

FINAL REPORT
**Meadow Invertebrate Detections in Southern
Oregon**

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Introduction

Public lands are home to a dynamic array of invertebrates, many of which are endemic to the ecosystems they inhabit. Of the insect species considered to be sensitive within the Medford and surrounding districts there are some that have been noted as absent within their entire ranges or portions of them during past survey efforts and remain undetected today. These sensitive meadow arthropods interact within complex and fragile ecosystems. Many of the habitats that support them are publically managed in a variety of ways. Their sensitivities make them more susceptible to management and a better understanding of these influences is imperative to preserving bio-diverse ecosystems. Sensitive species are influenced by a wide array of impacts associated with climate change, hybridization, over-grazing, pesticide use, controlled burning, drought, mowing, tilling, disease and displacement by introduced species. Pollinators in particular are of concern because they provide ecosystem services essential to the success of native meadow flora and fauna (Hatfield, Jepsen, Thorp, 2014).

Establishment of the presence or absence of special status meadow species within the Oregon Siskiyou and Cascade bioregions was the goal of this project. Of those listed under the Interagency Special Status Species Program (ISSSSP) six primary target species were chosen for the focus of the survey effort based on prior habitat knowledge and current federal status of concern.

Bombus franklini or franklin's bumblebee is a species of bee currently undetected within its historic range, and was last sighted by Robin Thorp in August of 2006 on Mount Ashland (Code, Haney, 2006). Franklin's are generally a large bodied bee with queens ranging from 22-24mm and workers ranging from 10-17mm in length. They are short, even haired, and can generally be distinguished by white hair on their extreme lateral margins (Koch, Strange, Williams, 2012). In the field Franklin's bumblebee will appear yellow above the wings and black on the upper thorax with white towards the base. Franklin's is considered a short tongued/cheeked bumblebee that may have a tendency to visit host plants based on accessibility to

nectar. However, the species has also been found to antagonistically nectar rob by chewing a hole in the host plant where nectar is located when access to other more accessible plants is less productively favorable (Hatfield, Jepsen, Thorp, 2014). This particular behavior has been known to occur during its visitation to pollinator plants such as *Aconitum*. Some of the other floral species Franklin's may be found visiting include: *Agastache*, *Centaurea*, *Ceanothus*, *Eriogonum*, *Eschscholzia*, *Lupinus*, *Monardella*, and *Vicia* (Koch, Strange, Williams, 2012).

The bumblebee known as *Bombus occidentalis* or the Western bumblebee is currently considered a BLM special status species whose range is contracting. Occidentalis is considered a medium bodied bee with queens ranging from 20-21mm and workers 9-15mm, and are short-tongued floral antagonists similar to Franklin's. This species may be found visiting floral hosts such as *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Geranium*, *Grindellia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Solidago*, *Trifolium*, and *Aconitum*. To the west of the Cascades the Western bumblebee will likely appear black faced, yellow on the upper thorax, and banded white at its base (Koch, Strange, Williams, 2012) (Hatfield, Jepsen, Thorp, 2014).

Chloealtis aspasma or the Siskiyou short-horned grasshopper was last surveyed by Medford BLM in 2008. This 2008 collection effort showed the species to be more abundant than in prior surveys that were conducted in 2006. It was also noted in the 2008 survey report that their presence within the Klamath-Siskiyou ecoregion is likely to occur in conjunction largely with a similar species known as *Chorthippus curtippennis* (Fouts, Wier, Manger, 2008). The Siskiyou short-horned grasshopper is often argus brown or gray in color with wings that do not extend the length of the abdomen and are usually wider towards the end of it and slender towards the base of the thorax (Fouts, Wier, Manger, 2008). They are small-bodied, generally 17-24mm in length, with the pronotum, abdomen, wings, and upper surface of the head likely yellow to brown in color (Rhen, Hebard, 1919). The species has been known to use elderberry plants as a host, however, due to findings during surveying in 2008 it is suspected that the grasshopper not only uses elderberry but other various components of the landscape opportunistically such as downed wood and other vegetation to rear offspring, and does not favor this plant directly (Fouts, Wier, Manger, 2008). Siskiyou short-horned are thought to be less susceptible to forest

management such as logging when the activity or treatment being performed provides added debris or opens up canopy in order to allow for increased shrubbery within an ecosystem (Rhen, Hebard, 1919).

Plebejus podarce klamathensis or the gray-blue butterfly is a meadow associate known to inhabit subalpine meadows abundant in moisture and bloom. This small blue is known generally to occur between 4000-5500 feet of elevation in high grassland environments within the Medford BLM and Rogue River-Siskiyou National Forest Districts. Much is still unknown about the population status of this species, but they have been documented in past survey efforts to the east of Grouse Gap on Mount Ashland (Runquist 2009, *pers. comm.*). They are considered small bodied with a wingspan of 2.2-2.6cm. Antennae of the gray-blue are banded with bodies tending to be iridescent and undersides tan with black pupils on top of white wing spots ventrally fused with white blotches over dark brown (The Xerces Society, 2014). Although a larval host plant within Oregon has not been documented, shooting stars (*Dodecatheon jeffreyi* and *Dodecatheon alpinum*) are known to support larvae in California. It has also been observed that gray-blue adults do not appear to move beyond the meadows their host plants are located in (The Xerces Society, 2014).

The *Polites mardon* or mardon skipper, which has been documented in the Ashland Resource Area of Medford BLM and is endemic to the region, is a small tawny orange butterfly who gets its common name by its tendency to bask and 'skip' during flight. This small, stout, hairy-bodied butterfly generally has a wingspan of 20-24mm with a light tan to orange and yellow to white pattern of light rectangular spots on the underside of its wings. The butterfly tends to be found collecting nectar from local flora species such as *Viola adunca*, *Vicia sativa*, *Calochortus*, *Erysimum capitatum*, *Penstemon*, *Camassia quamash*, *Lomatium utriculatum*, *Fragaria virginiana*, *Trifolium longipes*, *Erigeron peregrinus*, *Achillea millefolium* and *Phlox diffusa*. Populations of this species will likely be concentrated in areas that contain host flora and provide moisture, clustering primarily around floral *Vicia* host species (Beyer, Black, 2007) (USDA, USDI, 2007).

Both the gray-blue and mardon skipper require constant access to sources of water within their habitat during the reproductive flight period of their lifecycle making

them highly drought sensitive. Host plants may also experience negative impacts associated with drought affecting the species' larval stage (Xerces Society, 2014) (USDA, USDI, 2007).

Lastly, *Speyeria coronis nr. coronis* or coronis fritillary is a large bodied butterfly with a wingspan of approximately three inches, is considered a 'fast flyer' that is often seen in flight as opposed to basking (Pyle, 2002). Their bodies are generally tawny orange on the underside with the forewing tip drawn out. The ventral hind wing discs of coronis are tan to brandy colored with silver orbs, of which the marginal silver spots are flattened and capped with tan olive coloration. They can be distinguished from other fritillary types by the presence of heavy black marks, darker discs, and a lack of greenish tinge on the ventral part of the wings as well as ovular silver orbs on ventral portion of wings (Pyle, 2002). They tend to favor areas abundant in sage brush, a species of flora considered to be drought-tolerant (Opler *et al.* 2011, Evergreen Aurelians 1996).

Varying habitat components for these six different species were needed within the meadows surveyed, and sites were chosen based on their ability to provide them. Bloom is crucial for pollinator presence. Wet areas are favorable for the mardon skipper and gray-blue butterfly, while downed wood or shrubs are ideal for the Siskiyou short-horned. All of these attributes are important, and most of the sites chosen contained more than one, and ideally all of these elements. In attempts to more thoroughly understand the impacts on sensitive population numbers within meadow environments thirty-one sites were surveyed between July and September 2014.

Study Area

Surveys were conducted on U.S. Forest Service, Bureau of Land Management, and private land in and around the Medford district. Sites were partially chosen within the study area through the use of a mapping software program called ArcGIS. Other methods of site designation included the gathering of known historic species locations, as well as surveyor experience. Meadows that contained downed wood or

shrubs, nectar-producing bloom, and wet seeps or riparian zones where the species were suspected or detected were the primary targets of the survey effort.

Methods

Aerial maps of appropriate habitat to survey were generated using GIS data, known historic site records, and technician experience. Sites were chosen based on size (a minimum of ½ hour and maximum of 4 hours to survey depending on complexity of chosen meadows), as well as their ability to support bloom being that a portion of the target species were native pollinators. A photo and waypoint of each site was documented as well as elevation, size (in approximate acres), slope, a general site description (vegetation, grazing level, and moisture), and any significant weather conditions.

After initial data were collected a start time was noted and a visual encounter survey (VES) walk using sweep nets and collection containers was conducted within each meadow. These VES's aimed to collect and record all known populations of target species as well as similar meadow associates and their host plants when possible. At the end of each survey a stop time was noted and collected specimens examined in order to determine type. Target species were photographed and some vouchered using acetate. Bumblebees were placed in coolers with icepacks for 3-5 minutes in order to slow movement of the specimen and improve ability to identify.

At sites visited both target and common species were vouchered through digital photo documentation and vouchering specimens in collection containers. A collection of photos is stored with all other project files in the Medford BLM Ashland wildlife shared drive. Specimens are stored with the Medford BLM Ashland resource area wildlife division.

Results

Of the six primary target species, three were found in meadows ranging across the Medford BLM and Rogue River-Siskiyou National Forest Districts. *Bombus occidentalis*, *Speyeria coronis nr. coronis fritillary*, and *Chloealtis aspasma* were all found at various locations.

Bombus occidentalis was found only in the eastern half of the bioregion, at Buck Divide, Keno Access and Hoxie Creek meadows visiting species of flora in the *Solidago* genus. Both the Keno Access and Hoxie Creek sites were locations active with grazers. At all three of the locations the specimens identified were single workers found collecting pollen and nectar.

Speyeria coronis nr. coronis fritillary were found at Shale Divide and O'Brien Creek with one possible sighting at Tamarack Creek (although the butterfly was in flight and could not be positively identified). Overall, specimens tended to be in flight and were generally caught with sweep nets to examine in jars and photograph.

Lastly, *Chloealtis aspasma* was surveyed for at new locations as well as historic ones. Some of the new site locations were in close proximity to historic Siskiyou short-horned sites but provided a broadened array of habitat components for all of the target species. During 2014 surveys the grasshopper was identified at twelve of the thirty-one sites visited. These sites included Burnt Creek, Dead Indian, Conde Road, Hobart Peak, Keno Access, Little Hyatt, O'Brien Creek, Shale Divide, Scotch Creek, South Soda Creek, Wertz Reservoir, and Tamarack Creek. Within these meadows populations tended to cluster away from tall moist grasses and around dry woody debris and shrubs such as elderberry and willow.

Discussion

Species such as the Siskiyou short-horned become more active in dry shrubby environments that persist throughout late summer and into early fall. Surveys for the Siskiyou short-horned conducted in 2008 found all specimens between the end of July and into September, similar to the time period over which these 2014 surveys were conducted. The inability to survey throughout the majority of the

flight periods of species such as the gray-blue and mardon skipper may have contributed to an inability to determine absolutely the presence or absence of the species within some of the meadows surveyed. For future survey efforts, slope aspect is an important consideration when planning visits. South facing slopes ought to be targeted towards the beginning of the summer season in order to visit meadows when bloom density is high and flight periods are optimal. A better understanding of the environmental changes that are impacting these species throughout their entire lifecycle is needed in order to assess changes in population size and distribution.

It should be considered that many of these species have ranges that intersect with areas of heavy recreation and are also extremely sensitive to human activity. Caution should be taken in attempts to preserve host plants, water sources, and ground nests that can be trampled. The affects of grazing are not completely understood with regard to many of these species. However, at many of the locations grazing had occurred or was occurring. All three of the target species were found at one or more sites of current or past cattle grazing activity. This is notable being that most of these species likely rely on host plants that are either favored or trampled by grazers and bumblebees tend to nest in the ground where grazers are active. However, Siskiyou short-horned grasshoppers tended to be found in areas of sparse vegetation and grazing. It is evident that a better understanding of the positive and negative impacts of grazing in areas of sensitive meadow species activity ought to be examined.

Bumblebees in particular are highly susceptible to ecosystem management such as logging, recreation, and controlled burning because they tend to nest in old rodent dens in the ground. They are also genetically dependent as a collective on a single queen to collect and store food, hibernate, and reproduce a brood the following spring (Hatfield, Jepsen, Thorp, 2014). Fluctuations in temperature alter foraging abilities, and the movement of rodent populations causing changes in range habitat. The adaptation of native species as these changes occur made the surveying of a variety of locations within possible and known habitats necessary. Although no Franklin's bumblebee were found during this collection effort, it is possible that small niches of the species still exist (Hatfield, Jepsen, Thorp, 2014).

Much is still unknown about the reasons why these meadow species' ranges and population sizes are in decline. It is recommended that future meadow surveys be conducted. Broadened meadow invertebrate detection efforts will provide for a more thorough understanding of lifecycle interactions and habitat associations imperative to the preservation of these ecosystems and the sensitive species that inhabit them.

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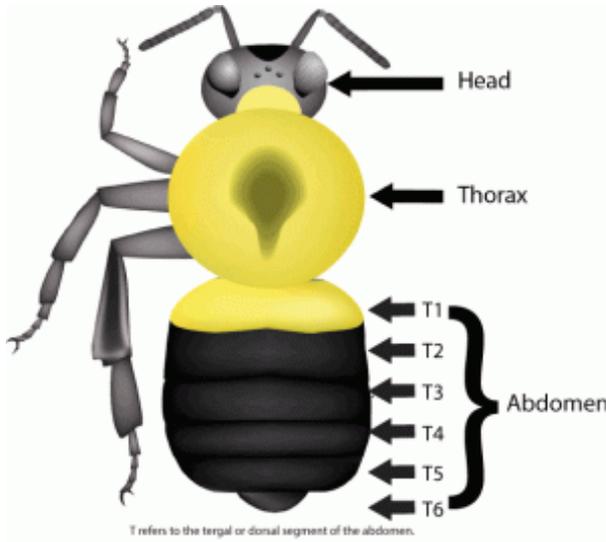
Sean Anderson- Map creation

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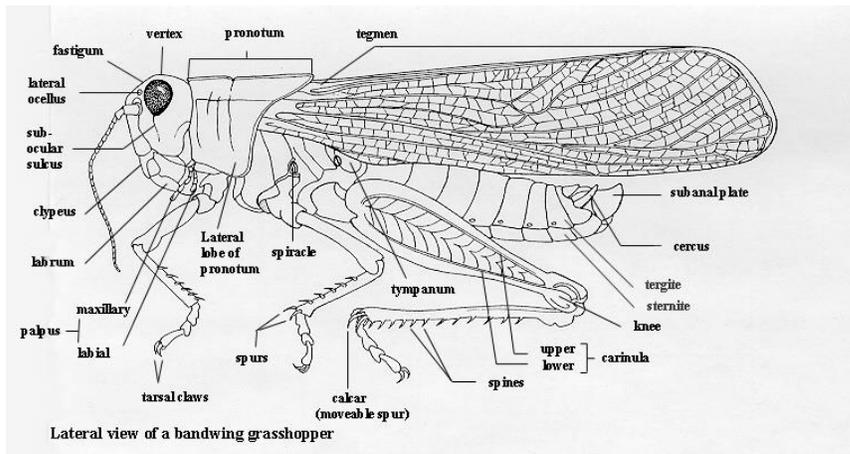
References Cited

- Beyer, L. and S. H. Black. 2007. Site utilization by adults and larvae of Mardon skipper butterfly (*Polites mardon*) at four sites in Washington and Oregon: Final report to the Forest Service and BLM from the Xerces Society, January 2007. Unpublished report. USDI Bureau of Land Management, Portland, OR. 72 pp.
- Code, B.H., S.L. Haney. 2006. Franklin's Bumble Bee Inventory in the Southern Cascades of Oregon. Internal project summary/report prepared by and for Medford BLM.
- Evergreen Aurelians. 1996. An unpublished collection of Oregon butterfly records. Database maintained by Dana Ross.
- Fouts, D., E. Wier, and T. Manger. 2008. Siskiyou Short-horned Grasshopper Survey Summary. Internal project summary/report prepared by and for Medford BLM.
- Hatfield, R., S. Jepsen, R.W. Thorp. 2014. Ashland, OR Bumblebee Workshop. The Xerces Society.
- Koch, J., J. Strange, P. Williams. 2012. Bumble Bees of the Western United States. United States Department of Agriculture.
- Mail, Royal. 2014. Butterfly Anatomy Graphic. United States Department of Agriculture.
http://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/habitat/
- NDSU. 2005. North Dakota State University Department of Entomology. Orthoptera of the Northern Great Plains website:
<http://www.ndsu.nodak.edu/entomology/hopper/anatomyimg1.htm>
- Opler, Paul A., Kelly Lotts, and Thomas Naberhaus, coordinators. 2011. Butterflies and Moths of North America. Bozeman, MT: Big Sky Institute (Version 06032011).
<http://www.butterfliesandmoths.org/>
- Pyle, R.M. 2009. Personal communication with Sarah Foltz.
- Pyle, R.M. 2002. The Butterflies of Cascadia. A Field Guide to all the Species of Washington, Oregon, and Surrounding Territories. Seattle Audubon Society, Seattle. 420 pp.
- Rehn, J.A.G. and M. Hebard. 1919. A new species of grasshopper of the genus *Chloealtis* (Acridinae) from the Pacific Coast. Trans. Amer. Entomol. Soc. 45:81-87.
- USDA, USDI. 2007. Survey Protocol for the Mardon Skipper (*Polites mardon*). USDA Forest Service Region 6, Oregon and Washington, USDI Bureau of Land Management, Oregon and Washington.
- The Xerces Society. 2014. Field Identification: Diagnostic for the Gray Blue Butterfly. The Xerces Society.

Identification Tools for *Acrididae*, *Bombus* and *Lepidoptera* genera

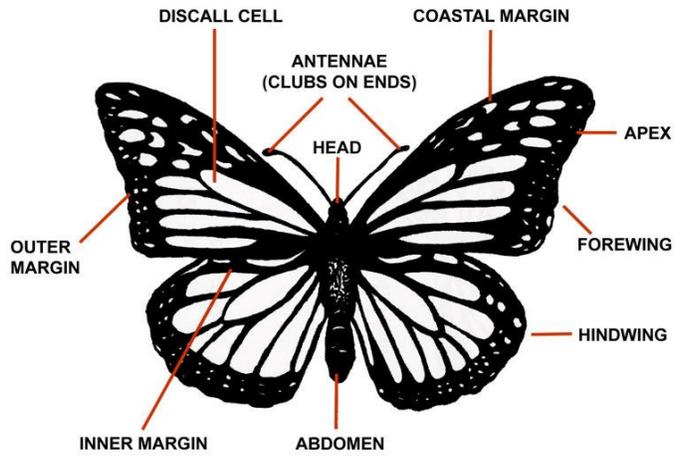


(The Xerces Society, 2014)



(NDSU, 2005)

BUTTERFLY ANATOMY



(Mail, 2014)