SS
Penstemon serrulatus	Coast Penstemon	X	–	–	–	–	–	–	–	X	–
Penstemon procerus	Small-Flowered Penstemon	–	X	X	–	X	–	–	–	X	X
Potentilla flabellifolia	High Mountain Cinquefoil	X	–	X	–	X	–	–	X	–	–
Sedum divergens	Pacific Stonecrop	–	–		X	–	–	–	–	–	–
Sedum oreganum	Oregon Stonecrop	–	–	X	X	–	–	–	–	–	–
Valeriana sitchensis	Sitka Valerian	X	X	X	X	X	X	X	–	X	–
Viola glabella	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

[3] indicates that the species might be incorrect – e.g., in the case of *Erigeron* it could be *E. peregrinus* or *E. glacialis*; for *Lomatium*, it could be *L. brandegeei* or *L. multifidum*

Mount Baker- Snoqualmie National Forest

Sauk Mountain Route

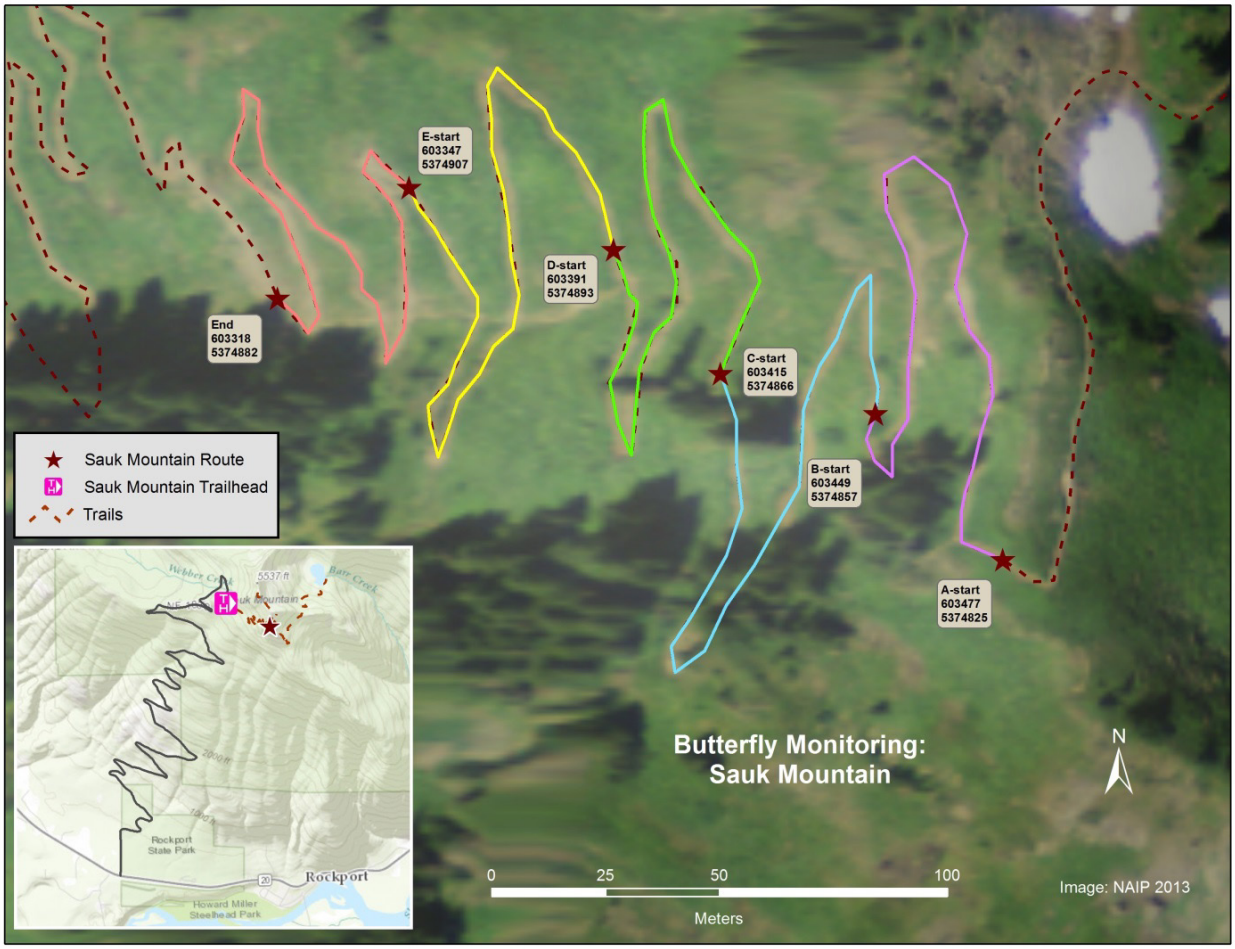


Figure 3. Sauk Mountain Route map illustrating segment locations.

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, documenting 34 butterfly species and consistently high abundances (Table 2, Figure 4). The five most abundant butterflies are Anna's Blues, Mormon Fritillary, Western Meadow Fritillary, Clodius Parnassian, and Julia's Orangetip. Fourteen plant species are currently being monitored (Table 3, Appendix D).

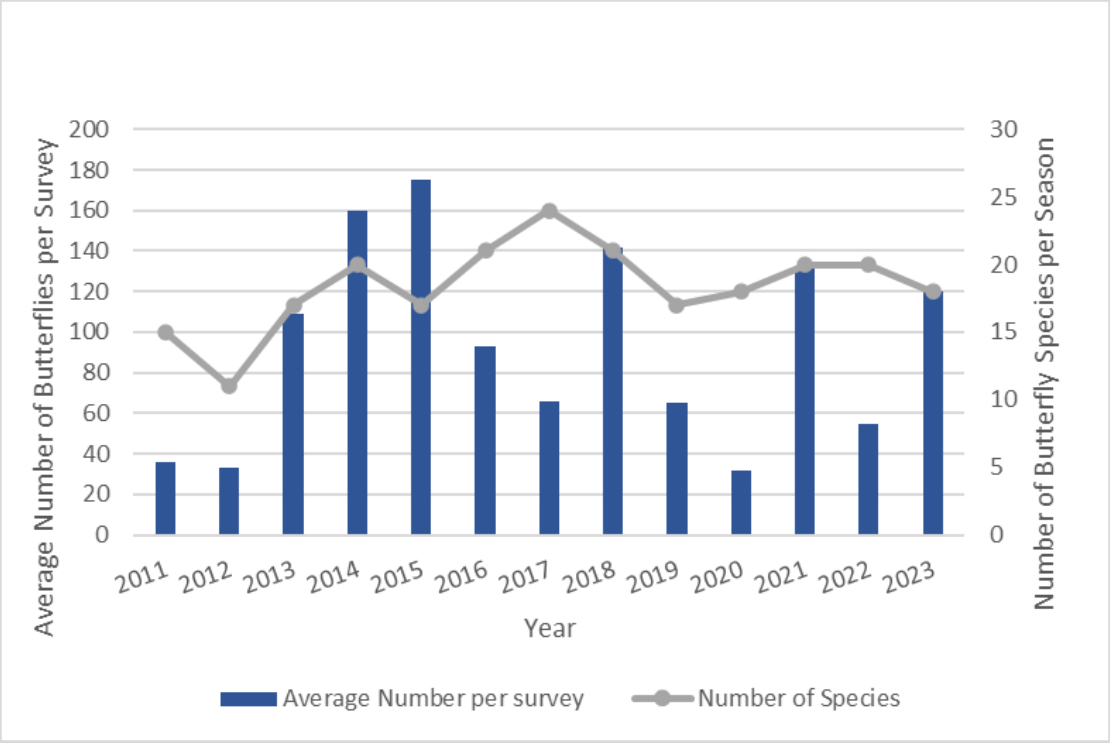


Figure 4. Butterfly species richness and average abundance documented at Sauk Mountain, 2011-2023.

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. 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. Segment markers are often established at the beginning of the field season, but segments can also be reliably located using the Latitude/Longitude or UTM (Universal Transverse Mercator coordinates of each segment or photo-points on the Trail Cards (Appendix A, E).

Mount Baker- Snoqualmie National Forest

Skyline Divide

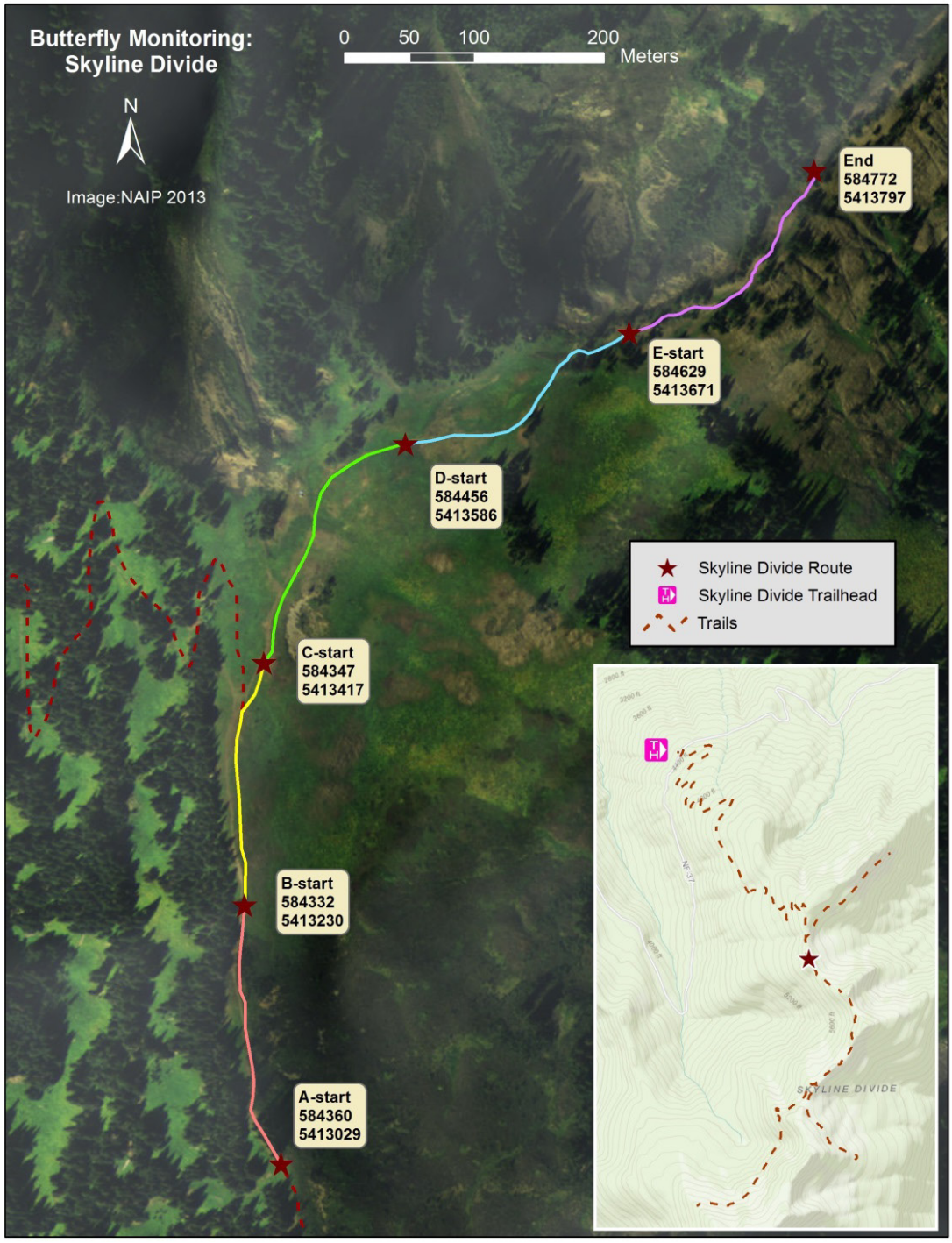


Figure 5. Skyline Divide map illustrating segment locations.

The Skyline Divide Route is another long drive along 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

(Figure 5). The route has been surveyed since 2012, 26 butterfly species have been documented along the route (Table 2, Figure 6). The five abundant butterfly species are Mormon Fritillary, Anna's Blue, Hydaspe Fritillary, Arctic Fritillary, and Silver Blues. Eleven plant species are monitored at this site (Table 3).

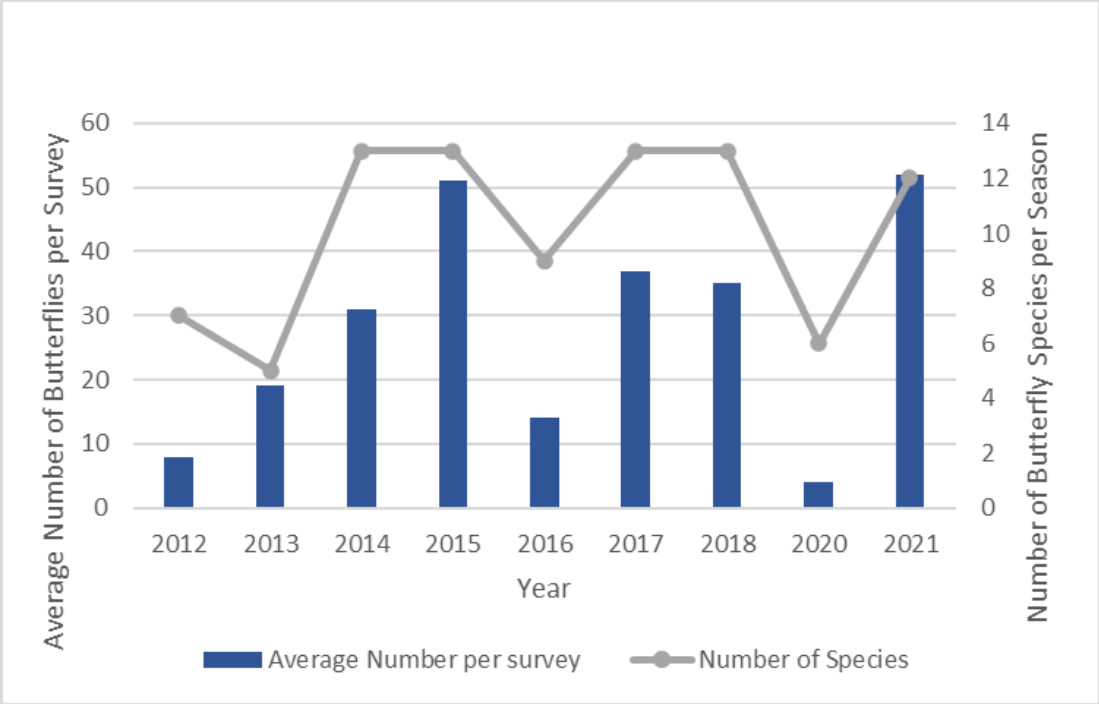


Figure 6. Butterfly species richness and average abundance documented at Skyline Divide, 2012-2020.

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 ft 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 (Figure 5). This route is more a south to north direction rather the up or down in elevation. Trail cards and segment coordinates are presented in Appendices A and E.

North Cascades National Park

Cascade Pass

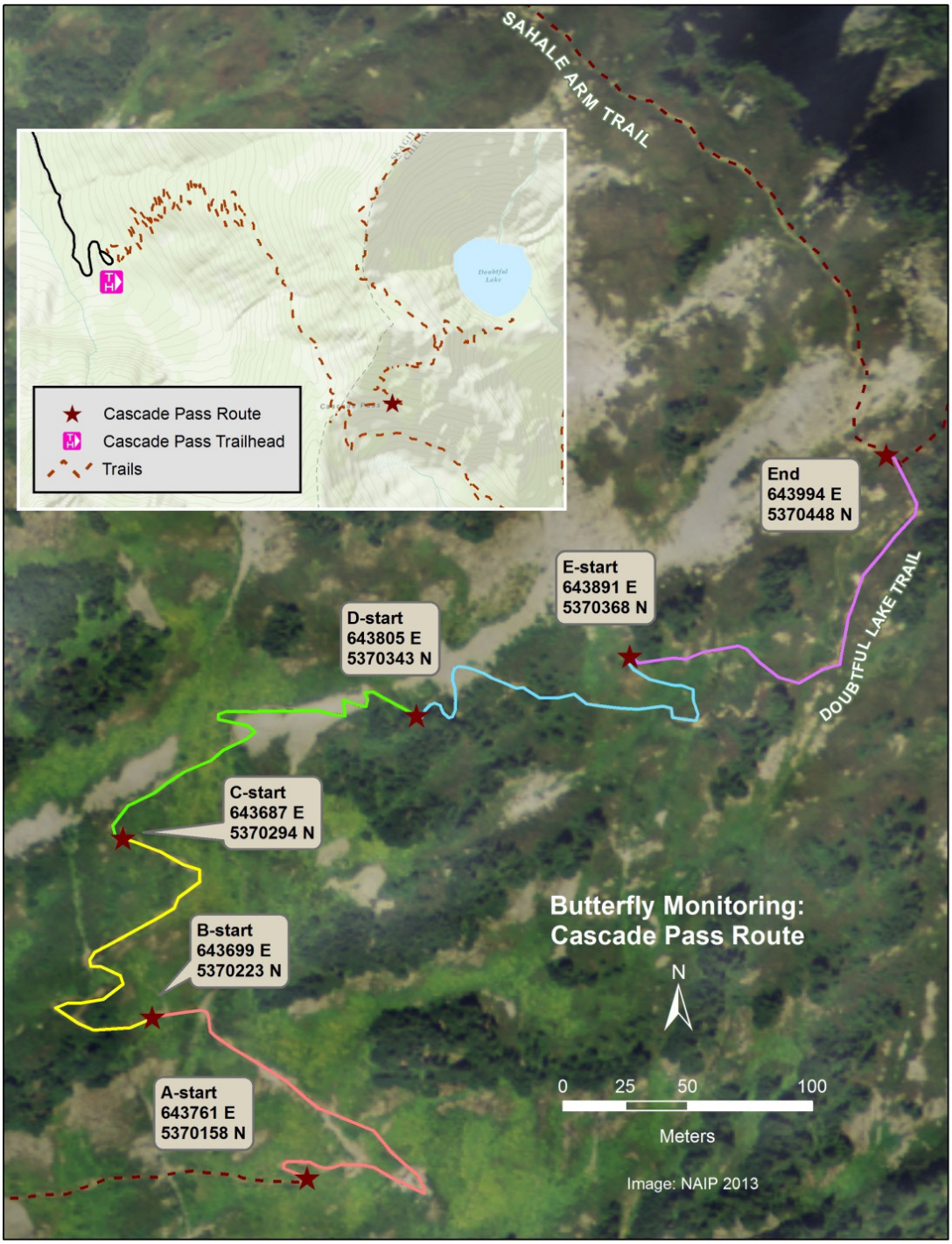


Figure 7. Cascade Pass Route map illustrating segment locations.

The Cascade Pass Route is located along the switchbacks above Cascade Pass was on the route to Sahale Arm and established in 2012 (Figure 7). In 2015 and 2016, NOCA 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 survey direction was reversed so that section A is at the lowest elevation; butterfly surveys are conducted going uphill and plant phenology on the way down (10 species). Twenty-six butterfly species have been documented Cascade Pass (Table 2, Figure 8). The abundant species are Mormon Fritillary, Mariposa Copper, Arctic Fritillary, Anna's Blue, and Western Meadow Fritillary (Figure 9).

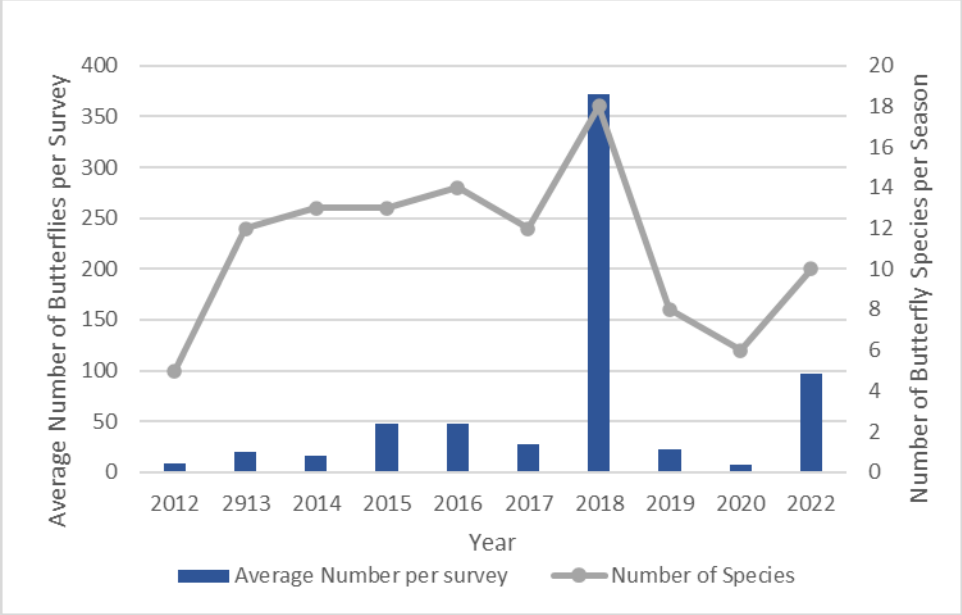


Figure 8. Butterfly species richness and average abundance documented at Cascade Pass, 2012-2022.



Figure 9. 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 ft in elevation; the road takes about an hour to drive. After about a 4 mile and 1,800 ft 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 7, Appendix E).

North Cascades National Park

Easy Pass

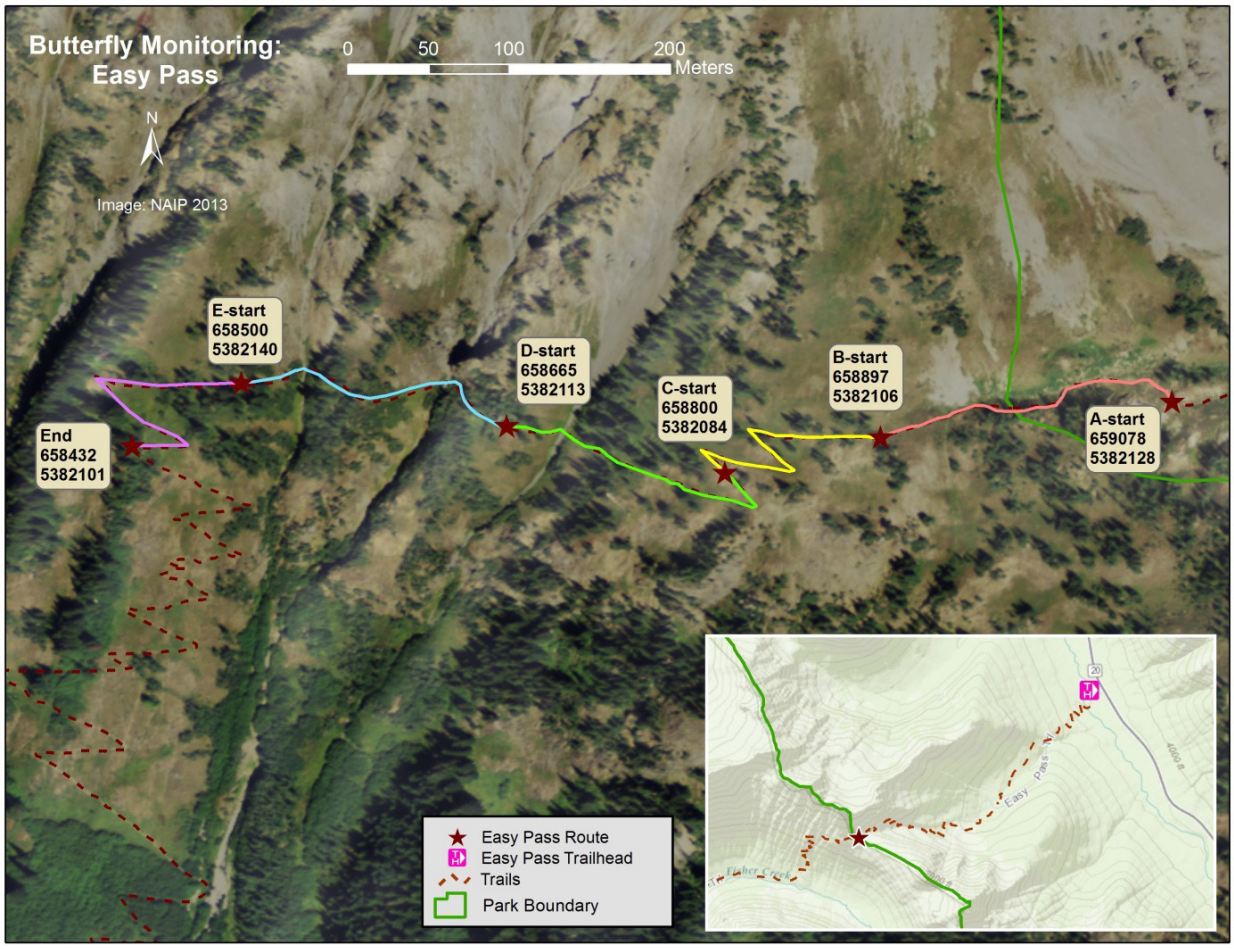


Figure 10. Map of Easy Pass survey route illustrating section locations.

The Easy Pass route was established in 2011 and is the most arduous North Cascades route to access (Figure 10). The views from Easy Pass and butterfly diversity (34 species, Table 2) 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 ft elevation and the trail to the Pass is about 3.5 miles and almost 3,000 ft up in elevation across talus slopes. The Cascades Butterfly Route starts just after the National Park boundary sign and descends a series of switchbacks. This route is tied for the highest species diversity (34) with Sauk Mountain and Sunrise Rim (Table 2, Figure 11). The most commonly detected butterfly species have been Anna's Blue, Anicia Checkerspot, Mariposa Copper, Arctic Fritillary, and Mormon Fritillary. The route traverses heath shrub and lush herbaceous communities which has resulted in a list of 12 species surveyed for plant phenology (Table 3).

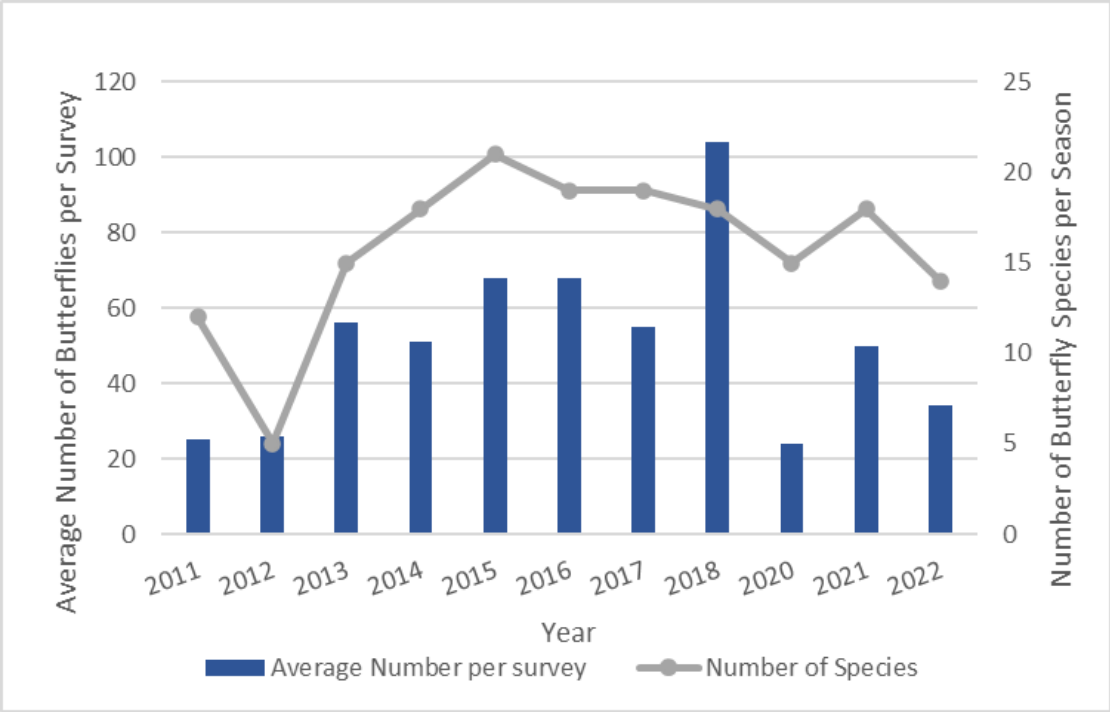


Figure 11. Butterfly species richness and average abundance documented at Easy Pass, 2011-2022.

Okanogan-Wenatchee National Forest

Maple Pass

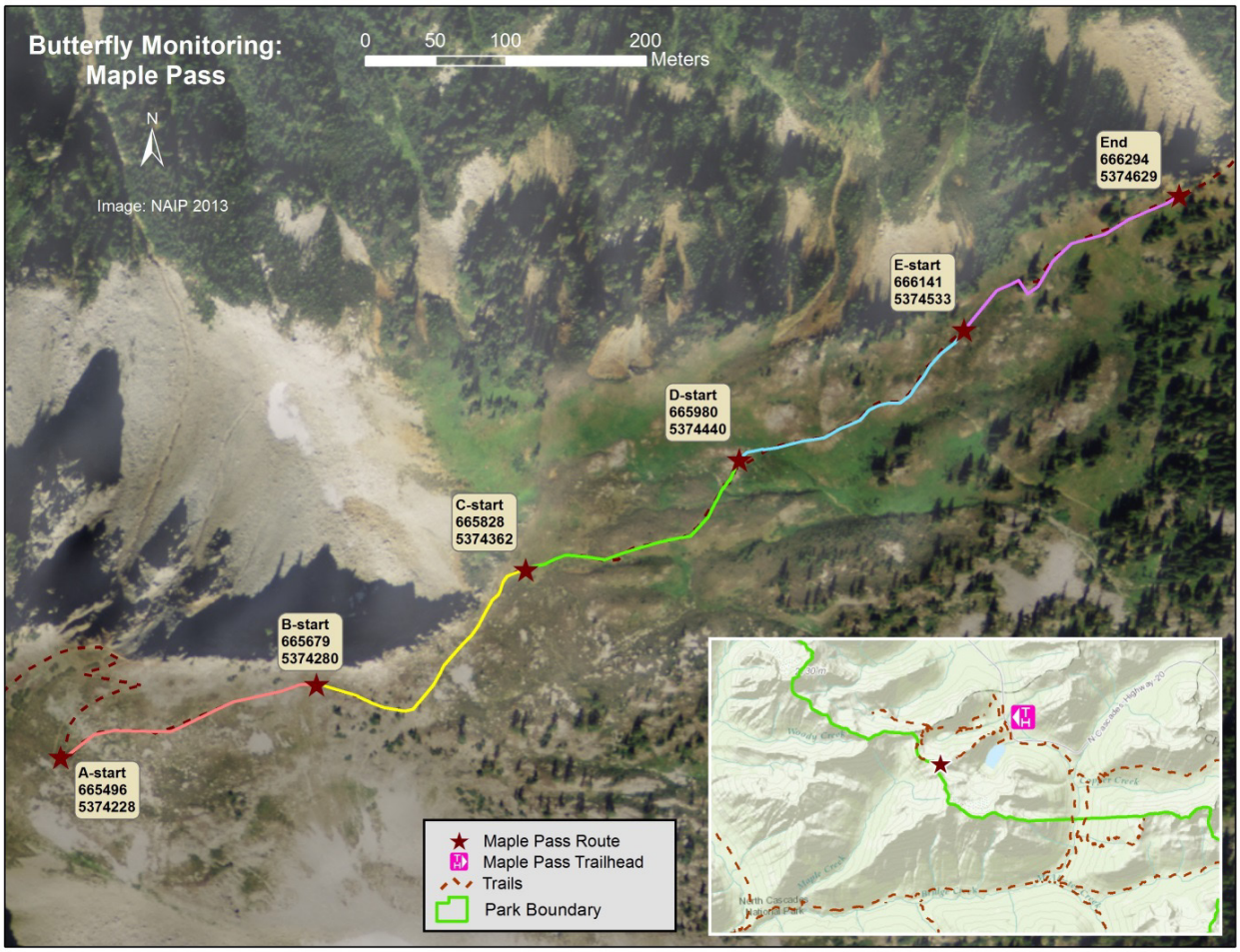


Figure 12. Map illustrating Maple Pass survey route and section locations.

The Maple Pass survey route is in a beautiful subalpine meadow just east of the North Cascades boundary into Okanogan-Wenatchee National Forest (Figure 12). 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 – 31 species (Figure 13). The five most abundant butterflies are Anna's Blue, Arctic Fritillary, Anicia Checkerspot, Milbert's Tortoiseshell, and Western White. Eleven plants species are monitored for plant phenology (Table 3).

Maple Pass is accessed from SR 20, about 51 miles east of Marblemount near milepost 158. 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.

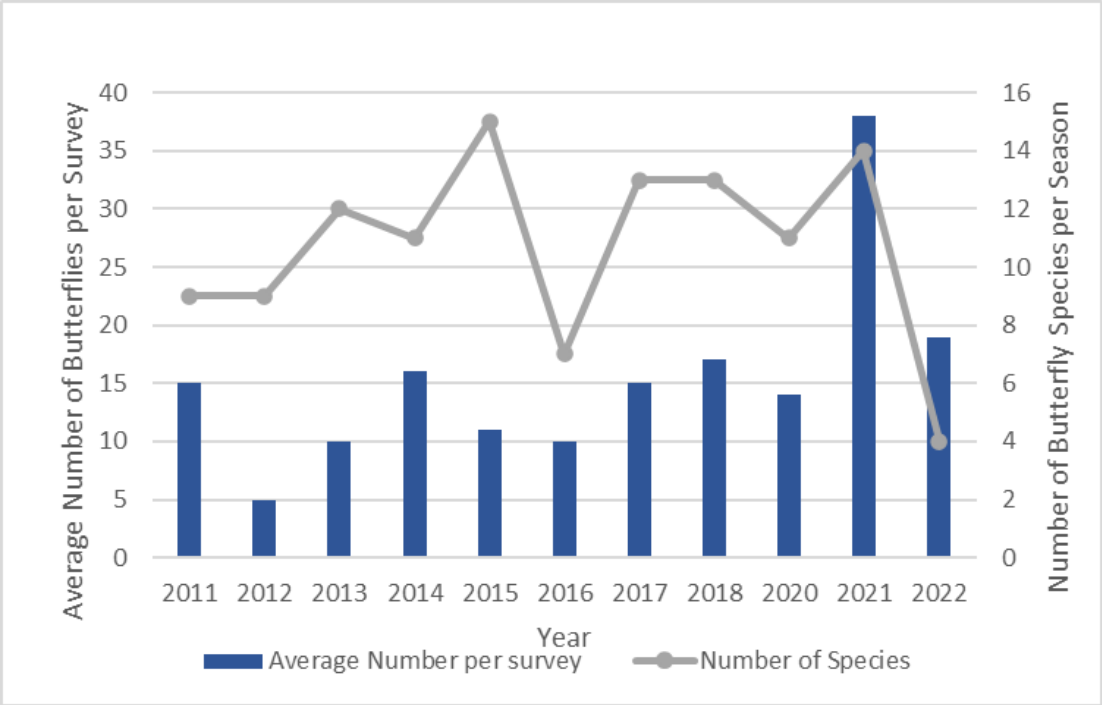


Figure 13. Butterfly species richness and average abundance documented at Maple Pass, 2011-2022.

Mount Rainier National Park

Mazama Ridge

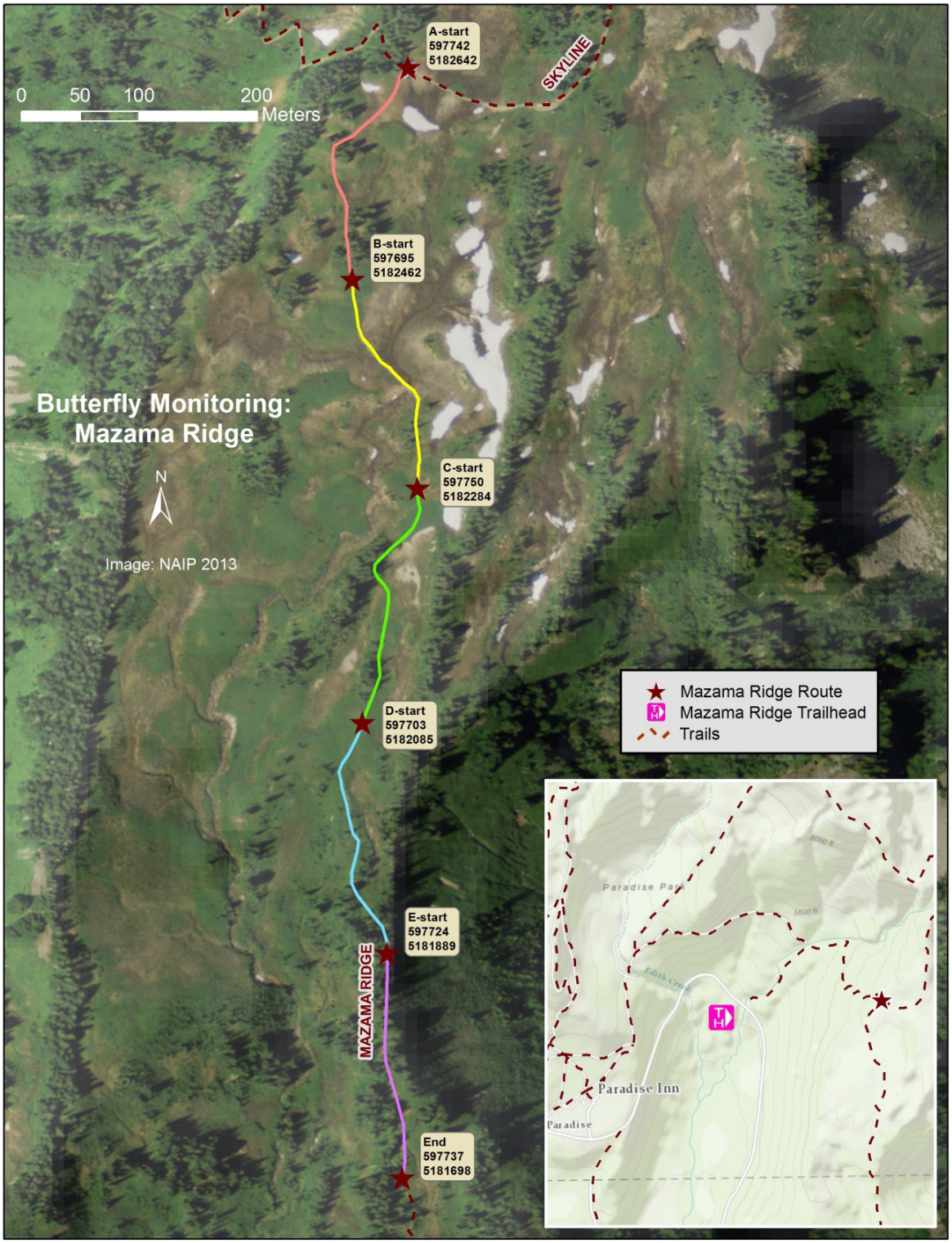


Figure 14. Map illustrating Mazama Ridge survey route and section locations.

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 (Figure 14). 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 15). 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 September 2022 (469 on August 25 and 749 on September 1) (Figure 16). The five most abundant butterflies observed are Anna's Blue, Arctic Fritillary, Mormon Fritillary, Silvery Blue, and Mariposa Copper. Eleven 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 15. Mazama Ridge survey crew on route on July 14, 2021. Left to right: Renee Buck, Regina Rochefort, Dave Purdon, Pam Gunther.

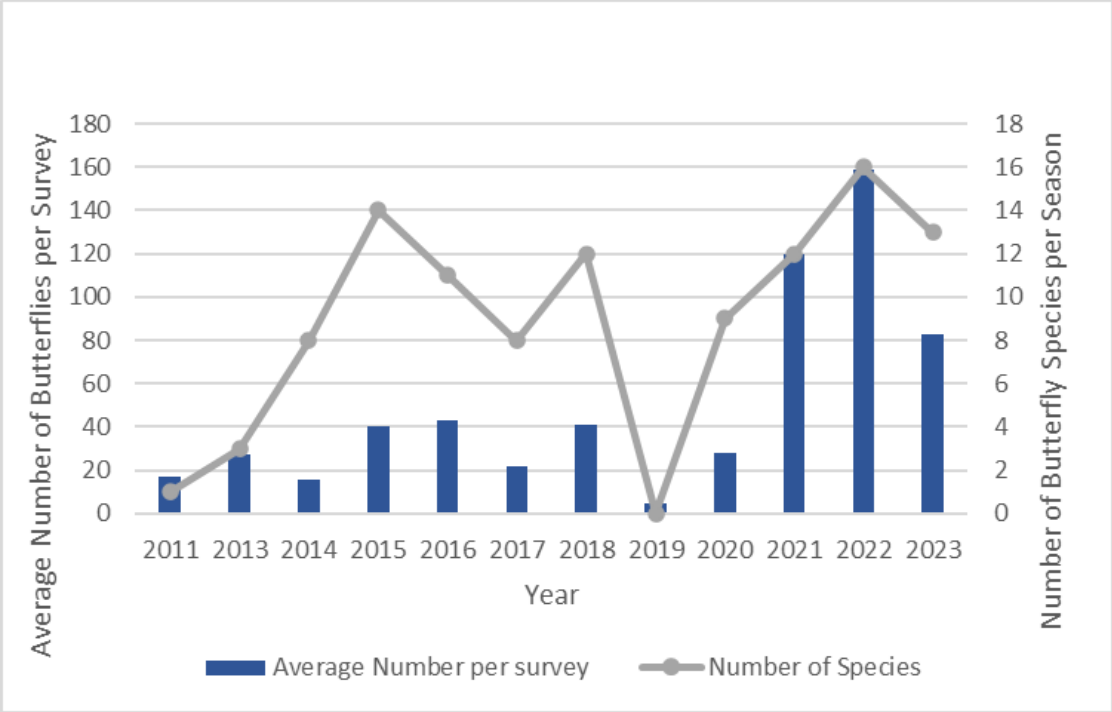


Figure 16. Butterfly species richness and average abundance documented at Mazama Ridge, 2011-2023.

Mount Rainier National Park

Naches Loop

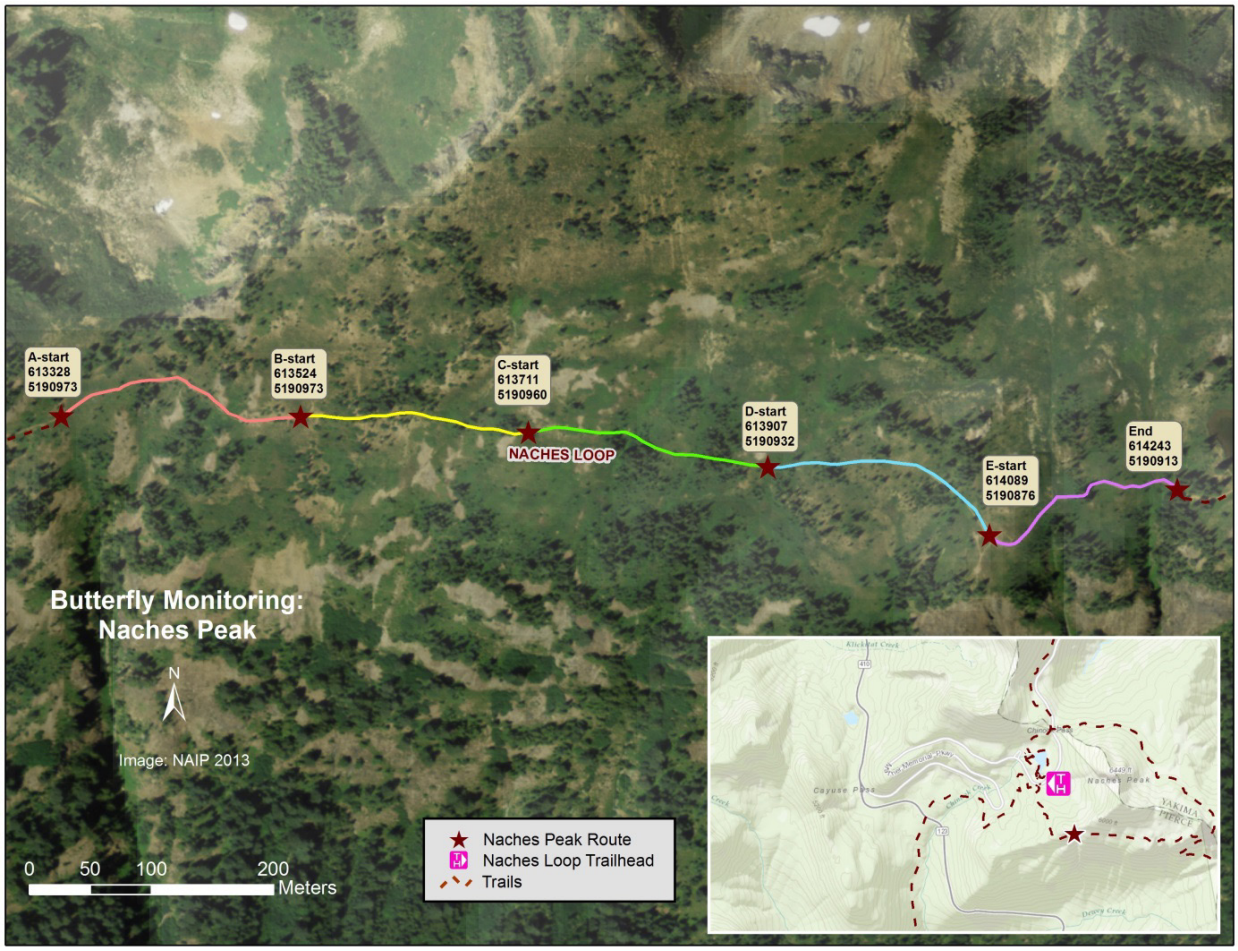


Figure 17. Map illustrating Naches Loop survey route and section locations.

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 Mount Baker-Snoqualmie National Forest parking lot on SR 123 just north of Chinook Pass (Figure 17). Only the USFS site requires a site pass. Butterfly abundances are generally less than 100 and peak annual abundances of 100 -160 documented in August of 2018, 2019, and 2021. Anna's Blue, Silvery Blue, Mormon Fritillary, Hydaspe Fritillary, and Arctic Fritillary have been the five most abundant of the 31 butterfly species recorded on this route (Figure 18). Over the last several years, Coronis Fritillary has frequently been observed on this route and this is the only route where Hoffman's Checkerspot has been observed. Ten plant species are surveyed (Table 3).

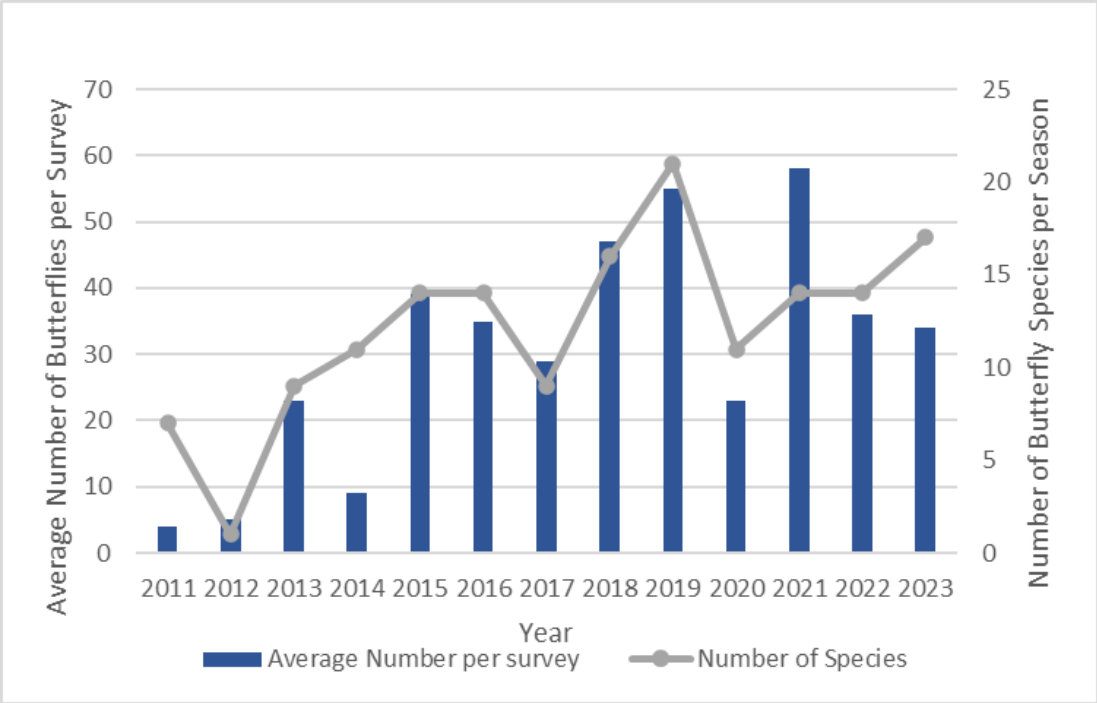


Figure 18. Butterfly species richness and average abundance documented at Naches Loop, 2011-2023.

Mount Rainier National Park

Skyscraper Mountain

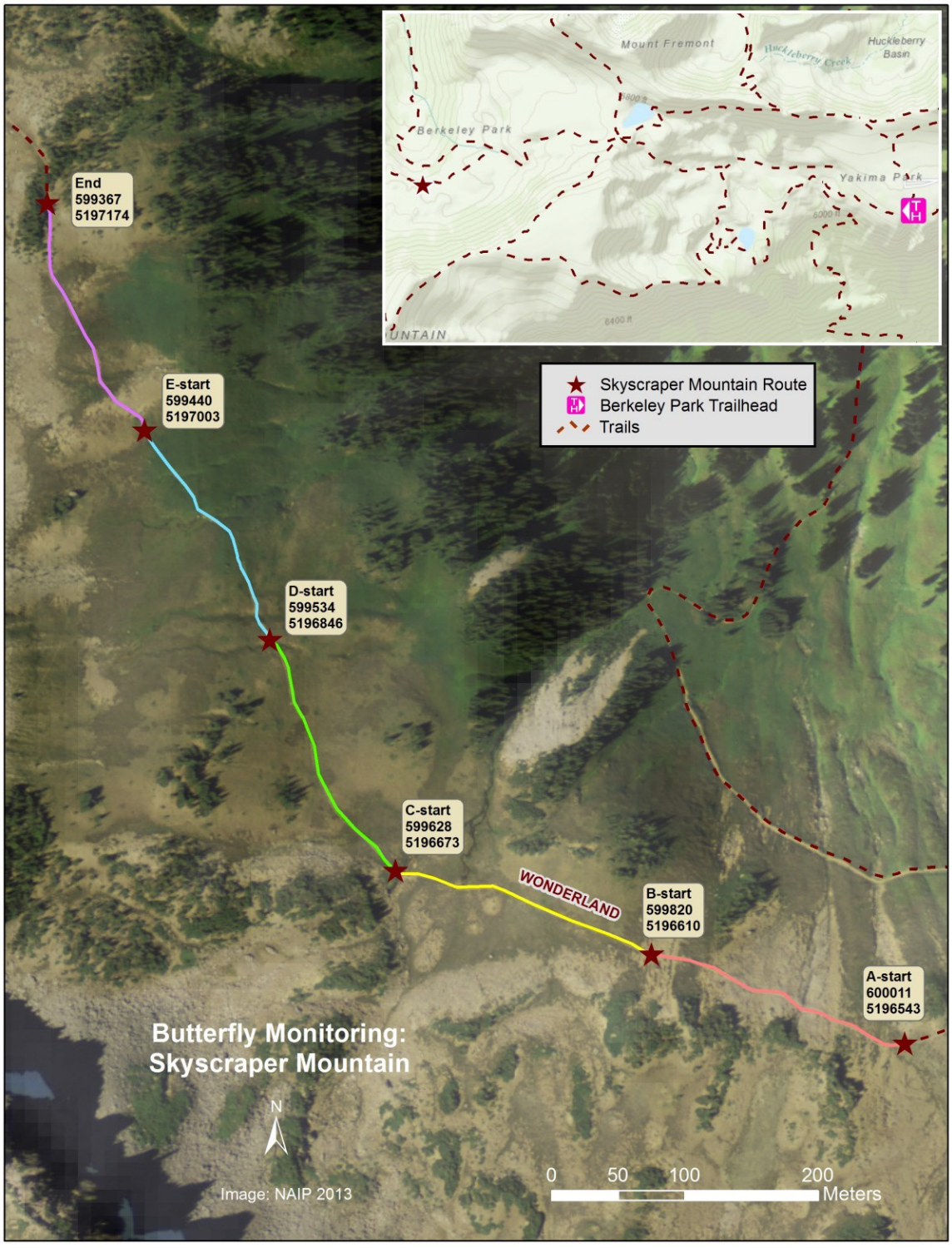


Figure 19. Map illustrating Skyscraper Mountain survey route and section locations.

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 19). 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-five butterfly species have been documented on this route with counts generally below 100 (Figure 20) and 11 plant species are surveyed (Table 3).

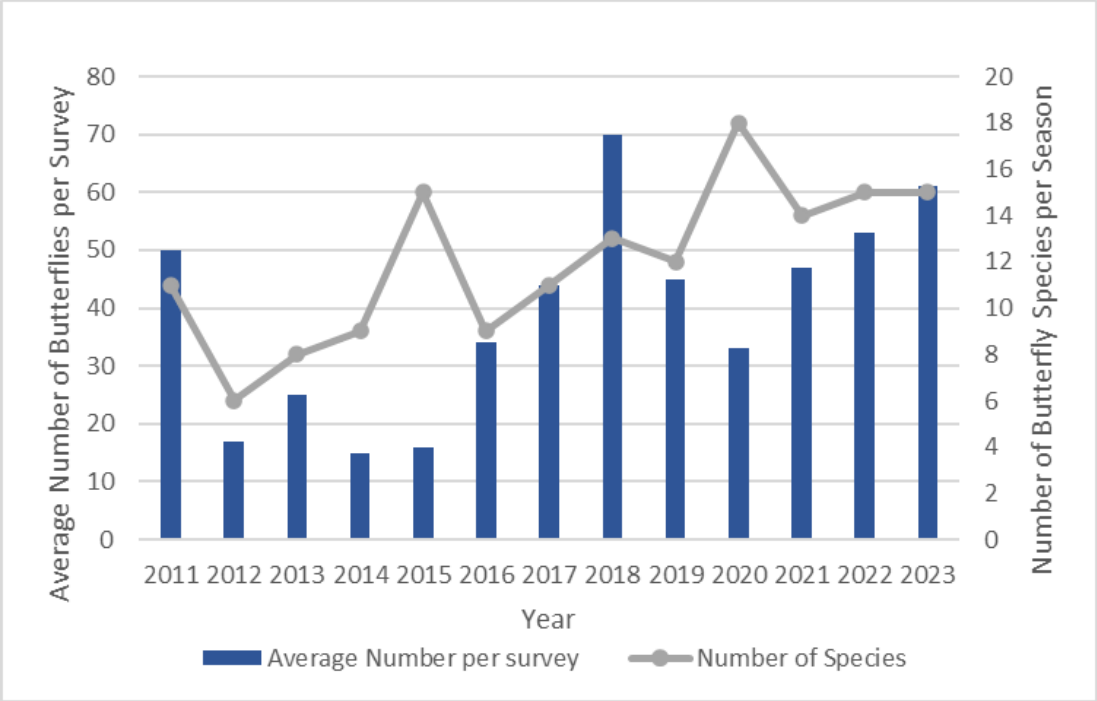


Figure 20. Butterfly species richness and average abundance documented at Skyscraper Mountain, 2011-2023.

Mount Rainier National Park

Spray Park

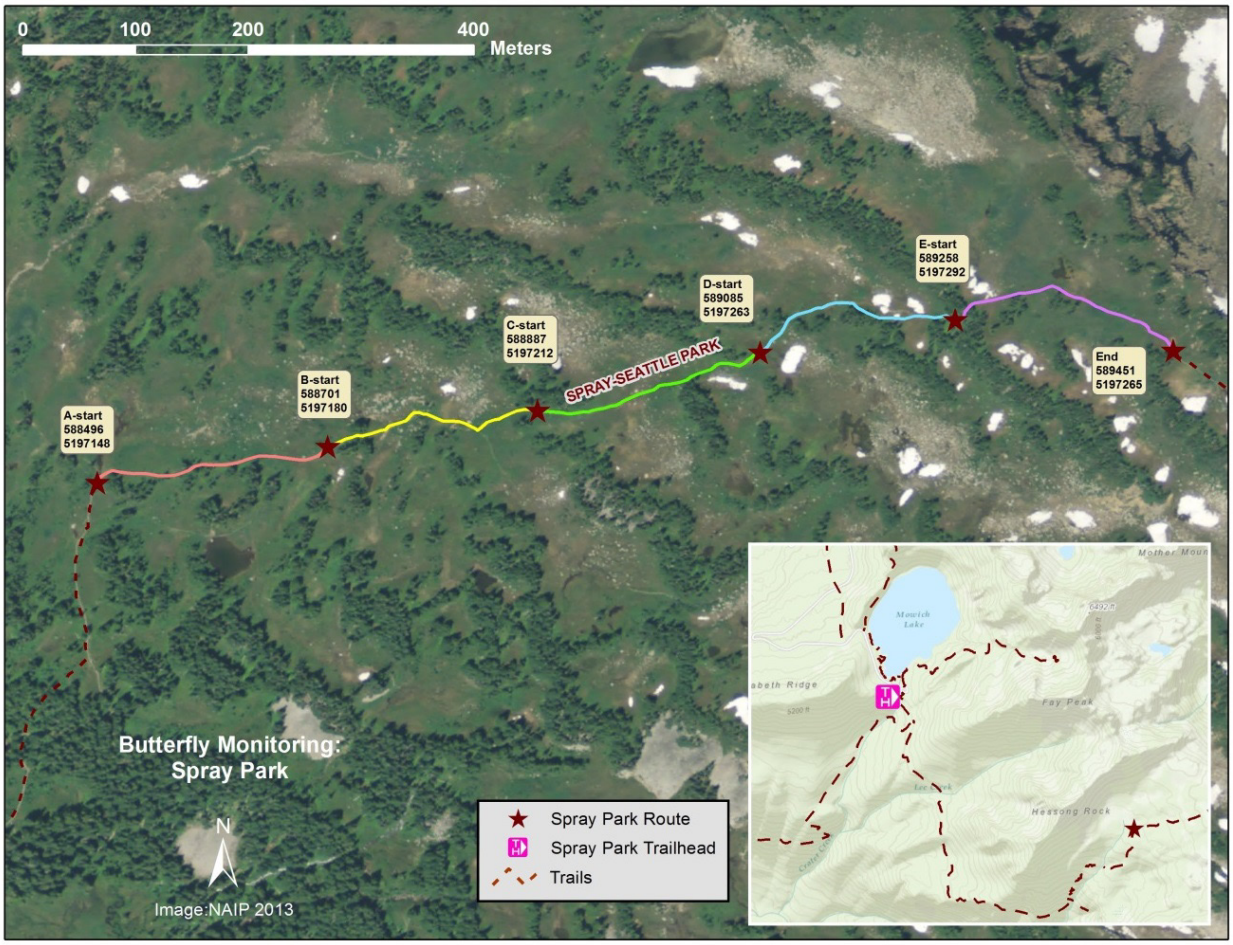


Figure 21. Map illustrating Spray Park survey route and locations of survey sections.

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 21). Between 2134 and 2018, we have been able to conduct surveys at least five times per season so our butterfly abundance estimates, and species lists have improved. No surveys were conducted from 2019– 2021, but this route was consistently surveyed in 2022 and 2023. Currently, we have documented 21 butterfly species with abundances generally <100 (Figure 22). The most frequently observed species were Arctic Fritillary, Mormon Fritillary, Anise Swallowtail, Silvery Blue, and Mariposa Copper. Nine plant species are surveyed (Table 3).

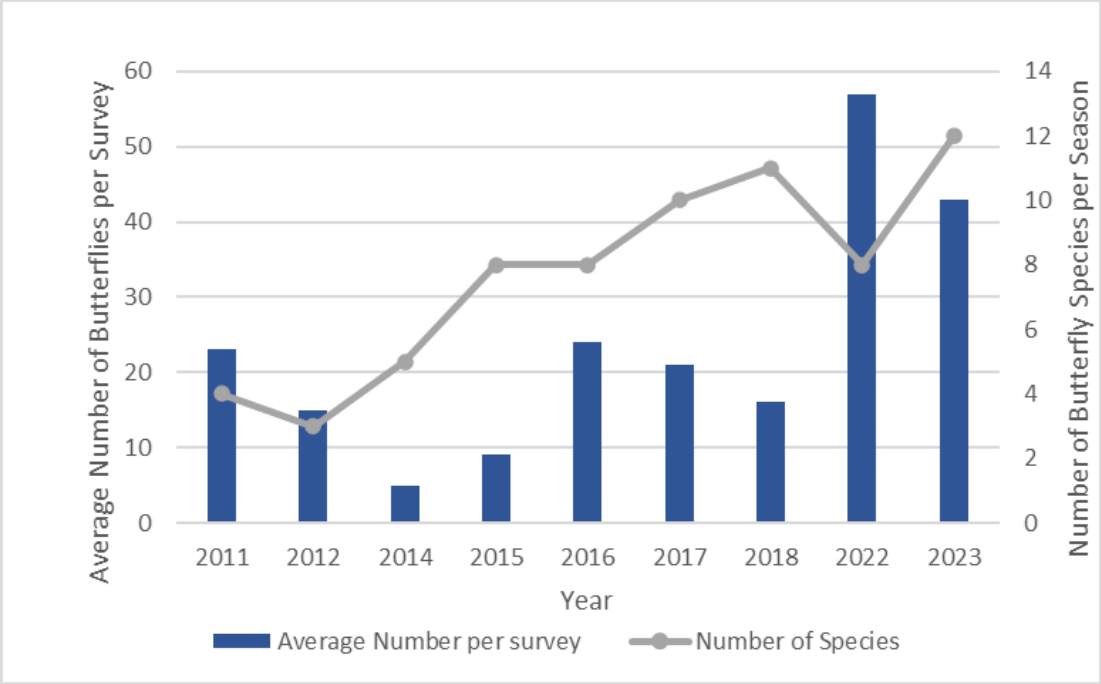


Figure 22. Butterfly species richness and average abundance documented at Spray Park, 2011-2023.

Mount Rainier National Park

Sunrise Rim

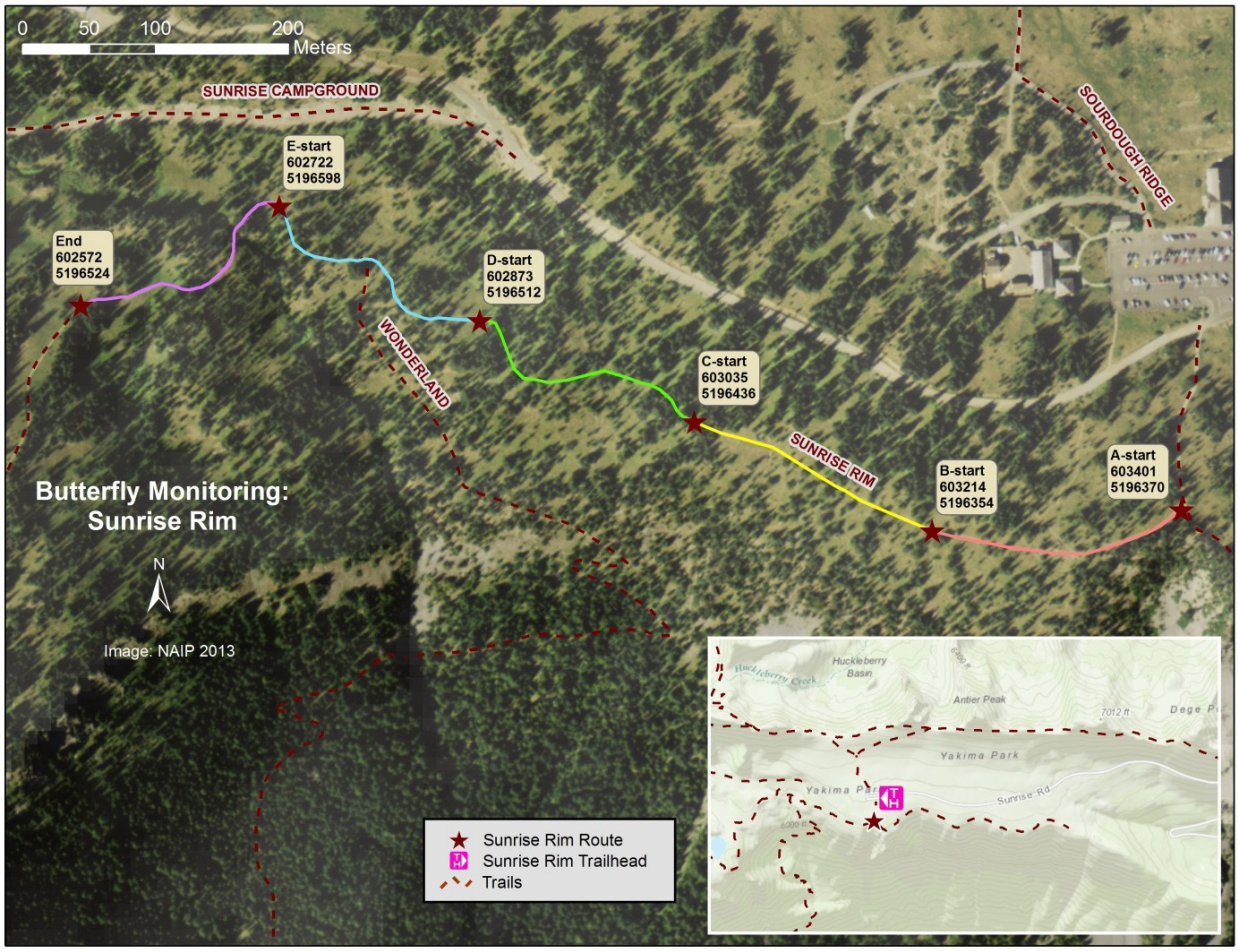


Figure 23. Map illustrating Sunrise Rim survey route and section locations.

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 23). Thirty-four species have been documented on this route and abundances can range up to 135 (Figure 24). Twelve plant species are surveyed on the route (Table 3). This is a great route to learn to differentiate the blues, checkerspots, and fritillaries as our eight most abundant butterflies are Anna's, Silvery, and Boisduval's Blue; Edith's and Snowberry Checkerspots; and Coronis, Mormon, and Hydaspe Fritillaries.

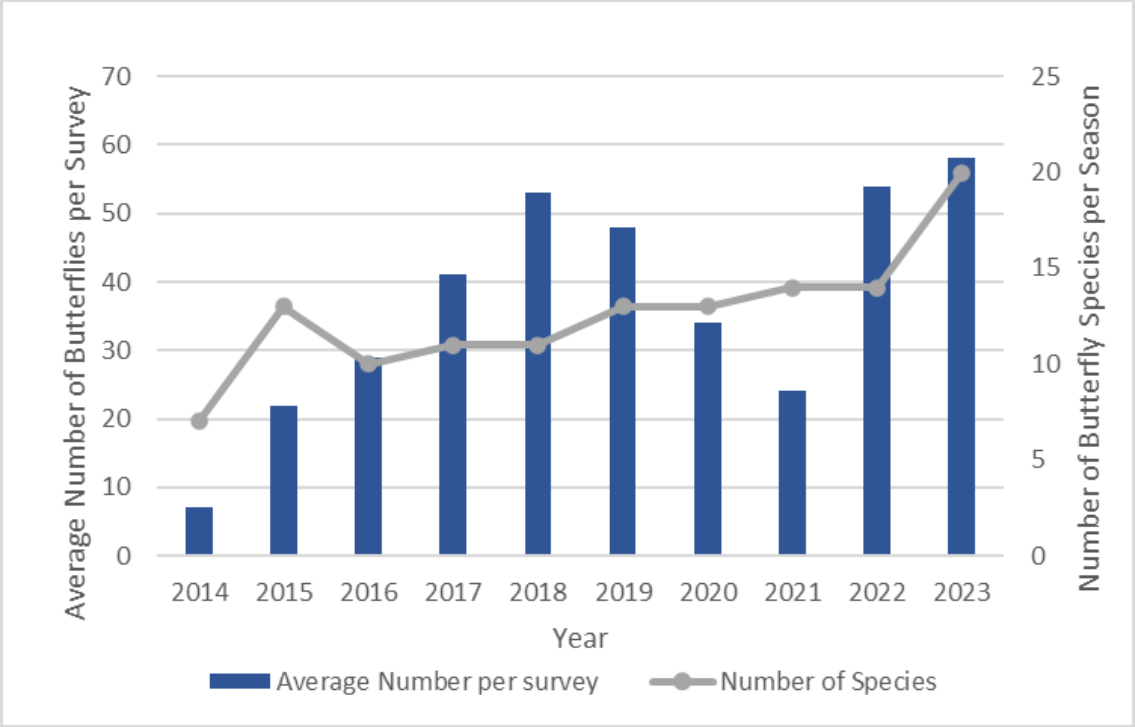


Figure 24. Butterfly species richness and average abundance documented at Sunrise Rim 2014-2023.

SOP 1: Monitoring Butterfly Abundance

Revision History Log

Revision Date	Author	Changes Made	Reason for Change
11/2/2023	Regina M. Rochefort	Updated data sheets in Appendix C	Updates species lists

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, bottom row).

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 ID are close focusing (6-8 ft range at a maximum), with a power between 7 and 10, and brightness to allow good ID (this is the second number in binocular description (e.g., 7 x 42).
- Camera: is helpful for uploading to Bamona (https://www.butterfliesandmoths.org/) or a photograph can be used after the survey to confirm your ID.
- 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 6 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 ≥ 55 °F (13°C) in sunny weather or ≥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, that 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: ~~HHT~~ 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)	~~HHT~~ 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 (3)	15 (4)	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
11/1/2023	Regina M. Rochefort	Data sheets in Appendix D	Updated species list

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).

Species Selection: On the back of each Plant Phenology Monitoring Date Sheet is an explanation for why each species was selected for the survey.

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.

CASCADES BUTTERFLY PROJECT

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

Butterfly Monitoring Plant Phenology

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

Observers: Paul Metzner **Date:** 8/8/2023

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	X	X	M1	M3	M3	
Bistorta bistortoides	American Bistort	L1	M2	L2	M3	L2	
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush	L1	L1	L1	L1	L1	
Erigeron peregrinus	Subalpine Daisy	X	L1	X	L2	X	
Gentiana calycosa	Mountain Bog Gentian	X	M2	X	M3	M1	
Lupinus latifolius	Broadleaf Lupine	X	X	X	L1	L1	
Lupinus lepidus	Dwarf Lupine	L2	L2	L2	L1	L1	
Oreostema alpigenum	Alpine Aster	L1	L1	L1	L1	L	
Pedicularis bracteosa	Bracted Lousewort	X	X	X	X	X	
Pedicularis rainierensis	Mt. Rainier Lousewort	X	X	X	X	X	
Penstemon procerus	Small-Flowered Penstemon	X	X	X	X	L1	

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

July 15, 2022

Figure 1. Plant phenology data sheet for Skyscraper Mountain.

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
12/28/2023	Regina Rochefort	Updated website for data entry	Pollardbase database was moved to a new website with new data managers

Overview

Butterfly abundance data for the Cascades Butterfly Project is entered into an on-line. Initially, the CBP database was developed as a partnership with Dr. Leslie Ries, Georgetown University and Kelly Lotts and Thomas Naberhaus of Butterflies of North America. Over the last year (2022-2023) the database has been revised and is available on the PollardBase site (https://pollardbase.org/). Currently only the butterfly data is entered at this site, but in the next couple of years, the site will be expanded to support data entry from the plant phenology monitoring.

Data Entry

Data is entered into the database by some volunteers and the Project Lead. Data entry is a two-step process. Each survey is entered, in the database, by one person and then becomes a pending record. Upon review by a second person, the survey is either approved or revised and then approved. If one person conducts both steps, then it is recommended that the person wait a day or two between the two steps.

Each person who enters data must have a logon and be approved as a member of the Cascades Butterfly Project. Prior to entering data, the Project Lead will send your name to the PollardBase web team, and you will receive an invitation to join the project. The Data Manager will then contact each person with directions on setting up a logon and password. On first page of the PollardBase web site (https://pollardbase.org/) there is a link to a PollardBase Tutorial (pdf) and a video tutorial (Figure 1). Since the new website and database were developed in 2023, the best way to learn to navigate is through these help tutorials. Revisions and updates to data entry are still on-going.

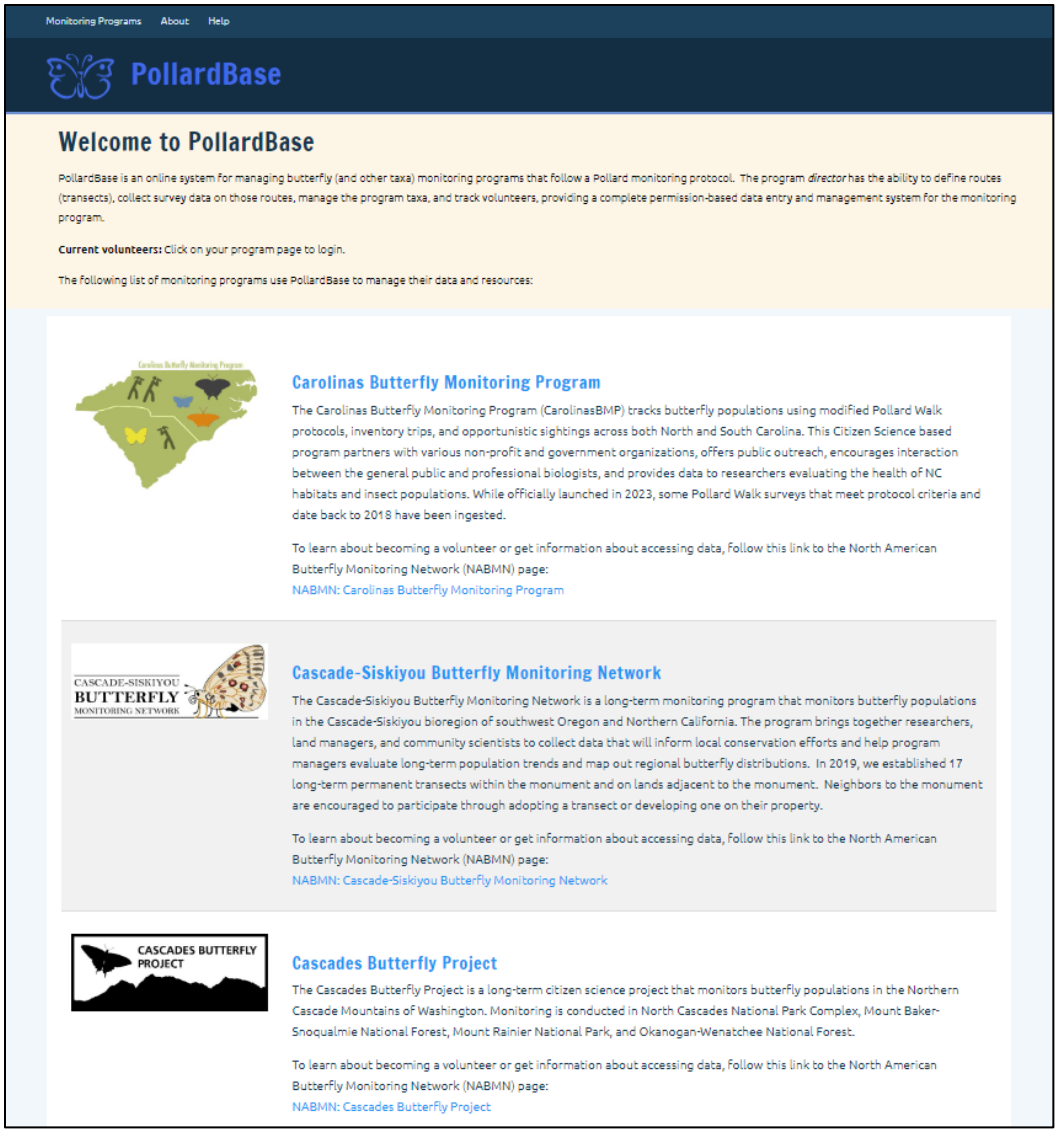


Figure 1. PollardBase website for data entry.

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

Route	Section	UTM E (m) (NAD83)	UTM N (m) (NAD83)	Latitude (WGS 84)	Longitude (WGS 84)	Elevation (m)
	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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper (82)[1]	*Hesperia comma*					
	Woodland Skipper (102)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Western Tiger Swallowtail (122)	*Papilio rutulus*					
	Pale Swallowtail (124)	*Papilio eurymedon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur[2] (134)	*Colias philodice*					
	Orange Sulphur (136)	*Colias eurytheme*					
	Sara's/ Julia's Orangetip (149)[3]	*Anthocharis julia*					
	Margined White (158)	*Pieris marginalis*					
	Cabbage White (160)	*Pieris rapae*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**
[2] Current name is Eriphyle's Sulphur, *C. eriphyle*, but still listed in Pyle and LaBar as Clouded Sulphur
[3] Current name is Julia's Orangetip, *A. julia* , but still listed in Pyle and LaBar as Sarah's Orangetip

October 26, 2023

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
Lycaenidae	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Brown Elfin (216)	*Callophrys augustinus*					
	Moss' Elfin (218)	*Callophrys mossii*					
	Echo Azure (231)	*Celastrina echo*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Anna's Blue (270)	*Plebejus anna*					
	Arctic Blue (273)	*Agriades glandon*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
	Unidentified Hairstreak/ Elfin	*Theclinae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Lorquin's Admiral (330)	*Limenitis lorquini*					
	Painted Lady (338)	*Vanessa cardui*					
	Milbert's Tortoiseshell (344)	*Aglais glandon*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Mylitta Crescent (390)	*Phyciodes mylitta*					
	Field Crescent (394)	*Phyciodes pulchella*					
	Vidler's Alpine (407)	*Erebia vidleri*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

October 26, 2023

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:** 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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper (82)[1]	*Hesperia comma*					
	Woodland Skipper (102)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Pine White (156)	*Neophasia menapia*					
	Margined White (158)	*Pieris marginalis*					
	Cabbage White (160)	*Pieris rapae*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

October 26, 2023

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
Lycaenidae	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Acmon/Lupine Blue (263)	*Icaricia acmon/ lupini*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Painted Lady (338)	*Vanessa cardui*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Anicia Checkerspot (373)	*Euphydryas anicia*					
	Vidler's Alpine (407)	*Erebia vidleri*					
	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.*					
?	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.):

October 26, 2023

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 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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper (82)[1]	*Hesperia comma*					
	Woodland Skipper (102)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Unidentified Parnassian	*Parnassius sp.*					
Pieridae	Sarah's/ Julia's Orangetip (149)[2]	*Anthocaris julia*					
	Pine White (156)	*Neophasia menapia*					
	Margined White (158)	*Pieris marginalis*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					

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

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Eriphyle's Sulphur, listed in Pyle and LaBar as Orange Sulphur

[3] Current name is Julia's Orangetip, *A. julia* , listed in Pyle and LaBar as Sarah's Orangetip

November 18, 2023

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
Lycaenidae	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Lorquin's Admiral (330)	*Limenitis lorquini*					
	Red Admirable (342)	*Vanessa atalanta*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Green Comma (358)	*Polygonia faunus*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Anicia Checkerspot (372)	*Euphydryas anicia*					
	Vidler's Alpine (407)	*Erebia vidleri*					
	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.*					
?	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.):

November 18, 2023

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Field Checked by: _____ date: _____		Updated by: _____ date: _____	
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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Arctic Skipper (66)[1]	*Carterocephalus*					
	Common Branded Skipper (82)	*Hesperia comma*					
	Woodland Skipper (102)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Anise Swallowtail (118)	*Papilio zelicaon*					
	Clodius Parnassian (110)	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur (134)	*Colias philodice*					
	Orange Sulphur (136)	*Colias eurytheme*					
	Sara's/ Julia's Orangetip[2] (149)	*Anthocharis julia*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Julia's Orangetip, *A. julia* , listed in Pyle and LaBar as Sarah's Orangetip

October 26, 2023

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
Lycaenidae	Blue Copper (182)	*Lycaena heteronea*					
	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Acmon/ Lupine Blue (263)	*Icaricia acmon/ lupini*					
	Anna's Blue (270)	*Plebejus anna*					
	Arctic Blue (273)	*Agriades glandon*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Painted Lady (338)	*Vanessa cardui*					
	Red Admirable (342)	*Vanessa atalanta*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Anicia Checkerspot (373)	*Euphydryas anicia*					
	Vidler's Alpine (407)	*Erebia vidleri*					
	Chryxus Arctic (413)	*Oeneis chryxus*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

October 26, 2023

Okanogan – Wenatchee National Forest

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Field Checked by: _____ date: _____		Updated by: _____ date: _____	
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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Common Branded Skipper (82)[1]	*Hesperia comma*					
	Woodland Skipper (100)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Indra Swallowtail (120)	*Papilio indra*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded/ Eriphyle's Sulphur (134)[2]	*Colias eriphyle*					
	Orange Sulphur (136)	*Colias eurytheme*					
	Sara's/ Julia's Orangetip (149)[3]	*Anthocharis julia*					
	Margined White (158)	*Pieris marginalis*					

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

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**
[2] Current name is Eriphyle's Sulphur, listed in Pyle and LaBar as Orange Sulphur
[3] Current name is Julia's Orangetip, *A. julia*, listed in Pyle and LaBar as Sarah's Orangetip

October 26, 2023

Maple Pass Survey Route

Butterflies			Number of Butterflies Per Section				
Common Name		Scientific Name	A	B	C	D	E
Pieridae	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae sp.*					
Lycaenidae	Blue Copper (182)	*Lycaena heteronea*					
	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (253)	*Icaricia icarioides*					
	Anna's Blue (270)	*Plebejus anna*					
	Arctic Blue (273)	*Agriades glandon*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Lorquin's Admiral (330)	*Limenitis lorquini*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Mourning Cloak (351)	*Nymphalis antiopa*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Anicia Checkerspot (373)	*Euphydryas anicia*					
	Vidler's Alpine (407)	*Erebia vidleri*					
	Butler's Alpine (409)	*Erebia epipsodia*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

October 26, 2023

Mount Rainier National Park

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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:** 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): _____

Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Persius Duskywing (58)[1]	*Erynnis persius*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded/Eriphyle's Sulphur (134)[2]	*Colias eriphyle*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Eriphyle's Sulphur, listed in Pyle and LaBar as Orange Sulphur

October 26, 2023

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
Lycaenidae	Blue Copper (182)	*Lycaena heteronea*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Gray Hairstreak (222)	*Strymon melinus*					
	Echo Azure (231)	*Celastrina echo*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Arctic Fritillary (298)	*Boloria chariclea*					
	Coronis Fritillary (308)	*Speyeria coronis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Lorquin's Admiral (330)	*Limenitis lorquini*					
	Painted Lady (338)	*Vanessa cardui*					
	Mourning Cloak (351)	*Nymphalis antiopa*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Western Meadow Fritillary (294)	*Boloria epithore*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

October 26, 2023

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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:** 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): _____

Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Perseus Duskywing (58)	*Erynnis persius*					
	Woodland Skipper (102)	*Ochlodes sylvanoides*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)[1]	*Parnassius clodius*					
	Mountain Parnassian (112)	*Parnassius smintheus*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Western Tiger Swallowtail (122)	*Papilio rutulus*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded Sulphur (134)	*Colias philodice*					
	Orange Sulphur (136)	*Colias eurytheme*					
	Sara's/Julia's Orangetip (149)[2]	*Anthocharis julia*					
	Pine White (156)	*Neophasia menapia*					
	Becker's White (162)	*Pontia beckerii*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Julia's Orangetip, *A. julia* , listed in Pyle and LaBar as Sarah's Orangetip

version: October 26, 2023

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
Lycaenidae	Purplish Copper (184)	*Lycaena helloides*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Echo Azure (231)	*Celastrina echo*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Acmon/Lupine Blue (263)	*Icaricia acmon/ I. lupini*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Coronis Fritillary (308)	*Speyeria coronis*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Lorquin's Admiral (330)	*Limenitis lorquini*					
	Painted Lady (338)	*Vanessa cardui*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Green Comma (358)	*Polygonia faunus*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Snowberry Checkerspot (370)	*Euphydryas colon*					
	Hoffmann's Checkerspot (378)	*Chlosyne hoffmanni*					
	Great Arctic (416)	*Oeneis nevadensis*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

version: October 26, 2023

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): _____

Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Two-banded Checkered Skipper (61)	*Pyrgus ruralis*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)[1]	*Parnassius clodius*					
	Anise Swallowtail (118)	*Papilio zelicaon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Clouded/Eriphyle's Sulphur (134)[2]	*Colias eriphyle*					
	Becker's White (162)	*Pontia beckerii*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Eriphyle's Sulphur, listed in Pyle and LaBar as Orange Sulphur

October 26, 2023

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
Lycaenidae	Blue Copper (182)	*Lycaena heteronea*					
	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Acmon/Lupine Blue (263)	*Icaricia acmon/ I. lupini*					
	Anna's Blue (270)	*Plebejus anna*					
	Arctic Blue (273)	*Agriades glandon*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Coronis Fritillary (308)	*Speyeria coronis*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Painted Lady (338)	*Vanessa cardui*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Snowberry Checkerspot (373)	*Euphydryas colon*					
	Field Crescent (394)	*Phyciodes pulchella*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

Version: October 26, 2023

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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:** 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): _____
Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae							
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Clodius Parnassian (110)	*Parnassius clodius*					
	Anise Swallowtail (118)[1]	*Papilio zelicaon*					
	Unidentified Parnassian	*Parnassius sp.*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Margined White (158)	*Pontia marginalis*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

October 26, 2023

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
Lycaenidae	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Arctic Fritillary (298)	*Boloria chariclea*					
	Coronis Fritillary (308)	*Speyeria coronis*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Mourning Cloak (351)	*Nymphalis antiopa*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Common Wood Nymph (401)	*Cercyonis pegala*					
	Unidentified Checkerspot	*Euphydryas/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Greater Fritillary	*Speyeria sp.*					
	Unidentified Lesser Fritillary	*Boloria 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.):

October 26, 2023

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): _____

Number of Visitor Contacts: _____

BUTTERFLIES OBSERVED

Butterflies			Number of Butterflies Per Section				
	Common Name	Scientific Name	A	B	C	D	E
Hesperiidae	Two-banded Checkered Skipper (61)	*Pyrgus ruralis*					
	Juba Skipper (81)	*Hesperia juba*					
	Unidentified Skipper	*Hesperiidae sp.*					
Papilionidae	Anise Swallowtail (118)[1]	*Papilio zelicaon*					
	Western Tiger Swallowtail (122)	*Papilio rutulus*					
	Unidentified Swallowtail	*Papilioninae sp.*					
Pieridae	Pine White (156)	*Neophasia menapia*					
	Cabbage White (160)	*Pieris rapae*					
	Clouded Sulphur (134)	*Colias philodice*					
	Orange Sulphur (136)	*Colias eurytheme*					
	Sara's/Julia's Orangetip (149)[2]	*Anthocharis julia*					
	Western White (166)	*Pontia occidentalis*					
	Unidentified Sulfur	*Coliadinae sp.*					
	Unidentified White	*Pierinae 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)

[1] **Page Numbers for Pyle and LaBar 2018, *Butterflies of the Pacific Northwest* are in ()**

[2] Current name is Julia's Orangetip, *A. julia* , listed in Pyle and LaBar as Sarah's Orangetip

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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
Lycaenidae	Mariposa Copper (188)	*Lycaena mariposa*					
	Silvery Blue (235)	*Glaucopsyche lygdamus*					
	Boisduval's Blue (258)	*Icaricia icarioides*					
	Acmon/Lupine Blue (263)	*Icaricia acmon/ lupini*					
	Anna's Blue (270)	*Plebejus anna*					
	Unidentified Blue	*Polyommatinae sp.*					
	Unidentified Copper	*Lycaeninae sp.*					
Nymphalidae	Western Meadow Fritillary (294)	*Boloria epithore*					
	Arctic Fritillary (298)	*Boloria chariclea*					
	Coronis Fritillary (308)	*Speyeria coronis*					
	Hydaspe Fritillary (320)	*Speyeria hydaspe*					
	Mormon Fritillary (322)	*Speyeria mormonia*					
	Painted Lady (338)	*Vanessa cardui*					
	Red Admirable (342)	*Vanessa atalanta*					
	Milbert's Tortoiseshell (344)	*Aglais milberti*					
	California Tortoiseshell (348)	*Nymphalis californica*					
	Satyr Anglewing (353)	*Polygonia satyrus*					
	Hoary Comma (356)	*Polygonia gracilis*					
	Edith's Checkerspot (365)	*Euphydryas editha*					
	Snowberry Checkerspot (370)	*Euphydras colon*					
	Mylitta Crescent (390)	*Phycoides mylitta*					
	Field Crescent (394)	*Phyciodes pulchella*					
	Common Wood Nymph (401)	*Cercyonis pegala*					
	Great Arctic (416)	*Oeneis nevadensis*					
	Unidentified Checkerspot	*Euphydras/Chlosyne sp.*					
	Unidentified Comma	*Polygonia sp.*					
	Unidentified Fritillary	*Heliconinae sp.*					
	Unidentified Lesser Fritillary	*Boloria sp.*					
	Unidentified Greater Fritillary	*Speyeria 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.):

October 26, 2023

Appendix D. Plant Phenology Data Sheets

Mount Baker – Snoqualmie National Forest

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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 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**
Anaphalis margaritacea	Pearly Everlasting						
Bistorta bistortoides	American Bistort						
Cirsium edule	Edible Thistle						
Erigeron glacialis	Subalpine or Fleabane Daisy						
Erigeron peregrinus	Subalpine Daisy						
Eucephalus engelmannii	Cascade Aster						
Heracleum maximum	Cow Parsnip						
Lomatium multifidum	Fern-leaved Desert Parsley						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Sedum divergens & S. oreganum	Pacific & Oregon Stonecrop						
Valeriana sitchensis	Sitka Valerian						
Viola glabella	Pioneer Violet (yellow)						
Optional	***1 site***	***Stump across from outhouse***					
Dicentra formosa	Bleeding Heart						

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

October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Sauk Mountain Survey Route

Most Abundant & Frequent Butterfly Species

Anna's (#1) & Silvery Blues (#9) – hosts: Lupine, nectar: Yarrow Pearly Everlasting
Mormon (#2), W. Meadow (#4), Hydaspe (#7) – hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster spp.
Clodius Parnassian (#3)- host: Dicentra (Bleeding hearts); Mountain Parnassian- Sedums
Arctic Blue- saxifrages
Sarah's Orangetip (#5) – host: *Sisymbrium, Arabis* (mustards)
Anise Swallowtail – host *Lomatium, Heracleum*
Purplish Copper (#6) – Polygonaceae (knotweeds & smart weeds, Rumex (sorrels and docks), maybe Potentilla

Plant species retained & reasons

Anaphalis margaritacea, Pearly Everlasting: - listed as a nectar source for almost all species
Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp
Cirsium edule, Edible Thistle: easy to recognize, visited by Hydaspe
Erigeron glacialis, ***E. peregrinus*** (Subalpine Daisy) – both species are present but *E. glacialis* is more abundant. If you cannot distinguish between the two species, you can lump them under *E. glacialis* since it is more abundant.
Eucephalus engelmanii, *Cascade Aster – nectar and host for Northern checkerspot*
Heracleum maximum – host for Anise swallowtail
Lomatium dissectum Fern leafed desert parsley, on very few segments and often missed by observers – kept this instead since Cathy Clark saw a lot of caterpillars on it
Lupinus latifolius, Broadleaf Lupine – host for many blues
Pedicularis bracteosa, Bracted lousewort: host for snowberry checkerspot, monitored on our other sites & MeadoWatch, good for comparison
Sedum divergens, Pacific Stonecrop and ***Sedum oreganum***, Oregon stonecrop: host for Mountain Parnassian
Note: some plants are S. oreganum Oregon stonecrop, alternate leaves vs. opposite on Pacific) but we will treat all as one species
Valeriana sitchensis, Sitka valerian – monitored by MeadoWatch, surveyed on other sites
Viola glabella, Pioneer Violet (yellow): host for Hydaspe, W. Meadow, Mormon. Previously un data sheets as *V. sempervirens (Evergreen violet) which was incorrect*

Questionable species & why the dilemna

Dicentra formosa – Bleeding heart – host for Clodius Parnassian – this is found on one switchback in section E and hard to see, but easily viewed off the route across from the out-house near the trailhead – added on optional site monitoring site for this

Phenophases – What is the flowering stage of the plant?

X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?

[1] for 1- 10
[2] for 11-50
[3] for ≥51 flowers

October 26, 2023

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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 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**
Arnica latifolia	Mountain Arnica						
Bistorta bistortoides	American Bistort						
Castilleja parviflora var. albida	White Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Eriogonum pyrolifolium	Alpine Buckwheat						
Lomatium martindalei	Cascade Desert Parsley						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Potentilla flabellifolia	High Mountain Cinquefoil						
Valeriana sitchensis	Sitka Valerian						

October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Skyline Divide Survey Route

Most Abundant & Frequent Butterfly Species
Mormon (#1), Hydaspe (#3) – hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster spp.
Anna's (#2), Silvery, Boisduval's Blues – hosts: Lupine, nectar: Yarrow Pearly Everlasting
Arctic Fritillary (#4) - Bistort
Anise Swallowtail (#5)- host *Lomatium, Heracleum*

Plant species retained & reasons
Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp
Castilleja parviflora var. albida, Magenta Paintbrush -
Erigeron glacialis? peregrinus, Subalpine daisy – nectar species
Eriogonum pyrolifolium – host for some blues or coppers
Lupinus latifolius, broadleaf lupine – blues, monitored on other sites
Lomatium martindalei – *swallowtail species hosts*
Penstemon procerus – monitored on other sites, hosts for checkerspots
Pedicularis bracteosa, bracted lousewort – host for snowberry checkerspot, monitored on other sites
Potentilla flabellifolia, high mountain cinquefoil, not certain if we should keep it – host for skippres

Valeriana sitchensis, Sitka valerian – monitored by MeadoWatch, surveyed on other sites, insect pollinated since male & female flowers, but can't find which insect

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥51 flowers

October 26, 2023

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						
Bistorta bistortoides	American Bistort						
Castilleja parviflora var. albida	White Indian Paintbrush						
Cirsium edule	Edible Thistle						
Erigeron peregrinus	Subalpine Daisy						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon serrulatus	Coast Penstemon						
Potentilla flabellifolia	High Mountain Cinquefoil						
Valeriana sitchensis	Sitka Valerian						

Section Coordinates (UTM E, UTM N): A (643763, 5370158); B (643698, 5370225); C (643685, 5370293); D (643802, 5370340); E (643890, 5370368); End (643993, 5370449) October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Cascade Pass Survey Route

Most Abundant & Frequent Butterfly Species

Mormon Fritillary (#1), Hydaspe Fritillary (#5), Western Meadow Fritillary (#7) - hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster spp.

Mariposa Copper (#2) - adults feed on Pearly Everlasting, sedums, yarrow, asters, spirea, larval hosts are ericaceous plants like huckleberries

Anna's Blue (#3) - hosts: Lupine, nectar: Yarrow Pearly Everlasting

Arctic Fritillary (#4) – hosts: large number of species – willows, blueberries, Bistort, mountain avens

Anicia Checkerspot (#6) – Penstemons and paintbrushes

Plant species retained & reasons

***Anaphalis margaritacea*,** Pearly Everlasting: - listed as a nectar source for almost all species

Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp

Castilleja parviflora var. albida

Cirsium edule, Edible Thistle: easy to recognize, visited by Hydaspe

Erigeron glacialis (we had it as *peregrinus, but it is glacialis), Subalpine Daisy*

Lupinus latifolius, Broadleaf Lupine – host for many blues

Pedicularis bracteosa, bracted lousewort – host for Edith's checkerspot which has been observed 4 times, but also monitored on other CBP sites

Penstemon serrulatus – host for checkerspots

Potentilla flabellifolia – easy to identify, some skippers lay eggs on it

Valeriana sitchensis, Sitka valerian – monitored by MeadoWatch, surveyed on other sites

Phenophases – What is the flowering stage of the plant?

X – plant not visible or seen

V – Vegetative all plants only leaves or unopened flower buds

Flowering has 2 choices:

E or Early - < 50% of the plants on this segment have open flowers

M or Middle - ≥ 50% of the plants on this segment have at least one flower open

L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?

[1] for 1- 10

[2] for 11-50

[3] for ≥51 flowers

October 26, 2023

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						
Bistorta bistortoides	American Bistort						
Castilleja miniata	Scarlet Paintbrush						
Cirsium edule	Edible Thistle						
Erigeron peregrinus	Subalpine Daisy						
Eucephalus ledophyllus	Cascade Aster						
Lomatium dissectum or L.brandegeei	Fern-leaved Desert Parsley, Brandegee's						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Valeriana sitchensis	Sitka Valerian						

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

October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Easy Pass Survey Route

Most Abundant & Frequent Butterfly Species
Anna's (#1), Boisduvals's (#6): hosts - Lupine, nectar: Yarrow Pearly Everlasting
Anicia Checkerspot (#2) – hosts: penstemons, Castillejas, snowberry
Mariposa Copper (#3) – hosts: various ericaceous plants; nectar: pearly everlasting, yarrow, asters, edum, spirea
Mormon (#4), Hydaspe (#7), W. Meadow (#9) - hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster.
Arctic Fritillary (#5) - Bistort
Vidler's Alpine (#8): nectar on aster family (yarrow, arnica, dandelion)
Clodius Parnassian (#11) - host: Dicentra (Bleeding hearts); Mountain Parnassian (#10)- Sedums

Plant species retained & reasons
Achillea millefolium, Anaphalis *margaritacea* – nectar plants for many species
Bistorta bistortoides – host for coppers, surveyed on many other sites for comparison
Castilleja miniata, Scarlet Paintbrush: Edith's, Snowberry, and Anicia checkerspots, monitored on other sites, easy to recognize
Cirsium edule – easy to recognize, visited by Hydapse and surveyed on other sites
Erigeron peregrinus, Eucephalus ledophyllus – asters are used for nectar, surveyed on other sites for comparisions
Lomatium dissectum, L. *brandegeii* – hosts for swallowtails,
Lupinus latifolius – host for blues
Pedicularis bracteosa – surveyed on several other sites, perhaps remove after more comparision
Penstemon procerus – checkerspot host
Valeriana sitchensis – surveyed on other sites, surveyed by Meadowatch

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023

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**
Castilleja minata	Scarlet Paintbrush						
Castilleja parviflora var. albida	White Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Ligusticum grayi	Gray's Lovage						
Lomatium brandegeei	Brandegee's Desert Parsely						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Potentilla flabellifolia	High Mountain Cinquefoil						
Sedum oreganum, S. divergens	Oregon or Pacific Stonecrop						
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)

October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Maple Pass Survey Route

Most Abundant & Frequent Butterfly Species
Anna's (#1): hosts - Lupine, nectar: Yarrow Pearly Everlasting
Anicia Checkerspot (#3)
Mormon, Hydaspe #5) – hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster spp.
Arctic Fritillary (#2) - Bistort
Western White (#4) – hosts are native and exotic crucifers, nectar: thistles, asters, grasses
Clodius Parnassian- host: Dicentra (Bleeding hearts); Mountain Parnassian- Sedums

Plant species retained & reasons
Castilleja miniata, Scarlet Paintbrush: Edith's, Snowberry, and Anicia checkerspots, monitored on other sites, easy to recognize
Castilleja parviflora var. oreopola, Magenta Paintbrush – same as Scarlet Indian Paintbrush
Erigeron peregrinus**,** Subalpine daisy – nectar species
Ligusticum grayi, *Gray's lovage* – host to Anise Swallowtails
Lomatium dissectum, Fern-leaf desert parsley – swallowtail hosts, surveyed on a couple of other sites
Lupinus latifolius, broadleaf lupine – blues, monitored on other sites
Pedicularis bracteosa, bracted lousewort – host for snowberry checkerspot, monitored on other sites
Sedum oreganum, S. divergens – host for Mountain Parnassian, but only on one segment
Valeriana sitchensis, Sitka valerian – monitored by MeadoWatch, surveyed on other sites, insect pollinated since male & female flowers, but can't find which insect

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023

Mount Rainier National Park

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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:** 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**
Bistorta bistortoides	American Bistort						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
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						
Valeriana sitchensis	Sitka Valerian						

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

October 26, 2023

Cascade Butterfly Monitoring Plant Phenology Data

Mazama Ridge Route - Mount Rainier National Park

Most Abundant & Frequent Butterfly Species

Arctic Fritillary (#1)- hosts: wide range including violets, willows, Bistort, Dryas
Anna's (#2), Silvery Blues (#3), Boiduval's Blues (#5) – hosts: Lupine, nectar: Yarrow Pearly Everlasting
Mormon Fritillary (#4) hosts: violets, nectar on asters, Pearly everlasting, yarrow

Plant species retained & reasons

Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp
Castilleja parviflora var. oreopola
Erigeron peregrinus (could be glacialis) *Subalpine Daisy*
Eucephalus ledophyllus, *Cascade Aster – nectar and host for Northern checkerspot*
Gentiana calycosa – characteristic of late season at Mount Rainier
Lupinus latifolius, Broadleaf Lupine – host for many blues
Oreostemma alpigenum – good comparison for Mt Rainier with *Erigeron* and *Eucephalus* as far as plant phenology
Pedicularis bracteosa, Bracted lousewort: host for snowberry checkerspot, monitored on our other sites & MeadoWatch, good for comparison
Pedicularis rainierensis – similar to P. bracteosa

Valeriana sitchensis, Sitka valerian – monitored by MeadoWatch, surveyed on other sites

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023

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Field Checked by: _____	date: _____	Updated by: _____	date: _____
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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 enter the **phenophase** of each species: **X** (did not see it), **V** for vegetative (plant present but not yet in flower), **E** for early (only a few plants with flowers), **M** for middle (more than 50% of plants have flowers), or **L** for late (most plants have flowers that have wilted or are in fruit).
Enter a flower abundance estimate when the phenophase is E or M: **1** for 1- 10 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						
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						
Valeriana sitchensis	Sitka Valerian						
OTHER: (*You may list other species you know below*)							

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

October 26, 2023

Cascades Butterfly Project Plant Phenology Data Sheet

Naches Loop Survey Route

Plant Species		Section (each 200m long)					
Scientific Name	**Common Name**	**A**	**B**	**C**	**D**	**E**	**Notes**

Most Abundant & Frequent Butterfly Species

Anna's, Silvery, Boisduval's Blues – hosts: Lupine, nectar: Yarrow Pearly Everlasting
Mormon, Hydaspe – hosts: Violet spp.; nectar: Pearly Everlasting, Thistles, Aster spp.
Mariposa Copper- larval plants: Ericaceae (Vaccinium, huckleberry); adults frequent visitors (nectar to yarro, Pearly Everlasting, sedum, Asters
Clodius Parnassian- host: Dicentra (Bleeding hearts); Mountain Parnassian- Sedums
Arctic Fritillary - Bistort

Plant species retained & reasons

***Anaphalis margaritacea*,** Pearly Everlasting: - listed as a nectar source for almost all species
Arnica latifolia
Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp
Castilleja parviflora var. oreopola, Magenta Paintbrush -
***Erigeron peregrinus*,** Subalpine daisy – nectar species
***Eucephalus ledophyllus*,** *Cascade Aster: no know host, good for nectar, late season flower*
Ligusticum grayi, *Gray's lovage* – host to Anise Swallowtails but only 8 observed here since 2011
Lupinus latifolius, broadleaf lupine – blues, monitored on other sites
Pedicularis bracteosa, bracted lousewort – host for snowberry checkerspot, monitored on other sites
Valeriana sitchensis. Sitka valerian – nectar plant, monitored on many other sites – good for comparison

Phenophases – What is the flowering stage of the plant?

X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?

[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023October 26, 2023

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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						
Bistorta bistortoides	American Bistort						
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						

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

October 26, 2023

Cascade Butterfly Monitoring Plant Phenology Data

Skyscraper Route- Mount Rainier National Park

Most Abundant & Frequent Butterfly Species
Arctic Fritillary (#1) - Bistort
Edith's Checkerspot (#2) – hosts: Castilleja, Penstemon, Pedicularis spp
Mormon Fritillary (#3)– Viola spp – hosts
Boisduval's Blues (#4), Anna's (#6), Silvery (#7) – hosts: Lupine, nectar: Yarrow, Pearly Everlasting
Snowberry Checkerspot (#5) – hosts: snowberry, penstemon, Castilleja spp

Species retained & reasons
Achillea millefolium – frequently used as nectar ad available late in the season
Bistorta bistortoides – host for Arctic frit
Castilleja parviflora var. oreopola – host for chekerspots
Erigeron peregrinus – good for becatr, surveyed on multiple other sites
Gentiana calycosa – characteristic of late season flowering species at Mount Rainier
Lupinus latifolius, L. Lepidus – host for blues, may be that one should be dropped after a couple of more examination
Oreostema alpigenum – early season aster, nectar species
Pedicularis bracteosa, P. rainierensis – checkerspot hosts
Penstemon procerus – checkerspot hosts

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023

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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						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Gentiana calycosa	Mountain Bog Gentian						
Lupinus latifolius	Broadleaf Lupine						
Oreostemma alpigenum	Alpine Aster						
Pedicularis bracteosa	Bracted Lousewort						
Pedicularis rainierensis	Mt. Rainier Lousewort						
Potentilla flabellifolia	High Mountain Cinquefoil						

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

October 26, 2023

Cascade Butterfly Monitoring Plant Phenology Data

Spray Park Route - Mount Rainier National Park

Most Abundant & Frequent Butterfly Species
Arctic Fritillary (#1) - Bistort
Anise Swallowtail – hosts: Lomatium (parsley), Heracleum (cow parsnip)
Silvery blue (#3), Boisduval's (#4) – hosts: lupines, nectar asters, yarrow, pearly everlasting
Mormon Frit (tied #4) – violet species

Plant Species Retained and Why
Bistorta bistortoides – host for Arctic frit
Castilleja parviflora var. oreopola – host for chekerspots
Erigeron peregrinus – good for becatr, surveyed on multiple other sites
Gentiana calycosa – characteristic of late season flowering species at Mount Rainier
Lupinus latifolius – host for blues, may be that one should be dropped after a couple of more examination
Oreostema alpigenum – early season aster, nectar species
Pedicularis bracteosa, P. rainierensis – checkerspot hosts
Penstemon procerus – checkerspot hosts

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
1 for 1- 10
2 for 11-50
3 for ≥51 flowers

October 26, 2023

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Field Checked by: _____	date: _____	Updated by: _____	date: _____
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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						
Bistorta bistortoides	American Bistort						
Castilleja miniata	Scarlet Paintbrush						
Castilleja parviflora var. oreopola	Magenta Indian Paintbrush						
Erigeron peregrinus	Subalpine Daisy						
Eucephalus ledophyllus	Cascade Aster						
Ligusticum grayii	Gray's lovage						
Lupinus latifolius	Broadleaf Lupine						
Pedicularis bracteosa	Bracted Lousewort						
Penstemon procerus	Small-flowered Penstemon						
Valeriana sitchensis	Sitka Valerian						
Penstemon serrulatus	Cascade or Coast Penstemon						

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

October 26, 2023

Cascade Butterfly Monitoring Plant Phenology Data

Sunrise Rim Route - Mount Rainier National Park

Most Abundant & Frequent Butterfly Species
Anna's & Boisduvals – hosts: Lupine
Edith's Checkerspot – hosts: Castilleja, Penstemon, Pedicularis spp
Mormon Fritillary – Viola spp – hosts
Snowberry Checkerspot – hosts: snowberry , penstemon, Castilleja spp

Plant species retained & reasons
Achillea millefolum, Yarrow- listed as a nectar source for almost all species
Bistorta bistortoides, American Bistort: surveyed by MeadoWatch, host for some Fritillary spp
Castilleja miniata, Scarlet Paintbrush: Edith's, Snowberry, and Anicia checkerspots, monitored on other sites, easy to recognize
Castilleja parviflora var. oreopola, Magenta Paintbrush – same as Scarlet Indian Paintbrush
Erigeron peregrinus**,** Subalpine daisy – nectar species
Eucephalus ledophyllus, *Cascade Aster: no know host, good for nectar, late season flower*
Ligusticum grayi, Gray lovage – host to Anise Swallowtail
Lupinus latifolius, broadleaf lupine – blues, monitored on other sites
Pedicularis bracteosa, bracted lousewort – host for snowberry checkerspot, monitored on other sites
Penstemon procerus, small-flowered penstemon – Edith's & snowberry hosts – last year the data sheet said Penstemon serrulatus but I think that is incorrect

Phenophases – What is the flowering stage of the plant?
X – plant not visible or seen
V – Vegetative all plants only leaves or unopened flower buds
Flowering has 2 choices:
E or Early - < 50% of the plants on this segment have open flowers
M or Middle - ≥ 50% of the plants on this segment have at least one flower open
L – late or senescent – ≥ 50% of all plants have flowers that are wilting or fruits/seeds are visible

Abundance – How many viable flowers?
[1] for 1- 10
[2] for 11-50
[3] for ≥ 51 flowers

October 26, 2023

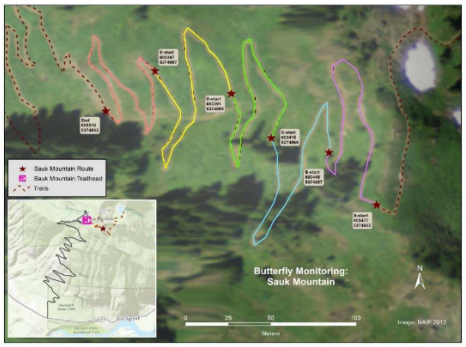
Appendix E. Trail Cards

Trail cards are formatted for be double-sided printing.

1. Sauk Mountain
2. Skyline Divide
3. Cascade Pass
4. Easy Pass
5. Maple Pass
6. Mazama Ridge
7. Naches Loop
8. Skyscraper Mountain
9. Spray Park
10. Sunrise Rim

Sauk Mountain Survey Route

Mount Baker-Snoqualmie National Forest



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Sauk Mountain Survey Route

Mount Baker-Snoqualmie National Forest

Section A



Looking downhill

The Section A marker is located near the top of the switchbacks where the view opens up to an expansive panorama of the North Cascade mountain range. The marker is located about 5 meters before a junction where the main trail veers left and a social trail cuts off to the right (hiking uphill).

Section A Coordinates:

UTM E: 0603477

UTM N: 5374825

Latitude: 48.518005

Longitude: -121.598723

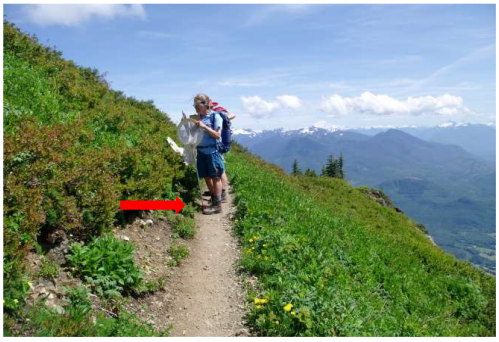
Elevation: 1,588.2 meters

Summary of Categories 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		

Sauk Mountain Survey Route

Mount Baker-Snoqualmie National Forest



Looking uphill

Section A

Beginning (top)of A looking uphill

Section A Coordinates:

UTM E: 0603477

UTM N: 5374825

Latitude: 48.518005

Longitude: -121.598723

Elevation: 1,588.2 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section B



Looking downhill

The Section B marker is located soon after rounding the third switchback from the Section A marker.

Section B Coordinates:

UTM E: 0603449

UTM N: 5374857

Latitude: 48.518298

Longitude: -121.599094

Elevation: 1,568.8 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section C



Looking downhill

The Section C marker is located halfway between the second and third switchbacks from the Section B marker.

Section C Coordinates:

UTM E: 0603415

UTM N: 5374866

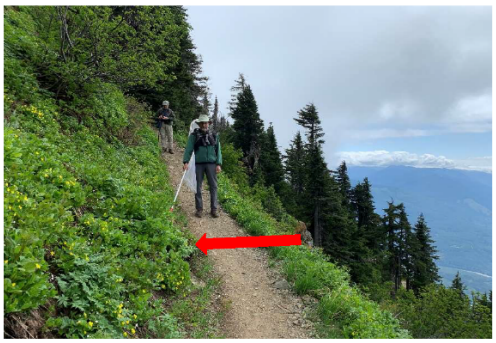
Latitude: 48.518382

Longitude: -121.599552

Elevation: 1,551.2 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section B



Looking uphill

Beginning (top)of B looking uphill toward A.

Section B Coordinates:

UTM E: 0603449

UTM N: 5374857

Latitude: 48.518298

Longitude: -121.599094

Elevation: 1,568.8 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section C



Looking uphill

The person is standing at the top of section C looking up toward B.

Section C Coordinates:

UTM E: 0603415

UTM N: 5374866

Latitude: 48.518382

Longitude: -121.599552

Elevation: 1,551.2 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section D



Looking downhill

The Section D marker is located halfway between the second and third switchback from the Section C marker.

Section D Coordinates:

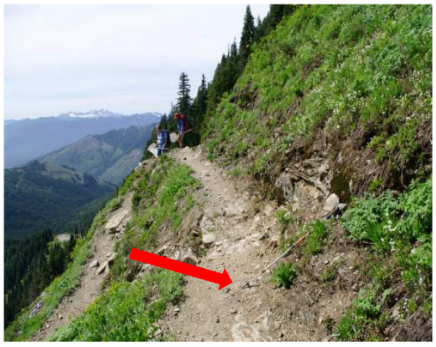
UTM E: 0603391
UTM N: 5374893

Latitude: 48.518631
Longitude: -121.599864

Elevation: 1,539.1 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest

Section E



Looking uphill

The Section E marker is located after two switchbacks from the Section D marker.

Section E Coordinates:

UTM E: 0603347
UTM N: 5374907

Latitude: 48.518761
Longitude: -121.600468

Elevation: 1,496.4 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest



Looking uphill

Section D

Beginning (top) of D looking uphill toward C.

Section D Coordinates:

UTM E: 0603391
UTM N: 5374893

Latitude: 48.518631
Longitude: -121.599864

Elevation: 1,539.1 meters

Sauk Mountain Survey Route
Mount Baker-Snoqualmie National Forest



Looking uphill

Section E

Beginning (top) of E looking uphill toward D.

Section E Coordinates:

UTM E: 0603347
UTM N: 5374907

Latitude: 48.518761
Longitude: -121.600468

Elevation: 1,496.4 meters

Sauk Mountain Survey Route

Mount Baker-Snoqualmie National Forest



Looking downhill

The End

The Route End marker is located after the third switchback from the Section E marker.

On your way uphill, you encounter the end after one switchback in the forest.

Route End Coordinates:

UTM E: 0603318

UTM N: 5374882

Latitude: 48.518547

Longitude: -121.600864

Elevation: 1,465.8meters

Sauk Mountain Survey Route

Mount Baker-Snoqualmie National Forest



Looking uphill

The End

End – On your way uphill, you encounter the end just before the second switchback in the forest.

Route End Coordinates:

UTM E: 0603318

UTM N: 5374882

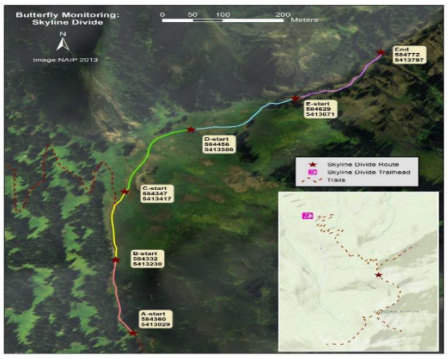
Latitude: 48.518547

Longitude: -121.600864

Elevation: 1,465.8meters

Skyline Divide Survey Route

Mount Baker-Snoqualmie National Forest



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Skyline Divide Survey Route

Mount Baker-Snoqualmie National Forest



Looking from A (start) toward B

Section A

When first reaching the divide, you will be in the middle of Section B. Turn right on the main trail, drop downhill and then hike uphill. At the top of that hill you will wrap around a corner and the Section A marker is right where it opens up again, after you pass the trees on the left.

Section A Coordinates:

UTM E: 0584360

UTM N: 5413029

Latitude: 48.864487

Longitude: -121.849743

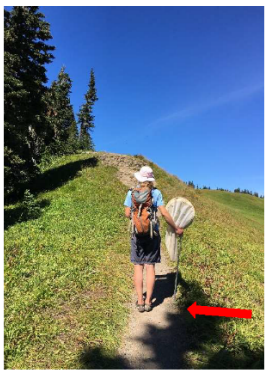
Elevation: 1,772.2 meters

Summary of Categories 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		

Skyline Divide Survey Route

Mount Baker-Snoqualmie National Forest



Looking from B toward C

Section B

The Section B marker is located near the bottom of the first hill you hiked down to reach the Section A marker. If you start to go back uphill in a rocky area, you've gone too far.

Section B Coordinates:

UTM E: 0584332

UTM N: 5413230

Latitude: 48.866291

Longitude: -121.850085

Elevation: 1,759.1 meters

Skyline Divide Survey Route
Mount Baker-Snoqualmie National Forest

Section C



Looking from C toward D

The Section C marker is located about 30 meters past the junction with the trail that you hiked up to reach the divide. There is a small drainage trail next to the main trail, the Section C marker is right where that trail peters out.

Section C Coordinates:

UTM E: 0584347

UTM N: 5473417

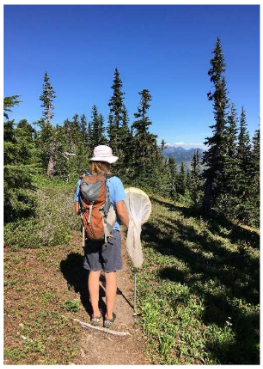
Latitude: 48.867973

Longitude: -121.849841

Elevation: 1,779.1 meters

Skyline Divide Survey Route
Mount Baker-Snoqualmie National Forest

Section E



Looking from E toward the end of the survey route

The Section E marker is located soon after you enter a dense treed area near a dead and downed log.

Section E Coordinates:

UTM E: 0584629

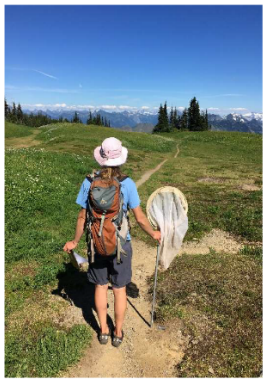
UTM N: 5413671

Latitude: 48.870221

Longitude: -121.845944

Elevation: 1,774.1 meters

Skyline Divide Survey Route
Mount Baker-Snoqualmie National Forest



Looking from D toward E

Section D

The Section D marker is located right next to a large dirt outcrop on the right-hand side of the trail.

Section D Coordinates:

UTM E: 0584456
UTM N: 5413586

Latitude: 48.869476
Longitude: -121.848319

Elevation: 1,794.5 meters

Skyline Divide Survey Route
Mount Baker-Snoqualmie National Forest



Looking away from the survey route

The End

The Route End marker is located soon after going up a small uphill section where you need to maneuver around a stick poking out into the trail at about chest height. You'll pass through a bushy part of the trail and the Route End marker is right where it opens up again.

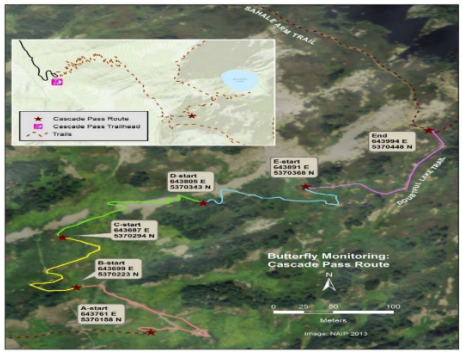
Route End Coordinates:

UTM E: 0584772
UTM N: 5413797

Latitude: 48.871330
Longitude: -121.843971

Elevation: 1,779.2 meters

Cascade Pass Survey Route
North Cascades National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Cascade Pass Survey Route
North Cascades National Park



Looking uphill from A (start) toward B

Section A

From Cascade Pass, follow the trail leading towards the Sahale Arm. The Section A marker is located on the turn of the 1st switchback leading up to the Sahale Arm.

Section A Coordinates:

UTM E: 0643761

UTM N: 5370158

Latitude: 48.468111

Longitude: -121.055087

Elevation: 1,665.4 meters

Summary of Categories 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		

Cascade Pass Survey Route

North Cascades National Park



Looking uphill from B toward C

Section B

The Section B marker is located one switchback from the Section A marker in a rocky area of the trail right after a rocky drainage that typically has a remnant snow patch that can persist late into the season.

Section B Coordinates:

UTM E: 0643699

UTM N: 5370223

Latitude: 48.468707

Longitude: -121.055908

Elevation: 1,694.5 meters

Cascades Pass Survey Route
North Cascades National Park

Section C



Looking uphill at C toward D

The Section C marker is located four switchbacks from the Section B marker, right before reaching the fifth switchback.

Section C Coordinates:

UTM E: 0643687
UTM N: 5370294

Latitude: 48.469356
Longitude: -121.056040

Elevation: 1,748.9 meters

Cascades Pass Survey Route
North Cascades National Park

Section E



Looking at uphill at E

The Section E marker is located six switchbacks from the Section D marker, right after rounding the turn of the sixth switchback.

Section E Coordinates:

UTM E: 0643891
UTM N: 5370368

Latitude: 48.469967
Longitude: -121.053261

Elevation: 1,830.7 meters

Cascades Pass Survey Route
North Cascades National Park



Looking uphill at D toward E

Section D

The Section D marker is located about seven switchbacks from the Section C marker, in a tree clump.

Section D Coordinates:

UTM E: 0643805
UTM N: 5370343

Latitude: 48.469772
Longitude: -121.054429

Elevation: 1,796.7 meters

Cascades Pass Survey Route
North Cascades National Park



The End

The Route End marker is located directly after the trail junction leading down to Doubtful Lake.

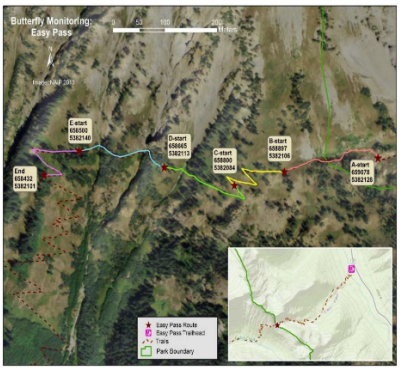
Route End Coordinates:

UTM E: 0643994
UTM N: 5370448

Latitude: 48.470670
Longitude: -121.051840

Elevation: 1,859 meters

Easy Pass Survey Route
North Cascades National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Easy Pass Survey Route
North Cascades National Park



Looking from A (start) toward B

Section A

The Section A marker is located about 10 meters before reaching the NPS park boundary sign, right at a bend in the trail.

Section A Coordinates:

UTM E: 0659078

UTM N: 5382128

Latitude: 48.572036

Longitude: -120.843448

Elevation: 1,996.9 meters

Summary of Categories 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		

Easy Pass Survey Route

North Cascades National Park



Looking from B toward C

Section B

The Section B marker is located right after passing through open meadows and as the trail begins to lose elevation and become more "shrubby."

Section B Coordinates:

UTM E: 0658897

UTM N: 5382106

Latitude: 48.571884

Longitude: -120.845908

Elevation: 1,998.1 meters

Easy Pass Survey Route
North Cascades National Park



Looking from C toward D

Section C

The Section C marker is located three switchbacks from the Section B marker, in a rocky section soon after passing the third switchback turn.

Section C Coordinates:

UTM E: 0658800

UTM N: 5382084

Latitude: 48.571711

Longitude: -120.847225

Elevation: 1,967.4 meters

Easy Pass Survey Route
North Cascades National Park



Looking from E toward the end of the survey route

Section E

The Section E marker is located in a shaded area right next to a large marmot burrow on the right-hand side of the trail.

Section E Coordinates:

UTM E: 0658500

UTM N: 5382140

Latitude: 48.572289

Longitude: -120.851273

Elevation: 1,907.3 meters

Easy Pass Survey Route
North Cascades National Park



Looking from D toward E

Section D

The Section D marker is located on a steepish down-hill slope that leads to a rocky drainage area on a slight bend in the trail, if you reach the rocky drainage area you've gone too far.

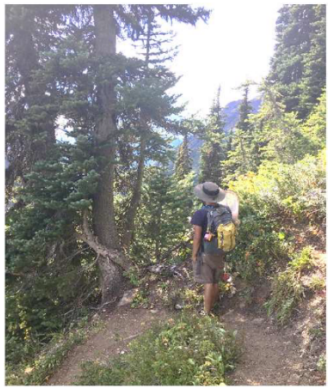
Section D Coordinates:

UTM E: 0658665
UTM N: 5382113

Latitude: 48.572005
Longitude: -120.849051

Elevation: 1,927.5 meters

Easy Pass Survey Route
North Cascades National Park



Looking away from the survey route

The End

The Route End marker is located directly before the third switchback from the Section E marker, right after crossing over a small stream/drainage area.

Route End Coordinates:

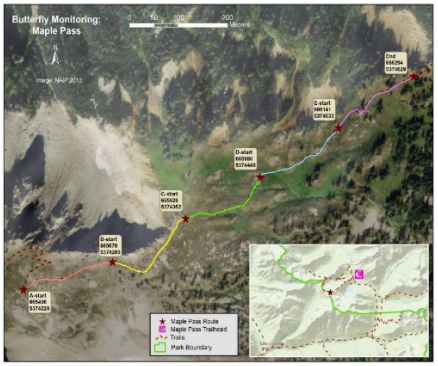
UTM E: 0658432
UTM N: 5382101

Latitude: 48.571953
Longitude: -120.852205

Elevation: 1,864.7 meters

Maple Pass Survey Route

Okanogan-Wenatchee National Forest



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Maple Pass Survey Route

Okanogan-Wenatchee National Forest



Looking from A (start) toward B

Section A

Hiking down from Maple Pass, the Section A marker is located right before the bend of the fifth switchback.

Section A Coordinates:

UTM E: 0665496

UTM N: 5374228

Latitude: 48.499359

Longitude: -120.759641

Elevation: 2,075.4 meters

Summary of Categories 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		

Maple Pass Survey Route

Okanogan-Wenatchee National Forest



Looking from B toward C

Section B

The Section B marker is located about 30 meters before entering a small Mountain Hemlock and Larch thicket, right under a large rocky wall.

Section B Coordinates:

UTM E: 0665679

UTM N: 5374280

Latitude: 48.499777

Longitude: -120.757151

Elevation: 2,048.1 meters

Maple Pass Survey Route
Okanogan-Wenatchee National Forest



Looking from C toward D

Section C

The Section C marker is located about 5 meters past a junction with the main trail and a well-established social trail. The social trail continues straight while the main trail turns to the right.

Section C Coordinates:

UTM E: 0665828

UTM N: 5374362

Latitude: 48.500474

Longitude: -120.755103

Elevation: 2,022.7 meters

Maple Pass Survey Route
Okanogan-Wenatchee National Forest



Looking from E toward the end of the survey route

Section E

The Section E marker is located about 30 meters before entering a dense Subalpine Fir thicket.

Section E Coordinates:

UTM E: 0666141

UTM N: 5374533

Latitude: 48.501929

Longitude: -120.750805

Elevation: 1,975.3 meters

Maple Pass Survey Route
Okanogan-Wenatchee National Forest



Looking from D toward E

Section D

The Section D marker is located just past a small boulder field on the left-hand side of the trail.

Section D Coordinates:

UTM E: 0665980
UTM N: 5374440

Latitude: 48.501139
Longitude: -120.753012

Elevation: 1,999.2 meters

Maple Pass Survey Route
Okanogan-Wenatchee National Forest



The End

The Route End marker is located in a rocky area about 10 meters before reaching a large dead Whitebark Pine that is on the right-hand side of the trail.

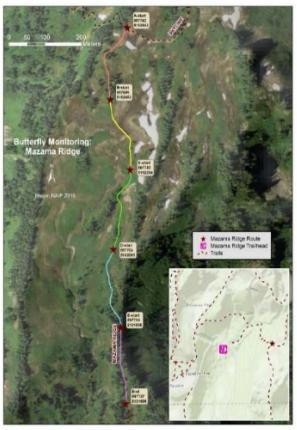
Route End Coordinates:

UTM E: 0666294
UTM N: 5374629

Latitude: 48.502751
Longitude: -120.748694

Elevation: 1,946.2 meters

Mazama Ridge Survey Route
Mount Rainier National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at A (start) toward B

Section A

Section A starts on the Lakes trail just beyond the signs at the junction of the Lakes Trail and Skyline Trial.

Section A Coordinates:

UTM E: 0597742

UTM N: 5182642

Latitude: 46.79016

Longitude: -121.719352

Elevation: 1,762 m

Summary of Categories 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		

Mazama Ridge Survey Route

Mount Rainier National Park



Looking back to A from segments A & B

Section A

Section A starts on the Lakes trail just beyond the signs at the junction of the Lakes Trail and Skyline Trial.

Section A Coordinates:

UTM E: 0597742

UTM N: 5182642

Latitude: 46.79016

Longitude: -121.719352

Elevation: 1,762 m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at B toward C

Section B

The Section B marker is located just beyond the forested section, about 10 feet past the last tree that is over 6 feet tall.

Section B Coordinates:

UTM E: 0597695
UTM N: 5182462

Latitude: 46.788547
Longitude: -121.720007

Elevation: 1,747

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at C toward D

Section C

The Section C marker is located just beyond two bushes of pink heather on the right of the trail. It is near wooden trail bars closest to the gully.

Section C Coordinates:

UTM E: 0597750
UTM N: 5182284

Latitude: 46.786938
Longitude: -121.719324

Elevation: 1,741m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at B from segment C

Section B

The Section B marker is located just before the forested section, about 10 feet before the last tree that is over 6 feet tall.

Section B Coordinates:

UTM E: 0597695

UTM N: 5182462

Latitude: 46.788547

Longitude: -121.720007

Elevation: 1,747

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at C from D

Section C

The Section C marker is located just before two bushes of pink heather on the left of the trail. It is near wooden trail bars closest to the gully.

Section C Coordinates:

UTM E: 0597750

UTM N: 5182284

Latitude: 46.786938

Longitude: -121.719324

Elevation: 1,741m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at D toward E

Section D

The Section D marker is about 60 feet beyond a ridge of trees on the right of the trail as it slopes downhill. About 10 feet in front of a lone sapling.

Section D Coordinates:

UTM E: 0597703

UTM N: 5182085

Latitude: 46.785154

Longitude: -121.719982

Elevation: 1,725m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at E toward the end of the survey route

Section E

The Section E marker is just beyond the first fantastic view of Stevens Canyon, about 10 feet past the stump on the right.

Section E Coordinates:

UTM E: 0597724

UTM N: 5181889

Latitude: 46.783388

Longitude: -121.719749

Elevation: 1,696m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at D from E

Section D

The Section D marker is about 10 feet after a lone subalpine fir sapling and about 60 feet before a ridge of trees on the left of the trail as it slopes uphill.

Section D Coordinates:

UTM E: 0597703
UTM N: 5182085

Latitude: 46.785154
Longitude: -121.719982

Elevation: 1,725m

Mazama Ridge Survey Route
Mount Rainier National Park



Looking at E from the end of the survey route

Section E

The Section E marker is about 10 feet before the stump on the left.

Section E Coordinates:

UTM E: 0597724
UTM N: 5181889

Latitude: 46.783388
Longitude: -121.719749

Elevation: 1,696m

Mazama Ridge Survey Route

Mount Rainier National Park



Looking at the survey route end point from segment E

The End

The Route End marker is pointed out by the last snag/stump in a grouping. A MeadoWatch marker is approximately 5 feet behind it on the right.

Route End Coordinates:

UTM E: 0597737

UTM N: 5181698

Latitude: 46.781668

Longitude: -121.719619

Elevation: 1,680m

Mazama Ridge Survey Route

Mount Rainier National Park



Looking back at the survey end point from beyond the survey route

The End

The Route End marker is pointed out by the last snag/stump in a grouping.

Route End Coordinates:

UTM E: 0597737

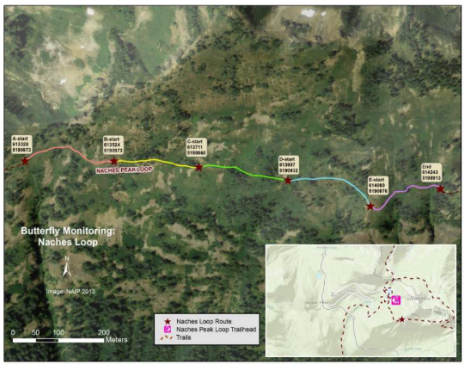
UTM N: 5181698

Latitude: 46.781668

Longitude: -121.719619

Elevation: 1,680m

Naches Loop Survey Route
Mount Rainier National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Naches Loop Survey Route
Mount Rainier National Park



Looking from A (start) toward B

Section A

Section A starts in front of a mountain ash bush on the left just and before a lone subalpine fir tree on the right- a bit after the first open big meadow and stunning Rainier views (behind you)

Section A Coordinates:

UTM E: 0613328

UTM N: 5190973

Latitude: 46.862639

Longitude: -121.513139

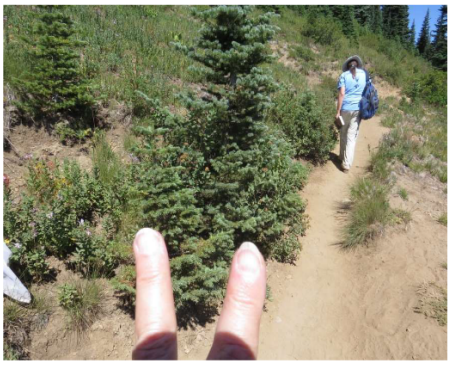
Elevation: 1,737m

Summary of Categories 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		

Naches Loop Survey Route

Mount Rainier National Park



Looking from B toward C

Section B

The Section B marker is just after you come around a curve. Two trees, one large and one small, bunched together on left side of trail (after a good patch of pearly everlasting on the right just past the curve). The marker is beyond the trees on the left, under a small fir and false hellebore

Section B Coordinates:

UTM E: 0613524

UTM N: 5190973

Latitude: 46.862606

Longitude: -121.510569

Elevation: 1,754m

Naches Loop Survey Route
Mount Rainier National Park

Section C



Looking from C toward D

The Section C marker is after a curve walking in the shade of trees, you come out into the sun. there is a clump of ear grass with a little fir tree growing out of it on the left about 10 feel after coming out of the trees. The marker is just below the bear grass.

Section C Coordinates:

UTM E: 0613711

UTM N: 5190960

Latitude: 46.862457

Longitude: -121.508119

Elevation: 1,771m

Naches Loop Survey Route
Mount Rainier National Park

Section E



Looking at E from a side trail

The Section E marker is in a rocky meadow with a view of Dewey Lake on the left and Rainier on the right. Several social trails enter the meadow on either side of the marker.

Section E Coordinates:

UTM E: 0614089

UTM N: 5190876

Latitude: 46.861636

Longitude: -121.503183

Elevation: 1,795m

Naches Loop Survey Route
Mount Rainier National Park





Looking from D toward E

Section D

The Section D marker is in a wet grassy area just before a clump of trees. The marker is in the ground at the left edge of wood water bar in the trail. There is a large roundish rock just prior to the water bar on the right and a very large arrowhead shaped rock just past the waterbar on the right side pointing to it.

Section D Coordinates:

UTM E: 0613907

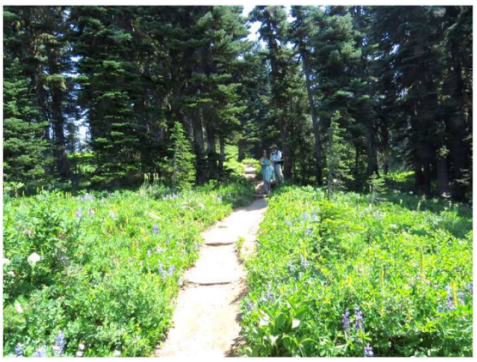
UTM N: 5190932

Latitude: 46.862171

Longitude: -121.505556

Elevation: 1,775m

Naches Loop Survey Route
Mount Rainier National Park



The End

The Route End marker is just past a stream bed as you climb up toward the shade of a few trees. It is located just prior to entering the trees. .

Route End Coordinates:

UTM E: 0614243

UTM N: 5190913

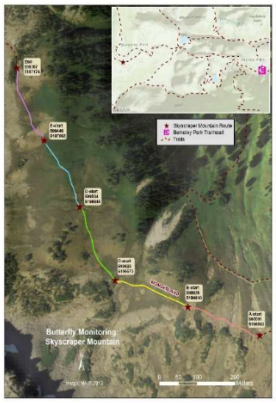
Latitude: 46.861943

Longitude: -121.501154

Elevation: 1,773m

Skyscraper Mountain Survey Route

Mount Rainier National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Skyscraper Mountain Survey Route

Mount Rainier National Park



Looking from A (start) toward B

Section A

Section A starts between two wooden trail bars just before the land slopes steeply downward on the right side of the trail.

Section A Coordinates:

UTM E: 0600011

UTM N: 5196543

Latitude: 46.914886

Longitude: -121.686585

Elevation: 1,935m

Summary of Categories 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		

Skyscraper Mountain Survey Route

Mount Rainier National Park

Section B



Looking from B toward C

The Section B marker is towards the end of a long bare patch. Not much growing around. Possibly hidden under a fleeceflower plant. Across large rock on the right side of the trail.

Section B Coordinates:

UTM E: 0599820

UTM N: 5196610

Latitude: 46.915517

Longitude: -121.689078

Elevation: 1,932m

Skyscraper Mountain Survey Route
Mount Rainier National Park

Section C



Looking from C toward D

The Section C marker is near the second wooden trail bar after the stream crossing/metal culvert.

Section C Coordinates:

UTM E: 0599628

UTM N: 5196673

Latitude: 46.916113

Longitude: -121.691585

Elevation: 1,926m

Skyscraper Mountain Survey Route
Mount Rainier National Park

Section E



Looking from E toward the end of the survey route

The Section E marker is in an area that is starting to get dryer, as trail is mid curve towards the right. About 10 feet before the wooden trail bar.

Section E Coordinates:

UTM E: 0599440

UTM N: 5197003

Latitude: 46.91911

Longitude: -121.693981

Elevation: 1,974m

Skyscraper Mountain Survey Route
Mount Rainier National Park



Looking from D toward E

Section D

The Section D marker is near the big rock and wooden trail bar on left side of the trail.

Section D Coordinates:

UTM E: 0599534

UTM N: 5196846

Latitude: 46.917683

Longitude: -121.692782

Elevation: 1,952m

Skyscraper Mountain Survey Route
Mount Rainier National Park



The End

The Route End marker is in a vegetatively sparse area just beyond where the trail goes through a small tree patch and before it goes into the trees properly.

Route End Coordinates:

UTM E: 0599367

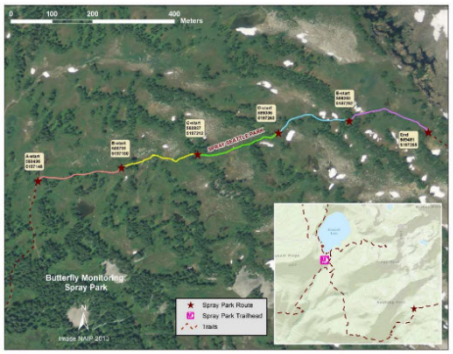
UTM N: 5197174

Latitude: 46.920659

Longitude: -121.694903

Elevation: 1,997m

Spray Park Survey Route
Mount Rainier National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Spray Park Survey Route
Mount Rainier National Park



Looking uphill from A (start) toward B

Section A

Section A starts near a wooden trail bar just after a social trail leading to the creek. If you get to the pond you've gone a little too far.

Section A Coordinates:

UTM E: 0588496

UTM N: 5197148

Latitude: 46.921964

Longitude: -121.837657

Elevation: 1,742m

Summary of Categories 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		

Spray Park Survey Route

Mount Rainier National Park



Looking uphill from B toward C

Section B

The Section B marker is about halfway up a flight of stone steps/trail bars. Just about where the trees start to come close to the trail

Section B Coordinates:

UTM E: 0588701

UTM N: 5197180

Latitude: 46.922223

Longitude: -121.834958

Elevation: 1,765m

Spray Park Survey Route
Mount Rainier National Park

Section C



Looking uphill at C toward D

The Section C marker is located near a wooden trail bar as the trail slopes upward. The land on the right side of the trail will be about knee high with trail erosion undercutting a small shelf.

Section C Coordinates:

UTM E: 0588887

UTM N: 5197212

Latitude: 46.922485

Longitude: -121.832507

Elevation: 1,795m

Spray Park Survey Route
Mount Rainier National Park

Section E



Looking at E toward the End

The Section E marker is in the middle of an uphill curve to the left. It is close to a downed branch parallel to the trail. If you reach a ridge with a great view you've gone too far.

Section E Coordinates:

UTM E: 0589258

UTM N: 5197292

Latitude: 46.923157

Longitude: -121.827624

Elevation: 1,858m

Spray Park Survey Route
Mount Rainier National Park



Looking uphill at D toward E

Section D

The Section D marker is in the middle of a flat, open, and straight stretch of trail. The trail is lined with rocks.

Section D Coordinates:

UTM E: 0589085
UTM N: 5197263

Latitude: 46.92292
Longitude: -121.829903

Elevation: 1,830m

Spray Park Survey Route
Mount Rainier National Park



The End

The Route End marker is about 2 feet beyond a social trail which leads to a view point at the edge of the ridge.

Route End Coordinates:

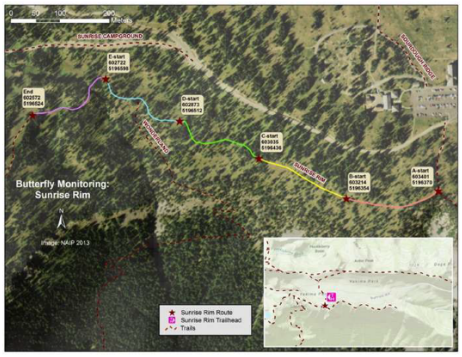
UTM E: 0589451
UTM N: 5197265

Latitude: 46.922888
Longitude: -121.825087

Elevation: 1,874m

Sunrise Rim Survey Route

Mount Rainier National Park



Note:

In each Section Photo, the individual in the photo is standing directly next to the Section Marker.

All UTM coordinates are NAD83 and all Latitude/Longitude coordinates are WGS84.

Sunrise Rim Survey Route

Mount Rainier National Park



Looking from A (start) toward B

Section A

Section A starts at the trail sign for the intersection of Sunrise Rim and Emmons Vista Nature Trail.

Section A Coordinates:

UTM E: 0603401

UTM N: 5196370

Latitude: 46.91281

Longitude: -121.642117

Elevation: 1,934 m

Summary of Categories 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		

Sunrise Rim Survey Route

Mount Rainier National Park



Looking from B toward C

Section B

The Section B marker is just after a small group of trees and is on the downhill side of a small gully.

Section B Coordinates:

UTM E: 0603214

UTM N: 5196354

Latitude: 46.912695

Longitude: -121.644576

Elevation: 1,920 m

Sunrise Rim Survey Route
Mount Rainier National Park

Section C



Looking from C toward D

The Section C marker is in a small wooded area on the downhill side of a small gully.

Section C Coordinates:

UTM E: 0603035
UTM N: 5196436

Latitude: 46.913461
Longitude: -121.646907

Elevation: 1,906

Sunrise Rim Survey Route
Mount Rainier National Park

Section E



Looking from E toward the end of the survey route

The Section E marker is on the **left** side of the trail where the trail curves to the left.

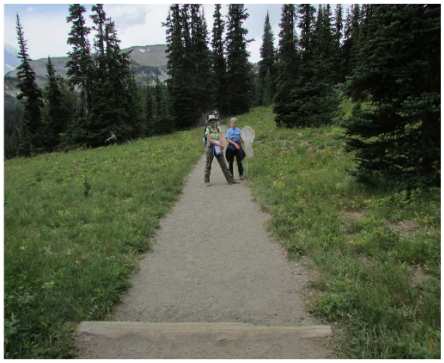
Section E Coordinates:

UTM E: 0602722
UTM N: 5196598

Latitude: 46.91467
Longitude: -121.65098

Elevation: 1,904 m

Sunrise Rim Survey Route
Mount Rainier National Park



Looking from D toward E

Section D

The Section D marker is on the **left** a flat section of trail about 20 feet after a slight downhill curve to the left with multiple wooden trail bars.

Section D Coordinates:

UTM E: 0602873

UTM N: 5196512

Latitude: 46.91417

Longitude: -121.649017

Elevation: 1,897 m

Sunrise Rim Survey Route
Mount Rainier National Park



The End

The Route End marker is on the **left** side of the trail in a wooded section. If you get to the dead tree on the right you've gone too far.

Route End Coordinates:

UTM E: 0702572

UTM N: 5196524

Latitude: 46.914324

Longitude: -121.652966

Elevation: 1,903 m


CASCADES BUTTE
PROJECT