

# Bay Checkerspot Butterfly Conservation

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*Populations of the threatened Bay Checkerspot butterfly (Euphydryas editha bayensis) have declined severely since the 1980s, with local extinctions and restriction to small habitat islands.*

**Goal:** Conserve threatened populations of the Bay Checkerspot butterfly through science-based habitat restoration and management.

**The Problem:** Encroachment on serpentine grassland habitat by human development has severely limited the distribution of the butterfly. In addition, invasive grass and shrub species are reducing populations of host and nectar plants, especially where atmospheric nitrogen deposition (from air pollution) favors faster-growing non-natives.

## Science-Based Conservation:

- **Population monitoring:** estimate butterfly population densities based on field counts of larvae and adults across habitat range
- **Habitat characterization:** assess biotic factors (host plants, invasive species, etc.) and abiotic factors (microclimate, slope orientation, etc.) of local habitat
- **Habitat modeling:** simulate population dynamics as influenced by prevailing climate, microclimate (solar exposure, temperature, etc.), slope orientation, host plant availability, and larvae development
- **Habitat restoration:** enhance habitat suitability by limiting human disturbance, replanting native species, and controlling invasive species with well-managed grazing, burning, and mowing

- **Nitrogen deposition:** assess and mitigate effects of atmospheric nitrogen deposition on the ecology of serpentine grasslands
- **Human impacts:** assess and mitigate the impacts of human development on and near butterfly habitat
- **Adaptive management:** implement site-specific management plans, with periodic review of success
- **Education and outreach:** communicate with diverse audiences (public, resource managers, decision makers, etc.) through various media (press, field tours, web sites, briefings, presentations, brochures, etc.)



*Bay Checkerspot butterflies thrive in serpentine grasslands of California, where low nutrient availability favors the Checkerspot's primary host plant, dwarf plantain (Plantago erecta), along with secondary hosts and nectar-producers that support adult butterflies.*

## Benefits

- Conservation of Bay Checkerspot butterfly
- Sound scientific basis for proactive, cost-effective management
- Compliance with government regulations
- Mitigation of human impacts

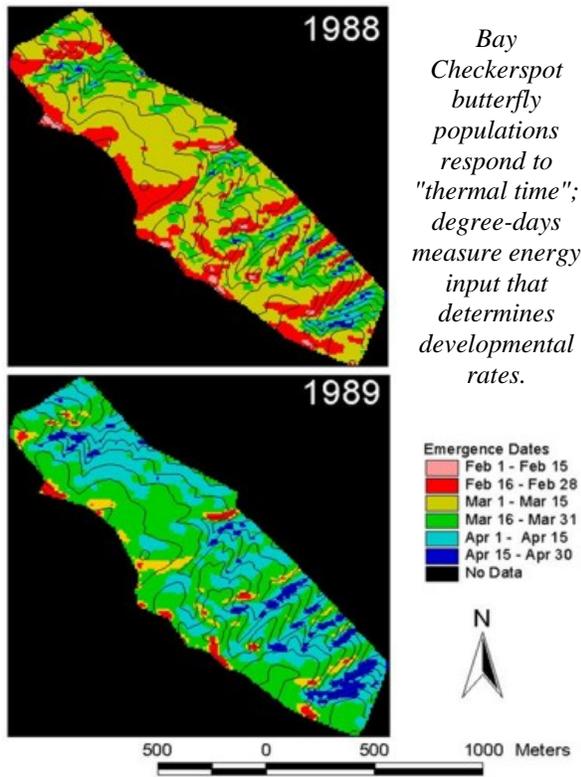
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*Bay Checkerspot butterfly populations respond to "thermal time"; degree-days measure energy input that determines developmental rates.*

### Key Literature:

Murphy, D.D., and S.B. Weiss. 1988. A long-term monitoring plan for a threatened butterfly. *Conservation Biology* 2:367-374.

Murphy, D.D., and S.B. Weiss. 1988. Ecological studies and the conservation of the Bay checkerspot butterfly, *Euphydryas editha bayensis*. *Biological Conservation* 46:183-200.

Weiss, S.B., D.D. Murphy, and R.R. White. 1988. Sun, slope, and butterflies: topographic determinants of habitat quality for *Euphydryas editha bayensis*. *Ecology* 69:1486-1496.

Weiss, S.B. 1999. Cars, cows, and checkerspot butterflies: nitrogen deposition and grassland management for a threatened species. *Conservation Biology* 13:1476-1486.

*available online:* <http://www.creeksidescience.com>