



Endangered Species Facts

U.S. Environmental Protection Agency



Photo source: T.W. Davies © California Academy of Sciences

The bay checkerspot butterfly is a **threatened species**. Threatened species are plants, and animals whose population numbers are so low that they may become endangered in the future.

Endangered species are plants and animals that are in immediate danger of becoming extinct.

The U.S. Environmental Protection Agency's (EPA) Endangered Species Protection Program (ESPP) will help ensure that pesticide use does not jeopardize the survival of listed species.

Euphydryas editha bayensis

Bay Checkerspot Butterfly *Euphydryas editha bayensis*

Description and Ecology

Status Threatened, listed June 18, 1987.

Critical Habitat Designated April 30, 2001.

Appearance The bay checkerspot butterfly typically has a 2 inch wingspan. The distinct, black bands along all the veins of the upper wing surface contrast sharply with the bright red, yellow and white spots, giving the butterfly its "checkerboard" appearance.

Range Historically, populations of bay checkerspot butterflies were recognized in many of the counties in the San Francisco Bay area. These included Contra Costa, Alameda, San Francisco, and especially San Mateo and Santa Clara Counties where the only known populations remain. These populations are uniquely tied to no more than 12,000 acres of native grasslands on serpentine soils, or similar infertile soils. This infertility appears to have staved off the invasion of European grasses and weeds, giving native plants and the bay checkerspot butterfly a stronghold. On these soils the distribution of the butterfly is patchy and demonstrates meta-population dynamics. Only four or five core populations support and are supported by a few other satellite populations. These populations can undergo large fluctuations and the ability to recolonize from one to another following local extinctions is critical to the survival of the species.

Habitat The serpentine outcrops in Santa Clara and San Mateo Counties harbor the native plants bay checkerspot butterflies require. The primary larval food plant is *Plantago erecta*, dwarf plantain. For those larvae who might not have accomplished their fourth instar before plantain dries, the near presence of *Castilleja densiflora*, purple owl's clover, and *Castilleja exserta*, exserted paintbrush, is critical for the extra food needed to reach diapause (i.e., a period of dormancy). Nectar plants for the adults include California goldfields, desert parsley, and tidy-tips. These native grasslands have been more recently enriched by nitrogen-deposition, enough to invite the invasion of alien forbs and grasses such as Italian

rye grass. Moderate grazing can help counter this invasion. Within these serpentine grasslands a variety of thermal microclimates created by variations in topography buffer the impact of climatic variability. Larvae, as well as host or nectar plants develop earlier on southern slopes; northern slopes remain cooler and more moist as the season heats up. Both slopes are essential to carry some of the population through seasonal differences from year to year, and especially through years of extreme weather.

Reproduction and Life Cycle The life cycle of the bay checkerspot butterfly is tied to the life cycle of its host plants. These plants germinate from early October to late December and then senesce from early April to mid-May. The emergence of the butterflies from pupae between late February and early May correlates to the blooming of their nectar plants. Feeding, mating and egg laying all occur during this 4-6 week flight season. The females deposit up to five egg masses in clusters of 5 to 250 eggs each at the base of the larvae host plants, usually dwarf plantain, sometimes purple owl's clover or exserted paintbrush. After hatching the black larvae soak up the sun to warm themselves. Once warm, they can travel to other host plants and a warmer or cooler microclimate. By laying eggs in a variety of microclimates and on a variety of host plants, the female butterfly increases the chances that some of her offspring will survive regardless of climate variation. The larvae eat and cycle through their molts until reaching the fourth instar. At this time they crawl under rocks or into cracks to protect themselves through diapause, which lasts until the next growing season. Some evidence suggests that during extremely dry seasons larvae may continue diapause until a second spring. With the onset of the rainy season diapause ends and larvae resume feeding. Post-diapause, they are larger and more able to travel in search of food plants, a warm slope, or the right place to pupate, which is usually suspended from vegetation just a few millimeters off the

Bay Checkerspot Butterfly

ground. Emergence to an adult butterfly occurs in 15-30 days, depending upon thermal conditions. The normal life span of the bay checkerspot butterfly (egg-larvae-pupae-butterfly) is one year.

Recovery Plan The U.S. Fish and Wildlife Service (FWS) developed a recovery plan for the bay checkerspot butterfly in 1998. Recovery plans outline reasonable actions that FWS believes are required to recover or protect listed species. FWS prepares recovery plans, sometimes with the assistance of recovery teams, contractors, state agencies, and others. Recovery plans do not necessarily represent the views nor the official positions or approvals of any individuals or agencies, other than FWS, involved in the plan formulation. Approved recovery plans are subject to modification as dictated by new findings, changes in species' status, and the completion of recovery tasks.

Bay Checkerspot Butterfly Information Sources

Primary Reference Beacham, Walton, Castronova, Frank F., and Sessine, Suzanne (eds.) 2001. *Beacham's Guide to the Endangered Species of North America*, Gale Group, New York. Vol. 3, pp. 1516–1518.

Listing Notice U.S. Fish and Wildlife Service. Federal Register 52 No. 181, September 18, 1987, pp. 35366-35378. http://ecos.fws.gov/docs/federal_register/fr1327.pdf

Critical Habitat Designation U.S. Fish and Wildlife Service. 2001. Federal Register 66, No. 83, April 30, 2001, pp.21450–21489 http://ecos.fws.gov/docs/federal_register/fr3740.pdf

Recovery Plan U.S. Fish and Wildlife Service, Pacific Region, Portland, Oregon. 1998. Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area. 330+pp. http://ecos.fws.gov/docs/recovery_plan/980930c_v2.pdf



Alternate host plants, purple-owl's clover and yellow goldfields.
Image source: KQED QUEST-Some rights reserved.



Bay checkerspot butterfly caterpillar.
Image source: KQED QUEST -Some rights reserved.



T.W.Davies © California Academy of Sciences