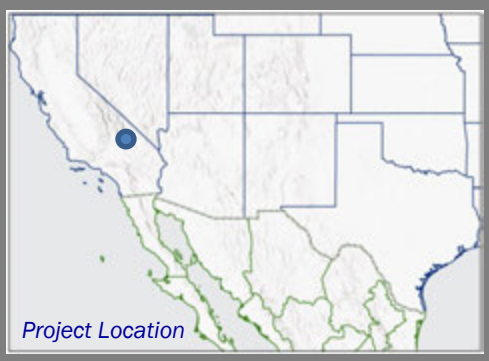
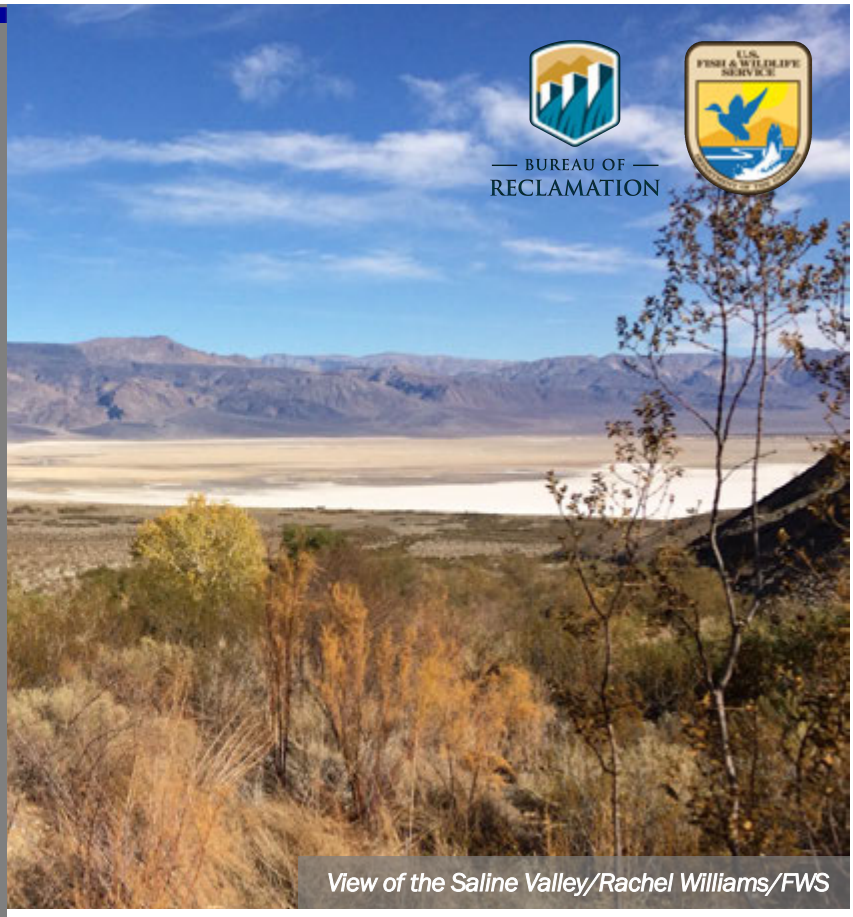
Community Engagement and Education

Citizen Science for Monarch Monitoring in the Saline Valley, California

Monarch butterflies (*Danaus plexippus*), a candidate species for listing under the Endangered Species Act, migrate to overwintering sites to survive cold winter temperatures. In western North America, monarch populations usually overwinter at sites on the Pacific Coast and some travel to central Mexico. Saline Valley, California, is a desert riparian site and one of the rare inland overwintering sites for monarchs. The Saline Valley Monarch Count (SVMC) is a citizen science effort that monitors monarch populations in Saline Valley. The SVMC continues surveys that were initiated in 1976 by Derham Giuliani. This work provides insights about monarch migration that will lead to a greater understanding of monarch population and migration dynamics.



Project Location



View of the Saline Valley/Rachel Williams/FWS

KEY ISSUES ADDRESSED

Loss of overwintering habitat contributes to monarch population declines. Understanding the features of Saline Valley, an unusual overwintering habitat compared to coastal sites, that make it appealing to monarchs is key to support this candidate species. Giuliani counted monarchs at Saline Valley throughout the winter. However, since 2017, the SVMC observed monarchs disappearing in late December. Accurately assessing monarch populations and migration dynamics is critical to support western monarchs. Saline Valley is too large and remote to be accurately surveyed by one survey team. Several survey teams with backcountry experience are required to survey Saline Valley monarchs.

PROJECT GOALS

- Count monarchs in Saline Valley and record when they arrive and leave the site to better-understand monarch migration patterns
- Gather information about Saline Valley to determine why it is used as a monarch overwintering site
- Recruit and train volunteer citizen scientists to count and tag monarchs

CREATING COMMUNITY

The SVMC has a strong community of returning volunteers. The sense of community, unique experience, and opportunity to contribute towards a larger goal all contribute to the high volunteer return rate.

Monarch on Mule Fat/Joanna Gilkeson/FWS

PROJECT HIGHLIGHTS

Weekly Surveys Improve Monitoring: Conducting smaller weekly counts provides more information about how and why monarch populations in Saline Valley change over the course of the overwintering season than larger, less frequent surveys. Volunteers form groups that conduct weekly counts in three canyons in the valley. Five to nine surveys are conducted during the surveying season, from October through January.

Improved Understanding of Monarch Behavior: In addition to counting and tagging monarchs, citizen science volunteers have made important observations about monarch behavior. Monarchs in Saline Valley are attracted to riparian areas and will roost on canyon walls and in riparian vegetation. These monarchs use mule fat (*Baccharis salicifolia*) as a nectar source.

Recruiting Volunteer Surveyors: In the first year, the Saline Valley Monarch Count coordinators published articles in local newspapers and connected with local nonprofits, tribes, and state and federal agencies to recruit volunteers. In the following years, most volunteers returned for multiple seasons or were recruited through word of mouth. There were 13-34 volunteers each season.

Collaborators

- U.S. Fish and Wildlife Service
- Xerces Society for Invertebrate Conservation
- Friends of the Inyo
- Bureau of Land Management

LESSONS LEARNED

The number of overwintering monarchs documented in Saline followed similar patterns of decline as coastal overwintering sites over the last 4 years. Although there were two counts of over 1,000 monarchs since Giuliani began counting in 1976, the SVMC has not found more than 145 in a single year since they began surveys in 2017.

In Saline Valley, monarchs were observed roosting in mule fat, willows (*Salix spp.*), cottonwoods (*Populus fremontii*), and other plants. Monarchs were observed using mule fat for nectar. This demonstrated that monarchs are not limited to coastal overwintering sites. Weekly surveys revealed that the monarchs' disappearance coincided with mule fat going to seed in late December, suggesting that monarchs may be leaving because of the loss of their nectar source. These monarchs do not appear to be dying in Saline Valley. However, their destination is still unknown.

Surveying the Saline Valley requires a large group of volunteers. The SVMC conducted most of their volunteer recruitment and training in the first year. This lowered the need for subsequent training and recruitment.

NEXT STEPS

- Continue surveying Saline Valley monarch populations
- Search for more inland overwintering sites
- Determine where the monarchs in Saline Valley migrate in late December
- Publish Giuliani's dataset detailing monarch populations in Saline Valley from 1976-2008 to make the information more widely available

For more information on this project, contact Rachel Williams: salinemonarchcount@gmail.com

Monarch at Saline Valley/Rachel Williams/FWS

CCAST Authors: Robin Bradley and Ariel Léger, University of Arizona, June 2021. For more information on CCAST, contact Genevieve Johnson (gjohnson@usbr.gov) or Matt Grabau (matthew_grabau@fws.gov).

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