

## **5-YEAR REVIEW**

### **Callippe silverspot butterfly (*Speyeria callippe callippe*)**

#### **GENERAL INFORMATION:**

**Species:** Callippe silverspot butterfly (*Speyeria callippe callippe*)

**Date listed:** December 5, 1997

**Federal Register (FR) citation:** 62 FR 49398 (Service 1997)

**Classification:** Endangered

#### **State Listing:**

The callippe silverspot butterfly is not listed by the State of California.

#### **BACKGROUND:**

##### **Species overview:**

The callippe silverspot butterfly (butterfly) is a subspecies in the brush foot family (Nymphalidae). It is a medium-sized butterfly with a wingspan of approximately 2.2 inches (Coast Range Ecology 2009, p. 24; Hammond 1985, p. 204; Howe 1975, p. 233). The upper wings are brown with extensive black spots and lines, and the basal areas are extremely melanic (dark-colored). The wing undersides are brown, orange-brown, and tan with black lines and distinctive black and bright silver spots. Basal areas of the wings and body are covered with dense hair (Service 2009a, p. 1). The butterfly is found in native grassland and associated habitats in the San Francisco Bay Area of California (Service 1997, pp. 64306–64320). They are univoltine (have one generation per year) and undergo complete metamorphosis (a structural transformation during the development of an organism) from egg to larva, pupa, and adult stages. Adults exhibit hill-topping behavior where they seek a topographic summit on which to mate (Shields 1967, entire). After mating, females oviposit on dirt, dry grass, mixed plant debris, or rodent trails and holes near their host plant, the California golden violet (*Viola pedunculata*; also known as the Johnny jump-up or yellow pansy) (Thomas Reid Associates 1982, p. IV-42). After diapause, larvae eat the foliage of the California golden violet (Service 1978, p. 28941; Arnold 1981, p. 19). Adults feed on flower nectar from a variety of native and non-native flowering plants (Bernhardt and Swiecki 2007, entire).

##### **Most recent status review:**

U.S. Fish and Wildlife Service (Service). 2020b. Callippe silverspot butterfly (*Speyeria callippe callippe*) 5-Year Review: Summary and Evaluation. Sacramento, California. 4 pp.

We did not recommend a status change in the 2020 status review.

##### **FR Notice citation announcing this status review:**

U.S. Fish and Wildlife Service (Service). 2024d. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 59 Pacific Southwest Species. Federal Register 89:83510–83514.

We did not receive information from the public regarding the callippe silverspot butterfly in response to the notice.

## **ASSESSMENT:**

### **Information acquired since the last status review:**

This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Sacramento Fish and Wildlife Office. Data for this review were solicited from interested parties through a Federal Register notice announcing this review on October 16, 2024 (Service 2024d, p. 83510). We used personal communications with species experts and land managers, obtained reports from partners, performed a literature search, reviewed information from our own files, and obtained data from occurrence searches of the California National Diversity Database (Diversity Database) maintained by the California Department of Fish and Wildlife (Department) (Department 2025) and of the community science site iNaturalist (iNaturalist 2025).

Since the last 5-year status review, the December 2024 Species Status Assessment (Service 2024a, entire) and a draft recovery plan (Service 2024b, entire) were developed for the callippe silverspot butterfly, and new information is available including: (1) new data on population abundance and habitat quality in each of the four populations from monitoring reports since 2020; (2) a new occurrence near San Bruno Mountain at Sign Hill Park in the City of South San Francisco, San Mateo County; (3) three new occurrences in the City of Vallejo, Solano County; (4) monitoring of the effects of a large wildfire on the Sears Point population in southern Sonoma County; (5) a proposed pilot cattle grazing study at San Bruno Mountain; (6) studies of the effects of cattle grazing on the larval host plant, the California golden violet; and (7) studies of how to propagate, restore, and translocate the California golden violet. The new information obtained since the last 5-year review is discussed further below.

### **Distribution and Abundance:**

When listed in 1997, only two populations throughout the historical range of the callippe silverspot butterfly were believed to be extant: on San Bruno Mountain in San Mateo County and in a city park in Alameda County (Service 1997, p. 64037). At that time, the abundances of these populations were unknown. Since listing, the population in Alameda County was likely extirpated (Service 2009a, p. 5), and new populations of the butterfly were found at Sears Point Ranch in southern Sonoma County and in the Cordelia Hills and Ferrari Ranch in Solano County.

The current distribution of extant populations is similar to as described in the December 2024 update to the Species Status Assessment (Service 2024a, p. 6). Four extant populations (i.e., Cordelia Hills, Ferrari Ranch, San Bruno Mountain, and Sears Point) are distributed within Solano, San Mateo, and Sonoma counties in the San Francisco Bay Area. New occurrences of the butterfly observed since 2020, occurrences not previously known to the Service, and recent survey data are summarized below.

#### Cordelia Hills Population, Solano County

A new occurrence of 10 adult butterflies was observed within the Cordelia Hills population on a hilltop in the City of Vallejo during wildlife surveys on June 27, 2023, approximately 0.9 miles northeast of the Columbus Parkway interchange with Interstate 80 (Montrose Environmental Solutions 2023 cited in Service 2024c, p. 21 and Figure 3). The occurrence is located at the edge of a proposed 49.1-acre biological preserve that would be protected and managed in perpetuity for the butterfly as compensatory mitigation for the Scotts Valley Band of Pomo Indians' proposed 59.5-acre casino development with Tribal housing adjacent to and southwest of the

biological preserve (Service 2024c, pp. 21–22 and Figure 3). The new occurrence is located approximately 1.25 miles west-northwest of Diversity Database occurrence number 16 at the Vallejo Swett Ranch (Department 2025).

Four adult *Speyeria callippe* butterflies<sup>1</sup>, that may be the listed subspecies, were observed within the Cordelia Hills population along the Hiddenbrooke Trail at the City of Vallejo’s Hiddenbrooke Open Space during one-day butterfly surveys conducted by volunteers on June 14, 2024, approximately 1.0 mile north of the nearest Diversity Database occurrence at the Vallejo Swett Ranch (B. Hill, Solano Land Trust, in litt. 2024a, Table “Benicia Butterfly Count Results - 14 Jun 2024”; Seth 2024). “Research grade” observations of single adult *Speyeria callippe* butterflies were also observed near this location at Hiddenbrooke Open Space on June 17, 2019, and May 20, 2020, and reported on iNaturalist (iNaturalist 2025).

A “research grade” observation of a single adult *Speyeria callippe* butterfly on iNaturalist (O’Brien 2019), that is likely the listed subspecies, was observed at Blue Rock Springs Corridor Park in the City of Vallejo on June 18, 2019, within 0.25 mile west of a 2009 Diversity Database occurrence at Vallejo Swett Ranch (Department 2025, Diversity Database number occurrence 14). The observation is within 0.9 mile northwest of a May 2012 Diversity Database occurrence on private land (Diversity Database 2025, Diversity Database occurrence number 18).

The 2020 and 2024 Species Status Assessments reported the abundance of adult callippe silverspot butterflies in the Cordelia Hills population as low (< 10 butterflies observed per hour) (Service 2020a, Table 8; Service 2024a, Table 8). New data on the abundance of adult butterflies at the King Ranch and Ridge Top Ranch Wildlife Conservation Bank populations are summarized below. Vallejo Swett Ranch and Eastern Swett Ranch have not been monitored since the butterfly was last observed there in 2009 (B. Hill, Solano Land Trust, in litt. 2025b; Department 2025).

#### *King Ranch*

Only one adult callippe silverspot butterfly was observed at King Ranch in June 2022, and three were observed in June 2023 during four rounds of butterfly surveys along six monitoring transects (Marty Ecological Consulting, Inc. 2024c, p. 13, Table 5). The butterflies were all observed exhibiting hill-topping behavior. On June 14, 2024, three callippe silverspot butterflies were observed on the northeast slope of King Ranch during one-day surveys (B. Hill in litt. 2024a, Table “Benicia Butterfly Count Results - 14 Jun 2024”). An unspecified number of callippe silverspot butterflies were observed on the eastern side of King Ranch within areas with high densities of California golden violets during surveys on May 14 and June 14, 2024; all sightings were on eastern-facing slopes near the tops of hills (LSA 2024, p. 3). This puts the population in the low condition as described in the Species Status Assessment for population abundance with fewer than 10 butterflies observed per hour (Service 2024a, Table 7).

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<sup>1</sup> The occurrence in iNaturalist was reported as *Argynnis callippe*. Because the genus *Argynnis* is restricted to the Old World, and the genus *Speyeria*, is found only in North America (dos Passos and Grey 1945), the butterfly described as *Argynnis callippe* is now considered *Speyeria callippe* (Service 2024a, p. 3).

### Ridge Top Ranch Wildlife Conservation Bank

Two biologists monitored Ridge Top Ranch Wildlife Conservation Bank for almost five hours on June 20, 2023, and observed only four adult callippe silverspot butterflies (WRA, Inc. 2024, p. 8). This is down from the six adult butterflies observed on June 17, 2021 (WRA, Inc. 2022, p. 8). This would put the abundance of adult butterflies as low at fewer than 10 butterflies observed per hour according to the metrics in the Species Status Assessment (Service 2024a, Table 7).

### Ferrari Ranch Population, Solano County

The 2020 and 2024 Species Status Assessments rated the abundance of adult callippe silverspot butterflies in the Ferrari Ranch population as low (< 10 butterflies observed per hour) (Service 2020a, Table 8; Service 2024a, Table 8). Surveys of adult callippe silverspot butterflies are conducted at the Ferrari Ranch Preserve every five years. In 2019, only three adult callippe silverspot butterflies were observed during six rounds of surveys at the Ferrari Ranch Preserve (R. Arnold in litt. 2019 in Westervelt Ecological Services 2020, pp. 1–2 in Appendix F). In June 2024, a maximum of three adult butterflies were observed per hour at the Ferrari Ranch Preserve (Hill 2024, p. 2). The callippe silverspot butterfly has been observed flying back and forth between the adjacent private Azevedo property to the west in areas with suitable high-quality habitat (R. Hill, University of the Pacific, in litt. 2025a; Hill 2024, p. 1), but the extent of suitable habitat on the private property and abundance of the butterfly is not known. No callippe silverspot butterflies have been observed at the Solano Land Trust’s adjacent Lynch Canyon Open Space or the recently acquired Lynch Expansion (B. Hill, Solano Land Trust, in litt. 2024b; B. Hill, Solano Land Trust, in litt. 2025a).

### San Bruno Mountain Population, San Mateo County

In the San Bruno Mountain population, there is a butterfly occurrence from 2010 that was not discussed in previous Service documents. The Diversity Database reports a single adult callippe silverspot butterfly was observed nectaring on a coyote mint (*Monardella villosa*) at the southeast end of Bayview Park in the City of San Francisco, approximately 1.4 miles northeast of the nearest occurrence on San Bruno Mountain (Department 2025, Diversity Database occurrence number 15). The observer believed the butterfly had hatched at the site since it did not appear to be tattered (Department 2025). Although this occurrence is “presumed extant” in the Diversity Database, no other observations of callippe silverspot butterflies have been reported here since 2010 (Department 2025).

Additionally, a new occurrence of a small number of callippe silverspot butterflies within the San Bruno Mountain population was observed in 2020 and 2021 south of San Bruno Mountain at Sign Hill Park in the City of South San Francisco, San Mateo County (C. LaCroix, City of South San Francisco Parks and Recreation, in litt. 2024). This occurrence overlaps with the Diversity Database occurrence at Sign Hill Park of two adult butterflies observed on June 23, 2006, which was not discussed in Service documents prior to the 2024 Species Status Assessment (Department 2025, Diversity Database occurrence number 6).

San Bruno Mountain is the largest and best-monitored population of callippe silverspot butterflies. Mark-release-recapture studies in 1980 and 1981 yielded population estimates of 9,000 and 11,000 (Thomas Reid Associates 1982, p. IV-4). The San Bruno Mountain population has been surveyed annually from 1982 to 2006, with surveys switching to biennial after 2006.

An analysis of occupancy using survey data from 1982 to 2000 revealed no major changes in occupancy across San Bruno Mountain (Longcore et al. 2010, p. 339).

Biennial monitoring of adult butterflies along fixed transects between 2014 and 2024 at San Bruno Mountain (Table 1) shows that the population abundance of the butterfly was in moderate condition (average maximum sightings per hour of  $< 20$  and  $\geq 10$ ) in four of six monitoring years, and in high condition (average maximum sightings per hour  $\geq 20$ ) the other two years (San Mateo County Parks 2022, Table 2; San Mateo County Parks 2024b, p. 6; Service 2024a, p. 47). The 2020 survey detected 686 adult butterflies, the highest number in this time frame (Table 1) (San Mateo County Parks 2022, p. 16). The observed species abundance declined to 266 in 2022 (mean maximum of 13.84 butterflies per hour) and 203 in 2024 (mean maximum of 12.90 butterflies per hour), resulting in a moderate condition assessment (Table 1) (San Mateo County Parks 2022, pp. 16–17 and Table 2; San Mateo County Parks 2024b, p. 6). The year 2024 had the second lowest number of callippe silverspot butterflies recorded at San Bruno Mountain since the record low in 2016 (Table 1) (San Mateo County Parks 2022, Table 2).

Table 1. Maximum abundance of callippe silverspot butterfly adults at San Bruno Mountain, averaged across transects by year. Data are only shown for the last six monitoring years (San Mateo County Parks 2022, Table 2; San Mateo County Parks 2024b, p. 6).

Year	Mean Maximum Sightings per Hour	Condition Based on Population Abundance <sup>2</sup>
2014	68.48	High
2016	11.29	Moderate
2018	18.89	Moderate
2020	30.67	High
2022	13.84	Moderate
2024	12.90	Moderate

Adult butterflies were observed on 13 out of 14 transects at San Bruno Mountain in 2024 (San Mateo County Parks 2024b, p. 7). Most butterflies are observed in the eastern portions of San Bruno Mountain, while western portions have few, if any, callippe silverspot butterflies (San Mateo County Parks 2022, Figure 1) likely due to the higher density of scrub, lower cover of host plants, and the windier, wetter, cooler, and foggier microclimatic conditions. However, a single adult butterfly was observed in 2024 on a transect on the western part of San Bruno Mountain for the first time since 2010 (San Mateo County Parks 2022, p. 12; San Mateo County Parks 2024b, p. 8).

No adult callippe silverspot butterflies have been observed on transect 6 (Dairy and Wax Myrtle Ravines) on the north central part of San Bruno Mountain since 2016 (San Mateo County Parks 2022, p. 17; San Mateo County Parks 2024b, p. 7). Host plant abundance has historically been low along transect 6 (San Mateo County Parks 2022, p. 17). Native coyote brush (*Baccharis pilularis*) and poison oak (*Toxicodendron diversilobum*), and non-native Scotch broom (*Cytisus*

<sup>2</sup> The condition of population abundance is calculated by averaging the maximum adult callippe silverspot butterfly sightings per hour for each transect and categorizing as: High  $> 20$ , Moderate = 10–20, or Low  $< 10$  (Service 2024a, Table 7).

*scoparius*) and Italian thistle (*Carduus pycnocephalus*) have likely displaced host plants along transect 6 despite San Mateo County Parks' efforts to manage shrubs and weeds at that location in 2018–2020 (San Mateo County Parks 2022, Table 1 and p. 13). Transect 12 (Southeast Ridge) continues to decline with only one adult observed there in 2024 (San Mateo County Parks 2024b, p. 7). Similarly, the number of endangered mission blue butterflies (*Icaricia icarioides missionensis*) has steeply declined along the Southeast Ridge transect with no mission blue butterflies observed there in 2023; this may be due to the growth of invasive annual grasses and encroaching native shrubs displacing the host plants (San Bruno Mountain San Mateo County Parks 2024a, pp. 14–15).

#### Sears Point Population, Sonoma County

A total of 16 adult callippe silverspot butterflies were observed at Sears Point Ranch during four surveys along six transects in May 30 – June 23, 2021 (Coast Ridge Ecology 2021, p. 6). This is a very low number compared to the 50–60 butterflies observed by a citizen scientist during a five-hour survey on June 5, 2013, which was reported to be a low number at the time (D. Rawlinson in litt. 2019 cited in Coast Ridge Ecology 2021, p. 10). Butterflies were observed on only two of the six transects in 2021 (Coast Ridge Ecology 2021, p. 6). The highest maximum sightings per hour on a single transect was 6.1 in 2021 (P. Kobernus, Coast Ridge Ecology, in litt. 2024). The average maximum sightings per hour across transects was 1.3 which puts the Sears Point population in low condition for population abundance (Coast Ridge Ecology 2021, pp. 6–7; P. Kobernus, in litt. 2024). The maximum number of callippe silverspot butterflies observed on a single survey date was nine on May 30, 2021 (Coast Ridge Ecology 2021, Figure 4). The majority of callippe silverspot butterfly observations occurred in the ravines where nectar plants were more abundant due to greater moisture (Coast Ridge Ecology 2021, p. 9). Thus, the abundance of callippe silverspot butterflies continues to be low (< 10 butterflies observed per hour) at Sears Point Ranch (Service 2024a, Table 8).

There are likely several factors contributing to the low numbers of callippe silverspot butterflies observed at Sears Point Ranch in 2021 (Coast Ridge Ecology 2021, pp. 10–11). The average annual rainfall as reported in the nearby Petaluma Valley is 24.39 inches, and the water year<sup>3</sup> 2020 was a drought year with less than 15 inches of rainfall (61 percent of average annual rainfall) (Petaluma Valley Groundwater Sustainability Agency 2022, p. 1). The following water year 2021 was the third driest year on record with only approximately 8 inches of rainfall (33 percent of the average annual rainfall) (Petaluma Valley Groundwater Sustainability Agency 2022, p. 1).

In addition, the 2021 flight season was shortened and lasted for only three weeks (Coast Ridge Ecology 2021, p. 11). In comparison, the typical flight season for the callippe silverspot butterfly on San Bruno Mountain is closer to six weeks (San Mateo County Parks Department 2022, p. 9). Severe drought conditions likely reduced the availability of host and nectar plants resulting in a shortened flight season, reduced reproduction of adults, and lowered survival rates of larvae. The population of adult butterflies at Sears Point Ranch may also still be recovering from a wildfire that occurred in October 2017, which is further discussed in the High-Severity Wildfires.

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<sup>3</sup> A water year begins on October 1 of the previous year and ends on September 30 of the current year. Water year 2020 is October 1, 2019 – September 30, 2020. Water year 2021 is October 1, 2020 – September 31, 2021.

## **Research and Conservation:**

### Cattle Grazing Studies

A short-term cattle grazing study conducted at King Ranch in 2023 evaluated the effects of cattle grazing on habitat for the callippe silverspot butterfly (Solano Land Trust 2024a, pp. 12–13). The study found that the average cover of California golden violets and relative cover of native species was significantly higher in grazed plots than ungrazed plots (Marty Ecological Consulting, Inc. 2024c, pp. 11, 13). While the cover of bare ground remained similar in grazed and ungrazed plots at King Ranch, the absolute cover of non-native grasses was significantly higher in ungrazed plots compared to grazed plots (Marty Ecological Consulting, Inc. 2024a, p. 12). Thatch accumulation was also higher in ungrazed plots versus grazed plots, although this difference was not statistically significant (Marty Ecological Consulting, Inc. 2024a, p. 12).

San Mateo County Parks proposes to implement a pilot study on the Southeast Slope and Northeast Ridge (if this property is acquired by San Mateo County Parks) at San Bruno Mountain State and County Park to analyze the effects of cattle grazing on the callippe silverspot butterfly, its host plant, and other federally listed butterflies (Ratcliff and Ford 2023, pp. 3 and 8). The study is estimated to begin in 2026 and will compare California golden violet cover and abundance, nectar plant diversity and abundance, spring grassland herbaceous height, and fall residual dry matter levels in grazed areas and ungrazed control plots (Ratcliff and Ford 2023, pp. 18–19).

### Host and Nectar Plant Restoration

Creekside Science et al. (2024, p. 1) are implementing a study to test methods for expanding California golden violet cover at San Bruno Mountain, Sears Point Ranch, and Ferrari Ranch Preserve by scraping and sowing seeds and transplanting rhizomes and analyzing their effects on host plant survivorship, vigor, and fecundity (Creekside Science et al. 2024, p. 2). The study will also characterize landscape and soil gradients and residual dry matter in comparison with California golden violet presence and callippe silverspot butterfly habitat quality (e.g., host plant height which is negatively related to host plant quality) (Creekside Science et al. 2024, p. 2; R. Hill, University of the Pacific, in litt. 2025b). Data will be collected in 2024–2025 and analyzed in fall 2025 (Creekside Science et al. 2024, pp. 2–6).

Preliminary observations in May 2025 in another study show some success in transplanting California golden violet caudexes (thickened base of the stem or root of a plant that stores water and nutrients) and sowing seeds especially if plots are scraped to bare soil (R. Hill in litt. 2025b). The preliminary results are summarized below.

### *Germination of Host Plants in the Laboratory*

Franklin et al. (2017, pp. 43, 49) found high germination success rates (73–100 percent) for California golden violets in the lab after simulating its natural environmental conditions of a prolonged warm-dry period followed by 6–10 weeks of stratification in the dark. They recommend adjusting the duration of warm-dry and cool-wet treatments to match that of the particular seed source to maximize germination rates (Franklin et al. 2017, p. 49). However, while California golden violet germination success in the laboratory is high, efforts to plant seedlings have not worked often due to fungal pathogens (Weiss pers. obs. 2023 cited in Creekside Science et al. 2024, p. 1; Franklin et al. 2017, p. 49). Franklin et al. (2017, p. 49) states

that additional research is needed to better understand the effects of fungal pathogens and variables affecting germination success.

The laboratory germination experiment (Franklin 2017, entire) was repeated with California golden violet seeds collected from Sears Point Ranch that were cold stratified (R. Hill in litt. 2025b). Germination success was slightly lower than Franklin (2017, pp. 43, 49) at 71 percent likely due to collecting seed capsules before they opened (R. Hill in litt. 2025b). The germinated seeds were planted in four treatments to test methods for laboratory propagation (R. Hill in litt. 2025b). Emergence and survival success differed significantly among treatments, with the Sears Point Ranch native soil having the highest emergence success (74.4 percent) and survival rates (R. Hill in litt. 2025b). Plants in the lab appeared similar to the strongest field-sown plants of similar age and senesced in May 2025, similar to host plants in the wild, and they will continue to be monitored for winter survivorship (R. Hill in litt. 2025b).

#### *Seeding and Sowing Host Plants*

Both sowing California golden violet seeds in restoration sites and transplanting well-established California golden violet plants were tested for their success in expanding host populations, but more time is needed to evaluate persistence through summer (R. Hill in litt. 2025b). One thousand California golden violet seeds (500 at Sears Point Ranch and 500 at San Bruno Mountain) were planted in December 2024 (R. Hill in litt. 2025b). At each site, 250 seeds were planted in plots scraped to bare soil (scraped), and 250 seeds were planted in plots that were lightly raked to remove loose vegetation (unscraped) (R. Hill in litt. 2025b). Preliminary results as of May 2025 found that germination, seedling survival, and seedling vigor (measured by number of true leaves) was higher in scraped than unscraped plots (R. Hill in litt. 2025b). These preliminary results indicate that scraping is useful in planting host plant seeds, probably to reduce competition for light, water, or both (R. Hill in litt. 2025b). However, these results are still preliminary given that host plants are drying up and will need to survive summer, and the true test of success will be whether seedlings are found in early winter (R. Hill in litt. 2025b). San Mateo County Parks and San Bruno Mountain Watch are attempting a direct seeding experiment at San Bruno Mountain using site-specific California golden violet seeds grown at the Mission Blue Nursery (San Mateo County Parks 2024a, p. 36).

#### *Transplanting Host Plants*

At Sears Point Ranch and San Bruno Mountain, ten caudexes of California golden violets were transplanted by digging up above-ground plants in January 2025 and moving them to a similar area nearby that lacked California golden violets (R. Hill in litt. 2025b). Plots were scraped or unscraped. Of the 20 host plants in scraped plots, 19 were still alive when re-surveyed in May 2025, though many were drying out, making it difficult to tell if they were dying or going dormant to make it through the summer (R. Hill in litt. 2025b). In contrast, only 10 of 20 host plants in unscraped plots showed signs of life (R. Hill in litt. 2025b). Further evaluation of the transplants through winter surveys is needed to test whether host plants are alive and whether they are vigorous enough to flower (R. Hill in litt. 2025b).

#### *California Golden Violet Response to Surrounding Herbaceous Vegetation Height*

C. Flores, a graduate student, is studying the morphological and reproductive responses of California golden violets to surrounding herbaceous vegetation height (R. Hill in litt. 2025b). Data was collected on herbaceous height near California golden violet plants in grazed and

ungrazed areas, and various host plant physical characteristics were measured, such as the length from the base to farthest leaf tip, number of leaves, and number of flowers and fruit (R. Hill in litt. 2025b). As surrounding vegetation height increases, especially over 5.9 inches, California golden violets grow tall and long, have fewer leaves and fewer secondary stems, but have higher leaf area (R. Hill in litt. 2025b). This suggests that the host plant responds to low light levels by growing tall and “leggy” to find light and invests in fewer, but larger, leaves (R. Hill in litt. 2025b). Flores plans to model available leaf area based on data on the number of leaves, leaf area, and number of secondary stems, to test if high herbaceous height means less food for consumption by callippe silverspot larvae (R. Hill in litt. 2025b).

Higher herbaceous height of surrounding vegetation also appears to significantly decrease reproduction in California golden violets (R. Hill in litt. 2025b). Preliminary results indicate that the number of host plant flowers and fruits declines with herbaceous height, but there is no significant difference in the number of fertile seeds in each fruit or size of the fruit (R. Hill in litt. 2025b; R. Hill, University of the Pacific, in litt. 2025c). One small data set from 2024 suggests that host plant seeds collected in an area with lower herbaceous height had seeds that were about 10–20 percent heavier (R. Hill in litt. 2025b). Overall, the preliminary results suggest that host plants in areas with higher herbaceous heights have reduced allocation to reproduction which could lead to declines in the abundance of California golden violets in unmanaged areas (R. Hill in litt. 2025b).

#### Sign Hill Park Habitat Restoration and Open Space Master Plan

The 91.76-acre Sign Hill consists of the 65.45-acre Sign Hill Park, which is owned and protected by the City of South San Francisco as open space, and 26.30 acres of undeveloped private land (WRA Environmental Consultants 2023, Figure 2; C. LaCroix in litt. 2024). Sign Hill Park contains approximately 39.51 acres of grassland habitat for the callippe silverspot and mission blue butterflies including 16.91 acres of native grasslands where their host plants occur (WRA Environmental Consultants 2023, Table 2).

In 2019, the City of South San Francisco Parks and Recreation Department launched the Sign Hill Habitat Restoration Project as part of a grant with San Mateo County, which has installed restoration plantings, conducted invasive plant species management, and controlled shrub encroachment to benefit the callippe silverspot and mission blue butterflies (C. LaCroix, in litt. 2024; City of South San Francisco 2024, entire; WRA Environmental Consultants 2023, pp. 32–33). Callippe silverspot and mission blue butterflies also benefitted from fuels reduction work at Sign Hill Park following a wildfire on October 14, 2020, that restored grassland habitat through the thinning of trees and underbrush along the entire southern slope, the removal of almost all trees within a 100-foot defensible space along the private/public boundary, and the thinning of a large eucalyptus grove in the southwest portion of Sign Hill (WRA Environmental Consultants 2023, pp. 25–26).

The City of South San Francisco adopted the Sign Hill Open Space Master Plan for Sign Hill Park in October 2023 which will “actively manage Sign Hill habitat for protection and restoration of its unique habitat” by protecting and restoring essential habitat for special-status species including the callippe silverspot and mission blue butterflies, protecting and restoring native grasslands, providing ongoing management of invasive plant species, balancing retention of non-native trees with native habitat restoration, determining if designation of Sign Hill as a

Priority Conservation Area is appropriate, and conducting protocol-level surveys for the callippe silverspot and mission blue butterflies (WRA Environmental Consultants 2023, pp. vi and ix).

### **Threats:**

The final listing rule in 1997 identified loss and degradation of habitat from human activities, including off-road vehicle use, trampling by hikers and equestrians, inappropriate levels of livestock grazing, and invasive exotic vegetation as the primary threats to the callippe silverspot butterfly (Service 1997, p. 64312). Urban development and overcollection were also identified as threats at the time of listing (Service 1997, pp. 64312, 64316). At the time of the 2020 status review and 2024 Species Status Assessment, the current and potential future threats thought to have population or species-level effects on the subspecies included habitat fragmentation; grassland conversion; illegal collection; habitat modification by non-native plant species, which is exacerbated by nitrogen deposition; pesticide use; fire; small population size; and climate change (Service 2020b, pp. 1–2; Service 2024a, pp. 25–31). Additionally, off-road vehicle use and trampling during recreational use have individual-level effects on the butterflies. These threats continue to act on the callippe silverspot butterfly, and new information on threats is provided below.

### Development

The final listing rule identified urban development as one of the primary causes of the extirpation of five callippe silverspot butterfly populations, but urban development had become less of a threat as habitat was protected from development under the San Bruno Mountain Habitat Conservation Plan (Service 1997, p. 64312; San Bruno Mountain Habitat Conservation Plan Steering Committee 1982, entire). While some habitat has been lost to urban development since listing (e.g., 19.64 acres of the Northeast Ridge on San Bruno Mountain (Service 2009b, p. 56)), urban development has become less of a threat to the subspecies as much of its habitat has been protected as open space or under conservation easement (e.g., San Bruno Mountain State and County Park, King Ranch, Ferrari Ranch Preserve, Ridge Top Ranch Conservation Bank, Sears Point Ranch). Currently proposed residential, commercial, utility, and transportation developments within callippe silverspot butterfly habitat are summarized in Table A in the **Appendix**. In addition, there is a proposal to purchase Pacific Gas and Electric Company-owned electrical transmission and distribution assets located in San Francisco and San Mateo counties and, if purchased, there may be impacts to suitable habitat for the butterfly near San Bruno Mountain (San Francisco Planning 2025, pp. 164, S-1).

### Invasive Plant Species and Thatch

Invasive exotic vegetation was identified in the 1997 final listing rule as a primary threat to the callippe silverspot butterfly (Service 1997, p. 64312). Invasive vegetation and thatch continue to be the primary threats to all four populations of the butterfly as they compete with and reduce the abundance of host and native nectar plants (Service 2024a, pp. 28–29). The level of threat of invasive plants and thatch is summarized below for each population.

#### *Cordelia Hills*

Thatch continues to be a significant threat at King Ranch (Marty Ecological Consulting, Inc. 2024d, Table 1). The cover of California golden violets at King Ranch has declined over the last 20 years likely due to the increase in thatch cover resulting from inadequate cattle grazing due to a lack of year-round water for cattle (B. Hill, Solano Land Trust, pers. comm. 2025; A.

Weinstein, Solano Land Trust, in litt. 2025; Solano Land Trust 2025a, pp. 8–9; Bernhardt and Swiecki 2010 cited in Marty Ecological Consulting, Inc., 2024a, p. 13). Additionally, the cover of invasive Italian thistle, fennel (*Foeniculum vulgare*), and rose clover (*Trifolium hirtum*) has increased at higher elevations of King Ranch because the cattle will not climb the slopes to graze (B. Hill pers. comm. 2025).

Invasive plants continue to be a primary threat at Ridge Top Ranch Wildlife Conservation Bank where artichoke thistle (*Cynara cardunculus*) covered 63 percent of the bank in 2024, but 33 percent were lower density infestations of artichoke thistle (WRA, Inc. 2025, Table 2). Artichoke thistle that grew densely or are near California golden violet populations were treated with approved herbicides or mechanically removed in spring 2024 (WRA, Inc. 2025, p. 8). WRA, Inc. (2025, p. 13) will contract drone-based herbicide weed abatement services to treat 200 acres of invasive plants over the next three years. Artichoke thistle was identified as a preferred nectar source for the callippe silverspot butterfly and other pollinators at King Ranch, but it may displace California golden violets and native nectar sources (Marty Ecological Consulting, Inc., 2024b, Table 8 and p. 36). Thatch also continues to be a threat at Ridge Top Ranch Wildlife Conservation Bank with high residual dry matter levels found in sampling plots in 2022, 2023, and 2024 (WRA, Inc. 2025, Table 3; WRA, Inc. 2024, Table 3; WRA, Inc. 2023, Table 3; Service 2024a, Table 1).

#### *Ferrari Ranch*

In 2024, Hill (2024, p. 1) observed that additional cattle grazing was needed to reduce thatch levels at the Ferrari Ranch Preserve on the ridges near California golden violet habitat enhancement areas. Non-native Italian thistle and thatch were likely suppressing California golden violets at Ferrari Ranch in 2024, but California golden violets were abundant on the neighboring private Azevedo property to the west with callippe silverspot butterflies observed easily flying back and forth between the two properties (Hill 2024, pp. 1, 5).

#### *San Bruno Mountain*

The highest priority invasive plant species at San Bruno Mountain with the largest acres treated between August 2022 and December 2023 were Bermuda buttercup (*Oxalis pes-caprae*), gorse (*Ulex europaeus*), coyote brush, and fennel (San Mateo County Parks 2024a, pp. 34). Additional invasive plant species were prioritized for treatment if they threatened priority grassland habitat for federally listed species or if they covered a small area but were suspected to become prevalent (San Mateo County Parks 2024a, pp. 34–35). A total of 210 acres of weeds in the highest priority butterfly habitat was treated in 2021 and 269 acres were treated in 2022, including a combination of native and non-native scrub, fennel, broom, mustard, thistle, and other weed species (San Mateo County Parks 2022, p. 6). A proposed amendment to the San Bruno Mountain Habitat Conservation Plan (Panorama Environmental, Inc. 2024, entire) is expected to address the funding shortfall that has resulted in the inability of San Mateo County Parks to maintain at least 1,200 acres of grassland habitat for the callippe silverspot and other federally listed butterflies at San Bruno Mountain (Service in litt. 2022, entire).

#### *Sears Point Ranch*

Thatch is less of a threat to the callippe silverspot butterfly at Sears Point Ranch due to the implementation of a year-round cattle grazing plan that controls the invasive annual grasses (Bush 2006, entire). Sears Point Ranch hosts several non-native plant species that are also

potential nectar plants, such as Himalayan blackberry (*Rubus armeniacus*), purple star thistle (*Centaurea calcitrapa*), and yellow star thistle (*Centaurea solstitialis*) (Coast Ridge Ecology 2021, Table 2). California golden violets were abundant and widespread at Sears Point Ranch in 2021 (Coast Ridge Ecology 2021, p. 13) and 2025 (J. Terry, Service, pers. obs. 2025), and thus are not likely being significantly suppressed by the invasive plants, at least during a severe drought year. Instead, butterflies are more likely negatively impacted by the low abundance of nectar plants at Sears Point Ranch. Therefore, Coast Ridge Ecology (2021, p. 14) recommended minimizing the removal of invasive species, such as Himalayan blackberry, that are serving as important nectar sources for butterflies until native nectar sources are more established.

#### Fire Suppression and Encroachment of Native Shrubs

At the time of listing, suppression of naturally occurring fires was identified as a threat because it can lead to the succession of grassland and coastal prairie habitat to shrublands or woodlands that would not support the callippe silverspot butterfly's host plant (Service 1997, p. 64315). The San Bruno Mountain population, due to its more mesic coastal climate, is the only population where fire suppression has resulted in the encroachment of native shrubs into grassland and coastal prairie habitat and the succession to late-seral scrub. San Bruno Mountain lost 239 acres of grassland habitat between 1983 and 2015 (Weiss et al. 2015, p. 3) and may have dropped to an estimated 980 acres in 2019 (R. Arechiga in litt. 2025, p. 3)<sup>4</sup>. The San Bruno Mountain population continues to be threatened by the encroachment of native shrubs into grassland habitat for the butterfly likely due to the absence of disturbance from fire and grazers. San Mateo County Parks only has enough funding to remove individual shrubs that are encroaching upon priority grassland habitat for federally listed butterflies at San Bruno Mountain but lack sufficient funding to manage all the encroaching shrubs and invasive plant species (San Mateo County Parks 2024a, pp. 24, 26; R. Arechiga in litt. 2025, p. 5).

Additionally, fire suppression results in the accumulation of dead vegetation or thatch which smothers the host plant and, when burning, burns hotter and moves more slowly across the landscape than fires in areas where naturally occurring, periodic fires have removed thatch build-up (Service 2009a, p. 15; Hammond and McCorkle 1983, p. 222). All four populations of the butterfly are at risk from the build-up of dead vegetation and thatch due to fire suppression, but cattle grazing reduces this threat in the Sears Point, Cordelia Hills, and Ferrari Ranch populations.

#### Inappropriate Levels of Grazing by Cattle

Inappropriate levels of grazing were listed as a threat to the callippe silverspot butterfly in the listing rule, particularly if grazing occurs at harmful levels such that the vegetation is overgrazed and the host plants and nectar sources of the butterfly are greatly reduced in abundance (Service 1997, p. 64306). However, the listing rule also acknowledged that some livestock grazing could keep other plants from outcompeting the subspecies' host plants (Service 1997, p. 64314). Cattle grazing was identified as an important tool in the Species Status Assessment for managing invasive annual grasses and thatch (Service 2024a, p. 35). Sears Point Ranch is grazed by cattle under a grazing management plan that includes year-round grazing (Bush 2006, entire). Overgrazing by cattle during the severe drought years in 2021–2022 at Sears Point Ranch

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<sup>4</sup> Estimates of the acres of suitable grassland habitat remaining at San Bruno Mountain vary based on how much cover of encroaching shrubs is allowed before it is no longer considered suitable grassland habitat.

combined with the loss of nectar resources following a catastrophic wildfire in October 2017 degraded the habitat for the callippe silverspot butterfly (Coast Ridge Ecology 2021, pp. 13–14). Coast Ridge Ecology (2021, p. 14) recommended implementing rotational grazing, especially in drier years, to help maintain host and nectar plant resources by moving cattle off areas with dense host plants and nectar plants between May and July to allow greater vegetation recovery and avoid the effects of overgrazing. In contrast, the Cordelia Hills, Ferrari Ranch, and San Bruno Mountain populations are more threatened by insufficient levels of grazing, as discussed above in Invasive Plant Species and Thatch.

#### Atmospheric Nitrogen Deposition

The 2020 Species Status Assessment identified the additional threat of atmospheric nitrogen deposition, which facilitates the spread of non-native annual grasses (Service 2020a, pp. 28–29). Habitat near heavily used roads, highways, and freeways are particularly at risk because air pollution from transportation can lead to increased nitrogen deposition (Weiss 1999, p. 1477). All callippe silverspot butterfly populations are in areas near major highways and are thus threatened by atmospheric nitrogen deposition (Service 2020a, pp. 28–29; Service 2024a, pp. 28–29). However, atmospheric nitrogen deposition is not uniformly distributed across San Bruno Mountain (Weiss et al. 2015, p. 104). The low elevation leeward slopes of San Bruno Mountain receive lower levels of atmospheric nitrogen deposition since they are sheltered from upwind regional and local nitrogen sources (Weiss et al. 2015, pp. 5, 104–105; San Bruno Mountain Watch in litt. 2025, p. 7; Sierra Club Loma Prieta Chapter and Green Foothills in litt. 2025, p. 5). Lower nitrogen deposition is indicated by the quality of the grassland in these areas (fewer dense tall stands of invasive wild oat grasses (*Avena* spp.) and thistles within several hundred meters of the edge) (Weiss et al. 2015, p. 104).

The average annual emission of nitrogen oxides from baseline operations of the Guadalupe Quarry, located on San Bruno Mountain, in 2017–2021 was estimated at 5.6 tons per year and is expected to increase to 15 tons per year during redevelopment construction and 11 tons per year under the proposed warehouse operations (Panorama Environmental, Inc. 2024, Tables 10 and 24 in Appendix G). Therefore, callippe silverspot butterfly habitat near the Guadalupe Quarry that is currently sheltered from the higher rates of atmospheric nitrogen deposition will be exposed to elevated deposition of nitrogen oxides due to all the vehicular traffic supporting the warehouse distribution center (R. Arechiga in litt. 2025, pp. 2–3; San Bruno Mountain Watch in litt. 2025, p. 7; Sierra Club Loma Prieta Chapter and Green Foothills in litt. 2025, p. 5). This will increase the growth of invasive plant species such as wild oat grasses which will outcompete the larval host plants and nectar sources for the callippe silverspot butterfly.

#### High-Severity Wildfires

The final listing rule in 1997 identified periodic low-intensity, fast-moving fires as important in maintaining the habitat for the callippe silverspot butterfly by removing thatch and suggested that larvae would be likely to survive these types of fires (Service 1997, p. 64315; Hammond and McCorkle 1983, p. 222), whereas hotter, slow-moving brush and woodland fires may kill larvae (Service 1997, p. 64315; Service 2024a, p. 30). In addition, under windy conditions, fast-moving grassland fires burn in patches that leave “islands” of unburned habitat where any butterflies present are not harmed (Service 1997, p. 64315). The 2020 and 2024 Species Status Assessments repeated the important role of fire in maintaining the grassland habitat for the butterfly while acknowledging that uncontrolled wildfires during the larval or pupal stages of the butterfly have

the potential to catastrophically affect populations because larvae and pupae would likely be destroyed by fire (Service 2020a, p. 30; Service 2024a, p. 30).

A high-severity wildfire that occurred at Sears Point Ranch in October 2017 burned over 1,600 acres (approximately two-thirds of the grasslands), including most of the known habitat areas for callippe silverspot butterflies without leaving unburned “islands” of refugia habitat (Coast Ridge Ecology 2021, p. 11 and Figure 5; Service 2024a, p. 42 and Figure 14). The burn area has since recovered, and California golden violets were found to be abundant and widespread throughout Sears Point Ranch in spring 2021 (Coast Ridge Ecology 2021, p. 11). However, the fire appeared to have destroyed all the nectar plants that were planted within the ravines as part of habitat restoration efforts (Coast Ridge Ecology 2021, p. 11). A severe drought in 2020–2021 combined with continued year-round grazing likely exacerbated the effects of the loss of nectar resources in the wildfire (Coast Ridge Ecology 2021, p. 14). While wildfire can help native plants outcompete non-native grasses through the reduction of thatch and stimulating native seed germination, they can also negatively impact different life stages of the callippe silverspot butterfly depending upon the timing of the fire (Coast Ridge Ecology 2021, p. 12). At Sears Point Ranch, the fire occurred in October when the larvae were in diapause and sheltering in ground litter; thus, it likely killed many dormant larvae (Coast Ridge Ecology 2021, p. 12). Callippe silverspot butterfly population numbers were considered to be low at Sears Point Ranch before the fire (Service 2020a, p. 55), and it is likely that the fire reduced the population even further. The population may have yet to recover from this wildfire (Coast Ridge Ecology 2021, p. 12). More surveys are needed to determine whether the population has rebounded since 2021.

### Pesticides

At the time of listing, the use of insecticides was considered a threat to the butterfly if used in proximity to occupied habitat (Service 1997, p. 64314). This threat was based on the finding that concentrations of insecticides found in agricultural runoff and the concentration deposited in soil after spraying was lethal to larvae of various species in the genus *Speyeria*, which is of particular concern when rearing them by hand (Mattoon et al. 1971, p. 254). The 2020 and 2024 Species Status Assessments stated that insecticides are not commonly used in the areas which are known to support the callippe silverspot butterflies (Service 2020a, p. 30; Service 2024a, p. 31). However, drifting spray from insecticides could affect butterfly species on San Bruno Mountain (Service 2009b, p. 52) and in other locations.

The Environmental Protection Agency (Agency) recently released final biological evaluations assessing the effects of labeled uses of three neonicotinoid insecticides on listed species (Agency 2022a, entire; Agency 2022b, entire; Agency 2022c, entire). The three insecticides (clothianidin, imidacloprid, and thiamethoxam) are registered for use on a variety of agricultural crops; however, there are also some non-agricultural applications. The three insecticides target insect species by acting on their neurotransmitters to cause excessive nervous stimulation, paralysis, and death. The Agency’s final biological evaluations determined that all three insecticides have the potential to adversely affect the subspecies (Agency 2022a, pp. 4, Appendix 4-1; Agency 2022b, pp. 2, Appendix 4-1; Agency 2022c, pp. 3, Appendix 4-1). The Agency anticipates releasing amended proposed interim decisions.

Herbicides are used to control the spread of invasive plants around the San Francisco Bay Area (Service 2024a, p. 30). For example, San Mateo County Parks (2024a, pp. 28–29) utilizes

herbicides to control invasive plant species and encroaching native shrubs at San Bruno Mountain for the benefit of listed butterflies. San Mateo County Parks (2021, entire) issued an addendum to the habitat management plan at San Bruno Mountain that includes best management practices to further avoid and minimize effects to federally listed butterflies during herbicide use and vegetation management activities. These practices include prohibiting the use of non-selective herbicides near host plants and minimizing disturbance within three feet of host plants (San Mateo County Parks 2021, pp. 1–2). Since California golden violets senesce and may be difficult to detect in the late spring/summer, San Mateo County Parks (2021, p. 2) minimizes harming callippe silverspot butterfly larvae and pupae by utilizing existing host plant maps, conducting surveys of the vegetation management area between December and May, and flagging locations of host plants. Herbicide treatments on flowering invasive plants, especially species known to be nectar sources to callippe silverspot butterflies, are avoided during the flight season (San Mateo County Parks 2021, p. 2).

### **Recovery Criteria:**

A draft recovery plan for the callippe silverspot butterfly was issued in December 2024 (Service 2024b). We do not assess the draft recovery criteria here as the plan is not yet finalized and published.

### **Conclusion:**

After reviewing the best available scientific information, we conclude that the callippe silverspot butterfly remains an endangered subspecies. The evaluation of threats affecting the subspecies under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the subspecies in our 2024 Species Status Assessment (Service 2024a, entire) remains an accurate reflection of the subspecies' current status.

### **RECOMMENDATIONS FOR FUTURE ACTIONS:**

Here we propose several habitat conservation, restoration, and avoidance recommendations that will aid in the recovery and conservation of the callippe silverspot butterfly.

1. *Determine distribution and population dynamics through regular monitoring.* Conduct biannual surveys of adult callippe silverspot butterflies in all populations using a standardized methodology, such as the number of butterfly sightings per hour on permanent transects. Conduct surveys at the Vallejo Swett Ranch and Eastern Sweet Ranch to determine whether these areas are still occupied by the butterfly. Conduct surveys in suitable habitat adjacent to Sears Point (e.g., Tolay Lake Regional Park) and Ferrari Ranch (e.g., Lynch Canyon Open Space, Lynch Expansion, the private Azevedo property, Newell Open Space Preserve, and Creston Station Ranch conservation easements) to evaluate the extent of populations. Butterflies found at the periphery of the range should be genetically and morphologically evaluated to determine the subspecies.
2. *Protect occupied habitat and develop management plans for all protected areas.* Habitat that is currently occupied or found to be occupied by the callippe silverspot butterfly should be protected and secured from threats and incompatible uses through land acquisition, conservation easement, or other means. A management plan that includes the survival of the butterfly as an objective should be developed for each protected area. Dedicated funding

sources should be identified to implement management plans. Areas that should be prioritized for protection include the undeveloped private parcel adjacent to Sign Hill Park, the Northeast Ridge property on San Bruno Mountain, and, if found occupied, habitat adjacent to the Ferrari Ranch Preserve.

3. *Restore and manage occupied habitat.* Habitat in the Sears Point, Ferrari Ranch, and Cordelia Hills populations should be enhanced by increasing host plant cover of California golden violets, increasing availability of native nectar resources, and decreasing non-native invasive plant cover to levels appropriate for the callippe silverspot butterfly. Invasive plants and thatch can be managed through cattle grazing, which can be strategically managed by installing water sources and salt licks for cattle. Cattle grazing levels should be adaptively managed in response to the density and quality of California golden violets and nectar plants and to avoid impacts to other listed species. Rotational grazing should be implemented, especially in drier years, to help maintain host and nectar plant resources. If negative effects of grazing are observed, cattle should be moved off areas with dense host plants and nectar plants between May and July to allow greater vegetation recovery and avoid the effects of overgrazing.
4. *Conduct research on the callippe silverspot butterfly's ecology, habitat needs, host plant, and suitability for captive rearing and reintroduction.* Determine the vegetative cover of larval host plants and nectar sources necessary to support callippe silverspot butterfly populations. Study methods of propagating, outplanting, and transplanting the California golden violet, such as through seeding or root and rhizome transplanting. Investigate methods for promoting natural recruitment of California golden violets to maintain robust populations. Investigate the effectiveness of translocation and captive rearing of the callippe silverspot butterfly by using surrogate *Speyeria callippe* subspecies such as the Comstock silverspot (*S. c. comstocki*) and Lilian's silverspot (*S. c. Liliana*) butterflies.
5. *Coordinate annual meetings to share information.* Annual meetings should be held among stakeholders, land managers, species experts, and the Service to share information, research, and strategies on managing, restoring, and recovering the callippe silverspot butterfly.
6. *Complete the Solano Multispecies Habitat Conservation Plan.* The Solano Multispecies Habitat Conservation Plan is currently in administrative draft form, and a final plan has not yet been adopted. The Draft Solano Multispecies Habitat Conservation Plan will cover effects to the Cordelia Hills and Ferrari Ranch populations of the callippe silverspot butterfly in Solano County and require the implementation of avoidance, minimization, and mitigation measures (Solano County Water Agency 2012, entire).

**Acting Field Supervisor, Sacramento Fish and Wildlife Office**

Approve \_\_\_\_\_ Date \_\_\_\_\_

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## APPENDIX

Table A. Proposed development projects within callippe silverspot butterfly habitat.

Project Name	Acres	Project Overview and Status
Scotts Valley Band of Pomo Indians Casino Development	Permanent loss of 59.5 acres of callippe silverspot butterfly habitat within the Cordelia Hills population (Service 2024, Table 2).	The Service issued a biological opinion to the U.S. Bureau of Indian Affairs on November 20, 2024, for the Scotts Valley Band of Pomo Indian’s proposal. The Scotts Valley Band of Pomo Indians proposes to compensate by preserving and managing in perpetuity 49.1 acres of occupied callippe silverspot butterfly habitat onsite and to compensate offsite through the purchase of 116.4 acres of callippe silverspot butterfly credits from a Service-approved conservation bank (Service 2024c, pp. 9–10). The Service’s biological opinion requires that the onsite and offsite compensatory mitigation be provided before construction begins (Service 2024c, p. 32). Construction was estimated to begin in 2026 (Service 2024c, p. 6). However, the casino development is currently on hold (Smith 2025, entire; Monterose 2025, entire).
Guadalupe Quarry Redevelopment Project	A total of 4.8 acres of high-quality habitat for the callippe silverspot and other federally listed butterflies would be permanently lost within the proposed development area (Panorama Environmental, Inc. 2024, Table 3.6-7 on p. 3.6-60).	Orchard Partners, LLC and the City of Brisbane are in the process of applying for an amendment to the San Bruno Mountain Habitat Conservation Plan to cover the effects of the proposed redevelopment of the quarry on the callippe silverspot butterfly and other federally listed butterflies at San Bruno Mountain. 82 acres of the quarry property (including the quarry benches and undeveloped areas) will be protected as open space through (1) a 36-acre conservation easement that would be annexed by the City of Brisbane and managed by a qualified third-party entity and (2) the dedication of 46 acres to the County of San Mateo that would be added to San Bruno Mountain County Park and managed under the San Bruno Mountain Habitat Conservation Plan (Panorama Environmental, Inc. 2024, Table 2.6-1 on p. 2-8).
California High-Speed Rail: San Francisco to San Jose Section	Temporary disturbance of 31 acres and permanent loss of 66 acres of lower quality ruderal nectar/dispersal habitat for the callippe silverspot butterfly to the northeast of San Bruno Mountain (Service 2022, p. 40).	The Service issued a biological opinion to the California High-Speed Rail Authority in 2022 for the construction of the San Francisco to San Jose section of the California High-Speed Rail. The California High-Speed Rail Authority will compensate for the effects to the callippe silverspot butterfly by either preserving and managing in perpetuity 66 acres of currently unprotected habitat or funding the restoration of 198 acres of callippe silverspot butterfly habitat on already protected lands (Service 2022, p. 38).
Recreational Facilities at Icehouse Hill	The callippe silverspot butterfly does not occur within the proposed residential and commercial development area (City of Brisbane 2025, Figures ES-2 and 4.6-19). However, preservation of open space and construction of a recreational trail and facilities are proposed at the 24.3-acre Icehouse Hill where high quality habitat for the callippe silverspot butterfly occurs with abundant and widespread California golden violets (Coast Ridge Ecology 2023, p. 2; City of Brisbane 2025, p. 4.6-28 and Figure ES-2).	Baylands Development, Inc. has proposed to close the approximately 360-acre former Brisbane Landfill and to remediate the 180-acre former railyard area in the Brisbane Baylands area of the City of Brisbane in San Mateo County northeast of San Bruno Mountain (Huffman-Broadway Group, Inc. 2024, entire; City of Brisbane 2025, entire). Residential and commercial development are proposed on the northern portion of the project site where ruderal areas and non-native annual brome ( <i>Bromus</i> spp.) grasslands occur (City of Brisbane 2025, Figures ES-2 and 4.6-1). Callippe silverspot butterfly does not occur within the proposed residential and commercial development area (City of Brisbane 2025, Figures ES-2 and 4.6-19). However, preservation of open space and construction of a recreational trail and facilities are proposed at the 24.3-acre Icehouse Hill where high quality habitat for the callippe silverspot butterfly occurs with abundant and widespread California golden violets (Coast Ridge Ecology 2023, p. 2; City of Brisbane 2025, p. 4.6-28 and Figure ES-2). Proposed mitigation measures for the callippe silverspot butterfly are included in the Draft Environmental Impact Report for Icehouse Hill (City of Brisbane 2025, pp. ES-27, ES-28).