

# The Cascade-Siskiyou National Monument Butterfly Monitoring Project

Developed for the Medford District Bureau of Land Management and the Cascade-Siskiyou National Monument by Candace Fallon, the Xerces Society for Invertebrate Conservation

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*Photo: Cascade-Siskiyou National Monument by Bob Wick, Bureau of Land Management.*

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## Introduction

Tucked into the southwest corner of Oregon and stretching into a small sliver of northern California, the Cascade-Siskiyou National Monument (CSNM) is one of the most biodiverse regions in the Pacific Northwest. Within its boundaries three major ecoregions—the Cascade Mountains, Klamath-Siskiyou Mountains, and Great Basin—clash together and give rise to species assemblages found nowhere else on Earth. Elevations range from 730 to 1,932 m (2,493 to 6,339 ft.), with mixed-conifer forests typically dominating the highest elevations and north-facing slopes and oak woodlands taking over the lower elevations and south-facing slopes. The landscape here is a mosaic of white fir forests, juniper scablands, wide open meadows, and chaparral, jostling with mixed forests of Douglas-fir, ponderosa pine, and incense cedar. Wildflowers carpet oak-juniper woodlands and rocky outcroppings. Botanical diversity and rates of endemism are high.

All of this variation in topography, plant communities, and climates has made the Monument one of the most species-rich regions for butterflies in the United States (BLM 2008). Nearly 120 species have been reported from within its borders (Appendix A), representing roughly 74 percent of Oregon’s known butterfly fauna (Warren 2005). Several rare butterflies have been documented on the Monument, including the gray blue butterfly (*Agriades podarce klamathensis*) and mardon skipper (*Polites mardon*). Other butterflies, such as the gold-hunter’s hairstreak (*Satyrium auretteorum*), are found here at the very northern limits of their range.

The outstanding biodiversity of this region, both butterfly and otherwise, was formally acknowledged in 2000 when the Cascade-Siskiyou National Monument was established under the Antiquities Act by President Clinton. Originally 52,947 acres, the Monument continued to grow in size with the purchase of private parcels and was ultimately expanded to its current 113,000 acres by President Obama in January 2017 (Figure 1; Obama 2017). The Monument is managed by the Medford Bureau of Land Management (BLM) District as part of the National Landscape Conservation System.

Butterflies have been monitored on the Monument since before its inception. This began with the Xerces Society Fourth of July Butterfly Counts in 1987, which took place until 1991. Local butterfly researcher Erik Runquist conducted comprehensive surveys of the Soda Mountain region and other parts of the Monument in 1999, 2003, and 2004. In 2005, the Xerces Society began presence/absence surveys for the mardon skipper. Annual Fourth of July counts were reestablished by members of the North American Butterfly Association (NABA) in 2012 and continue to this day. For a detailed timeline of butterfly monitoring efforts on the Monument, see Appendix B.

In contrast to the well-documented butterfly fauna, relatively little is known about the moths that inhabit the Monument. Approximately 1,200 species of macromoths are known from the Pacific Northwest; with the inclusion of micromoths, Runquist (2002) believes there may well be over 2,000 moth species native to the Monument. While moths are not a focus of the plan described in the pages that follow, we recommend including them in a larger Lepidopteran monitoring scheme as time and funding allow.

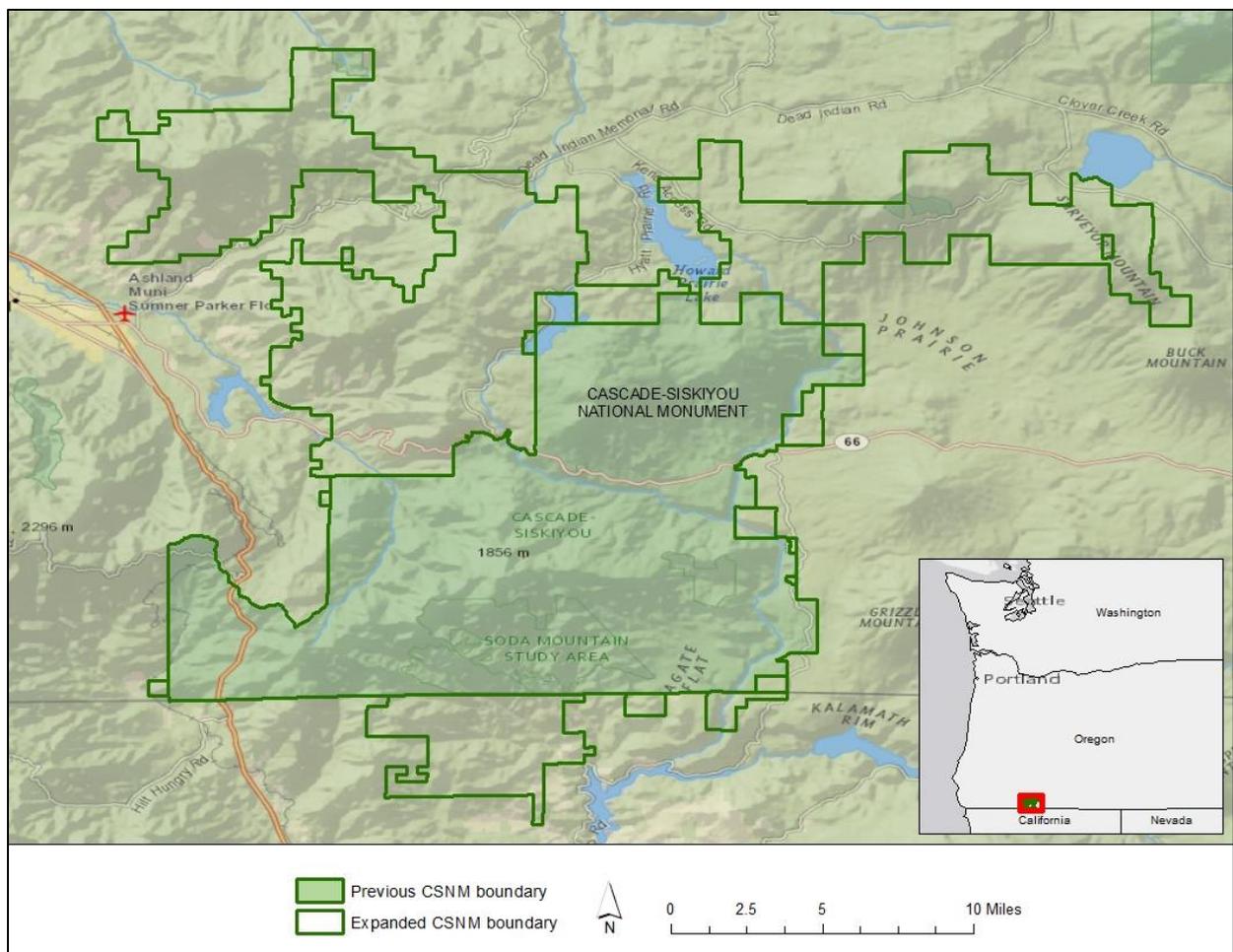


Figure 1. The Cascade-Siskiyou National Monument in southwest Oregon and northern California.

## Project rationale

Given its rich assemblage of habitats and corresponding butterfly diversity, the Cascade-Siskiyou National Monument is an ideal location for a long-term butterfly monitoring program. Butterflies can be important indicators of ecosystem health, and changes in their populations are often associated with habitat alteration, shifting climate, and changes in plant community health and composition. Butterflies make ideal monitoring targets because they are relatively easy to observe and identify and are generally well described taxonomically. In addition, detailed regional field guides and species keys are often available.

Insect populations naturally fluctuate from year to year, making long term monitoring important for providing an accurate picture of species distribution and population trends. Long term monitoring also provides land managers with a tool to identify future research needs and inform adaptive management. This type of monitoring also allows us to prioritize conservation actions for at-risk species and habitats, and effectively prevent the decline of other species.

Despite being relatively well-known for its butterfly species richness, the Monument does not have any comprehensive butterfly monitoring programs in place. A comprehensive study design covering

numerous habitat types, ecotones, and elevations, with replicated visits over time, could provide valuable data on the distribution and status of butterflies on the Monument. By including areas with historic records of rare butterfly species, land managers may also gain valuable information on distribution and persistence of several BLM-sensitive and strategic species (see Table 1 for a list of species documented from the CSNM). Results from this project will help biologists and land managers better understand the current trends and distribution of butterflies on the CSNM, provide information on species phenology and habitat associations, and guide future management activities to help minimize potential negative effects to populations of rare and sensitive species.

Table 1. Butterfly species of conservation concern on the Cascade-Siskiyou National Monument. Global and state statuses provided by ORBIC (2017). BLM status from BLM (2015).

Species name	Common name	Global Status	State Status	BLM Status
<i>Agriades podarce klamathensis</i>	Gray blue butterfly	G3G4T3	S2	OR-Sensitive
<i>Callophrys johnsoni</i>	Johnson’s hairstreak	G3G4	S3	Sensitive
<i>Hesperia colorado oregonia</i>	Western branded skipper	G5T2	S2	Strategic
<i>Polites mardon</i>	Mardon skipper	G2G3	S2	Sensitive
<i>Speyeria coronis coronis</i>	Coronis fritillary	G5T3T4	S2	OR-Sensitive

## The CSNM Butterfly Monitoring Project

### Project objectives

The primary goal of this project is to develop a long-term butterfly monitoring program that will refine our distributional knowledge for butterfly species on the Cascade-Siskiyou National Monument in southwestern Oregon and northern California. This monitoring project may also provide more information on the habitat associations for several BLM-sensitive species in Oregon, increasing the ability of federal land managers to identify important habitats to these species. Our objectives are as follows:

1. Monitor butterfly populations at priority monitoring sites on the CSNM through annual surveys
2. Compare species richness, relative abundance, composition, and endemism of butterfly species among different habitats
3. Engage local citizen scientists and partner organizations in butterfly conservation

In this report, we describe the core monitoring structure (including study design and survey protocols), identify priority monitoring sites, and make recommendations for modifying the monitoring program in future years.

### Monitoring approach

We recommend a combination of Pollard walk transects (“routes”) and species-specific presence/absence surveys. Transect surveys are an efficient means of monitoring butterfly distributions and densities among sites and years (Pollard 1997; Pollard and Yates 1993; Brown and Boyce 1998), and Pollard walks are regularly used by many groups for long term monitoring of butterfly populations. This survey type requires relatively low input and effort, allows for replication, and provides information on presence-absence and relative abundance. Relative species abundance can then be compared between sites and provides important information to land managers interested in the conservation of butterflies

and their habitat. Targeted presence/absence surveys are more suitable for species with patchy or low densities, or those that are otherwise difficult to detect. These can be used to survey for species of conservation concern at historic locations and likely nearby habitat.

Ideally, the first year of the monitoring program would be used to establish preliminary transect routes and confirm the suitability of selected sites and habitats. This pilot year can be used to test the protocol and refine transect placements as needed.

Well-trained volunteers could contribute significantly to the butterfly monitoring program. Both Pollard walks and presence/absence surveys could be assigned to volunteers once transects and sites are established. Volunteers could be trained in annual workshops that cover basic butterfly biology, common species of the CSNM, and species identification skills. Volunteers would then adopt a transect or site and revisit it throughout the season. Incidental butterfly sightings (those found outside of standardized surveys) could be reported to Butterflies and Moths of North America ([www.butterfliesandmoths.org](http://www.butterfliesandmoths.org)), which allows project managers to create project-specific, publicly available species lists with identifications vetted by regional experts.

### Survey design

Our recommended survey design, described in the sections below, includes a base program of annual transect surveys and presence/absence surveys with the following modifications as time and funding allow:

- Mod 1: Increase frequency of surveys.
- Mod 2: Increase number of transects/survey locations.
- Mod 3: Include standardized plant phenology assessments with each transect survey.
- Mod 4: Develop a robust citizen science program to grow program capacity (i.e., volunteers take over survey routes to increase frequency of visits and/or number of sites visited per year).

### Site selection

We selected 20 potential monitoring sites on BLM land within the Cascade-Siskiyou National Monument (Figure 2; Appendix C): fifteen for the placement of Pollard walk routes and five for species-specific surveys. Of these 20, we recommend that the project manager select a minimum number of sites to visit that they anticipate can be surveyed every year. In selecting sites for surveys, we included:

- 1) Areas where previous detections of BLM-sensitive species have occurred (historic sites) in an effort to verify species presence at these sites,
- 2) Areas that have been surveyed previously as part of a longer-term butterfly monitoring project (e.g., Runquist 2011; NABA 2017).

In general, sites selected cover a wide range of habitat types, elevations, and ecotones, in order to maximize the chances of capturing a greater diversity of species over time. Habitats on the Monument are incredibly varied and range from old growth and mixed-aged conifer and hardwood forests to chaparral, oak woodlands, wet meadows, shrublands, fens, and open native perennial grasslands. However, the primary habitats included in this project are oak woodlands and mixed conifer forests, as these dominate the landscape. Site accessibility and availability of host and nectar plant resources were also taken into consideration.

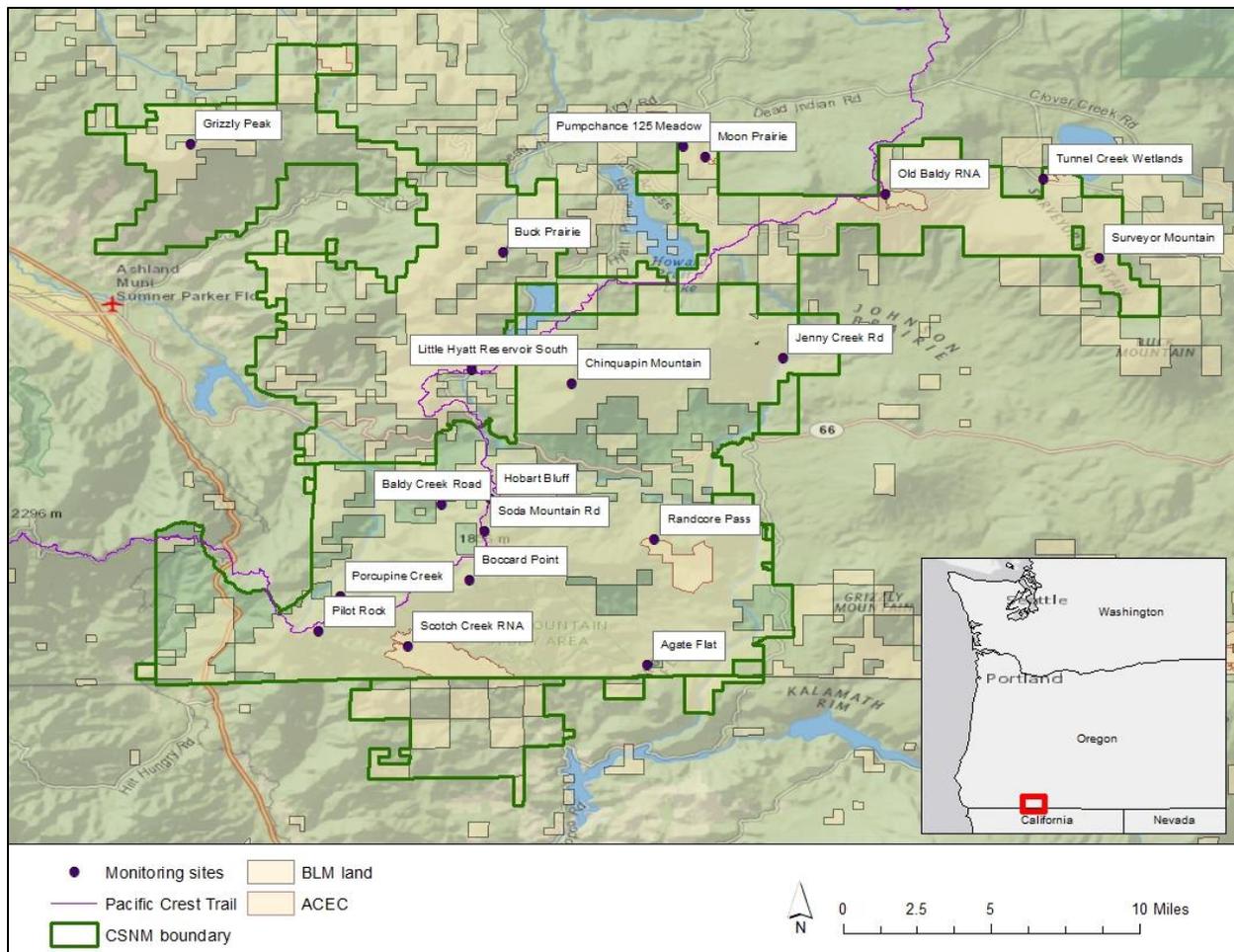


Figure 2. Locations of CSNM Butterfly Project survey sites.

### Transect placement

Selected sites should be assessed on the ground by the project manager to determine if they are appropriate for survey routes. Routes can then be placed in such a way as to sample evenly the different habitat types or management activities that may occur at each site. Each survey route should be one kilometer in length and subdivided into five sections (A, B, C, D, and E, ideally of equal length) that correspond to different microhabitats and/or management practices, if present. Routes should be designed with 200-meter buffers to prevent transect overlap. Once established in the field, subsection start and end points can be denoted by physical markers. These transects should be fixed so the same route can be surveyed each year, and they should be easy to relocate.

### Sampling frequency

Pollard walks should be conducted at least twice per month (although ideally once a week) during the adult flight season, roughly April through September. This will help ensure that butterflies with short flight periods are not missed in the sampling. Presence/absence surveys should occur during the known flight periods of target species, ideally with multiple visits to each site in order to capture the peak.

## Field methods

All butterfly surveys should be conducted under the following environmental conditions (adapted from Hatfield 2014):

- **Minimum temperature:** Above 60° F (15.5° C).
- **Cloud cover:** Partly sunny or better. On cooler days, the sun can play a very important role in getting butterflies to take to the air. On warmer days (above 60° F), direct sunlight is less important, but a significant amount of the sun's energy should be coming through the clouds to help elevate the temperature of basking butterflies.
- **Wind:** Less than 10 MPH (4.5 m/s). On windy days, butterflies will drop out of the air if they cannot maintain their direction and/or speed of flight.
- **Time of day:** Between 10AM and 4PM.

When a butterfly cannot be identified on the wing, net it to confirm its identification. Adults are collected using a long-handled aerial sweep net with mesh light enough to see the specimen through the net. When stalking perched individuals, approach slowly from behind. When chasing, swing from behind and be prepared to pursue the insect. A good method is to stand to the side of a butterfly's flight path and swing out as it passes. After capture, quickly flip the top of the net bag over to close the mouth and prevent the butterfly from escaping. Once netted, most insects tend to fly upward, so hold the mouth of the net downward and reach in from below when retrieving the butterfly.

Binoculars and cameras may also be used to view wing patterns of perched butterflies. Since most butterflies can be identified by macroscopic characters, high quality photographs will likely provide sufficient evidence of species occurrences at a site, and those of lesser quality may at least be valuable in directing further study to an area. Use a camera with good zoom or macro lens and focus on the aspects of the body that are the most critical to species determination (i.e. dorsal and ventral patterns of the wings) (Pyle 2002). When possible, take several photographs of potential target species showing a clear view of the underside and upperside of the wings at each survey area where they are observed.

Voucher specimens may be needed for individuals that are difficult to identify in the field, or to document the presence of a special status species at a new site. To remove a specimen from the net by hand, grasp it carefully through the net by the thorax with fingers or a pair of flat-nosed forceps, making sure the butterfly has its wings folded back. Place the specimen in a glassine envelope and then into a small plastic container. Place the container in a cooler with ice, buffering the specimen from the ice with a towel. Transfer the container to a freezer to kill the animal. Include a collection label with every voucher specimen (see Appendix D). This should include the following information: date, time of day, collector, and detailed locality and habitat descriptions (including geographical coordinates, mileage from named location, elevation, and plant community).

## Transect surveys

Butterfly abundances are monitored using the Pollard walk method (Pollard 1977; Pollard and Yates 1993), and butterflies are tallied by survey route segment (e.g., Transect 1, section A). Transect surveys are generally conducted by a minimum of two people: one person is the observer and the other is the recorder. Single surveyors can use voice recorders so their hands are free for butterflies that need to be netted. Additional people can help with plant phenology or identifying butterflies.

Transects should be visited twice a month from April through September using a slow and consistent walking pace. Surveyors should identify and record every butterfly encountered within a 5 meter “box” extending in front of and to either side of the person on the transect (i.e., within 2.5 meters on either side of the surveyor and 5 meters in front). Butterflies behind the surveyor are not counted, and any species observed outside of this box should be recorded as “off transect” (see Appendix E for data sheet). Surveyors should expect a single transect to take approximately 1.5 hours to walk, although more time may be spent netting and identifying butterflies for ID during peak activity periods or at sites with higher species richness. Even if no butterflies are observed, this information should still be recorded on the data sheet and shared with the project manager. If weather conditions change during the survey, wait it out and resume once conditions improve (and make a note on your data sheet), or run the survey again in its entirety on the next available sampling day.

Before starting a transect, use the data sheet (Appendix E) to record basic weather and site conditions, date, and transect number. The habitat assessment should include a thorough description of the habitat, including vegetation types, canopy cover, nectar and host species present, and degree of human impact. Record start and end times for your walk. As you walk, do so slowly (about 100 meters per 5-7 minutes), looking back and forth on either side in a box approximately 5 meters wide. If you must leave the transect path (e.g., to look at a particular butterfly), do your best to return to the specific place where you left your path when you resume walking through the site. Each butterfly is identified to species and tallied by the transect section (A, B, C, D, or E). The observer is the only person who can determine which butterflies are included in the survey, but other surveyors can assist with identifying or catching the butterfly. Each route should have an associated data sheet preprinted with a list of butterfly species for that site, based on previous surveys. However, surveyors should record all butterflies seen, even if not listed on the sheet.

Species not readily identified on the wing (e.g., many Lycaenids and skippers) can be caught with a butterfly net and held temporarily for photo documentation, and then released. Voucher specimens of difficult taxa can be collected for later identification by a Lepidoptera expert. These can then be held in a reference collection at the CSNM to aid in future species identification and training of volunteers and staff, or curated at a regional repository such as the Oregon State Arthropod Collection or the Southern Oregon University Insect Museum.

Standardized plant phenology assessments, conducted in tandem with Pollard walks, would provide useful information about nectar plant availability throughout the adult flight season, and may provide important data on host plant presence and phenology as well. These assessments could be conducted by additional staff or volunteers in the field and could include a small number of target species that are tracked each season (e.g., ten commonly encountered nectar source species), or a more robust assessment of all plants within a certain distance of the transect line or quadrats along the transect. See Rochefort (2017) for examples of plant phenology protocols that could be adapted for the Monument.

#### Presence/absence surveys

Presence/absence surveys for special status species can follow an intuitive controlled methodology in which the surveyor conducts a complete survey of habitats with the highest potential for supporting the target butterfly species and a less intense survey of all other habitats present. This type of survey should be conducted by biologists familiar with the habitat needs of the target species, including any required host plants and preferred nectar sources.

Surveyors should use Geographic Biotic Observations (GeoBOB) wildlife data sheets from the BLM (Appendix F), and include information on site name, survey date and time, elevation, aspect, legal location, latitude and longitude coordinates of site, and weather conditions. A thorough description of habitat, including vegetation types, vegetation canopy cover, suspected or documented host plant species, landscape contours (including direction and angle of slopes), degree of human impact, and insect behavior (e.g. “puddling”) is also important. Record the number of target species observed, as well as butterfly behavior, plant species used for nectaring or ovipositing, and general survey notes. Photographs of habitat are also a good supplement for collected specimens and, if taken, should be cataloged and referred to on the insect labels. Data should be recorded for all sites surveyed, regardless of whether butterflies are seen. In this way, overall search effort is documented, in addition to new sites.

Voucher specimens of suspected BLM-sensitive or strategic target species should be collected to provide conclusive evidence of presence at newly documented or historic sites and/or for use in genetic studies. When possible, collections of voucher specimens should be limited to males from large populations in order to reduce impacts on reproductive success of the population.

#### Equipment needed

- Butterfly net
- Insect vial
- Flat-nosed forceps for handling butterflies
- Thermometer or wind and temperature meter (e.g., Kestrel)
- Butterfly field guide (see Appendix G for recommendations)
- Close-focusing binoculars (optional)
- Camera (photos may help with species ID and a camera will be helpful for submitting photos of incidental sightings to BAMONA)
- GPS unit (needed to confirm transect locations and, if necessary, replace missing markers)
- Data sheet, clipboard, pencils
  - Data forms should be printed on Rite-in-the-Rain or similar water resistant paper
- Voice recorder and extra batteries (if surveying without a partner)
- Glassine envelopes, container, and cooler with ice and towel

#### Data management and reporting

##### Data storage

##### *Transect surveys*

Pollard walk data can be entered and stored in PollardBase (<https://www.pollardbase.org/>), a data entry and management system for butterfly monitoring programs that follow Pollard protocols. Program managers will need to submit their butterfly project to PollardBase, and once accepted can load route names and locations, site-specific species lists, and more. Surveyors can be approved by program managers to adopt routes and submit data directly to the online system, and numerous report tools are available to managers, including downloads of all raw data associated with their program. PollardBase fields include the following: names and roles, date, time, breaks and times, whether or not survey was completed, weather at the start and end of a route (sky, wind, and temperature), species data for each route or subsection of a route, and notes. Any data collected that do not fit into these fields can be entered into the notes field and structured in such a way that allows them to be parsed out later.

Voucher photos can also be uploaded, as can associated files like plant phenology. Habitat data and/or plant phenology data should be stored by the project manager in an Excel spreadsheet. PollardBase may eventually be expanded to include plant phenology data and other habitat characteristics (Ries 2018, pers. comm.), at which point all data associated with Pollard walks could be entered into a single system.

#### *Presence/absence surveys*

Data from presence/absence surveys should be loaded to the BLM's corporate database (GeoBOB) for managing observational attributes and locations, including population, habitat, positive and negative surveys, and vouchering data.

#### *Incidental sightings*

Surveyors are encouraged to report incidental sightings (including "off-transect" observations) of butterflies and moths to the Butterflies and Moths of North America website ([www.bamona.org](http://www.bamona.org)). The project manager can set up a project-specific account under BAMONA so all sightings are associated with the Cascade-Siskiyou National Monument project.

#### *Butterfly vouchers*

Vouchers should be identified to the lowest taxonomic level possible. Unusual or rare species identifications should be confirmed by a regional Lepidoptera expert, and vouchers of BLM-sensitive species must be curated and sent to the Oregon State Arthropod Collection at Oregon State University. Both species identification and curation can be coordinated through the Xerces Society's specimen ID contract with the Interagency Special Status Sensitive Species Program (<https://www.fs.fed.us/r6/sfpnw/issssp/inventories/identification.shtml>). Non-sensitive species vouchers can be spread and pinned in a reference collection for the Monument or sent to a regional repository such as the Oregon State Arthropod Collection or Southern Oregon University Insect Museum.

#### *Data analysis and reporting*

Annual reports should summarize sites surveyed and all species encountered at each site (including any species of conservation concern). These summaries can be used to update site-specific species lists and data sheets, and may provide useful phenological information for presence/absence surveys. More in-depth reports should be created every five years. Results from these surveys, coupled with previous inventories such as those by Runquist (2004), can help identify patterns of butterfly diversity, abundance, and phenology that will in turn help Monument biologists develop the best strategies for protecting, preserving, and restoring butterfly habitat on the Monument. Project managers must include the following information in reports:

- Relative abundance (number of individuals per 100 meters of transect surveyed)
- Species richness (number of species)
- Description of any unusual species encountered
- Differences in species richness and/or abundance between habitat types
- Peak sampling periods for different butterfly species
- Changes in butterfly emergence, abundance, and/or richness over time
- Changes in flowering plant phenology over time
- Locations of rare/sensitive/special status species and if they are persisting at historic sites

## Personnel requirements

### Core roles and responsibilities

A dedicated project manager is needed to coordinate the butterfly monitoring project, set up initial transects, create project-specific accounts with BAMONA and PollardBase, and pursue funding, partnerships, and additional personnel. Ideally, this person would be the ecologist at the BLM-CSNM, although duties could be shared by a knowledgeable individual outside of the federal agency. In addition, at least two surveyors who are familiar with southern Oregon butterfly species should be part of the project team. This can include the project manager, agency biologists, and/or trained contractors from other organizations such as the Xerces Society. If time and funding allow, we recommend incorporating local volunteers (citizen scientists) into the program, which will expand the capacity of the monitoring program to cover more sites at more times during the flight season.

### Training and education

Annual training workshops early in the season are recommended to train new staff and/or volunteers and provide a refresher to project veterans. This could take the form of a one-day short course or an evening presentation followed by a day in the field practicing species identifications and survey protocols. Short courses or presentations could include information about butterfly identification, survey methods, biology, distribution, and conservation status. Outdoor field sessions can include visits to high quality butterfly habitat on the CSNM to practice survey methods, field identification, and specimen vouchering and/or photographing. These workshops will facilitate staff and public participation in butterfly research and conservation, and provide the foundation for a long-term monitoring program on the Monument.

### Potential partnerships

Long term butterfly monitoring programs such as the one described in this report benefit from strong partnerships and well-developed networks of volunteers and regional experts. We recommend early coordination with Leslie Ries, who coordinates PollardBase ([www.pollardbase.org](http://www.pollardbase.org)), and the incredibly knowledgeable community found in the North American Butterfly Monitoring Network ([www.thebutterflynetwork.org](http://www.thebutterflynetwork.org)). A project-specific page should be set up through the coordinators (Thomas Naberhaus and Kelly Lotts) at the Butterflies and Moths of North America ([www.butterfliesandmoths.org](http://www.butterfliesandmoths.org)) website. Potential local partners that are already engaged in butterfly projects on the Monument include Friends of the Cascade Siskiyou National Monument, the North American Butterfly Association (NABA; Dianne Keller), the Xerces Society, and Southern Oregon University. Dedicated volunteers may be found through local chapters of NABA, the Native Plant Society of Oregon, and the Oregon Master Naturalist Program. Regional Lepidoptera experts include Bob Pyle, Paul Hammond, Dave McCorkle, Dana Ross, Erik Runquist, Andrew Warren, and staff at the Xerces Society. If the monitoring program is expanded to include moths in future years, we recommend reaching out to Dana Ross and the team behind the Pacific Northwest Moths (<http://pnwmoths.biol.wvu.edu/>) website.

## Species of conservation concern

Five special status species and a rare hairstreak have been documented on the CSNM. Surveyors should be made aware of these species and new sightings of special status species should be reported via GeoBOB. Species-specific survey protocols have already been developed for the mardon skipper and

Johnson's hairstreak, which can be found on the Interagency Special Status Sensitive Species Program's website (ISSSSP; [www.fs.fed.us/r6/sfpnw/issssp/](http://www.fs.fed.us/r6/sfpnw/issssp/)). When possible, we recommend that land managers follow these protocols when conducting surveys for these species. In instances when this is not possible and other protocols can still provide useful information, we recommend targeted presence/absence surveys, described in the field methods section above.

#### *Agriades podarce klamathensis* (gray blue butterfly)

This subspecies has been recorded from only one site on the Monument, in a small meadow below Little Hyatt Reservoir (Xerces Society 2018). Although the larval host plants in Oregon are unknown, the nominate species relies on several species of shooting stars (*Dodecatheon* spp.) as host plants. The gray blue butterfly is a meadow obligate that is usually associated with moister sites at elevations of 1,220 to 1,525 meters (4,000 to 5,000 ft.). Pollard walk surveys through suitable habitat may be helpful in locating additional populations of this butterfly and/or confirming that the historic site is still extant. However, targeted presence/absence surveys may be the best initial approach to determining this subspecies' distribution on the Monument.

#### *Callophrys johnsoni* (Johnson's hairstreak)

The Johnson's hairstreak is a small butterfly that relies on various species of conifer mistletoes to complete its life cycle. While relatively widespread across the Pacific Northwest, this species has a patchy distribution and is known from only three records on the Monument (Moon Prairie, Hyatt Reservoir, and Randcore Pass) (Xerces Society 2018). This species requires a species-specific survey protocol that differs from the methods described in this report (see Fallon and Black 2017 for more details).

#### *Hesperia colorado oregonia* (western branded skipper)

Most observations of this subspecies within its currently known range date from the 1970s through the 1990s. However, recent observations include Pilot Rock (1999) and two sites on the Cascade-Siskiyou National Monument (2012) (Xerces Society 2018). These sites should be revisited to inventory the existing populations. Repeat surveys at these previously occupied sites, historically occupied sites, and nearby areas are recommended where possible to confirm the status of this subspecies (Blevins 2016). Adults are active from late May through late September, although most records in southwest Oregon are from July and August (Blevins 2016). The larval host plants of this subspecies are not known but likely include various grasses and sedges. Adults may nectar on rabbitbrush, chokecherry, and yarrow (Pyle 2002; Warren 2005). Additional observations of this skipper and the habitats in which it is found will help improve our understanding of its habitat needs.

#### *Polites mardon klamathensis* (mardon skipper)

The mardon skipper is known from approximately ten sites on the CSNM (Xerces Society 2018). Mattoon et al. (1998) designated the mardon skipper population at Hobart Peak as the descriptive type locality of the subspecies *P. m. klamathensis*. Across their range, mardon skippers use a variety of grasses as larval host plants. On the Monument, sedges (*Carex* spp.), California oatgrass (*Danthonia californica*), red fescue (*Festuca rubra*), tufted hairgrass (*Deschampsia caespitosa*), Idaho fescue (*Festuca roemerii*), and the introduced Kentucky bluegrass (*Poa pratense*) are all documented host plants (Beyer and Black 2007). Adults nectar on a wide variety of flowers including hookedspur violet (*Viola adunca*), mariposa lily (*Calochortus* spp.), varileaf cinquefoil (*Potentilla diversifolia*), sea blush (*Plectritis congesta*),

narrowleaf mule-ears (*Wyethia angustifolia*), common camas (*Camassia quamash*), common lomatium (*Lomatium utriculatum*), strawberry (*Fragaria* spp.), and spreading phlox (*Phlox diffusa*) (Beyer and Black 2007; Jepsen et al. 2007; Hatfield et al. 2016). Hatfield (2014) developed detailed protocols for monitoring mardon skippers using distance sampling methods and one-day peak counts. The latter could be incorporated into a butterfly monitoring program on the Monument, using counts at the nearby Howard Prairie Complex sentinel site as a barometer for when surveys should occur.

### *Satyrium auretteorum* (gold-hunter's hairstreak)

This species is mostly restricted to oak woodlands in California but can be found in the southern Cascade Mountains in Oregon (Miller and Hammond 2007). It has been documented at four sites (Baldy Creek, Jenny Creek, Agate Flats, and Oregon Gulch) on the CSNM (Xerces Society 2018). Larvae of the gold hunter's hairstreak are dependent on oak trees, especially Oregon white oak (*Quercus garryana*). Adults are active from late May to early July, depending on elevation, and can be found in oak woodlands where nectar plants are present.

### *Speyeria coronis coronis* (Coronis fritillary)

The *Coronis fritillary* is associated with mountain slopes, foothills, dry gulches, lower elevation canyons, prairie valleys, meadows, chaparral, sage steppe, and forest glades, usually at elevations of less than 610 m (2,000 ft.) (Foltz Jordan 2012). This subspecies is known from a single site (Baldy Creek Road) on the Monument, where two females were collected on July 10, 2003 (Xerces Society 2018). However, *Speyeria coronis* nr. *coronis* was recently documented at three meadow sites on the Monument—Keno Access, Shale Divide, and O'Brien Creek (Pool 2014). *Speyeria* larvae depend on various species of violets (*Viola* spp.), but these early spring flowers have typically senesced by the time adults are on the wing. Surveying sites for violet host plants earlier in the spring may be helpful for determining host plant distributions, thus enabling more focused survey efforts once adults are active. However, this fritillary also migrates to high elevations in the summer and can be found north of the Monument in meadows surrounded by fairly dense forests, potentially away from areas with host plants (Black 2018, pers. comm.). Adults are active from late May through July and are attracted to azalea, mint, thistle, and other composites (Foltz Jordan 2012). Pollard walks may be useful for detecting *Coronis* fritillaries, but expert identification of specimen vouchers is recommended (Foltz Jordan 2012). Targeted presence/absence surveys in meadows with the known *Viola* host plants would be helpful for determining general distribution on the CSNM.

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## Appendix A – Known butterfly fauna of the CSNM

Sources: Runquist 1999; Runquist 2004; BLM 2010; Runquist 2011; NABA 2017; Pyle and LaBar 2018; Xerces Society 2018. Species names have been updated to most current taxonomy using Pelham (2017).

Family	Species name	Common name
Hesperiidae	<i>Amblyscirtes vialis</i>	Common roadside skipper
Hesperiidae	<i>Atalopedes campestris campestris</i>	Sachem
Hesperiidae	<i>Carterocephalus palaemon</i>	Arctic skipper
Hesperiidae	<i>Epargyreus clarus californicus</i>	Silver-spotted skipper
Hesperiidae	<i>Erynnis icelus</i>	Dreamy duskywing
Hesperiidae	<i>Erynnis pacuvius lilius</i>	Pacuvius duskywing
Hesperiidae	<i>Erynnis persius borealis</i>	Persius duskywing
Hesperiidae	<i>Erynnis propertius</i>	Propertius duskywing
Hesperiidae	<i>Euphyes vestris vestris</i>	Dun skipper
Hesperiidae	<i>Hesperia colorado oregonia</i>	Western branded skipper
Hesperiidae	<i>Hesperia columbia</i>	Columbian skipper
Hesperiidae	<i>Hesperia juba</i>	Juba skipper
Hesperiidae	<i>Hesperia lindseyi septentrionalis</i>	Lindsey's skipper
Hesperiidae	<i>Ochloides sylvanoides sylvanoides</i>	Woodland skipper
Hesperiidae	<i>Polites mardon klamathensis</i>	Mardon skipper
Hesperiidae	<i>Polites sabuleti aestivalis</i>	Sandhill skipper
Hesperiidae	<i>Polites sonora sonora</i>	Sonora skipper
Hesperiidae	<i>Pyrgus communis</i>	Common checkered skipper
Hesperiidae	<i>Pyrgus ruralis ruralis</i>	Two-banded checkered skipper
Hesperiidae	<i>Thorybes pylades indistinctus</i>	Northern cloudywing
Lycaenidae	<i>Agriades podarce klamathensis</i>	Gray blue
Lycaenidae	<i>Atlides halesus corcorani</i>	Great purple hairstreak
Lycaenidae	<i>Callophrys augustinus iroides</i>	Brown elfin
Lycaenidae	<i>Callophrys dumetorum</i>	Bramble green hairstreak
Lycaenidae	<i>Callophrys eryphon eryphon</i>	Western pine elfin
Lycaenidae	<i>Callophrys gryneus nelsoni</i>	Nelson's (juniper) hairstreak
Lycaenidae	<i>Callophrys johnsoni</i>	Johnson's hairstreak
Lycaenidae	<i>Callophrys mossii ssp.</i>	Moss's elfin
Lycaenidae	<i>Callophrys sheridanii lemberti</i>	Sheridan's green hairstreak
Lycaenidae	<i>Callophrys spinetorum spinetorum</i>	Thicket hairstreak
Lycaenidae	<i>Celastrina echo</i>	Echo blue
Lycaenidae	<i>Cupido amyntula amyntula</i>	Western tailed blue
Lycaenidae	<i>Cupido comyntas sissona</i>	Eastern tailed blue
Lycaenidae	<i>Euphilotes enoptes (E. compositum)</i>	Pacific dotted blue
Lycaenidae	<i>Euphilotes enoptes (E. elatum)</i>	Pacific dotted blue
Lycaenidae	<i>Euphilotes enoptes (E. nudum)</i>	Pacific dotted blue

Family	Species name	Common name
Lycaenidae	<i>Euphilotes glaucon intermedia</i>	Glaucon blue
Lycaenidae	<i>Euphilotes intermedia</i>	Intermediate dotted blue
Lycaenidae	<i>Glaucopsyche lygdamus columbia</i>	Silvery blue
Lycaenidae	<i>Glaucopsyche piasus piasus</i>	Arrowhead blue
Lycaenidae	<i>Habrodais grunus lorquini</i>	Golden hairstreak
Lycaenidae	<i>Lycaena arota virginiensis</i>	Tailed copper
Lycaenidae	<i>Lycaena cupreus</i>	Lustrous copper
Lycaenidae	<i>Lycaena editha pseudonexa</i>	Edith's copper
Lycaenidae	<i>Lycaena gorgon dorothea</i>	Gorgon copper
Lycaenidae	<i>Lycaena helloides helloides</i>	Purplish copper
Lycaenidae	<i>Lycaena heteronea ssp. 2</i>	Blue copper
Lycaenidae	<i>Lycaena nivalis ssp.</i>	Lilac-bordered copper
Lycaenidae	<i>Lycaena xanthoides nigromaculata</i>	Great copper
Lycaenidae	<i>Plebejus acmon acmon</i>	Acmon blue
Lycaenidae	<i>Plebejus anna ricei</i>	Anna's blue
Lycaenidae	<i>Icaricia icarioides helios</i>	Boisduval's blue
Lycaenidae	<i>Icaricia lupini lupini</i>	Lupine blue
Lycaenidae	<i>Plebejus melissa melissa</i>	Melissa's blue
Lycaenidae	<i>Icaricia saepiolus rufescens</i>	Greenish blue
Lycaenidae	<i>Satyrium auretorum auretorum</i>	Gold-hunter's hairstreak
Lycaenidae	<i>Satyrium behrii behrii</i>	Behr's hairstreak
Lycaenidae	<i>Satyrium californica californica</i>	California hairstreak
Lycaenidae	<i>Satyrium fuliginosa ssp.</i>	Sooty hairstreak
Lycaenidae	<i>Satyrium saepium saepium</i>	Hedgerow hairstreak
Lycaenidae	<i>Satyrium sylvinum nootka</i>	Sylvan hairstreak
Lycaenidae	<i>Satyrium tetra</i>	Mountain mahogany hairstreak
Lycaenidae	<i>Strymon melinus atrofasciata</i>	Gray hairstreak
Nymphalidae	<i>Adelpha californica</i>	California sister
Nymphalidae	<i>Aglais milberti subpallida</i>	Milbert's tortoiseshell
Nymphalidae	<i>Boloria epithore chermocki</i>	Western meadow (Pacific) fritillary
Nymphalidae	<i>Cercyonis oetus oetus</i>	Dark wood nymph
Nymphalidae	<i>Cercyonis pegala ariane</i>	Common wood nymph
Nymphalidae	<i>Cercyonis sthenele silvestris</i>	Great Basin wood nymph
Nymphalidae	<i>Chlosyne hoffmanni segregata</i>	Hoffman's checkerspot
Nymphalidae	<i>Chlosyne leanira oregonensis</i>	Leanira checkerspot
Nymphalidae	<i>Chlosyne palla palla</i>	Northern checkerspot
Nymphalidae	<i>Coenonympha tullia eryngii</i>	Common ringlet
Nymphalidae	<i>Danaus plexippus plexippus</i>	Monarch
Nymphalidae	<i>Euphydryas chalcedona colon</i>	Variable checkerspot
Nymphalidae	<i>Euphydryas editha rubicunda</i>	Edith's checkerspot

Family	Species name	Common name
Nymphalidae	<i>Junonia coenia grisea</i>	Common buckeye
Nymphalidae	<i>Limenitis lorquini lorquini</i>	Lorquin's admiral
Nymphalidae	<i>Nymphalis antiopa antiopa</i>	Mourning cloak
Nymphalidae	<i>Nymphalis californica</i>	California tortoiseshell
Nymphalidae	<i>Oeneis nevadensis nevadensis</i>	Great arctic
Nymphalidae	<i>Phyciodes mylitta mylitta</i>	Mylitta crescent
Nymphalidae	<i>Phyciodes orseis orseis</i>	California crescent
Nymphalidae	<i>Phyciodes pulchella</i> ssp.	Field crescent
Nymphalidae	<i>Polygonia faunus rusticus</i>	Green comma
Nymphalidae	<i>Polygonia gracilis zephyrus</i>	Hoary comma
Nymphalidae	<i>Polygonia oreas silenus</i>	Oreas anglewing
Nymphalidae	<i>Polygonia satyrus neomarsyas</i>	Satyr anglewing
Nymphalidae	<i>Speyeria callippe elaine</i>	Callippe fritillary
Nymphalidae	<i>Speyeria coronis coronis/snyderi</i>	Coronis fritillary
Nymphalidae	<i>Speyeria cybele pugetensis</i>	Great spangled fritillary
Nymphalidae	<i>Speyeria egleis mattooni/oweni</i>	Great Basin fritillary
Nymphalidae	<i>Speyeria hesperis dodgei</i>	Northwestern fritillary
Nymphalidae	<i>Speyeria hydaspes blend</i>	Hydaspe fritillary
Nymphalidae	<i>Speyeria zerene conchylitatus</i>	Zerene fritillary
Nymphalidae	<i>Vanessa annabella</i>	West coast lady
Nymphalidae	<i>Vanessa atalanta rubria</i>	Red admiral
Nymphalidae	<i>Vanessa cardui</i>	Painted lady
Nymphalidae	<i>Vanessa virginiensis</i>	American lady
Papilionidae	<i>Battus philenor hirsuta</i>	California pipevine swallowtail
Papilionidae	<i>Papilio eurymedon</i>	Pale tiger swallowtail
Papilionidae	<i>Papilio indra shastensis</i>	Indra swallowtail
Papilionidae	<i>Papilio multicaudata pusillus</i>	Two-tailed tiger swallowtail
Papilionidae	<i>Papilio rutulus rutulus</i>	Western tiger swallowtail
Papilionidae	<i>Papilio zelicaon zelicaon</i>	Anise swallowtail
Papilionidae	<i>Parnassius clodius clodius</i>	Clodius parnassian
Papilionidae	<i>Parnassius smintheus sternitzky</i>	Mountain parnassian
Pieridae	<i>Anthocharis lanceolata lanceolata</i>	Gray marble
Pieridae	<i>Anthocharis sara sara</i>	Sara orangetip
Pieridae	<i>Colias eurytheme</i>	Orange sulphur
Pieridae	<i>Colias occidentalis chrysomelas</i>	Western sulphur
Pieridae	<i>Colias philodice eriphyle</i>	Clouded sulphur
Pieridae	<i>Euchloe ausonides transmontana</i>	Large marble
Pieridae	<i>Neophasia menapia menapia</i>	Pine white
Pieridae	<i>Pieris marginalis castoria</i>	Margined white
Pieridae	<i>Pieris rapae rapae</i>	Cabbage white

<b>Family</b>	<b>Species name</b>	<b>Common name</b>
Pieridae	<i>Pontia beckerii</i>	Becker's white
Pieridae	<i>Pontia occidentalis occidentalis</i>	Western white
Pieridae	<i>Pontia protodice</i>	Checkered white
Pieridae	<i>Pontia sisymbrii sisymbrii</i>	Spring white
Riodinidae	<i>Apodemia mormo mormo</i>	Mormon metalmark

## Appendix B – History of butterfly monitoring on the CSNM

Event	Date	Surveyor(s)	Notes	Citation
Xerces Society Fourth of July Butterfly Count (Ashland, OR)	July 5, 1987	R. Ekstrom, M. Robbins, S. Summers, M. Uhtoff	1 <sup>st</sup> year. 58 species (1,648 individuals). Center of count circle: 42 deg 08'N, 122 deg 36'W.	Opler and Brown 1987
Xerces Society Fourth of July Butterfly Count (Ashland, OR)	July 9, 1988	R. Ekstrom, M. Robbins, N. Robbins, S. Summers, M. Uhtoff	2 <sup>nd</sup> year. 76 species (2,077 individuals).	Opler and Brown 1988
Xerces Society Fourth of July Butterfly Count (Ashland, OR)	July 1, 1989	E. Ekstrom, W. McCollum, M. Robbins, E. Runquist, P. Runquist, V. Runquist, S. Summers, M. Uhtoff	3 <sup>rd</sup> year. 76 species (2,069 individuals).	Opler and Brown 1989
Xerces Society Fourth of July Butterfly Count (Ashland, OR)	July 7, 1990	R. Ekstrom, D. Robbins, M. Robbins, N. Robbins, S. Summers	4 <sup>th</sup> year. 76 species (1,589 individuals).	Opler and Brown 1990
Xerces Society Fourth of July Butterfly Count (Ashland, OR)	June 30, 1991	J. Anderson, S. Anderson, A. Barron, R. Barron, Y.-P. Dion, R. Ekstrom, J. Hinchliff, S. Mattoon, D. McCorkle, B. Neil, D. Robbins, M. Robbins, N. Robbins, E. Runquist, P. Runquist, V. Runquist, R. Skibby, S. Summers, M. Utoff	5 <sup>th</sup> year. 63 species (2,887 individuals). Mattoon et al. discover the Soda Mountain Road mardon skipper population (now called the Hobart Peak Complex)--became the type specimen for <i>P. m. klamathensis</i> in 1998.	Opler and Swengel 1991; Mattoon et al. 1998; Hatfield et al. 2013
Informal one-day butterfly count	1992	Unknown	48 species during an informal count within the current CSNM boundaries.	Runquist 2000
Butterfly community surveys in the Soda Mountain Region, Jackson County, OR	1999	Erik Runquist		Runquist 1999

Event	Date	Surveyor(s)	Notes	Citation
Informal one-day butterfly count	June 22, 2000	Erik Runquist and Andy Warren	53 species along Soda Mountain Road (from Hwy 66 to the Soda Mountain Lookout).	Runquist 2000
Informal one-day butterfly count	June 27, 2000	Erik Runquist and Andy Warren	51 species within the upper Scotch Creek canyon.	Runquist 2000
Butterfly species diversity in the CSNM – Year 1	2003	Erik Runquist	77 species recorded (5,423 individuals)	Runquist 2011
Butterfly species diversity in the CSNM – Year 2	2004	Erik Runquist	84 species recorded (8,846 individuals)	Runquist 2011
One-day mardon skipper counts	June and July 2005	Mace Vaughan, Scott Hoffman Black, Dana Ross		Black et al. 2010; Xerces Society 2018
One-day mardon skipper counts	June 2006	Scott Hoffman Black (Xerces Society)		Xerces Society 2018
One-day mardon skipper counts	June 2007	Sarina Jepsen, Logan Lauvray, Scott Hoffman Black (Xerces Society)		Jepsen et al. 2007; Xerces Society 2018
One-day mardon skipper counts	June and July 2009	Scott Hoffman Black (Xerces Society)		Black et al. 2010; Xerces Society 2018
One-day mardon skipper counts	July 2010	Scott Hoffman Black (Xerces Society)		Black et al. 2010; Xerces Society 2018
One-day mardon skipper counts	June 2012	Scott Hoffman Black, Rich Hatfield, Alexa Carleton (Xerces Society)		Hatfield et al. 2013; Xerces Society 2018
Cascade-Siskiyou Fourth of July Butterfly Count	July 4, 2012	NABA participants	1 <sup>st</sup> annual count. Count center is located at 42.1230, -122.4644 (15 mile diameter).	Keller 2018, pers. comm.
Cascade-Siskiyou Fourth of July Butterfly Count	July 4, 2013	NABA participants	2 <sup>nd</sup> annual count	Keller 2018, pers. comm.
Cascade-Siskiyou Fourth of July Butterfly Count	July 4, 2014	NABA participants	3 <sup>rd</sup> annual count	Keller 2018, pers. comm.

Event	Date	Surveyor(s)	Notes	Citation
Meadow dwelling insects surveys	2014	Sasha Joachims, Ellen Myers, Todd Musser, Ernie Fliegel, Eliana Pool	Documented <i>Speyeria coronis</i> nr. <i>coronis</i> at Keno Access, Shale Divide, and O'Brien Creek.	Pool 2014; BLM 2015a
Cascade-Siskiyou Butterfly Bioblitz	June 6, 2015	Participants with Friends of the CSNM and NABA	First bioblitz on the Monument. Combined w/ the 4 <sup>th</sup> annual NABA count. 70 species identified.	Keller 2018, pers. comm.
Cascade-Siskiyou Butterfly Count	June 11, 2016	NABA participants	5 <sup>th</sup> annual count	Keller 2018, pers. comm.
Cascade-Siskiyou Butterfly Count	June 17, 2017	NABA participants	6 <sup>th</sup> annual count	Keller 2018, pers. comm.
Cascade-Siskiyou Butterfly Count	June 16, 2018	NABA participants	7 <sup>th</sup> annual count	Keller 2018, pers. comm.

## Appendix C – Monitoring site locations

Site Name	Survey type	Latitude	Longitude	Description
Agate Flat	Transect	42.014323	-122.399924	Dry open grassland and shrubland, unique for its heavy clay soils, unusual plant communities, and high quality perennial grasslands.
Baldy Creek Road	Transect	42.092442	-122.500305	Mix of habitats, from oak savanna to white fir-juniper mix. Incredibly species-rich area.
Boccard Point	Transect	42.055626	-122.486946	Coniferous forest with dry open areas.
Buck Prairie	Presence/absence	42.215436	-122.470707	Open wet prairie.
Chinquapin Mountain	Transect	42.151458	-122.436982	Dry meadows with juniper and shrub-scrub.
Grizzly Peak	Transect	42.268047	-122.622824	Large open meadow on summits.
Hobart Bluff	Transect	42.095400	-122.476400	Open dry and wet meadows.
Jenny Creek Rd	Transect	42.163900	-122.334200	Large meadow west of road.
Little Hyatt Reservoir South	Presence/absence	42.158265	-122.485699	Wet meadows south of reservoir.
Lower Keene Creek	Transect	42.109480	-122.443167	Wet meadow.
Moon Prairie	Presence/absence	42.262209	-122.371929	Open meadow.
Old Baldy RNA	Transect	42.244046	-122.284301	High elevation mixed conifer forest and open brush fields.
Pilot Rock	Presence/absence	42.030880	-122.560250	Prominent rock outcrop surrounded by high quality remnant grasslands.
Porcupine Creek	Transect	42.047900	-122.550000	Riparian and mixed conifer.
Pumpchance 125 Meadow	Presence/absence	42.266867	-122.382867	Wet meadow surrounded by conifers.
Randcore Pass	Transect	42.075622	-122.396733	Oak/grassland habitat interspersed with mixed conifer forests.
Scotch Creek RNA	Transect	42.023459	-122.517035	Riparian with wet and dry meadows. High quality perennial grasslands.
Soda Mountain Rd	Transect	42.079559	-122.479236	Mix of wet and dry areas.
Surveyor Mountain	Transect	42.212599	-122.179920	Old growth coniferous forest with open meadows.
Tunnel Creek Wetlands	Transect	42.251207	-122.207270	Spring-fed wetland area with high density of sedges and interesting plant community.

## Appendix D – Collection tags

Field tags should be filled out by the collector at the time of collection. Each tag should include a unique voucher collection number (e.g., initials of the collector, year, and number: CF2016-004).

<p>Species name: _____</p> <p>Date: _____ Time of day: _____</p> <p>Collector: _____ Collection # _____</p> <p>OR WA County: _____ USFS BLM</p> <p>Admin/Sub-admin unit: _____</p> <p>UTM E _____ UTM N _____ NAD83</p> <p>Coordinate accuracy: _____ Elevation: _____ ft.</p> <p>Locality description: _____</p> <p>_____</p> <p>Habitat/plant community: _____</p> <p>_____</p> <p>_____</p> <p>Behavior/other notes: _____</p> <p>_____</p>	<p>Species name: _____</p> <p>Date: _____ Time of day: _____</p> <p>Collector: _____ Collection # _____</p> <p>OR WA County: _____ USFS BLM</p> <p>Admin/Sub-admin unit: _____</p> <p>UTM E _____ UTM N _____ NAD83</p> <p>Coordinate accuracy: _____ Elevation: _____ ft.</p> <p>Locality description: _____</p> <p>_____</p> <p>Habitat/plant community: _____</p> <p>_____</p> <p>_____</p> <p>Behavior/other notes: _____</p> <p>_____</p>
<p>Species name: _____</p> <p>Date: _____ Time of day: _____</p> <p>Collector: _____ Collection # _____</p> <p>OR WA County: _____ USFS BLM</p> <p>Admin/Sub-admin unit: _____</p> <p>UTM E _____ UTM N _____ NAD83</p> <p>Coordinate accuracy: _____ Elevation: _____ ft.</p> <p>Locality description: _____</p> <p>_____</p> <p>Habitat/plant community: _____</p> <p>_____</p> <p>_____</p> <p>Behavior/other notes: _____</p> <p>_____</p>	<p>Species name: _____</p> <p>Date: _____ Time of day: _____</p> <p>Collector: _____ Collection # _____</p> <p>OR WA County: _____ USFS BLM</p> <p>Admin/Sub-admin unit: _____</p> <p>UTM E _____ UTM N _____ NAD83</p> <p>Coordinate accuracy: _____ Elevation: _____ ft.</p> <p>Locality description: _____</p> <p>_____</p> <p>Habitat/plant community: _____</p> <p>_____</p> <p>_____</p> <p>Behavior/other notes: _____</p> <p>_____</p>



# Appendix F – Data sheets for presence/absence surveys

10/8/2010

## OR / WA BLM GeoBOB v 1.4 OBSERVATIONS & SITE FORM – FAUNA, pg 1.

(Circle appropriate option when a list is provided, **Bold** items are required fields, \*key to codes on cheat sheet. See data dictionary for Field Name and List of Value definitions.)

### OBSERVATIONS

**OBS ID:** \_\_\_\_\_ **SPECIES CODE:** \_\_\_\_\_  
**SCIENTIFIC NAME:** \_\_\_\_\_ **COMMON NAME:** \_\_\_\_\_  
**UTM:** \_\_\_\_\_ **E,** \_\_\_\_\_ **N** **ZONE:** \_\_\_\_\_ **DATUM:** \_\_\_\_\_  
**LAT:** \_\_\_\_\_ **W,** \_\_\_\_\_ **LONG:** \_\_\_\_\_ **N** **GPS model & software used:** \_\_\_\_\_  
**\*OBSERVATION TYPE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_  
**DATE ACCURACY:** Day, Month, Year  
**RELIABILITY:** Excellent, Good, Fair, Poor, Unknown **\*LOCATION ACCURACY:** \_\_\_\_\_  
**TOTAL QUANTITY:** \_\_\_\_\_ **QUANTITY ESTIMATED?:** Y / N  
**DISTRIBUTION:** Clumpy, Linear, Scattered-Even, Scattered-Patchy  
**ABUNDANCE:** Unknown, Abundant, Common, Uncommon, Very Uncommon  
**OBSERVERS:** \_\_\_\_\_  
**Notes:** \_\_\_\_\_

### DETAIL OBS

**QUANTITY:** \_\_\_\_\_ **GENDER:** Female, Male, Hermaphrodite, Unknown **\*AGE:** \_\_\_\_\_  
**\*ACTIVITY:** \_\_\_\_\_ **CONDITION:** Dead, Excellent, Fair, Good, Injured, Live, Poor, Shell, Sick, Unknown.  
**REPRO-STATUS:** Non-repro, Repro, Unknown, Not Applicable. [BATS] Lactating, Null Parous, Parous, Post-lactating, Pregnant, (bats) Testes/epididymides enlarged & visible .  
**NOTES:** \_\_\_\_\_

### HABITAT/ENVIRONMENTAL CONDITIONS (Optional data)

**SLOPE (%):** \_\_\_\_\_ **SLOPE – MIN. (%):** \_\_\_\_\_ **SLOPE – MAX. (%):** \_\_\_\_\_ **SLOPE SOURCE:** \_\_\_\_\_  
**Aspect (deg):** \_\_\_\_\_ **Aspect – min. (deg):** \_\_\_\_\_ **Aspect – max. (deg):** \_\_\_\_\_ **Aspect source:** \_\_\_\_\_  
**Elevation (ft):** \_\_\_\_\_ **Elevation – min. (ft):** \_\_\_\_\_ **Elevation – max. (ft):** \_\_\_\_\_ **Elevation source:** \_\_\_\_\_  
 Source: C = Calculated, M = Measured, E = Estimated, G = GPS generated (for elevation only)  
**\*Landform:** \_\_\_\_\_ **Stand Age:** \_\_\_\_\_  
**Stand Structure:** Multiple Canopies, Single Canopy, Two Canopies, Even/Live Resid, Unspecified  
**\*Serai Stage:** \_\_\_\_\_ **\*Substrate:** \_\_\_\_\_  
**Percent Cover:** 1) **Overstory:** \_\_\_\_\_ **Overstory min.:** \_\_\_\_\_ **Overstory max.:** \_\_\_\_\_  
 2) **Understory:** \_\_\_\_\_ **Understory min.:** \_\_\_\_\_ **Understory max.:** \_\_\_\_\_  
 ~Fire Presence: Absent, Burned, Completely Burned, High Scorch, Mod Scorch, Partial Scorch, Very High Scorch  
**Topographic Position (rel. to overall slope):** Bottom, Lower, Mid, Ridge, Upper.  
**Soil Texture Class:** Clay, Clay Loam, Loam, Sand, Silt, Silt Loam, Sandy Loam, Other  
**Air Temperature (F):** \_\_\_\_\_ **Relative Humidity (%):** \_\_\_\_\_ **Soil Temperature (F):** \_\_\_\_\_  
**Soil Moisture:** Dry, Moist, Wet, Inundated/Flooded **Light Index:** Full Shade, Full Sun, Part Shade  
**Precip:** Dry, Fog, Misty Rain, Rain, Sleet/Hail, Snow **Wind:** Calm, Gusty, Light, Moderate, Windy (15+ mph)  
**Notes:** \_\_\_\_\_

~If fire was present within the last 5 years

### ADDITIONAL OBSERVATION LOCATIONS

If more than one observation is found in the survey area and that is within the survey site, record the location, Obs ID, and notes here. If specifics about the additional observations need to be recorded (feature, detail observation, or collection information) complete a separate Obs form.

Latitude/UTM E	Longitude/UTM N	Obs ID	Notes

PLEASE ATTACH MAPS of Observation or Site when helpful.

### THREATS

**\*THREAT TYPE(S):** \_\_\_\_\_  
**NOTES:** \_\_\_\_\_



## Appendix G – Educational and identification tools for surveyors

### Field Guides

Fallon, C. and C. LaBar. 2013. *Plebejus podarce klamathensis* field guide. Prepared for the Interagency Special Status Sensitive Species Program (ISSSSP). 3 pp. Available online at <https://www.fs.fed.us/r6/sfpnw/issssp/documents2/inv-iile-plebejus-podarce-klamathensis-field-guide-2013.pdf> (accessed 7 May 2018).

Fallon, C. and C. Mazzacano. 2015. *Speyeria coronis coronis* field guide. Prepared for the Interagency Special Status Sensitive Species Program (ISSSSP). 7 pp. Available online at <https://www.fs.fed.us/r6/sfpnw/issssp/documents3/inv-fg-iile-speyeria-coronis-coronis-xerces-201509.pdf> (accessed 7 May 2018).

James, D. and D. Nunnallee. 2011. *Life Histories of Cascadia Butterflies*. OSU Press, Corvallis, OR. 447 pp.

Pyle, R.M. 2002. *The Butterflies of Cascadia: A Field Guide to all the Species of Washington, Oregon, and the Surrounding Territories*. Seattle Audubon Society, Seattle, WA. 420 pp.

Pyle, R.M. and C. LaBar. 2018. *Butterflies of the Pacific Northwest*. Timber Press, Portland, OR. 461 pp.

### Additional Information

Blevins, E. 2016. *Hesperia colorado oregonia* species fact sheet. Version 2. Updated for the Interagency Special Status Sensitive Species Program. 21 pp. Available online at <https://www.fs.fed.us/r6/sfpnw/issssp/documents4/sfs-iile-hesperia-colorado-oregonia-2016-10-508.pdf> (accessed 7 May 2018).

Fallon, C., and S.H. Black. 2017. Conservation assessment for Johnson's hairstreak (*Callophrys johnsoni* Skinner 1904). Prepared for the USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington. 49 pp.

Foltz Jordan, S. 2012. *Speyeria coronis coronis* species fact sheet. Version 2. Updated for the Interagency Special Status Sensitive Species Program. 19 pp.

Hietala-Henschell, K. 2018. *Agriades podarce klamathensis* species fact sheet. Version 3. Updated for the Interagency Special Status Sensitive Species Program. 17 pp.

Kerwin, A.E. 2011. Conservation assessment for the mardon skipper (*Polites mardon*). Version 2.0. Developed for the Interagency Special Status Sensitive Species Program. 60 pp.

Miller, J.C. and P.C. Hammond. 2007. Butterflies and moths of Pacific Northwest forests and woodlands: Rare, endangered, and management-sensitive species. Forest Health Technology Enterprise Team FHTET-2006-07. 234 pp.

Ross, D. and P. Hammond. 2015. Butterflies and moths. Pages 179-189 in: *The Klamath-Siskiyou: Timely Treasures of an Iconic Bioregion*, J. Roth (ed), US Department of the Interior, National Park Service, Washington, DC.

### Digital Image Collections

#### **PNW Moths**

A comprehensive guide to moths in the PNW, including species fact sheets, identification keys, high resolution photos, and occurrence maps.

<http://pnwmoths.biol.wvu.edu/>

**Southern Oregon University Insect Museum – Butterfly Collection**

This collection highlights digital images and field collection data of preserved Lepidoptera from students, researchers, and amateur collectors primarily from the CSNM and surrounding areas.

<http://digital.hanlib.sou.edu/cdm/landingpage/collection/p16085coll9>

**Visual Guide to Butterflies and Moths of the Cascade-Siskiyou National Monument**

<https://www.inaturalist.org/guides/6499>