Bay Checkerspot Butterfly Reintroduction
FAQs

1. What is the difference between threatened and endangered species?

   * A **threatened** species is one likely to become endangered.
   * An **endangered** species is one in danger of becoming extinct.

2. If these animals are on the Federal list of threatened species, why was it OK to move them?

   Dr. Weiss wrote a very thorough application for permission to relocate 1000 larvae and a dozen adult butterflies from Coyote Ridge in 2007. The Coyote Ridge population is sufficiently large enough and stable enough to spare a few individuals for Edgewood. The proposal also described how the Edgewood grasslands had been prepared for the butterflies' homecoming. Dr. Weiss's proposal went on to describe the ongoing monitoring that will take place in the coming years that will track their success. The reintroduction continued with higher numbers starting n 2011.

3. What happened to the butterfly in the first place?

   Dr. Weiss dubbed what happened to the Bay Checkerspot Butterfly as "drive by extinction." The brochure describes in more detail how exhaust fumes (nitrous oxides and ammonia) from cars driving by on Hwy 280 actually act as a fertilizer on the grasslands. The fertilizer boost given to the non-native grasses, which do not normally grow well in the nutrient poor serpentine soils, allows them to out-compete the native wildflowers. In time, the wildflowers are reduced to such small numbers they no longer support the butterfly.

4. Where were the butterflies reintroduced and why was this site chosen?

   In 2001 the Fish and Wildlife Service designated 23,903 acres in San Mateo and Santa Clara Counties as critical habitat for the Bay Checkerspot Butterfly. Edgewood was among the areas designated as critical habitat.

   Dr. Weiss needed to choose a serpentine grassland large enough to support the native wildflowers upon which the butterfly depends. These 15 acres of prime habitat were restored through mowing over the last two years through generous grants funded by PG & E.

   The larvae were reintroduced into their pre extirpation historic home, in the serpentine grassland between the Serpentine loop and the Clarkia trails. The site can be observed when standing on the Serpentine loop, facing toward the freeway, and looking across the swale and upslope.

5. Will we ever see the butterflies from the trail?

   The chosen site happens to be away from public trails, but when the population multiplies and has a chance to reestablish itself over the next few seasons, we may be able to see adult butterflies fluttering about.

6. How will you keep the habitat from degrading again?

   Careful monitoring, coupled with rotational mowing based on need, will prevent reinfestation of the non-native grasses.

7. What is the probability the relocated larvae and butterflies will survive?

   Good. There is plenty of California plantain at the restored site in Edgewood. The larvae were collected and transported over several weeks to ensure genetic variability and spread the risk any foibles in the weather may pose.

8. When will we know if the reintroduction has succeeded?

   By careful monitoring, part of Dr. Weiss's permit application to Fish and Wildlife, we will follow indications of success. We already know that larvae have been able to pupate and metamorphose into adult butterflies, and survive through diapause (a dormant stage) through the summer months. Adult butterflies in 2012 are already higher than they were in 2011.

9. Why is the Bay Checkerspot Butterfly (*Euphydryas editha bayensis)* associated with serpentine soil and what plants does it depend upon?

   The butterfly depends on serpentine endemic plants such as California plantain. In the larval stage, the butterfly prefers California plantain (*Plantago erecta*) but will migrate to late blooming purple-owl's clover (*Castilleja exserta)* as the plantain withers. Adult butterflies nectar primarily on tidy tips (*Layia platyglossa)*, goldfields (*Lasthenia californica)*, lomatium (*Lomatium* spp.) and linanthus (*Linanthus* spp.).

10. How big are the butterflies and the larvae?

    The transported caterpillars were around an inch long. The wingspan of adult butterflies is about 2 inches.

11. How many eggs does the female butterfly lay? How many usually survive?

    Eggs are typically laid in up to 5 masses of 5 to 250 eggs each during March and April. The eggs are deposited at the base of California plantain, or if not available, on purple owl's clover.

Larvae hatch in about 10 days and grow to the fourth instar (molt) in 2 weeks or more. California plantain is the primary food and most larvae feed on it initially. Larvae that successfully reach the fourth instar enter a period of dormancy (diapause) that lasts through the summer. They pass the summer months under rocks or in cracks in the soil (one of the reasons visitors are asked to stay on trails). Larvae that have not reached the fourth instar before their host plantain dies must find another plant (usually purple owl's clover) or die of starvation. These larvae are not very mobile, so the owl's clover must be nearby. The mortality rate for pre-diapausal larvae is very high, usually in excess of 90%, and can reach 99%! High fertility, reliable food sources, and undisturbed habitat are required to maintain the precariously balanced bay checkerspot population.

12. What are the most problematic non-native grasses?

    Italian rye grass (*Lolium multiflorum)* and soft chess *(Bromus hordeaceus).*

13. What works in favor of success, or failure and who preys upon the butterflies and caterpillars?

    By far the most critical factor is whether the caterpillars' host plants dry up before they are large enough to go into diapause. Certain wasp and fly species can parasitize the caterpillars, with their larvae eating the living caterpillars from the inside. Rain and hail can cause substantial mortality of adult Bay checkerspot butterflies. Strong wind can also be problematic for the butterflies, often damaging their wings to the point that their ability to fly is compromised. Bay checkerspot butterfly adults are also eaten by a variety of predators. Spiders catch butterflies both in their webs and while the butterflies are not flying (Ehrlich 1965). Other invertebrates undoubtedly prey on some butterflies while the butterflies are on the ground or in the vegetation. Mammals may take some butterflies, particularly during periods when the butterflies are inactive (at night and during periods of bad weather). Birds take Bay checkerspot butterflies, but predation by birds is typically not high (Ehrlich 1965). This is because chemical compounds in the host plants (iridoid glycosides) make the checkerspots taste bad.

14. How come caterpillars don't dry out over the summer?

    They spend their summer hunkered down in under rocks, debris, or plant litter, or in cracks and crevices in the soil where it is cooler.

15. Why can't the caterpillars just eat ryegrass and why not just plant more plantain?

    Just like the monarch butterfly depends on milkweed, Bay checkerspot butterflies depend on certain native species for their existence. The restoration of the native grassland improved the conditions so more plantain can grow and support the butterfly.