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

Credit: Terra Fuller (California State Parks)
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’I 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
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 populations in California

- Principal population in and around Tolowa Dunes SP/Lake Earl Wildlife Area
  - Historical population near Kamph Park
  - Sightings reported from Endert’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