



Butterflies of Northern Coastal California

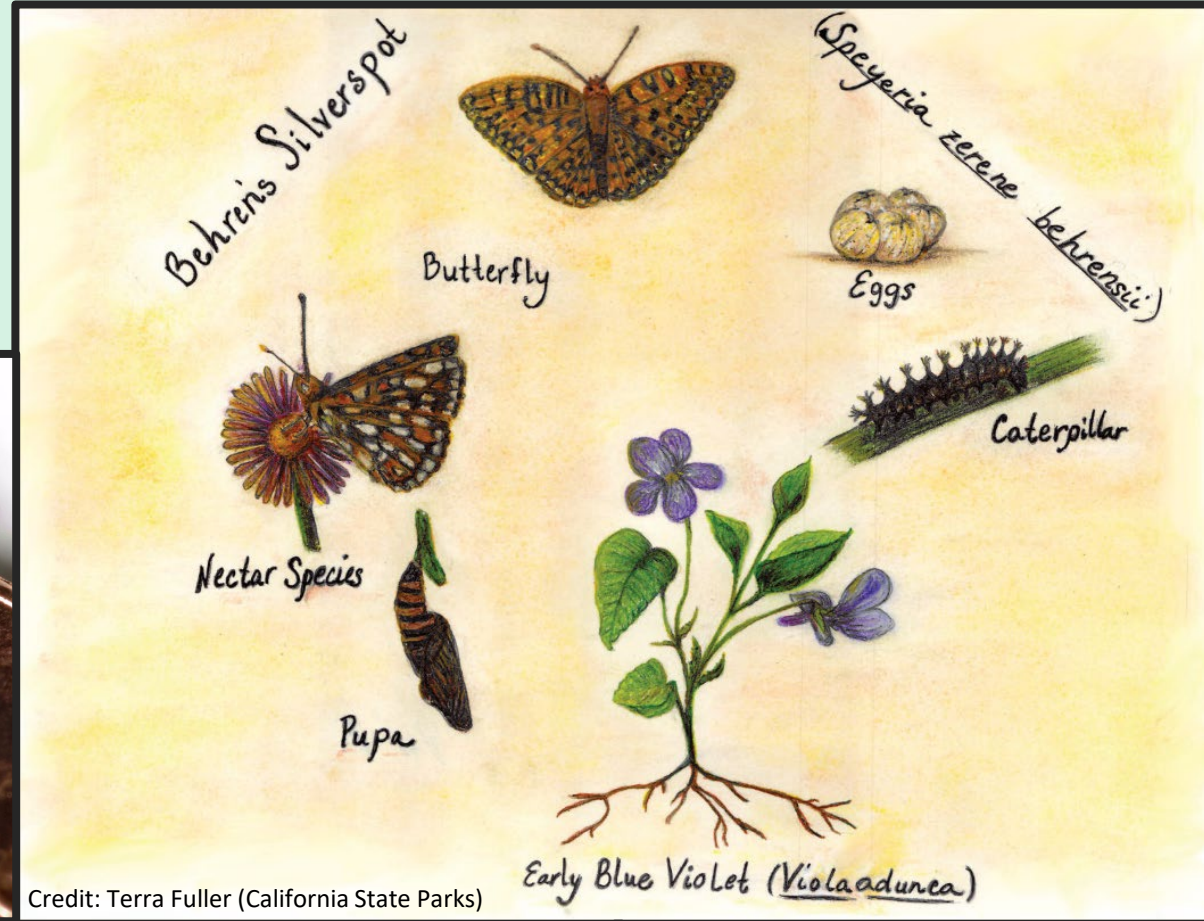
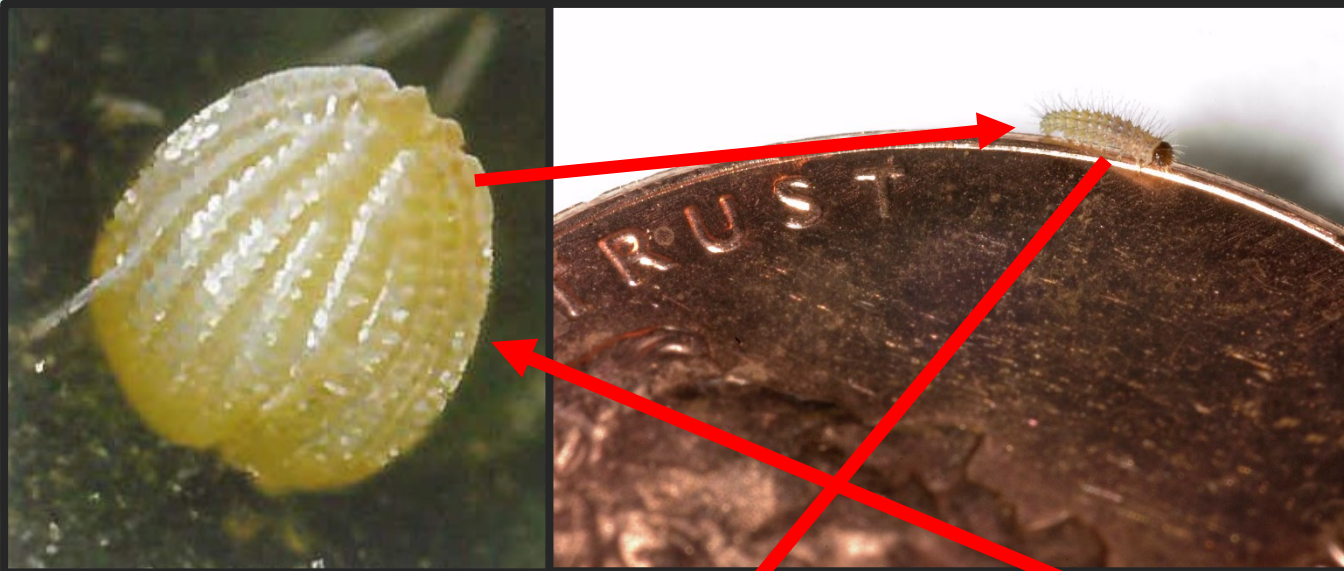


What is a butterfly?

- Lepidoptera is a group of insects that includes butterflies and moths
 - Means “scale-wing”
 - Note: “moths” are not a biologically-defined group
- Rhopalocera is an antiquated biological term for butterflies
 - Means “club-horn”
 - clubbed antennae
 - 7 families
- Four-stage life cycle
 - egg -> larva (caterpillar) -> pupa -> imago (adult)



Butterfly life cycle



Parnassians & Swallowtails (Papilionidae)

- Spectacular and striking adults
- Strong fliers
- Distinguished by the presence of larval defensive scent organ called “osmeterium”



Anise swallowtail

late-February to late-September

Humboldt location: Arcata Marsh

Larval foodplants: fennel (*Foeniculum* spp.)
and desert parsley (*Lomatium* spp.)



Western tiger swallowtail

mid-April to late-September

Humboldt location: streambanks with good sun exposure; Headwaters BLM

Larval foodplants: bigleaf maple (*Acer macrophyllum*), willows (*Salix* spp.)

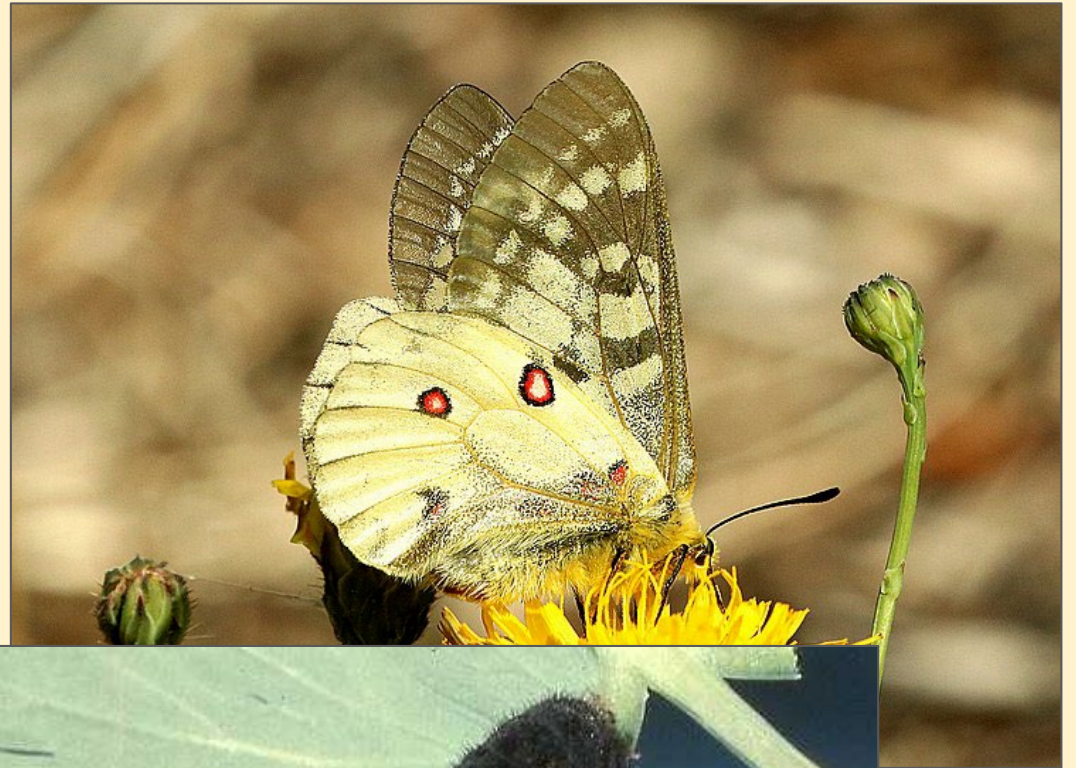


Clodius parnassian

early-May to mid-September

Humboldt location: Grouse Mountain

Larval foodplants: Bleeding heart
(*Dicentra formosa*)



Whites, Marbles, & Sulphurs (Pieridae)

- Predominantly white, yellow, or orange
- Most larvae feed on the leaves of weedy mustard and pea family plants
- Can be found in highly-altered (e.g., roadsides) and in pristine alpine environments



Margined white

early-March to early-October

Humboldt location: Headwaters BLM

Larval foodplants: bittercresses (*Cardamine* spp.), watercress (*Nasturtium officinale*), and other mustards (Brassicaceae)

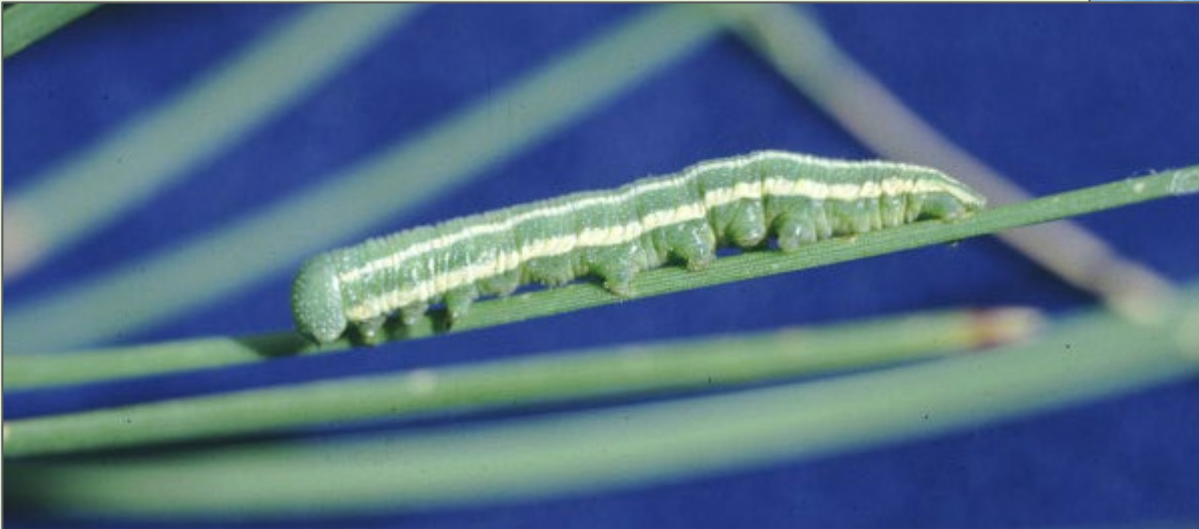


Pine white

late-June to mid-October

Humboldt location: Horse Mountain

Larval foodplants: ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), douglas-fir (*Pseudotsuga menziesii*)



Orange sulphur

late-March to early-November

Humboldt location: Arcata Marsh

Larval foodplants: alfalfa (*Medicago sativa*), birdsfoot trefoil (*Lotus corniculatus*)



Gossamer wings (Lycaenidae)

- Includes coppers, hairstreaks, blues, and elfins
- Distinguished by their unique egg and larval shapes
- Often have a mutualistic relationship between larvae and ants



Western pine elfin

late-February to late-August

Humboldt location: Ma-le'l Dunes North

Larval foodplants: ponderosa pine
(*Pinus ponderosa*) and lodgepole/shore
pine (*Pinus contorta*)



Acmon blue

early-April to early-October

Humboldt location: Ma-le'l Dunes

Larval foodplants: buckwheats
(*Eriogonum* spp.)



Purplish copper

late-April to mid-October

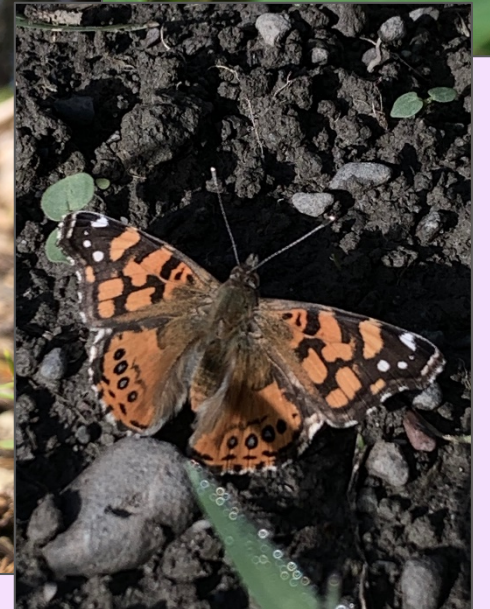
Humboldt location: Horse Mountain

Larval foodplants: buckwheat family (*Rumex* spp.,
Polygonum spp.) and silverweed (*Argentina egedii*)



Brushfoots (Nymphalidae)

- Highly-reduced front pair of legs (brush-like)
- Predominantly orange, red, brown, black, as well as silver highlights
- Very diverse in species and in form



Monarch

early-June to late-October

Humboldt location: transient (luck!)

Larval foodplants: milkweeds (*Asclepias* spp.)



Painted lady

early-March to early-November

Humboldt location: Arcata Marsh

Larval foodplants: thistles (*Carduus* spp.
and *Cirsium* spp.)



Common ringlet

late-March to late-October

Humboldt location: South Spit of Humboldt Bay

Larval foodplants: many native and naturalized grasses including fescues (*Festuca* spp.) and bromes (*Bromus* spp.)



Lorquin's admiral

mid-February to early-October

Humboldt location: Signal Peak

Larval foodplants: willows (*Salix* spp.),
aspen and cottonwood (*Populus* spp.)



California sister

late-May to late-October

Humboldt location: Grizzly Creek State Park

Larval foodplants: oaks (*Quercus chrysolepis*,
Q. agrifolia) and golden chinquapin
(*Chrysolepis chrysophylla*)



Chalcedona checkerspot

late-April to early-August

Humboldt location: Signal Peak

Larval foodplants: Penstemons (*Penstemon* spp.), monkeyflowers (*Mimulus* spp.), and paintbrushes (*Castilleja* spp.)

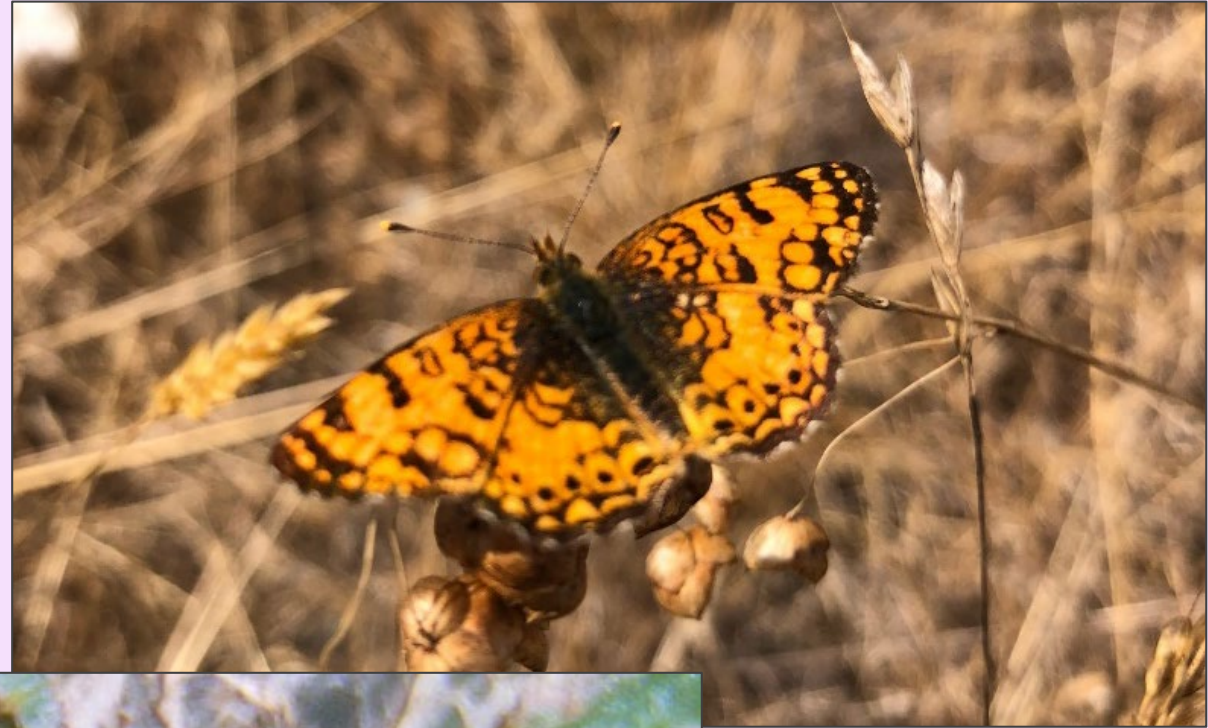


Mylitta crescent

late-February to mid-October

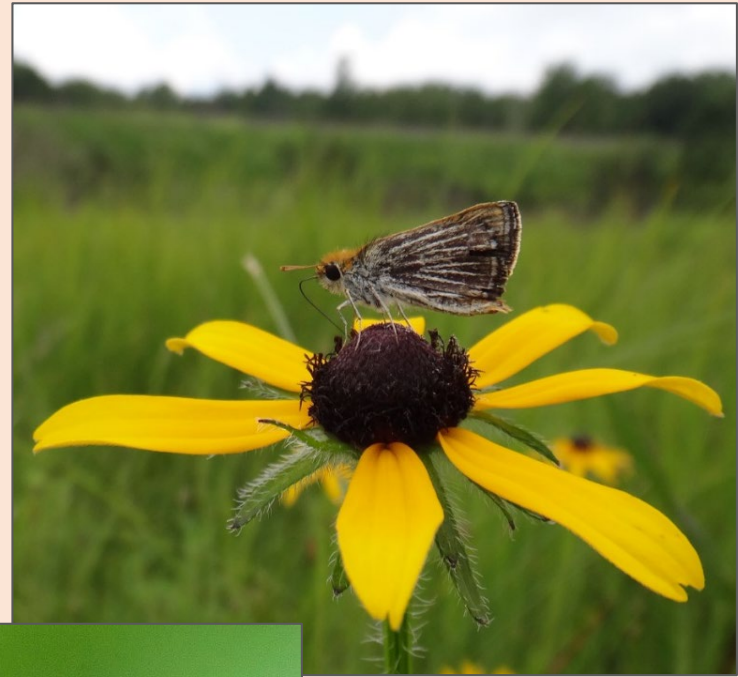
Humboldt location: Arcata Marsh

Larval foodplants: thistles (*Cirsium* spp.)



Skippers (Hesperiidae)

- Compact bodies, short wings, “jet pose” appearance
- Evolutionarily distinct among butterflies and moths
- Antennae clubs are sharply curved to slightly hooked



Woodland skipper

mid-June to early-October

Humboldt location: Arcata Marsh

Larval foodplants: various grasses including common wild oats (*Avena* spp.), ryes (*Elymus* spp.), and reed canarygrass (*Phalaris arundinacea*)



Silver spotted skipper

early-April to early-September

Humboldt location: Horse
Mountain

Larval foodplants: many legumes
including broad leaved lotus
(*Hosackia crassifolia*)



Persius duskywing

mid-April to mid-August

Humboldt location: Horse Mountain

Larval foodplants: Lupines (*Lupinus* spp.)
and other pea family plants



Threatened and Endangered Butterflies of Northern Coastal California



Photo Credit:
Christine Damiani



Photo Credit:
Gordon Pratt



The Endangered Species Act and the Service

The purpose of the Endangered Species Act is to protect and recover imperiled species and the ecosystems upon which they depend.

The Act is administered by the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS).

The Service has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife.



What is recovery?

The Service has quantifiable criteria that determine if a species can be considered “recovered” and taken off the Endangered Species List

Oregon silverspot butterfly recovery criteria

1. At least 10 viable populations exist in protected habitat throughout the range (specifics in Recovery Plan).
2. Habitats are managed long-term to maintain native, early successional grassland communities.
3. Managed habitat at each population site supports a minimum viable population of 200 to 500 butterflies for at least 10 years.

Lotis blue butterfly (*Plebejus anna lotis*)

Endangered

- Lycaenidae
- Distribution includes portions of coastal Mendocino and Sonoma counties
- Life history and biology is largely unknown
- Undetected since 1983
- Messy taxonomy and systematics
 - Many nomenclature changes
- Reasons for decline are unclear



Behren's silverspot butterfly (*Speyeria zerene behrensii*)

Endangered

- Nymphalidae
- Coastal prairies of Mendocino and Sonoma counties
- Univoltine
- Larvae obligate to *Viola adunca*
- Habitat destruction/alteration
 - Invasive species
- Consistently low counts



Oregon silverspot butterfly (*Speyeria zerene hippolyta*)

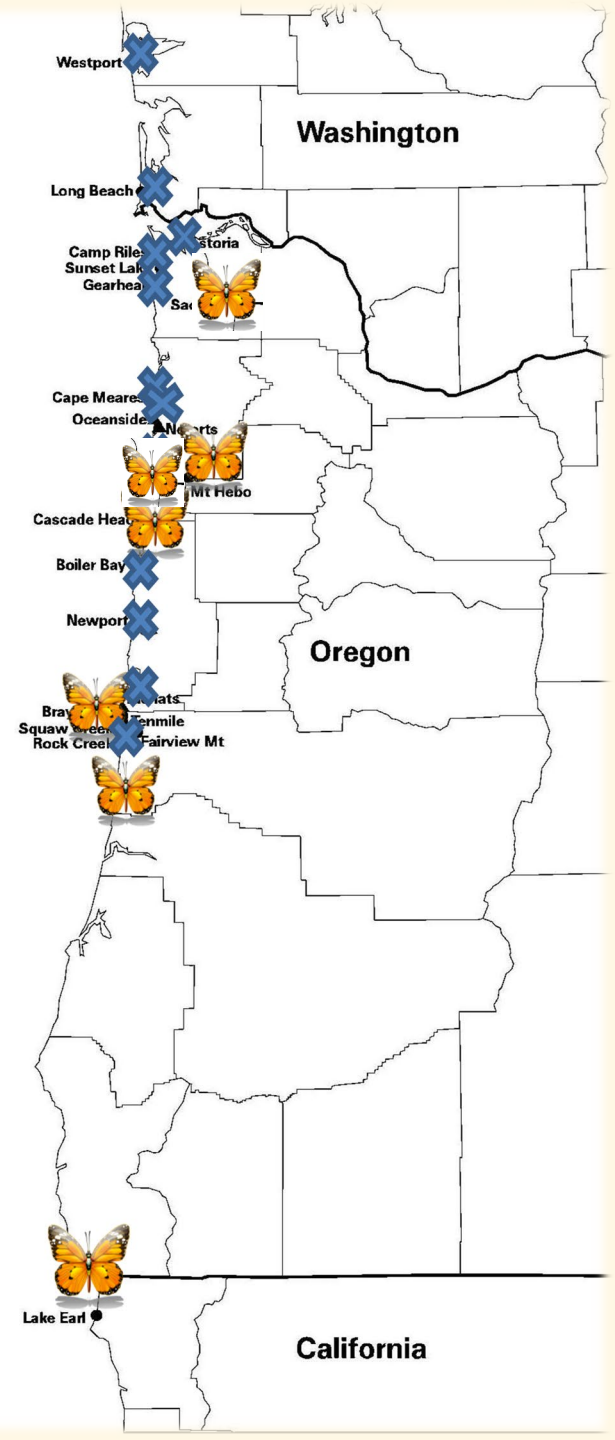
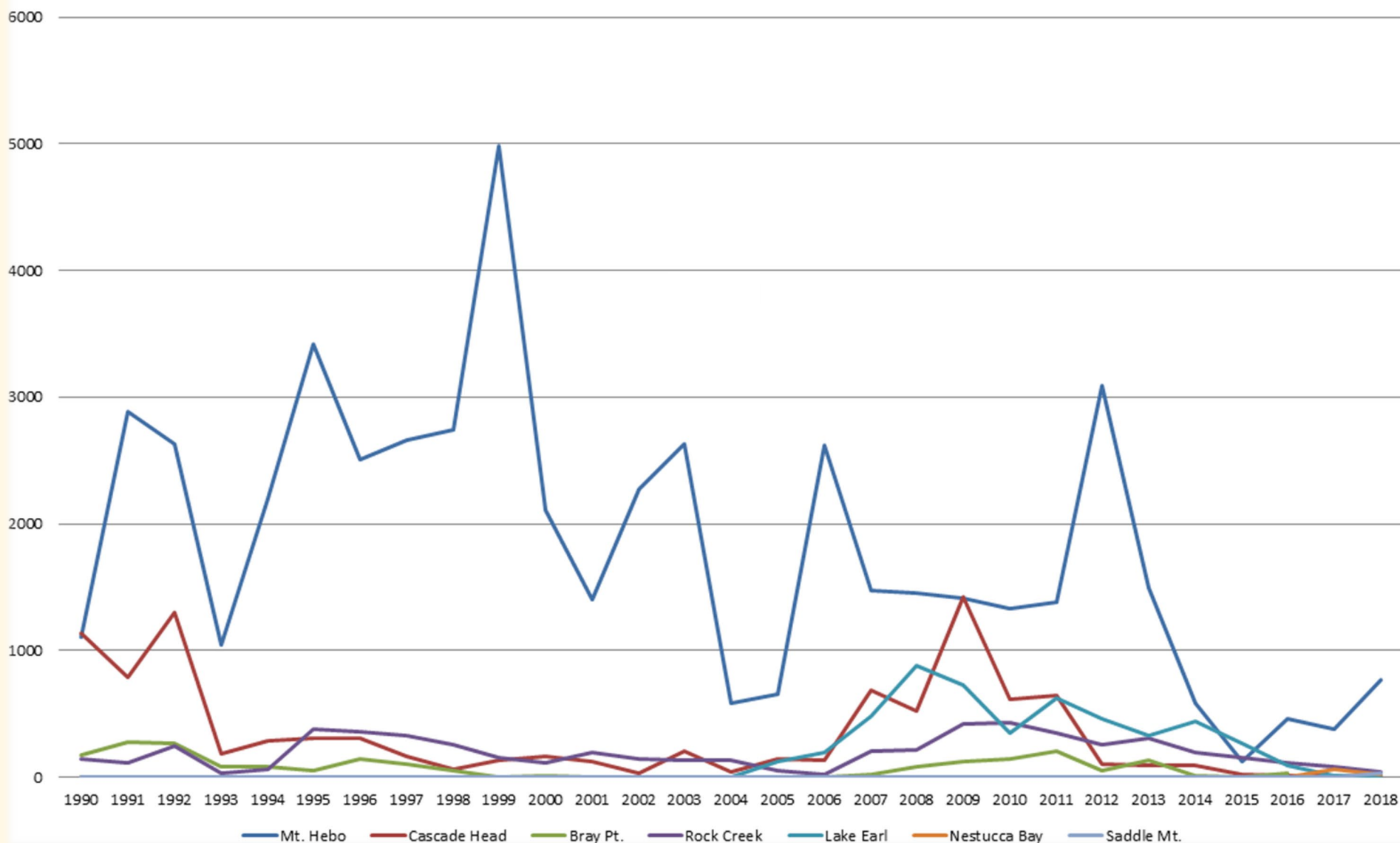
Threatened

- Grassland habitats within 12 miles of the Pacific Coast from Westport, WA to Lake Earl, CA
 - Coastal prairies
 - Stabilized dunes
 - Montane grassland
- Univoltine
- Larvae obligate to *Viola adunca*
- Habitat destruction/alteration
 - Invasive species



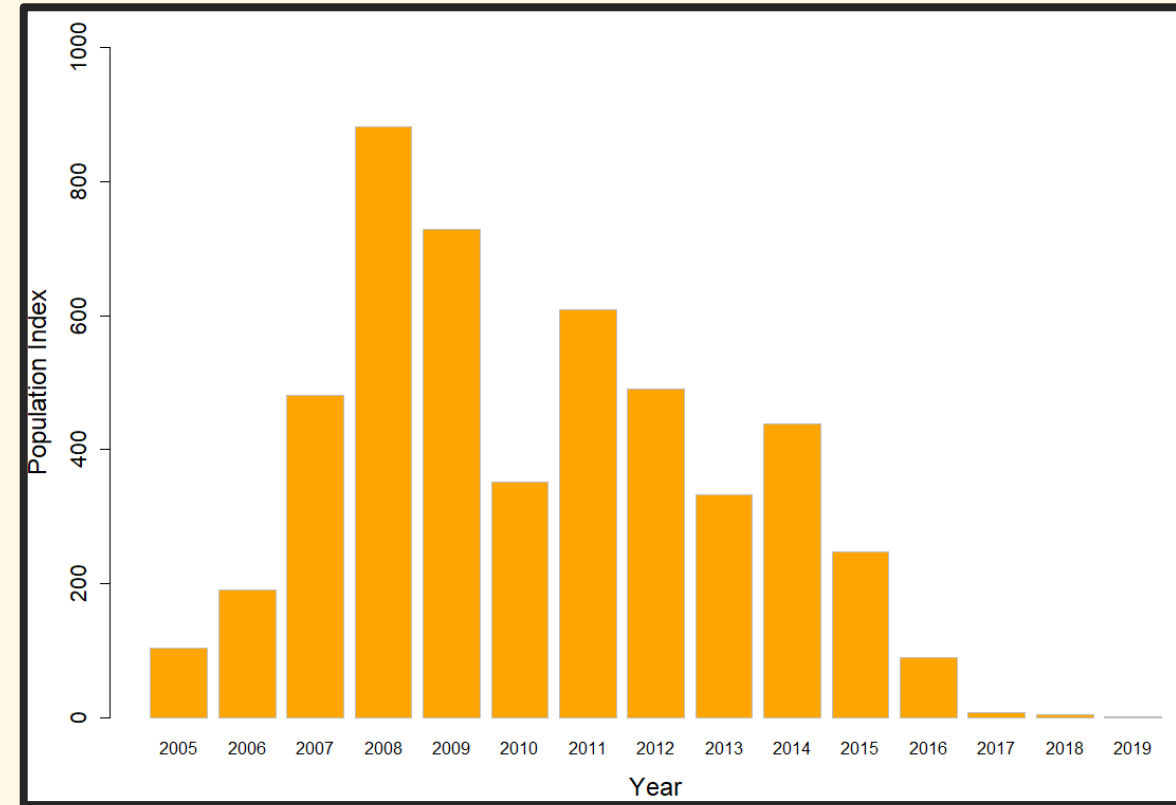
Current status of Oregon silverspot

OREGON SILVERSPOT BUTTERFLY INDEX COUNTS 1990-2018



Oregon silverspot populations in California

- Principal population in and around Tolowa Dunes SP/Lake Earl Wildlife Area
 - Historical population near Kamph Park
 - Sightings reported from Ender's Beach and Point St. George
- Miller et al. (2016) mtDNA study found the Lake Earl population genetically distinct
- Steep declines from 2015 to 2019



Reasons for decline – Habitat loss

- Habitat loss often the impetus for decline
- Reduction in habitat extent, contiguity, and quality
 - Population has fewer resources and less connectivity with other portions of the population
 - Less available habitat -> less butterflies
- Encroachment due to willows, conifers, beachgrass
- Fragmentation due to road network
 - Willows growing in ditches



Reasons for decline – Climate change

- The 2011 – 2017 California Drought potentially reduced the extent, density, and vigor of *Viola adunca* throughout the area
 - Less violets -> less butterflies
 - *V. adunca* remained only in the areas which were historically more mesic
- Heavy rains in the 2016-2017 winter produced flooding in the habitat
 - Caterpillars likely drowned



Conservation strategy - Habitat restoration

- Currently a stabilized dune-swale complex with few prairie components
 - Previously ranchland
 - Grazed
 - Pre-European settlement conditions are unknown
- OSB need violets and nectar
 - Violets need mesic conditions
 - Nectar plants vary in their needs
- Goal is to connect two hotspots
- Connection corridor determined using field visits and habitat modeling



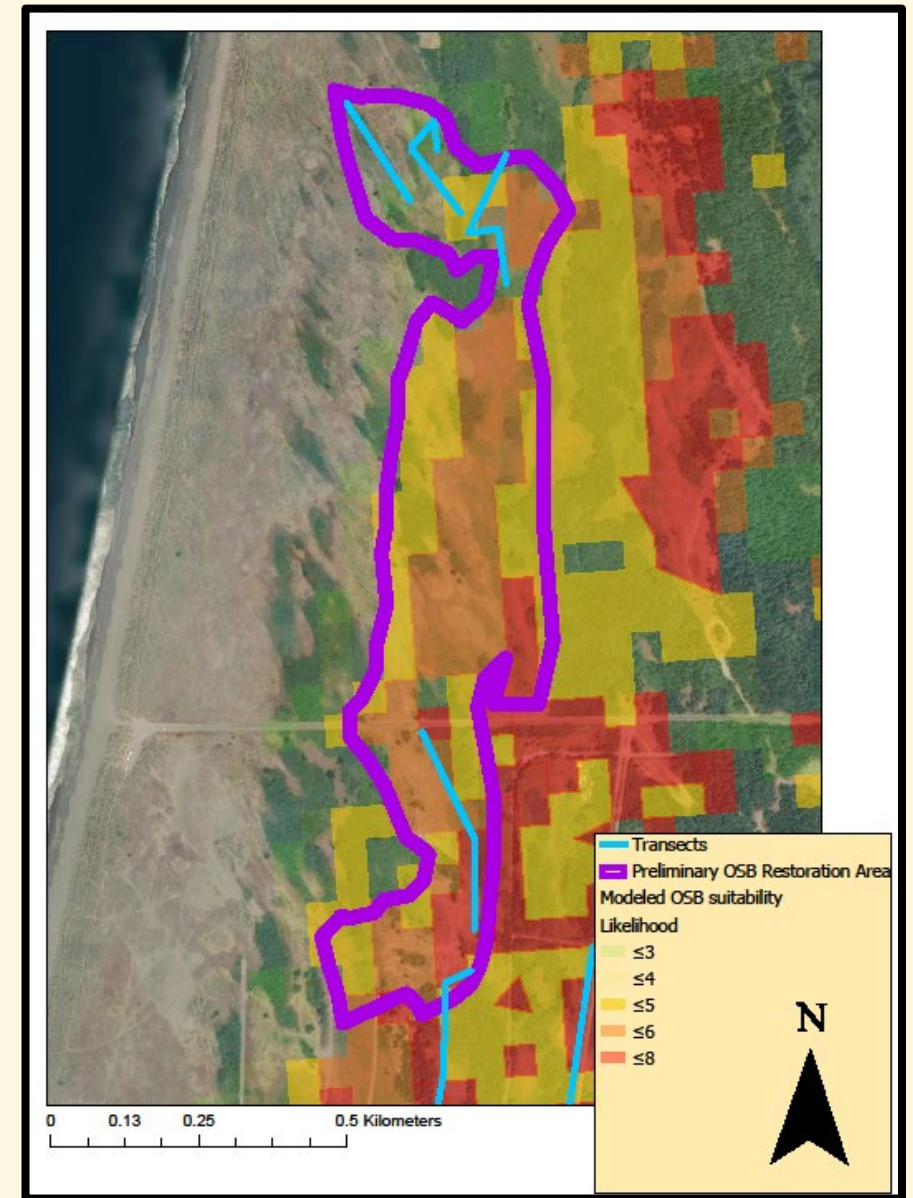
Conservation strategy - Habitat restoration

- Crews hand-pulling beachgrass in pilot area
- Violets are being grown at Samara
- Nectar plants
 - Collected seed 2 times in 2018; 3 times in 2019
 - Pearly everlasting
 - California aster
 - Yarrow
 - Gumplant
 - Goldenrod
 - Seeded areas where beachgrass was removed



Conservation strategy - Habitat restoration

- California Department of Parks and Recreation undertaking restoration study
- Data effort will inform most effective strategies moving forward
- Expanding to 20 acres over time
- Over the next several years we hope to connect two OSB hotspots via an 80-acre restoration area...and beyond!



Conservation strategy - Captive propagation

- Captive propagation
 - Bolsters populations
 - Reduces mortality among the most vulnerable life-stages
 - Relies on collection of females which have mated in the wild
 - Reared to the caterpillar or pupation stage
 - Caterpillars and/or pupae are released into the field
- Sequoia Park Zoo working with closely-related butterflies to hone skills and develop facilities
- Hoping to work with OSB and BSB in the coming years



Partners

