

5-YEAR REVIEW
Behren's silverspot butterfly (*Speyeria zerene behrensii*)

GENERAL INFORMATION:

Species: *Speyeria zerene behrensii*

Date listed: December 5, 1997

Federal Register (FR) citation(s): 62 FR 64306 64320 (Service 1997)

Classification: Endangered

State Listing:

The Behren's silverspot butterfly is not state listed in California.

BACKGROUND:

Species overview:

The Behren's silverspot butterfly (*Speyeria zerene behrensii*) is a medium-sized butterfly in the brushfoot family (Nymphalidae) and has an approximate wingspan of 2.2 inches. The dorsal side of the wings are golden orange with black spots and lines. The ventral side of the wings are maroon and yellow ochre with black lines and distinctive silver spots. The butterfly inhabits grasslands on coastal terraces and stabilized dunes, and the larvae (*i.e.*, caterpillars) feed on the early blue violet (*Viola adunca*). Historically, the Behren's silverspot butterfly was recorded at several coastal locations from central Mendocino County to central Sonoma County, California (Service 2012, p. 1).

Most recent status review:

[Service] U.S. Fish and Wildlife Service. 2020. Behren's silverspot butterfly (*Speyeria zerene behrensii*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata, California. 3 pp.

We did not recommend a status change in the 2020 5-year review.

FR notice citation announcing this status review:

[Service] U.S. Fish and Wildlife Service. 2024. 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 Behren's 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) Arcata Fish and Wildlife Office (Arcata Office). Data for this review were solicited from interested parties through a Federal Register notice announcing this review on October 16, 2024. We also maintained communication with California Department of Parks and Recreation – Sonoma-

Mendocino Coast District, Bureau of Land Management-Ukiah, Wynn Coastal Planning and Biology, Mendocino Land Trust, and Sequoia Park Zoo to request any data or information we should consider in our review. Additionally, we conducted a literature search, a review of information in our files, and coordinated with the Sacramento Fish and Wildlife Office to account for the jurisdictional overlap with the range of the species.

Captive Rearing Program:

Since the last status review, a captive rearing program has been established at the Sequoia Park Zoo in Eureka, California. The program received funding from the Service in 2018 to build captive rearing and augmentation skillsets using Hydaspe fritillary (*Speyeria hydaspe*) which is a non-listed but closely-related butterfly to Behren’s silverspot. Rearing of Behren’s silverspot butterflies started in 2021. The captive rearing and augmentation program involves four steps:

1. Collect mated adult females from the wild and place them in temporary captivity
2. Collect eggs laid from females and return females to continue laying eggs in wild
3. Care for caterpillars in captivity, some through pupation
4. Release individuals as caterpillars or as pupae to continue to mature in the wild

To reduce the likelihood of reamplifying genetics, females for captive rearing purposes are collected from areas that did not receive augmentation in the previous year. Also, in 2024 the program began marking individuals to further reduce this likelihood. Caterpillars and pupae are released in the same location from where their parent was collected so that any genetic substructure of the population is preserved.

Table 1. Number of adult female Behren’s silverspot (Speyeria zerene behrensii) butterflies collected, number of eggs hatched, number of larvae that survived, and number of released individuals from 2021-2025. Compiled from Sequoia Park Zoo Foundation Reports (2022, 2023, and 2024).

Years	Number of Adult Females Collected	Number of Eggs Hatched	Number of Larvae Surviving Diapause	Number Released
2021 – 2022	7	1,314	248	80 adults; 0 larvae
2022 – 2023	8	1,415	1,213	245 adults; 295 larvae
2023 – 2024	9	1,441	1,365	250 adults; 813 larvae
2024 – 2025	10	948	In Progress	In Progress

Habitat Restoration:

Habitat restoration efforts for Behren’s silverspot are underway at Manchester State Park (California Department of Parks and Recreation), Fort Ross State Park (California Department of Parks and Recreation), Point Arena-Stornetta (Bureau of Land Management), and Navarro Point (Mendocino Land Trust). These efforts include planting additional early blue violets for

caterpillars and nectar resources for adults. Further, restoration will include the removal of invasive plant species that outcompete resources required by Behren’s silverspot.

Distribution:

Historically, the Behren’s silverspot butterfly ranged from near the unincorporated community of Mendocino, California, south to the area of Salt Point State Park, Sonoma County (Service 2015, p. 6). The historic location of this butterfly from north to south includes Mendocino headlands, Point Arena and nearby in the vicinity of the town Manchester, headlands south of Anchor Bay, Sea Ranch, coastal terrace of Stewarts Point, and Salt Point (Service 2012, p. 6). Currently, the known distribution is limited to areas near Point Arena and Salt Point State Park, as well as a 2023 sighting at Manchester State Park. The 2024 annual report from Sequoia Park Zoo for activities conducted under permit 67253D-2 states that Behren’s silverspot adults were seen further north and further south than they have been observed in the recent past, which includes the sighting at Manchester State Park (Sequoia Park Zoo Foundation 2024, p. 6).

Abundance:

Since the last status review, weekly monitoring surveys have been conducted by California Department of Parks and Recreation (CDPR), Bureau of Land Management (BLM), Wynn Coastal Planning and Biology, and Mendocino Land Trust in Mendocino County, California. In 2020, no Behren’s silverspot butterflies were seen during surveys. In 2021 and 2022, surveys were not conducted because the team prioritized augmentation and release over surveys due to limited staff. In 2023, 56 Behren’s silverspot butterflies were recorded during surveys, including new transects established near the 2023 release sites. In 2024, 13 Behren’s silverspot butterflies were recorded during surveys. This number is lower than in 2023 and is potentially due to release locations being alternated to other areas away from the more recently established transects.

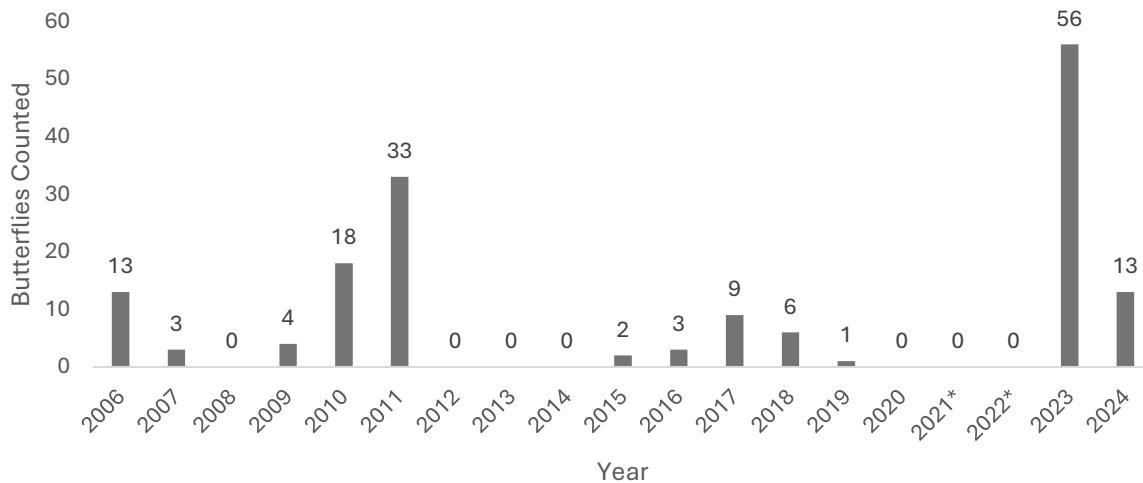


Figure 1. Range-wide count for Behren’s silverspot butterfly (*Speyeria zerene behrensii*) from 2006 to 2024 in Mendocino County, California. Years with no official surveys due to augmentation and propagation efforts are indicated by an asterisk (*).

Threats:

Threats described in the final listing rule include destruction, modification, or curtailment of habitat or range; diseases and predation; overutilization for commercial, recreational, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors. These threats were also listed in the 2012 5-year review and 2015 recovery plan (Service 2012, pp. 11-17; Service 2015 pp. 17-25). The threats noted in the final listing rule, previous 5-Year Review, and the Recovery Plan continue to act on the species. We are not aware of any new or additional threats since the last recovery plan and 5-Year Review.

Recovery criteria:

Recovery criteria for downlisting and delisting are described in Service (2015, p. 30). Downlisting criteria for Behren’s silverspot butterfly have not been met (Table 1), thus delisting criteria are not assessed here.

Table 2. Downlisting criteria for Behren's silverspot butterfly with a comparison from the 2015 status review with the current status. Downlisting criteria are not met.

Downlisting criteria	2015 Status	2025 Status
Three metapopulations* in Mendocino County and one metapopulation in Sonoma County have been established (discovered or reintroduced) at protected sites.	Not met	Partially met. One metapopulation persists in Mendocino County and one metapopulation persists in Sonoma County. Although both metapopulations exist on protected lands, some areas within the metapopulations may be on private lands that do not have any known conservation agreements.
All metapopulations are protected in perpetuity.	Not met	Partially met. Principal areas within metapopulations exist on federal and state-owned lands which are protected in perpetuity. Other metapopulations or subpopulations may exist on unprotected lands.
Adequate funding for management of all sites is assured and adaptive management plans have been developed and are being implemented.	Not met	Partially met. Currently, an estimated \$7.8 million is required to fully recover Behren’s silverspot butterfly populations. Thus far, the Behren’s silverspot conservation team has received piecemeal funding from multiple sources including \$150,000 from Disney Conservation Fund and a CA Wildlife Conservation Board Grant of \$1.8M in 2023. There has been no funding through appropriations or endowments to

Downlisting criteria	2015 Status	2025 Status
		ensure long term management or conservation.
Annual monitoring has shown that the range-wide population cumulatively supports a minimum of 4,000 adults for 10 consecutive years, with no individual protected metapopulation having fewer than 1,000 adults in any year. Each metapopulation needs to reflect a stable or increasing population trend over the 10-year period.	Not met	Not Met. Surveys are conducted almost each year, but these surveys do not reflect population estimates. The Service recommends initiation of a statistically rigorous population estimate once the index count reaches 100 individuals.

**Metapopulations are defined in the Recovery Plan as the major centers for historical populations, which can either be a single population or a group of subpopulations in an area that could individually be more vulnerable to random extinction than the range-wide population as a whole (Service 2015, p. 6). The metapopulation concept is discussed in Harrison et al. (1988) and Wells and Richmond (1995).*

Conclusion:

After reviewing the best available scientific information, we conclude that the Behren’s silverspot butterfly remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Endangered Species Act and analysis of the status of the species in our 2020 5-Year Review (Service 2020, 3pp.) remains an accurate reflection of the species’ current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

Here we propose conservation and research recommendations which will aid in the recovery and conservation of the Behren’s silverspot butterfly. Some of these recommendations have already been discussed in previous recovery documents (Service 2012, p. 19; Service 2020, pp. 2-3) and remain valid.

1. *Genetics.* Genetic analysis of the Behren’s silverspot butterfly could help determine the metapopulation structure and aide with efforts for reintroduction and augmentation efforts in the future. To date, no work on the genetics of Behren’s silverspot butterfly has been completed.
2. *Habitat Modeling.* By modeling habitat for the Behren’s silverspot butterfly, the Service and its partners will be able to identify and prioritize additional areas for surveys and potential augmentation locations. Additionally, habitat modeling can inform outreach targets and consultation needs.
3. *Expanding the Augmentation and Propagation Program.* Since the previous 5-Year Review, a propagation and augmentation program has been established at Sequoia Park Zoo. This program has been successful in preventing the extinction of the Behren’s silverspot butterfly, and expanding the program to other facilities would increase the success. Expanding the program would allow for more Behren’s silverspots to be

propagated and could allow for research opportunities, such as studying the viability and reproductive capacity of offspring.

4. *Behavioral Studies*. Conducting behavioral studies for Behren’s silverspot butterflies, such as temperature responses, habitat-specific behaviors, and flight behaviors, will provide insight on landscape-level recovery. Identifying how Behren’s silverspot butterflies react to varying environmental factors will help the Service and partners determine essential steps for future recovery actions.
5. *Additional Surveys*. A very low number of Behren’s silverspot butterflies are counted each year on public lands. Additional individuals may persist on private lands, which include agricultural and residential properties that support early blue violet. Contacting private landowners regarding the presence of Behren’s silverspots on their property will provide insight on where else the species persists and where conservation opportunities exist.
6. *Conservation Benefit Agreements*. Partnering with private landowners through Conservation Benefit Agreements will be a useful tool in Behren’s silverspot recovery by increasing habitat while providing regulatory assurances for landowners.

Field Supervisor, Arcata Fish and Wildlife Office

Approve _____ Date _____

REFERENCES:

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Wells, J.V., and M.E. Richmond. 1995. Populations, metapopulations, and species populations: what are they and who should care? Wild. Soc. Bul. 1995, 23(3):458-462. NY Cooperative Fish and Wildlife Research Unit, Cornell University, Ithaca, NY.