5-YEAR REVIEW
Alameda Whipsnake (*Masticophis lateralis euryxanthus*)

GENERAL INFORMATION

Species: Alameda whipsnake (*Masticophis lateralis euryxanthus*)
Date listed: December 5, 1997
Federal Register (FR) citation: 62 FR 64306 (Service 1997)
Classification: Threatened

State Listing:
The Alameda whipsnake was listed by the State of California as threatened in 1971.

BACKGROUND

Species overview:
The Alameda whipsnake is one of two subspecies of the California whipsnake (*Masticophis lateralis*). It is a slender, fast-moving, diurnal (i.e., primarily active during the day) snake with a broad head, large eyes, and slim neck, characteristics typical of snakes that prey on lizards. This subspecies is commonly associated with small to large patches of chaparral or coastal scrub vegetation, interspersed with other native vegetation types throughout Contra Costa County, most of Alameda County, and portions of northern Santa Clara and western San Joaquin counties in California. Chaparral and coastal scrub vegetation serve as the center of home ranges and provide for concealment from predators as well as foraging opportunities. However, there have been verified observations of Alameda whipsnakes up to 6.4 kilometers from coastal scrub and chaparral habitat.

Most recent status review:
[Service] U.S. Fish and Wildlife Service. 2020. Alameda Whipsnake (*Masticophis lateralis euryxanthus*). 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California. 17 pp.

We did not recommend a status change in the 2020 status 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 for 59 Pacific Southwest Species. Federal Register 89: 83510–83514.

We received information from the Center for Natural Lands Management regarding Alameda whipsnake monitoring and general recommendations at Ohlone West Conservation Bank in response to the notice (See **Recommendations for Future Actions**; D. L. Rogers, A. Richey, and M. Labbé, Center for Natural Lands Management, *in litt.* 2025).

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. We also contacted species experts, performed a literature search, reviewed information from our own files, including a review of Alameda whipsnake 10(a)(1)(A) recovery permit annual reports, and obtained data from an occurrence search of the California Natural Diversity Database maintained by the California Department of Fish and Wildlife (Department).

There are no new processed California Natural Diversity Database occurrences of the subspecies since the last 5-year review in 2020. However, survey reports from land managers provide a baseline for understanding the relative changes to the populations within the past five years, specifically after wildfire (addressed further in **Abundance** section below). Publications following the last 5-year review include analyses of age and growth models; chin spot patterns for identification; phenology; cases of entrapments occurring in or around urban development; and notes on arboreality and its implications for survey techniques. However, the information collected since the last 5-year review does not alter our understanding of the subspecies' current status.

Age-Growth Analyses
Howard et al. (2024, entire) conducted a five-year long mark-recapture study of the Los Vaqueros Reservoir watershed population of the Alameda whipsnake in Contra Costa County. The purpose of the study was to establish size-at-age relationships for the whipsnake, as well as age-specific growth rates and age of reproductive maturity. In the study, data collected from 2001–2005 was used to compare three predictive growth models to determine the best fit. Sampled Alameda whipsnakes were initially checked for sexual dimorphism through a comparison of snout-vent length (SVL) size from known-age individuals across sexes. Because size-frequency distribution and subsequent analyses demonstrated no differences between sexes, the data was aggregated for both male and females (Howard et al. 2024, pp. 305–306). Of the three growth models, the Gompertz model demonstrated the best fit for the data and was ultimately used to predict size and growth rates (Howard et al. 2024, pp. 305–307). The Gompertz model utilized known-age data to inform a growth curve that predicted size growth would be strongest at earlier ages, with the maximum growth rate occurring when individuals are still relatively small and the rate of growth declining over time (Howard et al. 2024, p. 307). The model was then extended to determine the age of unknown-age individuals from SVL size, estimating the age of the largest captured individual (960 millimeters (mm)) to be 8.3 years (Howard et al. 2024, pp. 307–308). Four other captured individuals shared similar sizes and were approximated to be between 6.8 and 7.5 years old, which aligns with previous understanding of the subspecies' biology (Service 2002, p. II-67). The authors note that free-ranging Alameda whipsnakes may therefore have a longevity between 6 and 8 years based on captive observations, similar species, and the model (Howard et al. 2024, p. 308). The study also observed six gravid females with the smallest individual, which was assumed to be reproducing for the first time, measuring a 720 mm SVL. Applying the Gompertz model to the smallest female, the approximate age at first reproduction was predicted to be 2.2 years.

Growth rates of the Alameda whipsnake were calculated using recaptured known-age and estimated-age individuals from the Gompertz model. Growth rates varied from 0.01 to 0.61 mm per day; growth rates were highest among younger individuals and gradually fell with age (Howard et al. 2024, pp. 307–308). Although most growth rate points aligned well with the predicted growth rate curve, there were four individuals with rates significantly higher than the curve. Furthermore, there were high levels of variation amongst young-of-year (< 400 mm SVL) and juveniles (400 to < 600 mm SVL), suggesting poorer model performance at predicting growth patterns at younger ages (Howard et al. 2024, p. 307). Despite this, the developed model can be used as a predictor of age and growth and can inform future studies on Alameda whipsnake populations.

Chin Spot Patterns
The identification of individual snakes has historically focused on marking techniques such as ventral scale clipping, scale branding, and inserting passive integrated transponder (PIT) tags. Chin spot pattern identification is effective for many snake species, and new evidence suggests that it may also provide reliable identification of individuals from both subspecies of whipsnakes in California. To better understand its effectiveness, Murphy and Alvarez (2023, entire) investigated the utility of chin spot pattern in differentiating individual Alameda whipsnakes using 64 captured Alameda whipsnakes from 2017–2022. Photographs of the ventral portion of the chin as well as the anterior portion of the head were taken for each capture and subsequently compared to all prior captures (Murphy and Alvarez 2023, p. 615).

One snake was first captured as a juvenile in 2020, then recaptured in 2022 as an adult (Murphy and Alvarez 2023, pp. 615–616). In the 23 months between captures, the individual grew 372 mm in length and gained 43 grams in weight (Murphy and Alvarez 2023, pp. 615–616). Despite an increase in the size of spots and darkening of spots over time, the pattern of chin spots remained identical, and the recaptured individual could be identified (Murphy and Alvarez 2023, p. 616). These findings suggest that taking photographs of the chin and anterior portions of the ventral surface may adequately identify individual Alameda whipsnakes and be a long-lasting and non-invasive alternative to other marking techniques.

Phenology
Alvarez et al. (2021a, entire) examined 610 records of Alameda whipsnake observations from 1953–2006 to understand annual activity patterns in relation to historical weather and temperature data. The findings of this study demonstrated a bimodal activity pattern with activity peaking in May with a total of 31.5 percent of observations occurring within the month, and a secondary peak in activity in September with a total of 6.4 percent of the observations (Alvarez et al. 2021a, p. 259). Despite most activity taking place in the warmer months between April and June, several Alameda whipsnakes were also active on days with daily high temperatures of 13.9 °C, which is lower than previously reported (Alvarez et al. 2021a, pp. 260–262). This suggests that Alameda whipsnake activity and presence above-ground can occur during winter months. The authors note that surface activity can therefore occur on days with daily high temperatures of 13.9 °C, which should be accounted for when performing vegetation management or ground-disturbing activities (Alvarez et al. 2021a, pp. 261–262). However, more data is necessary to predict the conditions that determine the phenology of whipsnake activity.

Distribution:
At the time of listing, the Alameda whipsnake was known to occupy the Inner Coast Ranges in western and central Contra Costa and Alameda counties (Service 1997, p. 64308). The known range was expanded to include small portions of northern Santa Clara and western San Joaquin counties at the time of the 2011 status review (Service 2011, p. 10). There are seven draft recovery units that reflect the broad geographic scope of the Alameda whipsnake, including five populations (Tilden-Briones, Oakland-Las Trampas, Hayward-Pleasanton Ridge, Mount Diablo-Black Hills, and Sunol-Cedar Mountain) and two corridors (Caldecott Tunnel Corridor and Niles Canyon/Sunol Corridor) that provide habitat linkages between the populations (Service 2002, pp. II-60–II-65). Altogether, these units represent a relatively contiguous mosaic of chaparral and coastal scrub, grassland, oak woodland/savanna, and riparian habitats that are fragmented by urban development, roads, and a lack of coastal scrub and chaparral vegetation. A genetic analysis by Richmond et al. (2016, p. 208) indicates that these populations are mostly isolated from each other and have limited admixture.

At the time of the 2020 5-year review, Alameda whipsnakes were found within Coyote Hills Regional Park, expanding the known range of the Alameda whipsnake to the west of Interstate 880 (Service 2020, p. 5). In addition, surveys prior to the 2020 5-year review at the John Muir National Historic Site (Tilden-Briones draft recovery unit) suggested that the Alameda whipsnake was using additional habitat types including remnant olive orchards surrounded by dense oak woodlands (Alvarez et al. 2021b, p. 10; Service 2020, pp. 3–4). Surveys that have been completed since the 2020 5-year review do not alter our understanding of the subspecies' distribution (Murphy 2020; Sprague and Seher 2020; Murphy 2021; Sprague and Seher 2021; Blank and Seher 2022; Blank and Seher 2023; Swaim et al. 2023; Blank and Seher 2024). However, several unprocessed California Natural Diversity Database records fall outside of the draft recovery units and therefore indicate the subspecies may occur across more habitats than previously assumed. Increased survey effort in atypical habitats may yield a more comprehensive understanding of the subspecies' range and distribution (see **Recommendations for Future Actions**).

Abundance:
Little population abundance data has been available for the Alameda whipsnake from the time of its listing to now. However, it was noted in the 2011 5-year review that Alameda whipsnakes have been observed to be locally abundant when the quality of habitat is high (Service 2011, p. 10). Almost all trapping studies targeting this subspecies have been designed to determine presence or absence for regulatory purposes and to assess impacts to potential habitat. Surveys have continued for the Alameda whipsnake across several different regions within the subspecies' range since the last 5-year review. Surveys of note include trapping at the Ohlone Fire Fuels Conservation Property and John Muir National Historic Site (see respective sections below). Additionally, survey efforts to investigate the effects of wildfires and measure post-fire abundance of the species have also been reported (see *Post-Fire Disturbance at Ohlone Regional Wilderness*), as well as occupancy analyses following fuel management treatment of vegetation (see *Fuel Treatment Surveys at Tilden Regional Park, Claremont Canyon Regional Preserve, and Sibley Volcanic Regional Preserve*). At the time of this 5-year review, we are not aware of any studies that have quantified Alameda whipsnake range wide abundance or population trends.

Ohlone Fire Fuels Conservation Property

In 2020, Murphy (2020, entire) conducted a live trapping survey at the Ohlone Fire Fuels Conservation Property within the Ohlone Regional Wilderness area in the Sunol-Cedar Mountain draft recovery unit. In late April twenty traps were deployed over 30 days for a total of 600 trap-days, and eight Alameda whipsnakes were captured (Murphy 2020, p. 6). This yields a capture rate of 0.013 Alameda whipsnakes per trap-day (Murphy 2020, p. 6). The survey effort was delayed, and the capture rate would likely have been higher if trapping began during the period of highest activity in April (Murphy 2020, p. 16). A total of 67 snakes of 10 different species were captured, and Alameda whipsnakes had the third-highest relative abundance estimate at 11.94 percent (Murphy 2020, p 15). The abundance of different age classes and sexes indicates that the site supports a breeding population of Alameda whipsnakes (Murphy 2020, p. 16).

John Muir National Historic Site

Annual herpetological surveys were continued from 2020 to 2024 at the John Muir National Historic Site within the Tilden-Briones draft recovery unit. Staff used visual surveys and drift fences with funnel traps to collect demographic, morphometric, and occurrence data to develop a long-term monitoring program for Alameda whipsnakes within the park. Surveys were conducted in the spring and fall to account for the subspecies' phenology (Alvarez et al. 2021a, pp. 260–262; Sprague and Seher 2021, p. 3). The site contains less than an acre of preferred coastal scrub habitat. Despite this, surveys have demonstrated that the subspecies frequently uses the site as well as adjacent atypical habitats (Sprague and Seher 2021, p. 5; Alvarez et al. 2021b, p. 10). However, there has been no evidence of dispersal between sites from recaptured data, most likely due to the density of ungrazed, non-native grasses between each site (H. Blank, National Park Service, *in litt.* 2025). Models using data from previous survey years estimate the Alameda whipsnake population at the site to be between 30–92 snakes, with 43 individuals being the mode (Sprague and Seher 2021, p. 5). Additional information is still needed to accurately assess the demographics, size, and movement of Alameda whipsnakes in the area.

Capture rates varied across each monitoring year with seven individuals captured in 2020, three in 2021, six in 2022, four in 2023, and nine in 2024 (Sprague and Seher 2020, p. 4; Sprague and Seher 2021, p. 4; Blank and Seher 2022, p. 5; Blank and Seher 2023, p. 5; Blank and Seher 2024, p. 4). Two individuals were recaptured in 2020 as well as one in 2024, making the total number of captures nine and ten for the respective years. Throughout all years, the majority of captured individuals were identified as males. Fall survey efforts were discontinued after the 2021 monitoring year due to increased risk of trapping-related mortalities and low capture rates. Additionally, in 2023, photographing chin spot patterns replaced previous methods of taking ventral scute clips to mark captured individuals. As discussed in *Chin Spot Patterns*, one individual captured in the 2024 season was identified through this methodology as a previously captured snake from 2023 (Blank and Seher 2024, p. 5). This recapture identification reinforces the use of chin spot patterns as a viable method of marking individuals, as described in Murphy and Alvarez (2023, entire).

Post-Fire Disturbance Surveys at Valpe Ridge

In 2021, the East Bay Regional Park District initiated a post-fire trapping survey in chapparal and scrub plant communities along Valpe Ridge in the Ohlone Regional Wilderness within the Sunol-Cedar Mountain draft recovery unit. The survey consisted of 45 trap-days across 20 trap units to investigate the effects of disturbance following the Santa Clara Unit Lightning Complex

Fire that occurred in 2020 (Murphy 2021, p. 5). The study replicated an Alameda whipsnake survey effort from 2019 and used the same trap-lines and control variables to isolate the effects of fire on surveyed populations and allow for a direct comparison between pre- and post-fire populations. All captured individuals were measured, sexed, and classified into age classes. All vertebrates were identified to the species level and recorded for the subsequent analysis.

A total of three Alameda whipsnakes were captured throughout the course of the post-fire survey in 2021, compared to the five individuals captured during the 2019 survey (Murphy 2021, p. 10). The individuals surveyed were all new captures and consisted of two juvenile females and one adult female. These captures were also noted to have occurred in a burned portion of the study area, although it is unknown whether these individuals were occupying the area at the time of the fire. The resulting capture rate of 0.003 individuals per trap-day is a decline from the rate of 0.006 in 2019 (Murphy 2021, p. 7). However, there was an increase in relative abundance of the Alameda whipsnake from 4 percent in 2019 to 7 percent in 2021 when compared with other snake species captured (Murphy 2021, pp. 11–12).

Increases in total numbers and relative abundance of preferred prey species for the Alameda whipsnake were observed in the post-fire surveys (Murphy 2021, pp. 13–18). The rise in deer mice (*Peromyscus* spp.), a preferred prey for the Alameda whipsnake, may be attributed to higher rates of deer mouse fecundity due to increases in foraging efficiency in open burned areas, reductions of parasite loads, or both (Zwolak 2008, p. 66; Vandegrift et al. 2008, p. 2255; Murphy 2021, p. 18). While the direct effects of wildfires are not well understood for the Alameda whipsnake, the promotion of prey species populations may support Alameda whipsnakes recovering from medium intensity disturbance (Murphy 2021, p. 18).

The results from the sites surveyed indicate that habitat suitability may not be greatly impacted by low to moderate intensity wildfire. However, abundance estimates for Alameda whipsnake may have been confounded by site-specific conditions due to differences in vegetative communities and their response to disturbance (Valler 2022, pp. 38–40). Additionally, at the time of the post-fire survey, Alameda County and the Greater Bay Area were experiencing an extreme drought (Murphy 2021, p. 19; Valler 2022, p. 39). The extent of the drought and its effects on vertebrate capture rates remain unclear and should be considered when drawing conclusions. While the degree to which these variables may confound the results is unknown, the available data suggests that the Alameda whipsnake may not be substantially impacted by moderate severity wildfires. However, more research is needed to determine the degree to which wildfires and other natural phenomena impact the subspecies.

The study also investigated the utility of camera trapping as a non-invasive method of sampling Alameda whipsnakes. Although camera trap capture rates were lower than standard live trapping methods, they were still able to detect the subspecies and monitor post-fire site-use (Valler 2022, pp. 50–52). These findings suggest that camera trapping may be used to detect Alameda whipsnake presence while also providing more details on activity as it relates to temporal and environmental factors. Furthermore, the non-invasive nature of camera trapping may aid in the reduction of disease transmission and should be considered as a potential alternative when appropriate.

Fuel Management Surveys at Tilden Regional Park, Claremont Canyon Regional Preserve, and Sibley Volcanic Regional Preserve

As a part of the East Bay Regional Parks District's (District) implementation of their Wildfire Hazard Reduction Resource Management Plan, the District carried out its third and final survey of Alameda whipsnake response to fuel reduction treatments in Tilden Regional Park (Tilden Briones draft recovery unit), Claremont Canyon Regional Preserve (Caldecott Tunnel draft recovery unit), and Sibley Volcanic Regional Preserve (Caldecott Tunnel draft recovery unit) in 2021. The purpose of the study was to 1) collect baseline data on Alameda whipsnake occupancy, abundance, and behavior pre-treatments and 2) measure any deviations from the baseline after treatments. However, due to unforeseen changes and other limitations in the study design, results were not fully conclusive but still provide insights on Alameda whipsnake habitat use and behavior. At the time of the last 5-year review, surveys in 2016 and 2019 indicated that fuel reduction treatment areas do not appear to deter Alameda whipsnakes from occupying the site and may potentially be attracting them (Service 2020, p. 5). Moreover, the total number of individuals across both survey periods had suggested that these treatment areas could be supporting a breeding population of Alameda whipsnakes.

During the 2021 survey period, a total of 26 individuals were captured (Swaim et al. 2023, p. 18). Alameda whipsnakes were only captured in portions of Tilden Regional Park and Claremont Canyon Regional Preserve, while no whipsnakes were found in Sibley Regional Volcanic Preserve. Alameda whipsnakes were only captured in relatively small parts of these areas, so it is assumed that the distribution of the population across the landscape is patchy. These patches may represent core habitat with areas outside of them supporting connectivity and genetic interchange between populations (Richmond et al. 2016, entire; Swaim et al. 2023, p. 27). Year-specific abundance models produced an estimated median abundance of 23, 32, and 28 Alameda whipsnakes in 2016, 2019, and 2021, respectively. However, these estimates only reflect the portion of the study area where individuals were captured and should be interpreted as an abundance for these sites rather than the entire study area.

Across all three survey years, dynamic occupancy models indicate that there was a relatively strong positive relationship between site treatment and occupancy probability (Swaim et al. 2023, p. 31). As an exception, Swaim et al. (2023, pp. 31–32) noted a drastic decrease in captures in a treated area at Vollmer Peak from 13 captures in 2016 to two captures in 2021. However, this is potentially influenced by how the peak is situated, which could intensify the effects of drought due to how much more exposed the area is than other sites. Removal of vegetation in more highly exposed areas may therefore contribute to reduced capture rates, but the role of treatment in this decline is largely unknown (Swaim et al. 2023, p. 32).

The authors note that the study design may have contributed to biased estimates, and caution against making general assumptions off the data alone (Swaim et al. 2023, p. 25–27). Site selection for the study was relatively uniform and based upon features favorable to Alameda whipsnakes, making it difficult to determine any habitat features that contribute to higher occupancy. Additionally, inconsistencies in treatment types as well as their application across all three study periods obscured the ability to understand the impact of vegetation treatments on Alameda whipsnakes. While the findings suggest that vegetation removal does not negatively affect Alameda whipsnake presence, further studies should be carried out to identify the extent to which vegetation management influences Alameda whipsnake behavior, survival, and population size.

Threats:
Threats described in the final listing rule include urban development and associated habitat fragmentation, predation from native and exotic animal species, and habitat alteration resulting from inappropriate grazing practices and fire suppression (Service 1997, pp. 64306–64320). The 2011 5-year review noted the same threats as the final listing rule, but also included water development projects, invasive vegetation, ecological succession, and climate change (Service 2011, pp. 4–9). The 2020 5-year review included two new threats of pesticides and snake fungal disease (Service 2021, p. 6). The threats noted in the final listing rule, previous 5-year reviews, and the draft recovery plan continue to act on the species. Recent information concerning the prevalence of snake fungal disease has demonstrated a greater need to better understand the mitigate its potential impact on the Alameda whipsnake (see *Snake Fungal Disease* below). Additionally, new information regarding entrapments has become available (see *Entrapment* below), but the threat is minimal in scope.

Snake Fungal Disease

Although the threat of snake fungal disease was reported in the last 5-year review, emerging evidence as a part of the Department's disease surveillance efforts suggests that the disease is more widespread in California than previously assumed and there are several occurrences of the disease in other snake species that share habitat with the subspecies (Elander et al. 2023, p. 12; Department 2023, entire; Patterson, *in litt*. 2025). While there have been no recorded incidents of snake fungal disease in Alameda whipsnake populations, precautionary measures should be implemented when studying or handling the subspecies to reduce the risk of disease transmission.

Entrapment
Anthropogenic structures and materials can pose potential risks to snakes and amphibians, especially when not routinely maintained. Jansen and Alvarez (2023, entire) describe incidents where such structures entrap the whipsnake without the ability to self-extricate. An unmaintained settling well was found to have four trapped whipsnakes, one of which was deceased (Jansen and Alvarez 2023, p. 700). Other similar structures with steep walls and depth may be a source of mortality for the snake.

Recovery criteria:
A draft recovery plan for the Alameda whipsnake was issued in November 2002 (Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California; Service 2002); however, it was not finalized.

Conclusion:
After reviewing the best available scientific information, we conclude that the Alameda whipsnake remains a threatened 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 species in our 2020 5-year review remains an accurate reflection of the subspecies' current status.

RECOMMENDATIONS FOR FUTURE ACTIONS

Here we propose several habitat conservation and ecological research recommendations which will aid in the recovery and conservation of the Alameda whipsnake. Some of these recommendations have already been discussed in previous recovery documents (Service 2002, entire; Service 2011, p. 24; Service 2020, p. 9) and remain valid.

1. *Snake Fungal Disease Monitoring* – Recent reports indicate detection of *Ophidiomyces ophidiicola*, the fungal pathogen that causes snake fungal disease, near Alameda whipsnake habitat. Additional surveys should continue to monitor for signs of disease across populations. Precautions should be implemented when handling the snake to prevent transmission of the disease.

2. *Vegetation Management* – The presence of certain types of vegetation can benefit or hinder Alameda whipsnakes and is generally important for movement and supporting prey populations. Control of non-native and invasive vegetation such as Tasmanian blue gum (*Eucalyptus globules*), Monterey pine (*Pinus radiata*), Monterey cypress (*Cupressus macrocarpa*), French broom (*Genista monspessulana*), and others should be implemented. Additionally, the enhancement and protection of core habitat (chaparral and scrub communities) as well as mixed oak woodlands, grasslands, and edge habitats in proximity to scrub can help support Alameda whipsnake populations. Future studies should continue to investigate the role of vegetation treatments on Alameda whipsnake distribution, abundance, and behavior (Rogers et al., *in litt*. 2025).

3. *Conduct a Species Status Assessment* – The Service should conduct a Species Status Assessment (SSA) to inform recovery planning for the subspecies. Development of the Species Status Assessment should involve reviewing the draft recovery units to ensure that they accurately reflect the current understanding of the subspecies' distribution.

4. *Climate-level Impacts* – The impacts of more severe climatic and weather events are not well understood for the Alameda whipsnake. Research should continue to investigate the subspecies' response and tolerance to stochastic natural events such as floods, wildfires, and droughts.

5. *Surveying Techniques* – Recent observations have suggested Alameda whipsnakes are more arboreal than previously assumed and have detected them within a variety of atypical habitats. Survey protocols should be developed to account for these arboreal behaviors while also making considerations for vegetation structure as well as type. Additional work should focus on developing protocols and evaluating the effectiveness of new survey techniques such as camera trapping and identification of individuals using chin spot patterns.

Acting Field Supervisor, Sacramento Fish and Wildlife Office

Approve AMBER AGUILERA Digitally signed by AMBER AGUILERA Date: 2025.09.26 10:20:26 -07'00' ____________________ **Date** _________

LITERATURE CITED

Alvarez JA, Davidson KA, Villalba F, Walker D, Sprague AV. 2021b. Atypical habitat use by the threatened Alameda whipsnake in the eastern Bay Area of California. Western Wildlife. 8: 8–12.

Alvarez JA, Jansen DS, Shaffer C, Didonato J. 2021a. Observations on the phenology of the threatened Alameda whipsnake. California Fish and Wildlife Journal. Special CESA Issue. 258–263.

Alvarez JA, Murphy AC. 2022. Arboreality in the California Whipsnake (*Masticophis lateralis*): Implications for Survey Techniques, Bulletin, Southern California Academy of Sciences. June 21, 2022. 121(1): 34–40,

Blank H, Seher V. 2022. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. December 2022.

Blank H, Seher V. 2023. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. October 2023.

Blank H, Seher V. 2024. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. October 2024.

[Department] California Department of Fish and Wildlife. 2023. CDFW Research Confirms New Detections of Snake Fungal Disease. July 6, 2023. Available online at: https://wildlife.ca.gov/News/Archive/new-detections-of-snake-fungal-disease. Accessed August 15, 2025

Elander R, Patterson L, Clifford D. 2023. Annual Performance Report: Detection of Ophidiomyces Ophidiicola and Snake Fungal Disease in California. California Department of Fish and Wildlife. 16 pp.

Howard JS, Britt E, Swaim K. 2024. An Analysis of Age and Growth Models Examining Size-At-Age Data for the Alameda Whipsnakes (*Masticophis lateralis euryxanthus*), Journal of Herpetology. 58(3): 304–312.

Jansen DS, Alvarez JA. 2023. *Masticophis lateralis euryxanthus* (Alameda whipsnake) Entrapment. Herpetological Review. 53: 699–700.

Swaim K, McGinnis SM. 1992. Habitat associations of the Alameda whipsnake. Transactions of the Western Section of the Wildlife Society. 28: 107–111.

Murphy AC. 2020. Report: Results of a 30-Day Trapping Survey for the Alameda Whipsnake (*Masticophis lateralis euryxanthus*) at Ohlone Fire Fuels Conservation Property East Bay

Regional Park District Alameda County, California. Prepared for East Bay Regional Park District. July 2020.

Murphy AC. 2021. Report: Results of a 45-Day Post-fire Trapping Survey for the Alameda Whipsnake (*Masticophis lateralis euryxanthus*) at Valpe Ridge, Ohlone Regional Wilderness East Bay Regional Park District Alameda County, California. Prepared for East Bay Regional Park District. November 2021.

Murphy AC, Alvarez JA. 2023. Using chin spot patterns to differentiate individual *Masticophis lateralis* (Hallowell, 1853) on the Pacific Coast of the United States. Herpetology Notes. 16: 615–618.

Richmond JQ, Wood DA, Swaim KE, Fisher RN, Vandergast AG. 2016. Historical Habitat Barriers Prevent Ring-like Genetic Continuity Throughout the Distribution of Threatened Alameda Striped Racers (*Coluber lateralis euryxanthus*). Herpetologica. 72(3): 202–213.

Sprague AV, Seher V. 2020. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. December 2020.

Sprague AV, Seher V. 2021. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. December 2021.

Stoelting R, Swaim K, Swaim C. 2019. Draft Year “2” (2019) Report: Assessing the response of the Alameda whipsnake, *Masticophis lateralis euryxanthus*, to fuels management and habitat variation within East Bay Regional Park District. USFWS Service Ref. No. 2016-TA-1089. Prepared for: East Bay Regional Park District. December 4, 2019.

Swaim K, Howard J, Britt E, Swaim C. 2023. Assessing the response of the Alameda whipsnake, Masticophis lateralis euryxanthus, to fuels management and habitat variation within East Bay Regional Park District from 2016 to 2021. Final Report, Prepared for DA Bell, East Bay Regional Park District, Oakland, CA.

[Service] U.S. Fish and Wildlife Service. 1997. Determination of Endangered Status for the Callippe Silverspot Butterfly of Behren's Silverspot Butterfly and Threatened Status for the Alameda Whipsnake. Federal Register 62: 49398–49397.

[Service] U.S. Fish and Wildlife Service. 2002. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California. Region 1, Portland, OR. xvi + 306 pp.

[Service] U.S. Fish and Wildlife Service. 2011. Alameda Whipsnake 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Office, Sacramento, California. September 28, 2011. 34 pp.

[Service] U.S. Fish and Wildlife Service. 2020. Alameda Whipsnake 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Office, Sacramento, California. July 8, 2020. 17 pp.

Sprague AV, Seher V. 2020. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. December 2020.

Sprague AV, Seher V. 2021. Report: Demographic Survey of the Alameda whipsnake (*Masticophis lateralis euryxanthus*) on Mt. Wanda at John Muir National Historic Site. Prepared for National Park Service. December 2021.

Stoelting R, Swaim K, Swaim C. 2019. Draft Year "2" (2019) Report: Assessing the response of the Alameda whipsnake, *Masticophis lateralis euryxanthus*, to fuels management and habitat variation within East Bay Regional Park District. USFWS Service Ref. No. 2016-TA-1089. Prepared for: East Bay Regional Park District. December 4, 2019.

Valler JB. 2022. The Response of Reptiles to a Fire in Northern California, with a Focus on Alameda Whipsnake. Unpublished master's thesis. University of San Francisco. 83 pp.

Vandegrift KJ, Raffel TR, Hudson PJ. 2008. Parasites prevent summer breeding in white-footed mice, *Peromyscus leucopus*. Ecology. 89(8): 2251–2258.

Zwolak RP. 2008. Causes and consequences of the postfire increase in deer mouse (*Peromyscus maniculatus*) abundance. Doctoral dissertation. University of Montana, Missoula, Montana. 123 pp.

In litteris

Blank H. National Park Service. 2025. Electronic mail to Nathan Ling, U.S. Fish and Wildlife Service, Sacramento, California, dated September 15, 2025. Subject: Alameda whipsnake 5-Year Review.

Patterson L. California Department of Fish and Wildlife. 2025. Electronic mail to Nathan Ling, U.S. Fish and Wildlife Service, Sacramento, California, dated September 2, 2025. Subject: Alameda whipsnake 5-Year Review: Snake Fungal Disease.

Rogers DL, Richey A, Labbé M. Center for Natural Lands Management. 2025. Electronic mail to Amber Aguilera, U.S. Fish and Wildlife Service, Sacramento, California, dated January 30, 2025. Subject: Comments on 5-year Status Review of *Masticophis lateralis euryxanthus* - FWS–R8–ES–2024–N041.