

**MARSH SANDWORT**  
*(Arenaria paludicola)*

**5-Year Review: Evaluation and Summary**



Wayne Chapman, Cheadle Center for Biodiversity and Ecological Restoration 2022

**U.S. Fish and Wildlife Service**  
**Ventura Fish and Wildlife Office**  
**Ventura, California**

**August 2025**

## 5-YEAR REVIEW

### Marsh Sandwort (*Arenaria paludicola*)

#### GENERAL INFORMATION

**Species:** marsh sandwort (*Arenaria paludicola*)

**Date listed:** August 3, 1993

**FR citation(s):** 58 Federal Register (FR) 41378–41384

**Classification:** Endangered

#### **Critical Habitat Designation:**

We have not designated marsh sandwort critical habitat.

#### **State Listing:**

The state of California listed marsh sandwort as endangered under the California Endangered Species Act in 1990 (California Natural Diversity Database [CNDDDB] 2025a, p. 2).

#### **Recovery Plan:**

[Service] U.S. Fish and Wildlife Service. 1998. Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*). U.S. Fish and Wildlife Service. Portland, Oregon. 63 pp.

[Service] U.S. Fish and Wildlife Service. 2019. Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*). Amendment 1. U.S. Fish and Wildlife Service. Ventura, California. 13 pp.

#### BACKGROUND

##### **Species Overview:**

Marsh sandwort is a perennial herb in the Caryophyllaceae family. It can grow up to 100 centimeters (39 inches) tall. The stems are relatively slender. They may be erect or are often clambering and supported by other surrounding vegetation. The leaves are linear with acute tips. Marsh sandwort inflorescences are often solitary and terminal, but may also be axillary, and occur on short pedicels (stalks of individual flowers within an inflorescence). The flowers are radially symmetric. They have five distinct sepals<sup>1</sup> and between zero and five white petals. They are bisexual with 10 stamens, superior ovaries, and three stigmas. Marsh sandwort flowers typically bloom May through August, but the blooming period can extend depending on seasonal variability. It has dehiscent (a fruit that naturally splits open when ripe), capsule fruits, which have 15 to 20 reniform/kidney-shaped seeds (Keil 2022, pp. 398–399; Hartman [deceased] and Rabeler, 2012, website).

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<sup>1</sup> Sepals are the outer-most whorl of the perianth in a perfect, complete flower, which is the most common form and contains moving from the outside towards the center; sepals, petals, male reproductive parts (stamens), and female reproductive parts (pistils),

The species is associated with coastal, freshwater marshes and swamps. It requires mesic, slow-moving wetlands and other boggy habitats (Keil 2022, pp. 398–399; Hartman [deceased] and Rabeler, 2012, website). Most known occupied areas have perennial hydrology or at least remain saturated throughout most of the year. In these habitats, marsh sandwort typically occurs where a peat-like substrate has formed, and it frequently grows on clumps and other floating mats of fibrous and non-woody, hydrophytic vegetation. Succession and encroachment of woody, riparian species make habitats less suitable for marsh sandwort and may result in extirpation. Accumulation of woody vegetation, and even excessive cattail (*Typha latifolia*) and bulrush species (such as *Scirpus microcarpus*; *Schoenoplectus californicus*), can change the local hydrology in ways that are not conducive to persistence of marsh sandwort. The species often occurs at the base of vegetative clumps and on floating mats. It will sprawl and clamber over other hydrophytes in these settings for structural support (U.S. Army Corps of Engineers 2022, p. 7). In particular, sedges (*Carex cusickii*; *C. obnupta*) tend to form tussocks or hummocks that extend up out of open water during the driest months of the year, creating a platform where drift, sediment, and other debris accumulate, which seems to be ideal for marsh sandwort seed germination and establishment. However, marsh sandwort can also occur in clumps and be free-standing, if the hydrology is suitable.

The species was historically widespread, with an intermittent distribution that extended from the coast of Washington and south into central Mexico. Now marsh sandwort occurs in one naturally-occurring location and several other outplanted locations within western San Luis Obispo County and southern Marin County, California (Service 2020, pp. 2–3).

We presume that marsh sandwort reproduces both sexually and asexually. Propagated plants in a greenhouse setting successfully produced viable seed (Chapman and Stratton 2023, pp. 6–7, 11). However, we do not know about potential pollinators or if the seed was produced via outcrossing or by selfing. Other annual members of the genus are capable of autonomous self-pollination and outcrossing (Fishman and Wyatt 1999, p. 1724). Marsh sandwort roots readily propagate at the nodes, and this is the primary mechanism for asexual reproduction in the species. If sections break off during high-flow events, these pieces can root easily where deposited and several of our partners have been successfully propagating marsh sandwort clones from cultivated cuttings for many years. Many wetland-adapted (hydrophytic or aquatic) plant species persist in the soil as a seedbank (DeBerry and Perry 2000, p. 4). We do not have any information about marsh sandwort seed viability or if it persists as a sandbank. Seed dispersal is likely by water.

**Most Recent Status Review:**

[Service] U.S. Fish and Wildlife Service. 2020. Marsh sandwort (*Arenaria paludicola*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura, California. 13 pp.

We recommended no status change for marsh sandwort 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. 89 FR 83510–83514.

## ASSESSMENT

### **Information Acquired Since the Last Status Review:**

The Service's Ventura Fish and Wildlife Office (VFWO) conducted this 5-year review. We announced the review through a FR notice on October 16, 2024 (Service 2024; 89 FR 83510–83514). We did not receive any information from the public in response to our FR notice. We also conducted a literature search and review of information in our files, and contacted other agencies, species experts, and stakeholders to request any data or additional information we should consider in our review. We have new data on the species' historical and current distribution and range, and conservation seed banking efforts. We provide these updates below.

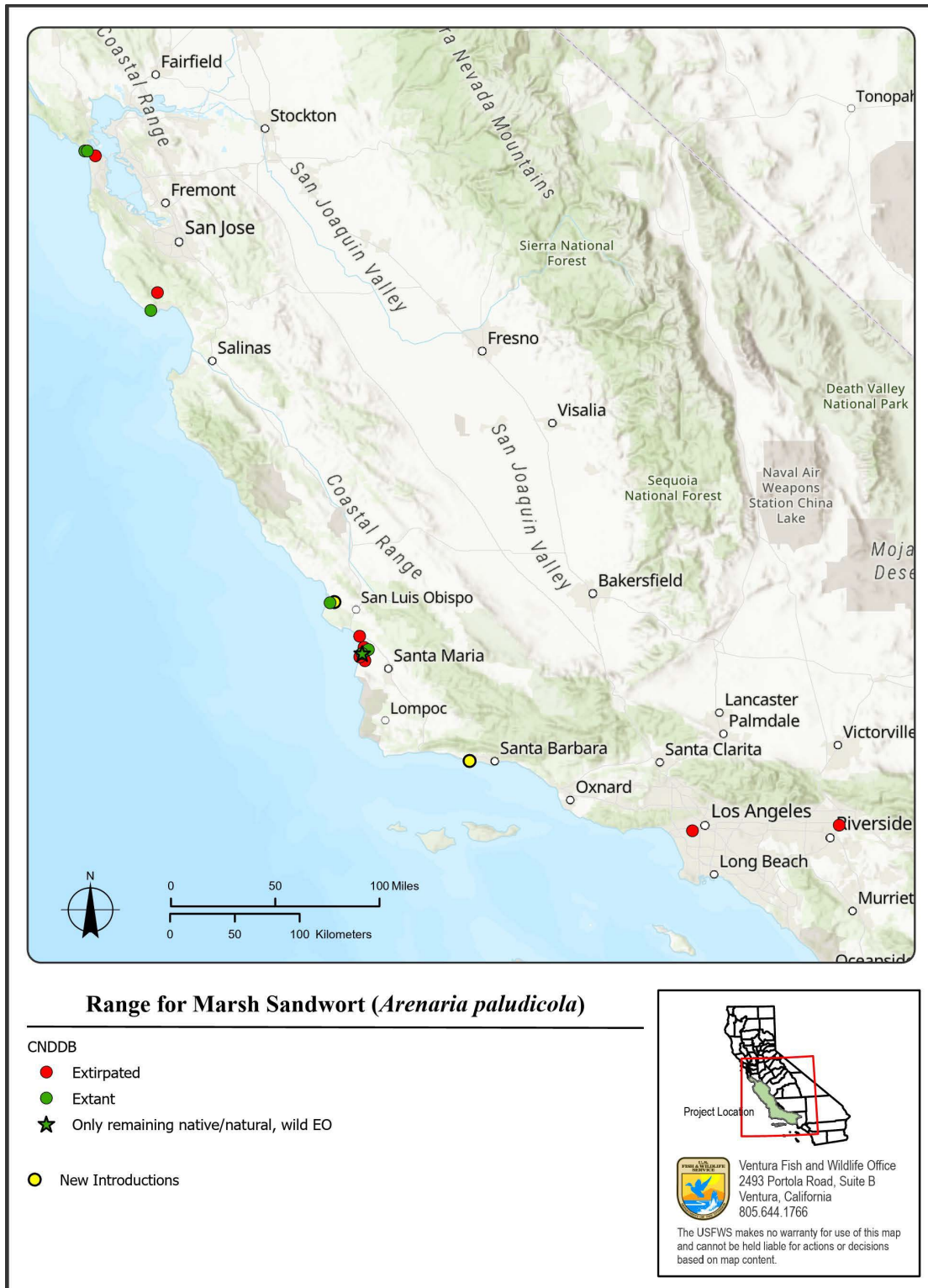
### **Distribution and Range:**

Marsh sandwort was historically known from occurrences found in Los Angeles, Riverside, San Bernardino, San Francisco, San Luis Obispo, and Santa Cruz counties in California, as well as Mexico and Pierce County, Washington (Service 2008, p. 5–6). At the time of listing, only one extant population was known within Black Lake Canyon, in southwestern San Luis Obispo County (Service 1993, p. 41378).

For this review we have new information about the species historical range and distribution, as well as updated information about the current range. First, we compiled all available occurrence data for marsh sandwort to visualize the species historical and current range and distribution in California. These data include California Natural Diversity Database (CNDDDB) Element Occurrences (EOs), geo-referenceable herbarium specimens from the Consortium of California Herbaria (CCH2), and additional, newly outplanted locations that we refer to here as “new introductions” (Appendix A). We included geo-referenceable herbarium specimens from CCH2 in the 2020 5-year review and in this review for completeness, and to help characterize the historical and current distribution and range of the species. CCH2 point locations represent a single snapshot in time on the collection date. Therefore, we do not know the current status of most of the CCH2 specimens (meaning if the species is still present at the location or if the habitat is still suitable). Further, several CCH2 locations overlap with one another because botanists made multiple collections at the same site, and these locations may also overlay with EOs when mapped.

In 2020, we knew of 16 CNDDDB EOs, 34 CCH2 specimen records, and two other locations of the species. Of these, only two of the EOs were extant and the two other known locations persisted (Service 2020, pp. 2–3). These included EO number 9 (Oso Flaco Lake in San Luis Obispo County), which is the only remaining native/natural, wild occurrence of the species, EO number 14 (Sweet Springs Nature Preserve in San Luis Obispo County), and the two other locations that comprise the Golden Gate National Recreation Area (GGNRA) population in Marin County (now EO 21 and 22).

We now know of 19 CNDDDB EOs and three new marsh sandwort introduction sites, all depicted in Figure 1 (CNDDDB 2025b, website; Land Conservancy of San Luis Obispo County [LCSLO] 2024, p. 4; LCSLO 2021, pers comm; Coastal San Luis Resource Conservation District [RCD] 2024, p. 2; Service 2025, pers comm).



**Figure 1.** Geographic range of marsh sandwort, California. Mapping based on all available data from the CNDDB and other partners and includes new introduction sites (CNDDB 2025b, website; LCSLO 2024, p. 4; LCSLO 2021, pers comm; RCD 2024, p. 2; Service 2025, pers comm).

Since our 2020 5-year review, CDFW combined EOs 10, 11, and 13 into EO 5. They also added EOs 17–22. EOs 17 and 18 were older, failed outplanting attempts we conducted within the Guadalupe Nipomo Dunes National Wildlife Refuge in San Luis Obispo County for recovery. EOs 19–20 are failed outplanting attempts we conducted with partners at the GGNRA in San Francisco County for recovery at the Presidio National Park. Lastly, EOs 21–22 are persisting outplanting projects we conducted with partners at the GGNRA in Marin County for recovery (CNDDDB 2025b, website); we referenced these in the 2020 5-year review as “other” locations. Since our 2020 5-year review, CCH2 incorporated six new specimen record locations into their database (CCH2 2025, website). In addition, there are also three new introduction sites where we established marsh sandwort at in 2022 and 2025, since our last status review completed in 2020. We provide additional information about the extant EOs and all other, persistent locations below.

To further characterize the current marsh sandwort range, we provide information on the status of the extant EOs, as well as the three new introduction sites that do not yet have EO numbers assigned to them. We completed surveys with partners within the areas mapped for EO 5 in 2020 and we did not observe any marsh sandwort except in one of the previously mapped polygons. We found only three frail stems in poor condition and have not been able to return to this location to verify the status. However, we presume EO 5 is still extant but need to return to the site to confirm the status of this location. EO 9 is located along the northeastern shores of Oso Flaco Lake, on Oceano Dunes State Vehicular Recreation Area (ODSVRA). ODSVRA staff monitor this population regularly and confirmed that the species is still present in two previously mapped polygons (ODSVRA 2025, pers comm). We established EO 14 with partners at the Morro Coast Audubon Society’s Sweet Springs Nature Preserve in 2003. The site is located in Los Osos, on the southeastern end of Morro Bay. Sweet Springs Nature Preserve staff regularly monitor the population and last observed approximately four separate colonies in 2025 (Sweet Springs Nature Preserve 2025, pers comm). We also established EO 16 with partners at Wilder Ranch State Park located slightly inland from the coast in Santa Cruz County in 2010. We reached out to Parks staff, and they were unable to confirm the status of the population and did not know if the plants persist at this location (California State Parks, Santa Cruz District 2025, pers comm). Therefore, this site needs fieldwork to determine the current status but we presume it is still extant. EOs 21 and 22 are also re-introduction efforts with partners at the GGNRA in Marin County in 2011. This population has persisted, and we augmented some of the different locations with additional plants in 2020. As of 2024, these sites continue to persist and GGNRA staff observed natural recruitment of marsh sandwort into a novel area that was not previously outplanted (Chassé et al. 2024, p. 14).

In addition, there are three new marsh sandwort introduction sites (“new introduction” locations on Figure 1). We discuss these new occurrences from north to south. First, we established a new population of marsh sandwort at the RCD, Los Osos Creek Wetland Restoration Site in 2022. This site is located east and inland from the Sweet Springs Nature Preserve (EO 14) in San Luis Obispo County. We worked collaboratively with our partners to obtain funding for implementation of this restoration project through the National Coastal Wetlands Conservation (NCWC) Program. We outplanted 40 cultivated plants at several locations onsite for the project. By winter of 2024, seven plants survived (RCD 2024, pp. 1–3). We completed a second supplemental planting effort at the site in early 2025. This time we installed 54 marsh sandwort plants (Service 2025, pers comm). We do not yet know how many of these plants survived and

will continue to monitor them. Second, we established a new population of marsh sandwort at the Black Lake Ecological Area, which is owned and managed by LCSLO for conservation in southern San Luis Obispo County in 2025. Implementation of this project was also funded in partner collaboration through a NCWC grant award. We installed 350 cultivated plants at this site in winter of 2024 for the project (LCSLO 2024, pers comm). We do not yet know how many of these plants survived and will continue to monitor them. The third new population of marsh sandwort we established is located within the North Campus Open Space Restoration Site on the University of California, Santa Barbara campus in Santa Barbara County. We worked collaboratively with our partners from the Cheadle Center for Biodiversity and Ecological Restoration (CCBER) to implement the project with funding through the Service's Coastal Program. We installed 20 marsh sandwort plants at the site in early spring 2025 (Service 2025, pers comm). We do not yet know how many of these plants survived and will continue to monitor them. CCBER propagated all the plants for these three new introduction projects in their greenhouse facilities. We obtained the stock for their propagation program from greenhouse-maintained lineages kept at the University of California, Santa Cruz Biology Department. We presume that these greenhouse lineages originated from collections made in Black Lake Canyon in 1995 and possibly from Oso Flaco Lake in 2006 (Service 2020, pers comm; Wilken 2019, pers comm).

We are working with most of our partners who own and manage the existing marsh sandwort populations to ensure that annual monitoring occurs, and we are trying to establish monitoring programs where no monitoring is being conducted. More robust monitoring data is needed to inform and achieve recovery of the species. However, many of the sites are challenging to access and it is difficult to determine how many individual plants are present because of the species' clonal growth habit. Therefore, we are currently unable to assess population trends.

In summary, we currently presume that there are eight extant populations, comprised of six extant marsh sandwort EOs, including numbers 5, 9, 14, 16, 21, and 22 (21 and 22 are considered one population), and three new introduction sites. All of these locations are illustrated in Figure 1, which depicts the species current geographic range.

### **Conservation Seed Banking:**

The California Plant Rescue (CaPR) conservation seed banking database includes 13 marsh sandwort accessions to date. However, all but one of these accessions were lost in the Jesusita Fire that occurred in 2009. The lone, remaining accession is stored at the Santa Barbara Botanic Garden (SBBG). We do not know where the seeds in this accession originated, and they were collected from cultivated lineages, meaning that they have unknown, ex-situ origins (CaPR 2025, website). We do not know how long marsh sandwort seeds remain viable.

In addition, CCBER began establishing a marsh sandwort conservation seed bank from their nursery stock as part of their propagation program in 2021 (CCBER 2025, pers comm). These seeds are not yet formally curated for long-term storage and may be deposited in a Center for Plant Conservation certified affiliate institution in the future.

**Threats:**

When we listed marsh sandwort in 1993, we stated that hydrological alterations, competition from encroaching eucalyptus (*Eucalyptus globulus*) trees, urban development, and stochastic extinction due to the small number of populations that remained were the primary threats to the species (Service 1993; 65 FR 41379). We added habitat degradation and destruction, increased soil erosion, and other biological factors (such as lack of reproductive vigor, pollinator deficiency, inbreeding, and lack of genetic diversity) to the list of primary threats in the Recovery Plan (Service 1998, pp. 18–21). We reiterated these same threats in our 2008 marsh sandwort status review and added conversion of marsh habitat due to excessive vegetative growth caused by bio-stimulation and eutrophication to the list of primary threats. Here we also noted that the species' threats act in a synergistic and cumulative manner, thus increasing the overall risk of extinction (Service 2008, pp. 10–13). In our 2020 status review we added impacts from climate change as a threat, including changes associated with increased temperature, sea level rise, drought, precipitation, and wildfire risk. The threat analysis in the 2020 5-year remains current (Service 2020, p. 7).

**Evaluation of Recovery Criteria:**

We developed the following downlisting criteria for marsh sandwort in the 1998 Recovery Plan (Service 1998, pp. 30–31):

- 1) New plants are established so that there are at least five populations of at least 500 individuals.
- 2) Some of these populations occur in permanently protected habitats in Black Lake Canyon and the Dune Lakes area.
- 3) Some of the populations must be in other areas of suitable habitat within the species' historical ranges in the United States.
- 4) The populations remain viable for at least five years.

We have not yet achieved any of the established marsh sandwort downlisting criteria. To date we presume that there are eight extant populations. These include, from north to south: 1. the Rodeo Lagoon and Miwok Trail locations, both at GGNRA in Marin County<sup>2</sup>, 2. the Wilder Ranch State Park site in Santa Cruz County, 3. the newly outplanted RCD, Los Osos Creek Wetland Restoration site in San Luis Obispo County, 4. the Sweet Springs Nature Preserve site in San Luis Obispo County, 5. the newly outplanted LCSLO, Black Lake Ecological Area site in San Luis Obispo County, 6. the Black Lake Canyon site in San Luis Obispo County, 7. the Oso Flaco Lake at ODSVRA in San Luis Obispo County, and 8. the newly outplanted CCBER, North Campus Open Space Restoration site in Santa Barbara County. However, we need to confirm the extant status of the Wilder Ranch State Park site in Santa Cruz County and the Black Lake Canyon site in San Luis Obispo County because these populations could have become extirpated. The three confirmed, extant marsh sandwort populations (Sweet Springs Nature Preserve, Oso Flaco Lake, and GGNRA), have persisted for more than five consecutive years, which indicates that they are likely viable and self-sustaining per the recovery criterion We do not yet know if

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<sup>2</sup> This population is comprised of two EOs.

the other populations will persist and become self-sustaining, which is required for at least five years. It is unlikely that any of the other, remaining populations support 500 or more total individuals because of the estimated small amount of area each population occupies. None of the populations occur within Black Lake Canyon or Dune Lakes. All of the populations occur within the species historical range.

We did not evaluate the delisting criteria for marsh sandwort because the downlisting criteria have not yet been satisfied.

**Summary:**

Marsh sandwort is historically known from 19 EOs (CNDDDB 2025b, website), and 40 geo-referenceable herbarium specimens from CCH2 (CCH2 2025, website). Currently, we presume that there are eight extant populations, comprised of six extant or presumed extant EOs and three new introduction sites where we worked with partners to outplant the species to establish new populations for recovery. All of the previously identified threats continue to act negatively on the species and its habitat including loss and degradation of habitat from development and urbanization, hydrologic changes and conversion of marsh and bog habitats caused by bio-stimulation, eutrophication, and resultant excessive growth of woody, riparian vegetation, competition and encroachment of nonnative, invasive weeds, stochastic loss due to small population size and isolation of extant populations, and climate change.

**Conclusion:**

After reviewing the best available scientific information, evaluating threats affecting the species, and analyzing its recovery criteria, we conclude that marsh sandwort remains an endangered species and recommend no change in status at this time.

**RECOMMENDATIONS FOR FUTURE ACTIONS**

1. Conduct comprehensive annual monitoring of occupied area and abundance. During surveys assess the overall status and conditions of the populations and their habitat and evaluate current threats at each occupied location. Include estimates of the total number of marsh sandwort individuals present, using uniform methodologies suitable for trend analyses, and map the approximate total occupied area. Collect other pertinent ecological and demographic data including co-occurring and co-dominant species, hydrologic regimes, presence and abundance of nonnative, invasive species and competitors, and timing of phenology, and record observations of any potential insect pollinators, disturbance, and herbivory.
2. Conduct experimental research to determine the most effective management techniques for occupied marsh sandwort sites to ensure persistence and expansion of the species. We recommend evaluating manual vegetation and sediment removal practices, and other disturbance techniques designed to manage nonnative, invasive weeds and other overgrown hydrophytic and other woody riparian vegetation. Explore methods intended to maintain open water habitats and maximize hydrology to optimal hydrologic regimes.

3. Obtain conservation easements or acquire other sites within the species historical range to introduce the species to new locations or repatriate it at extirpated sites. Include long-term management strategies to ensure success and persistence of the species. In particular, focus on establishing populations, instituting easements, and purchasing properties for conservation within Black Lake Canyon and at Dune Lakes within San Luis Obispo County pursuant to downlisting criterion 2 (Service 1998, p. 30).
4. Continue making conservation seedbank accessions of marsh sandwort seed when available for banking, with the goal of every three to five years, and prioritize EO 9, which is the only remaining native/natural, wild occurrence of the species. Conduct seed bulking activities to ensure an ample supply of seed for recovery efforts and for insurance in the event of stochastic loss or extirpation.

**APPROVAL**

**Lead Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service**

Approved \_\_\_\_\_

## LITERATURE CITED

- [CNDDDB] California Natural Diversity Database. 2025a. State and federally listed endangered, threatened, and rare plants of California. State of California, Natural Resource Agency, Department of Fish and Wildlife, Biogeographic Data Branch. Sacramento, California.
- [CNDDDB] California Natural Diversity Database. 2025b. Version 6.25.0416. California Department of Fish and Wildlife, Government Version. Biogeographic Information and Observation System Viewer. Available online at: <https://apps.wildlife.ca.gov/bios6/>.
- California Rare Plant Rescue [CaPR]. 2025. Conservation Collections database. Available online at: <https://www.caplantrescue.org/401/login.php?redirect=/old---collections-database.html>.
- Chapman, W. and L. Stratton. 2023. Marsh sandwort (*Arenaria paludicola*) propagation, maintenance, and research. Cheadle Center Nursery. Unpublished technical report for U.S. Fish and Wildlife Service. F20AC10730-00.
- Chassé, M.R., A. Wu, K. Jones, E. Wrubel, and E. Grijalva. 2024. Threatened and endangered vascular plant species activities within the Golden Gate National Recreation Area. Unpublished technical report for U.S. Fish and Wildlife Service. TE-036499-9.
- Coastal San Luis Obispo County Resource Conservation District [RCD] 2024. Los Osos Creek Wetland Restoration Project: marsh sandwort outplanting. Unpublished technical report prepared for California Department of Fish and Wildlife. 2081(a)-21-026-RP.
- Consortium of California Herbaria [CCH2] data portal. 2025. Data for *Arenaria paludicola*. Available online at: <https://www.cch2.org/portal/>.
- DeBerry, D.A. and J.E. Perry. 2000. An introduction to wetland seedbanks. Wetlands Program Technical Report no. 00-2. Virginia Institute of Marine Science, College of William and Mary. Available online at: <http://dx.doi.org/doi:10.21220/m2-qhfc-d458>.
- Fishman, L. and R. Wyatt. 1999. Pollinator-mediated competition, reproductive character displacement, and the evolution of selfing in *Arenaria uniflora* (Caryophyllaceae). *Evolution*, 53(6): 1999, pp. 1723–1733.
- Hartman, R.L. (deceased) and R.K. Rabeler. 2012. *Arenaria paludicola*, in Jepson Flora Project (eds.) Jepson eFlora. Available online at: [https://ucjeps.berkeley.edu/eflora/eflora\\_display.php?tid=14042](https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=14042).

Keil, D. J. 2022. Vascular Plants of San Luis Obispo County, California. Second Edition. Pacific Street Publishing. San Luis Obispo, California.

Land Conservancy of San Luis Obispo County [LCSLO]. 2024. Black Lake Ecological Area, *Arenaria paludicola* (marsh sandwort) and *Cirsium scariosum* var. *loncholepis* (La Graciosa thistle) Recovery Plan. Unpublished technical report prepared for California Department of Fish and Wildlife. 2081(a)-21-003-RP.

U.S. Fish and Wildlife Service [USFWS]. 1993. Endangered and threatened wildlife and plants; determination of endangered status for two plants *Arenaria paludicola* (marsh sandwort) and *Rorippa gambelii* (Gambel's watercress). 58 Federal Register (FR) 41378–41384.

[Service] U.S. Fish and Wildlife Service. 1998. Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*). U.S. Fish and Wildlife Service. Portland, Oregon.

[Service] U.S. Fish and Wildlife Service. 2008. *Arenaria paludicola* (marsh sandwort) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service. Ventura Fish and Wildlife Office. Ventura, California.

[Service] U.S. Fish and Wildlife Service. 2016. USFWS Species Status Assessment Framework. Version 3.4 dated August 2016.

[Service] U.S. Fish and Wildlife Service. 2019. Recovery Plan for Marsh Sandwort (*Arenaria paludicola*) and Gambel's Watercress (*Rorippa gambelii*). Amendment 1. U.S. Fish and Wildlife Service. Ventura Fish and Wildlife Office. Ventura, California.

[Service] U.S. Fish and Wildlife Service. 2020. Marsh sandwort (*Arenaria paludicola*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service. Ventura Fish and Wildlife Office. Ventura, California.

[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. 89 FR 83510–83514.

U.S. Army Corps of Engineers. 2022. National Wetland Plant List. Version 3.6. U.S. Army Corps of Engineer Research and Development Center. Vicksburg, MS. Available online at: [https://wetland-plants.sec.usace.army.mil/static/reports/NWPL%20Cover%20Page%20National\\_v3.pdf](https://wetland-plants.sec.usace.army.mil/static/reports/NWPL%20Cover%20Page%20National_v3.pdf).

### **Personal Communication**

Cheadle Center for Biodiversity and Ecological Restoration [CCBER]. 2025. Email from Wayne Chapman, CCBER to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding marsh sandwort seeds. May 28, 2025.

- Land Conservancy of San Luis Obispo County [LCSLO]. 2021. Email from Lindsey Roddick, LCSLO to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding Black Lake Canyon marsh sandwort occurrence. May 4, 2021.
- California State Parks, Santa Cruz District. 2025. Email from Tim Hyland, California State Parks, Santa Cruz District to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding Wilder Ranch State Park, 2013 marsh sandwort recovery project. May 22, 2025.
- California State Parks, Oceano Dunes State Vehicular Recreation Area [ODSVRA]. 2025. Email from Ben Wagner, ODSVRA to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding marsh sandwort. May 21, 2025.
- Morro Coast Audubon Society, Sweet Springs Nature Preserve [Sweet Springs Nature Preserve]. 2025. Email from John Chesnut, Sweet Springs Nature Preserve to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding sandwort at sweet springs, status for 5-yr review. May 24, 2025.
- U.S. Fish and Wildlife Service [USFWS] 2020. Email from Kristie Scarazzo, Ventura Fish and Wildlife Office to Ingrid Parker, University of California, Santa Cruz regarding marsh sandwort clones at UCSC. January 8, 2020.
- U.S. Fish and Wildlife Service [USFWS] 2025. Email from Colleen Grant, USFWS Coastal Program Regional Coordinator to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding marsh sandwort – plant numbers? May 21, 2025.
- Wilken, D. 2019. Email from Dieter Wilken, former Director of Conservation at the Santa Barbara Botanic Garden to Kristie Scarazzo, Ventura Fish and Wildlife Office, regarding original cloned stock of marsh sandwort. October 23, 2019.

**Appendix A.** Geographic range and distribution of marsh sandwort, California. Mapping based on all available data from the CNDDDB, CCH2 Data Portal, and other partners and includes all historical occurrences as well as new introduction locations (CNDDDB 2025b, website; CCH2 2025, website; LCSLO 2024, p. 4; LCSLO 2021, pers comm; RCD 2024, p. 2; Service 2025, pers comm).

