

**TOP: Mountain Parnassian (*Parnassius smintheus*) at South Pass. 2008.**  
**BOTTOM: North Cascades butterfly crew at Mt. Shuksan and Curtis Glacier. 2008**

# Cascades Butterfly Project

Climate change is expected to affect mountain ecosystems in many ways. Scientists predict that warmer summers may result in earlier snowmelt, more frequent forest fires, and changes in distributions of plants and animals. Although some ecosystem changes have already been observed, (e.g. melting glaciers), many future impacts remain uncertain. Monitoring provides a way to document ecosystem changes, anticipate future changes, and improve management of protected lands.

Butterflies are sensitive indicators of climate change because temperature influences the timing of an individual’s life cycle and the geographic distribution of species. As individuals develop from egg to larvae to pupae and finally to mature butterfly, temperature thresholds may trigger these changes. Annual temperature patterns are often the primary determinant of the distribution of “generalist” butterflies. Generalist butterflies are species that can utilize many different plant species for nectar, larval development, and egg deposition. Specialist butterflies depend on a few plant species for food and development and they can be directly and indirectly influenced by climate (temperature and precipitation). An example of indirect influences is when climate limits the growth of the butterflies’ “host” plant; when the quality or number of these plants decline, so do the number of butterflies.

Recently, studies in Europe and California have documented range shifts in butterflies in response to changing temperatures. As average annual temperatures have increased, some species have responded by moving northward or to higher elevations to track their optimum temperature range. However, scientists still have a lot of unanswered questions about the long-term survival of these species. For instance, if butterflies fly to higher elevations faster than their host

plants can migrate, will they be able to survive? Will some species become extinct?

### What are we doing?

Six protected areas in the Cascade Mountains are establishing a program to monitor butterflies to learn how climate is affecting their populations. The six areas include four sites in Washington: North Cascades National Park, Mount Baker-Snoqualmie National Forest, Okanagan-Wenatchee National Forest, and Mount Rainier National Park and two areas in British Columbia: Skagit and Manning Provincial Parks.

We are using two approaches to study butterflies: photo-inventories and field surveys. First, we are documenting butterflies across our landscape through photo-inventories. Second, we established permanent field survey sites to monitor changes in butterfly abundance and species diversity in North Cascades National Park, Mount Baker-Snoqualmie National Forest, and Mount Rainier National Park. Permanent transects will be established in three areas: North Cascades National Park, Mount Baker-Snoqualmie National Forest, and Mount Rainier National Park. Along each transect, volunteers record butterfly abundances and plants in flower.

### Contact Information:

Regina Rochefort, North Cascades National Park  
regina\_rochefort@nps.gov, 360-854-7202

Mason Reid, Mount Rainier National Park  
mason\_reid@nps.gov, 360-569-6771

Jeff Anderson, North Cascades Institute  
jeff\_anderson@ncascades.org, 206-526-2574

Joanna Hirner, British Columbia Parks  
joanna\_hirner@gov.bc.ca, 604-924-2228



### Interested in helping?

We are looking for volunteers for both parts of the Cascades Butterfly Project.

#### Photo-inventories

If you like to photograph, you can help us identify what species are present in the study areas. All you need is a camera, map (or GPS), computer, and time to hike.

- Any time you are out hiking and can get a detailed photo of a butterfly, snap it, and mark your location on a map or record GPS coordinates .
- Once you arrive home, upload your photo to the Butterflies and Moths of North America Project, BAMONA (<http://www.butterfliesandmoths.org/>) website and mark the location of your photo on a map.
- Butterfly experts will then verify your identification or identify the butterfly for you. In a couple of weeks, you will be able to see your photo and observation on the website!

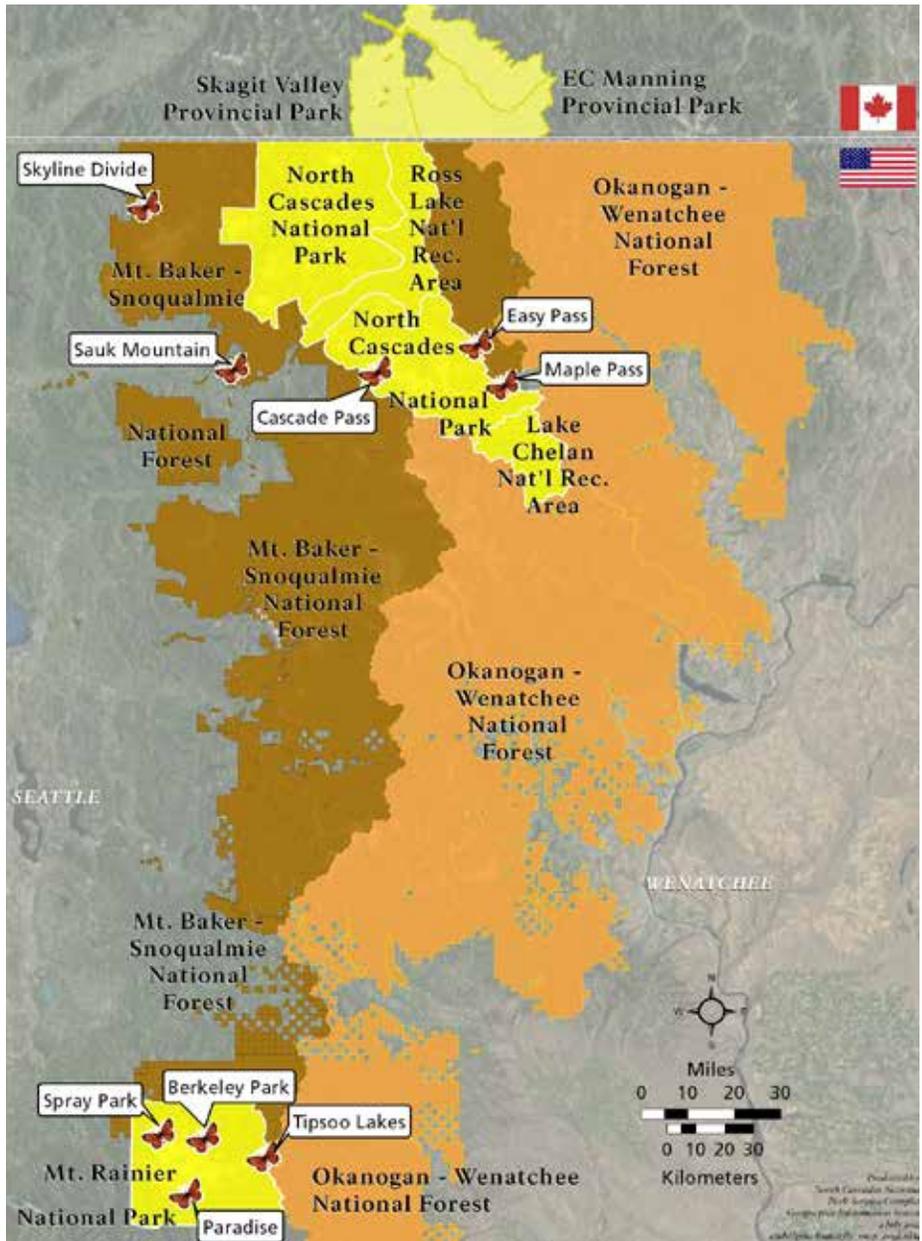
#### Butterfly Transects (see table)

If you are interested in learning butterfly identification and would like to help document abundances using a standardized scientific protocol, this is the project for you.

- Nine 1-kilometer transects have been established in subalpine meadows across our study area which will be surveyed once a week.
- Two volunteers are needed to walk the transects and document every butterfly in a 5-m wide band.
- Focal plants in flower will also be recorded in this area to track plant phenology patterns.
- All transects are along trails and most transects are within a couple of miles of a road, but several require a steep, uphill hike.

#### Project Partners

- Mount Rainier National Park
- North Cascades National Park
- Mount Baker-Snoqualmie National Forest
- Okanogan-Wenatchee National Forest
- North Cascades Institute
- Western Washington University
- Carthage College



LOCATION	TRAILHEAD	DISTANCE TO START	ELEVATION	ELEVATION GAIN
<b>NORTH CASCADES NATIONAL PARK</b>				
Maple Pass	Rainy Pass	5.6km, 3.5mi	1940m, 6360ft	550m, 1800ft
Easy Pass	Easy Pass	5.6km, 3.5mi	1970m, 6500ft	850m, 2800ft
Cascade Pass	Cascade Pass	6km, 3.7mi	1641m, 5384ft	550m, 1700ft
<b>MOUNT BAKER-SNOQUALMIE NATIONAL FOREST</b>				
Sauk Mountain	Sauk Mountain	2.9km, 1.8mi	1585m, 5200ft	260m, 853ft
Skyline Divide	Skyline Divide	3.2km, 2.0mi	1758m, 5800ft	457m, 1500ft
<b>MOUNT RAINIER NATIONAL PARK</b>				
Berkely Park	Sunrise	2.7km, 1.7mi	2063m, 6770ft	112m, 370ft
Naches Peak	Tipsoo Lake	0.8km, 0.5mi	1585m, 5200ft	260m, 853ft
Mazama Ridge	4th Crossing	1.1km, 0.7mi	1765m, 5790ft	360m, 1180ft
Spray Park	Mowich Lake Campground	4.0km, 2.5mi	1660m, 5450ft	440m, 1450ft