



Western Monarchs Conservation

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USFWS; and Sarina Jepsen, The Xerces Society



Monarch Butterfly Migration

In western North America, a smaller population of monarchs makes a shorter annual flight from inland, farmland and rangeland to overwintering areas in trees along the California coast.

Monarch Migration

Spring & Fall



LEGEND

- Overwintering areas
- Spring breeding areas
- Spring & summer breeding areas
- Summer breeding areas
- No milkweed - no breeding area
- Nonmigratory population
- Fall migration
- Spring migration
- Unconfirmed migration
- Northern limit of milkweed
- ? Potential monarch breeding habitat



Western Monarch Butterfly Decline

Between 1997 and 2013, annual Thanksgiving counts of overwintering monarch clusters in California demonstrate a clear decline.



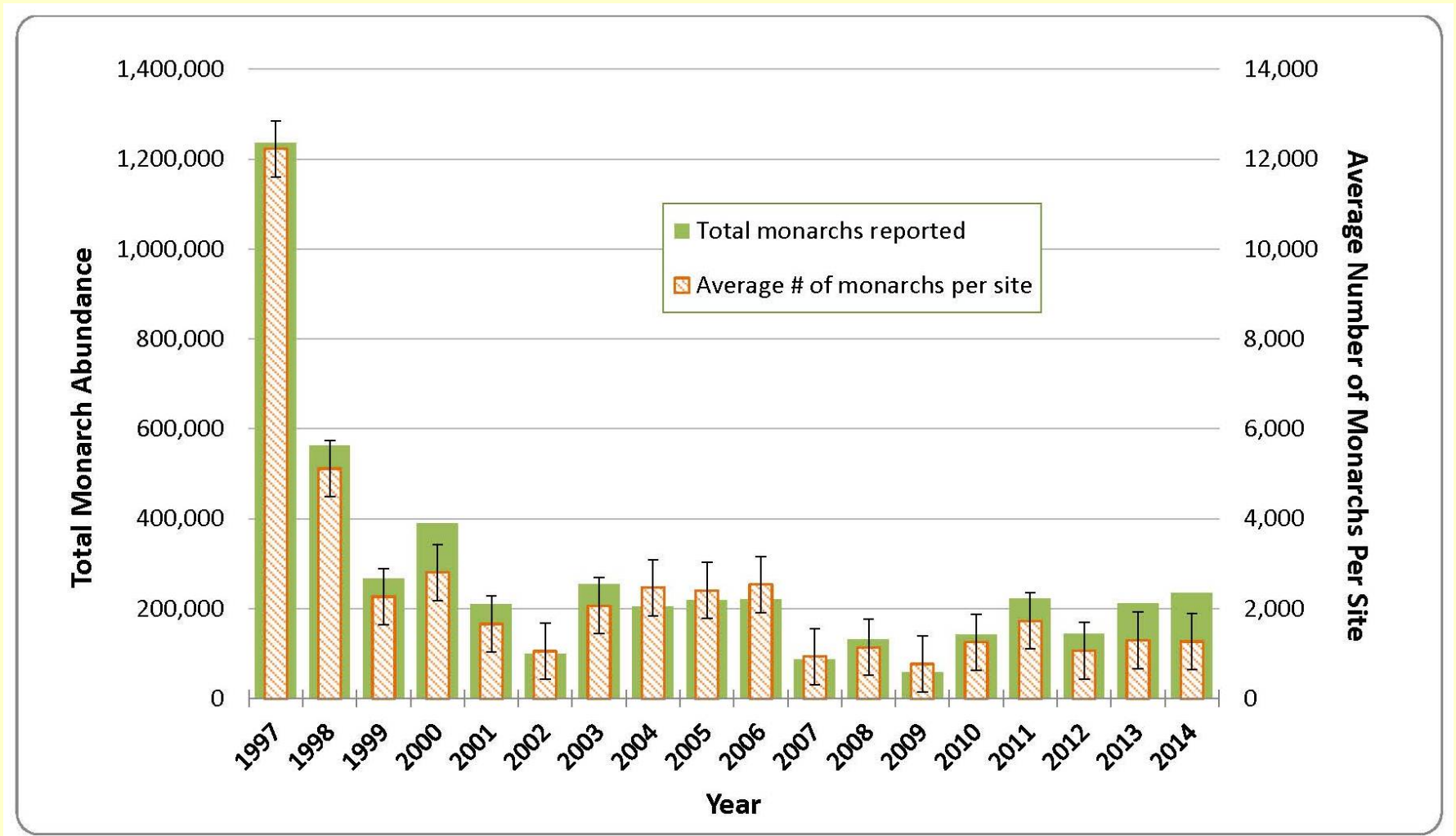


Western Monarch Butterfly Decline

1997: Over 1,200,000 monarchs counted.

2014: Just over 200,000 monarchs were counted.

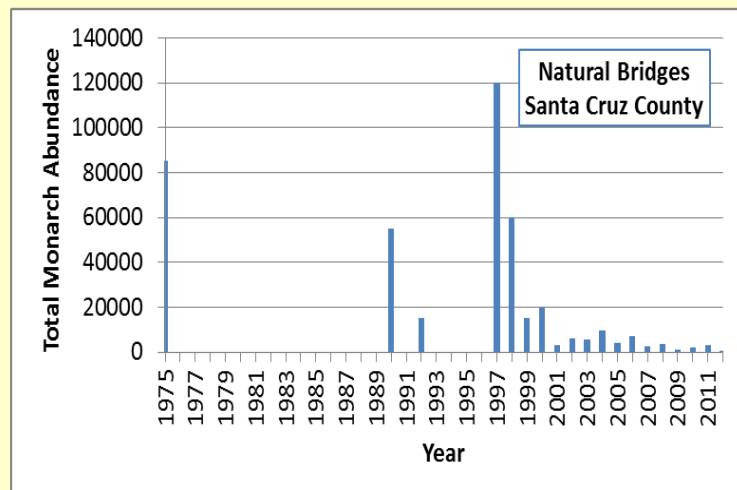
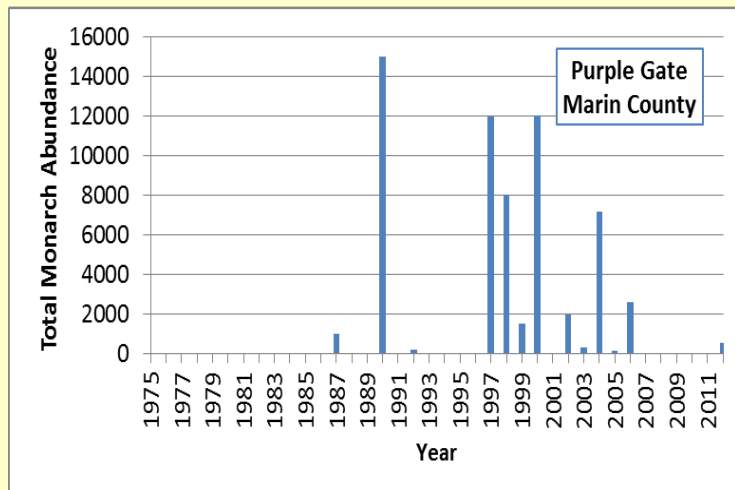
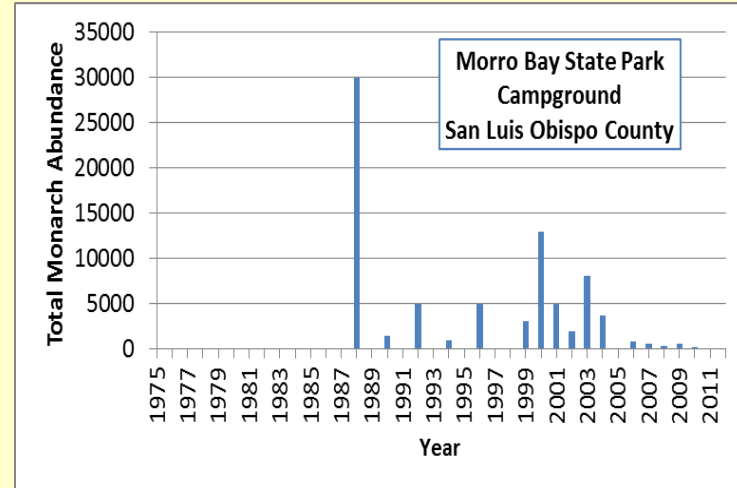
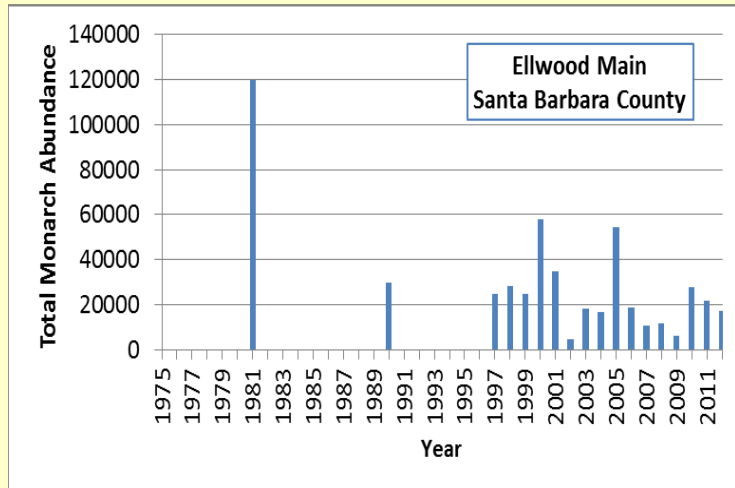
- Average number of monarchs per site decreased from 12,232 to 2,000





Western Monarch Butterfly Decline

Is 1997 an anomaly?: Monarch population estimates at four sites:
(Monroe et al. 2013; Xerces Monarch Overwintering DB 2014).





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Monarch Habitat in the West

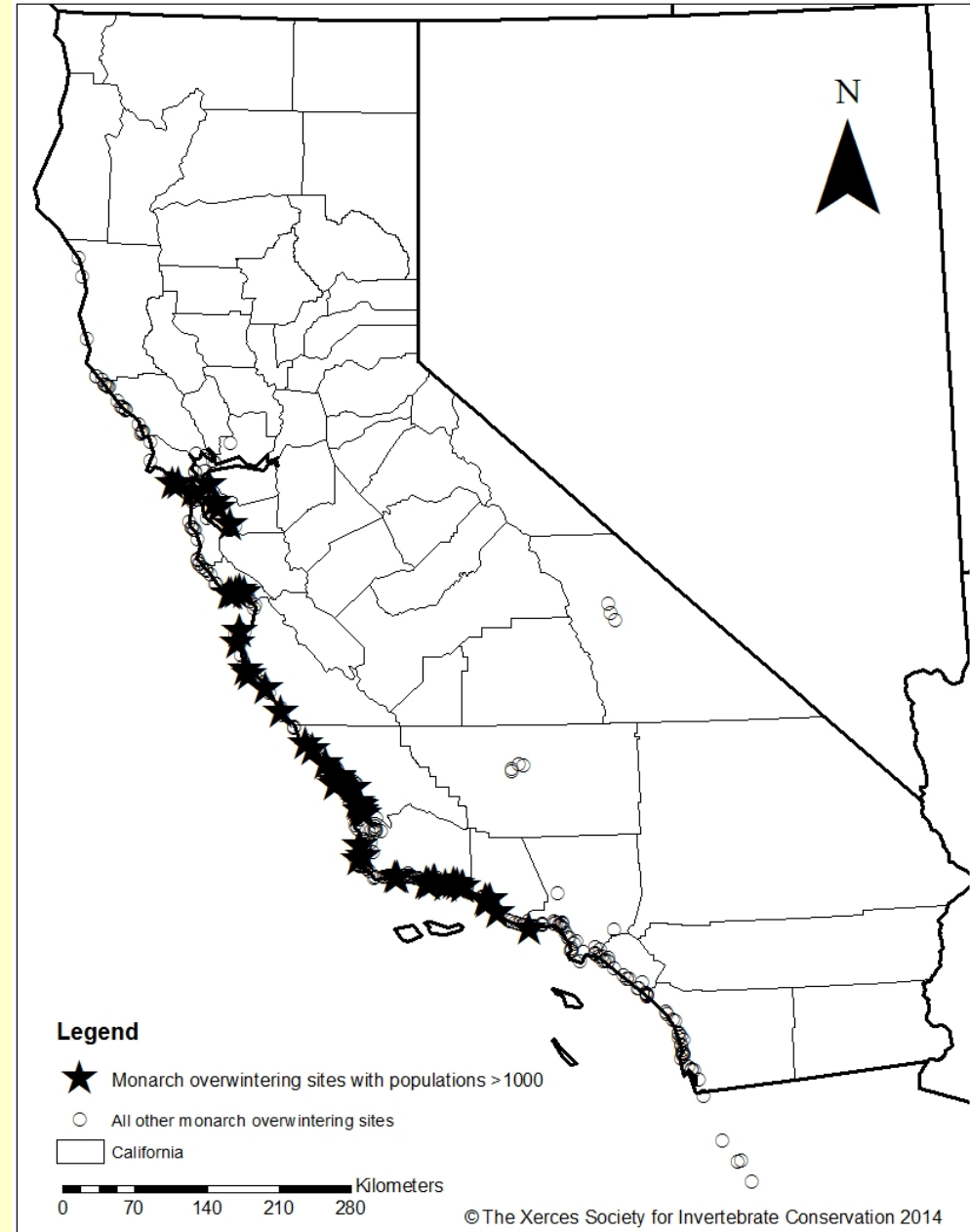


Photo: Hectonichus; Wikimedia Commons



Habitat: Overwintering sites

Distribution of current and historic monarch overwintering sites in California. Black stars represent sites that have hosted more than 1,000 monarchs in the past decade.





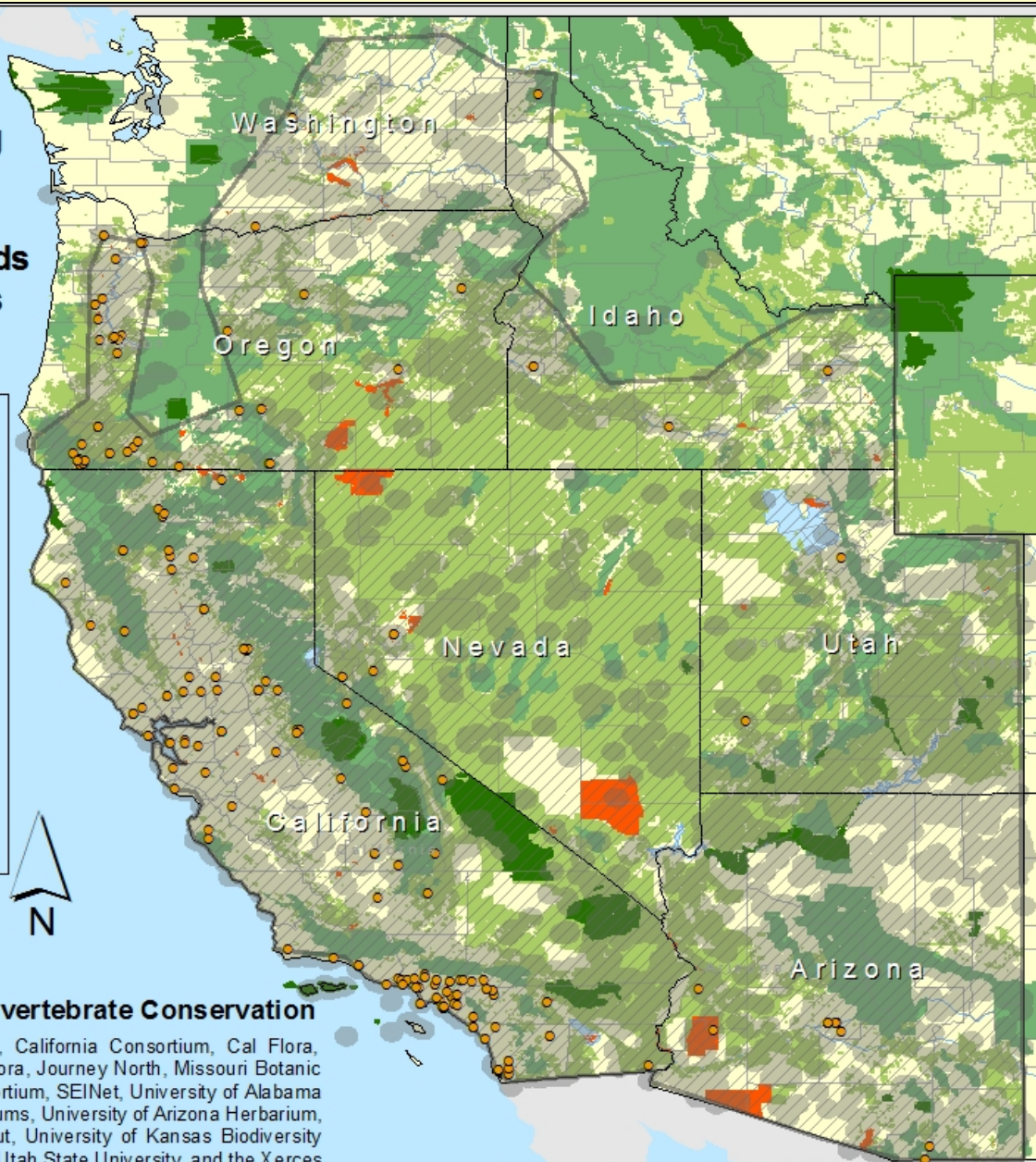
Documenting Known and Potential Monarch Breeding Areas in the Western US:

A Review of Milkweed Records and Breeding Observations in Seven Western States

Legend

- Monarch Breeding Observations
- Priority Conservation Areas
- State Boundaries
- US Counties
- Milkweed Records
- USFWS
- Bureau of Land Management
- National Parks
- National Forests
- Major Rivers
- Major Lakes

0 85 170 340 Miles



Prepared by The Xerces Society for Invertebrate Conservation

Data provided by Berkeley Natural History Museums, California Consortium, Cal Flora, California Academy of Sciences, GBIF, Intermountain Flora, Journey North, Missouri Botanic Garden, OR Flora, Oregon State University, PNW Consortium, SEINet, University of Alabama Biodiversity and Systematics, University of Alberta Museums, University of Arizona Herbarium, University of British Columbia, University of Connecticut, University of Kansas Biodiversity Institute, University of Nevada Herbarium, USDA Plants, Utah State University, and the Xerces Online Milkweed Survey. Data accessed from February 2013 to November 2014.



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Threats to Monarchs



Photo: The Xerces Society/Carly Voight



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Threats: Habitat Loss

We do not have habitat loss information for the west.



Photo: Eric Eldredge , NRCS



Threats: Loss of Open Space

- Rate of open space loss per day in acres: 6,000

Sources: USDA Forest Service 2006





Threats: Habitat Loss

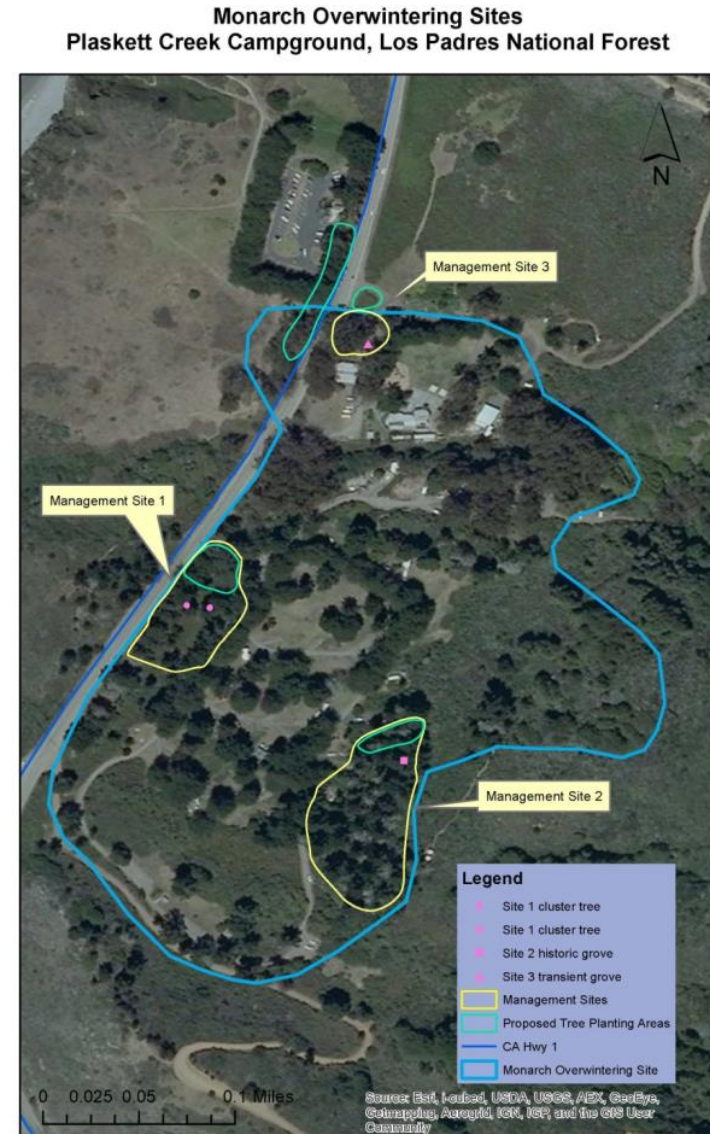
We have lost more than 30
overwintering sites in
California to development.



Threats: Habitat Degradation

Many additional sites are threatened because the trees are old and in decline and there is little recruitment of new trees to ensure the microclimate in the groves are maintained. Active management is needed to maintain overwintering sites.

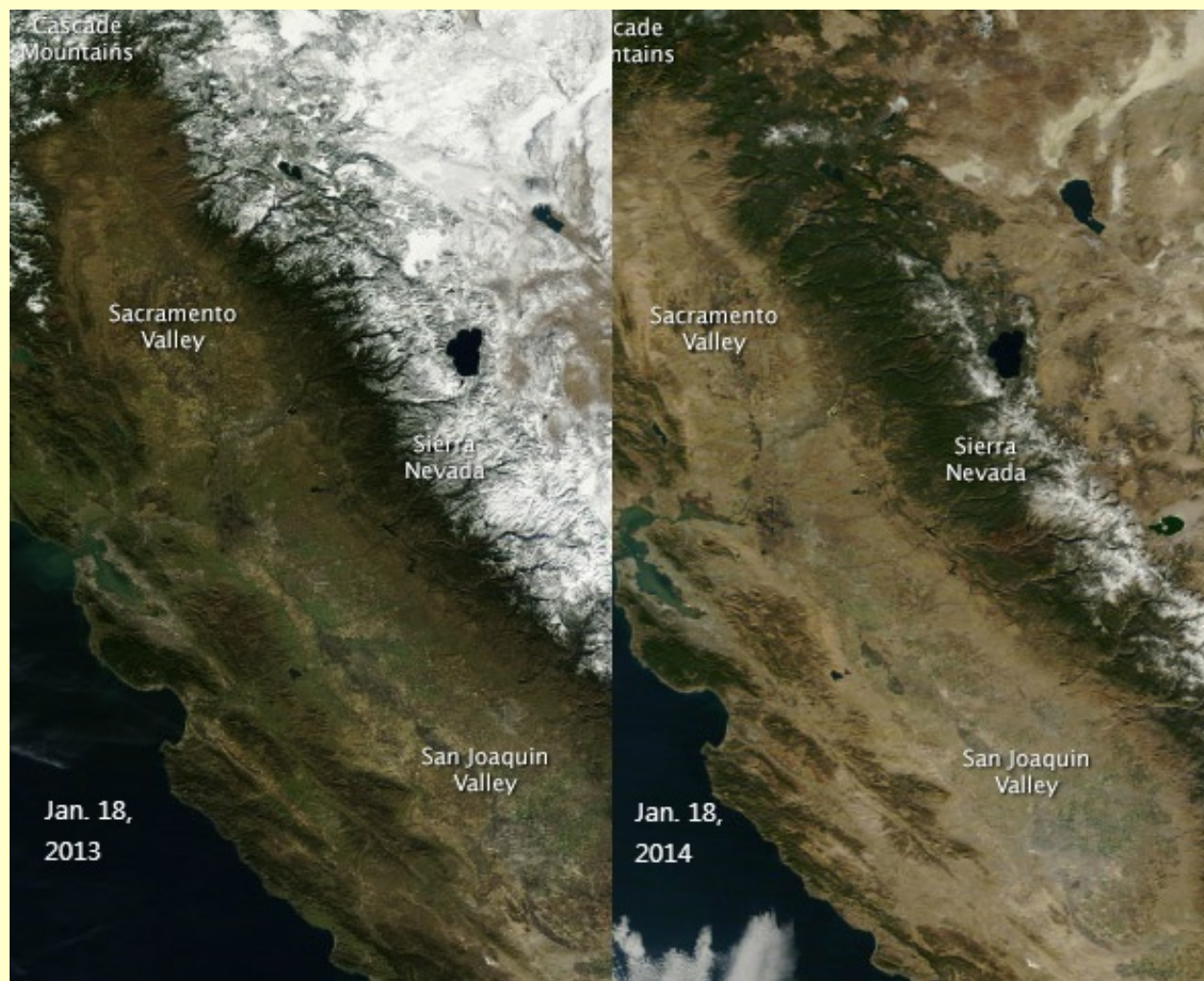
- Xerces has developed a guidance on how to develop a management plan.
- Training land managers at overwintering sites.





Threats: Climate Change

Extreme weather conditions and long-term drought associated with climate change may impact monarchs. Stevens & Frey 2010 created a model of drought severity in likely breeding areas and found a significant inverse relationship between increased drought severity and monarch population size.





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Western Monarch Butterfly Habitat Suitability Modeling Project

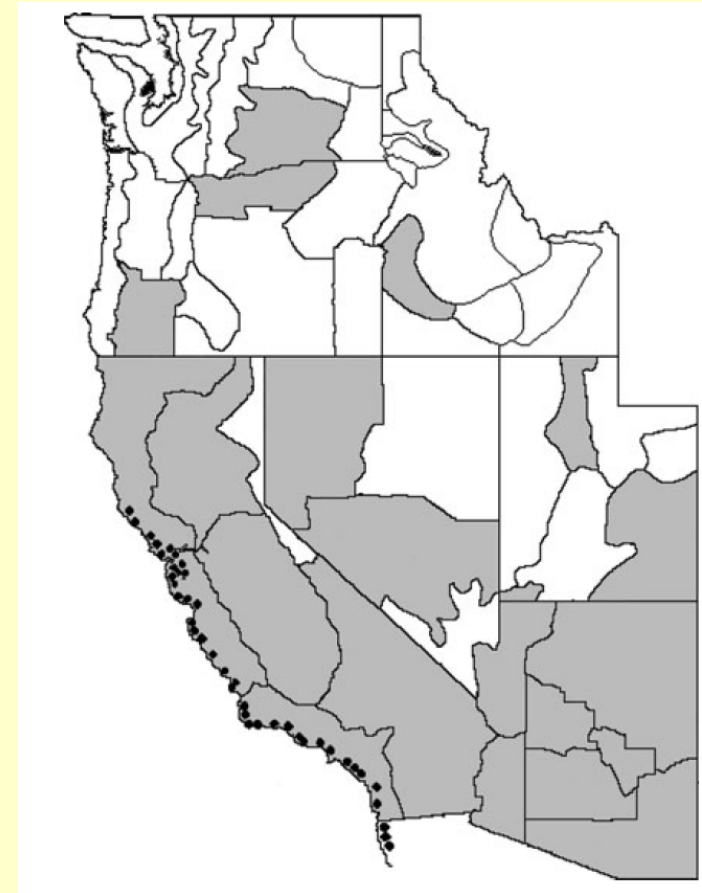


Photo: The Xerces Society/Carly Voight



Habitat Suitability Modeling Project

- The need:
 - Managers require information on where habitat management and restoration will provide most benefit to species
 - Current understanding of summer distribution and breeding locations is coarse



Stevens & Frey 2010



Habitat Suitability Modeling Project

January



February



March



April



May



June



July



August



September



October



November



December



To prioritize areas for conservation we can look at a variety of data.

Monarch occurrence records from Dingle et al 2005.



Habitat Suitability Modeling Project

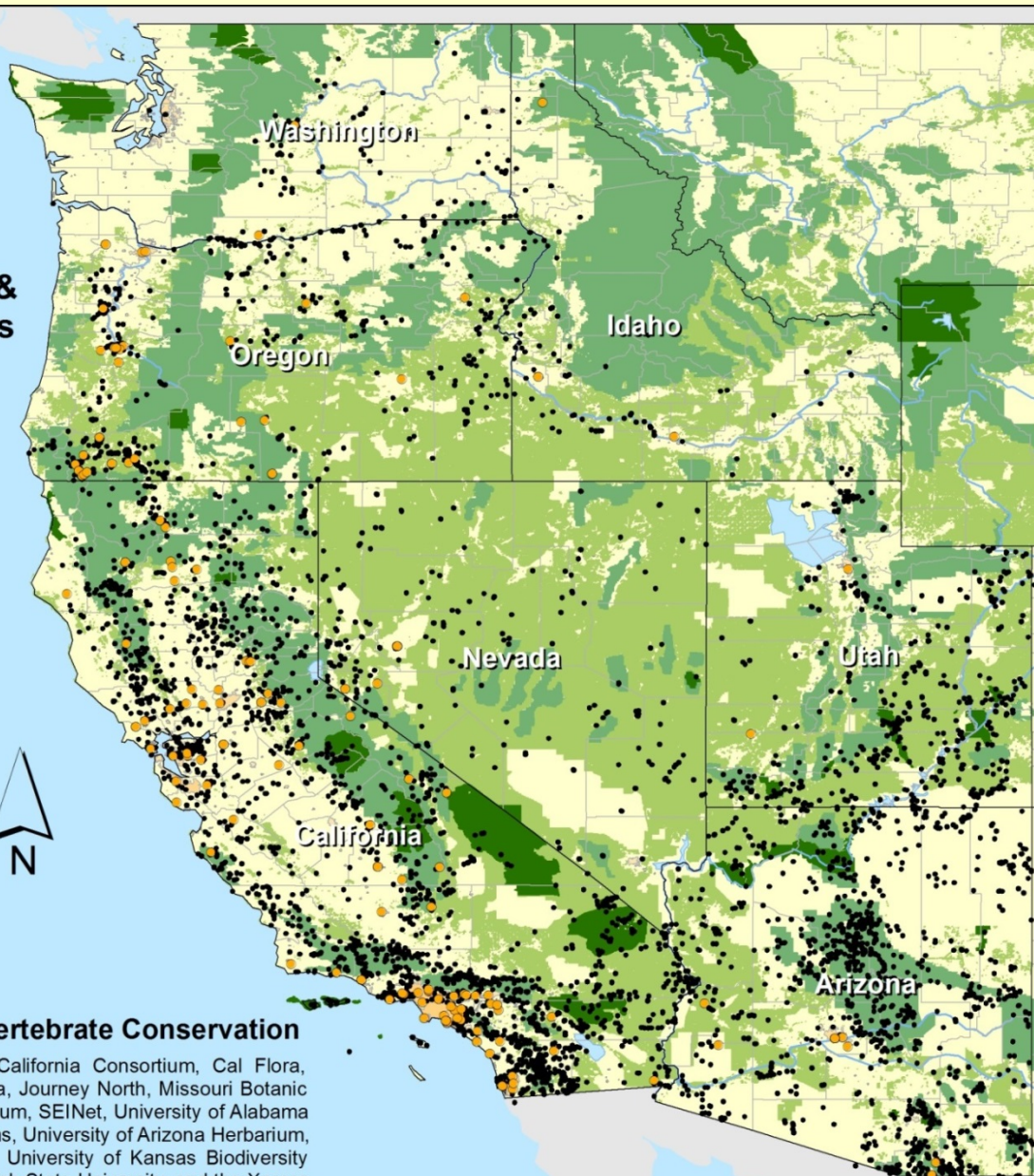
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- BLM

0 85 170 340 Miles



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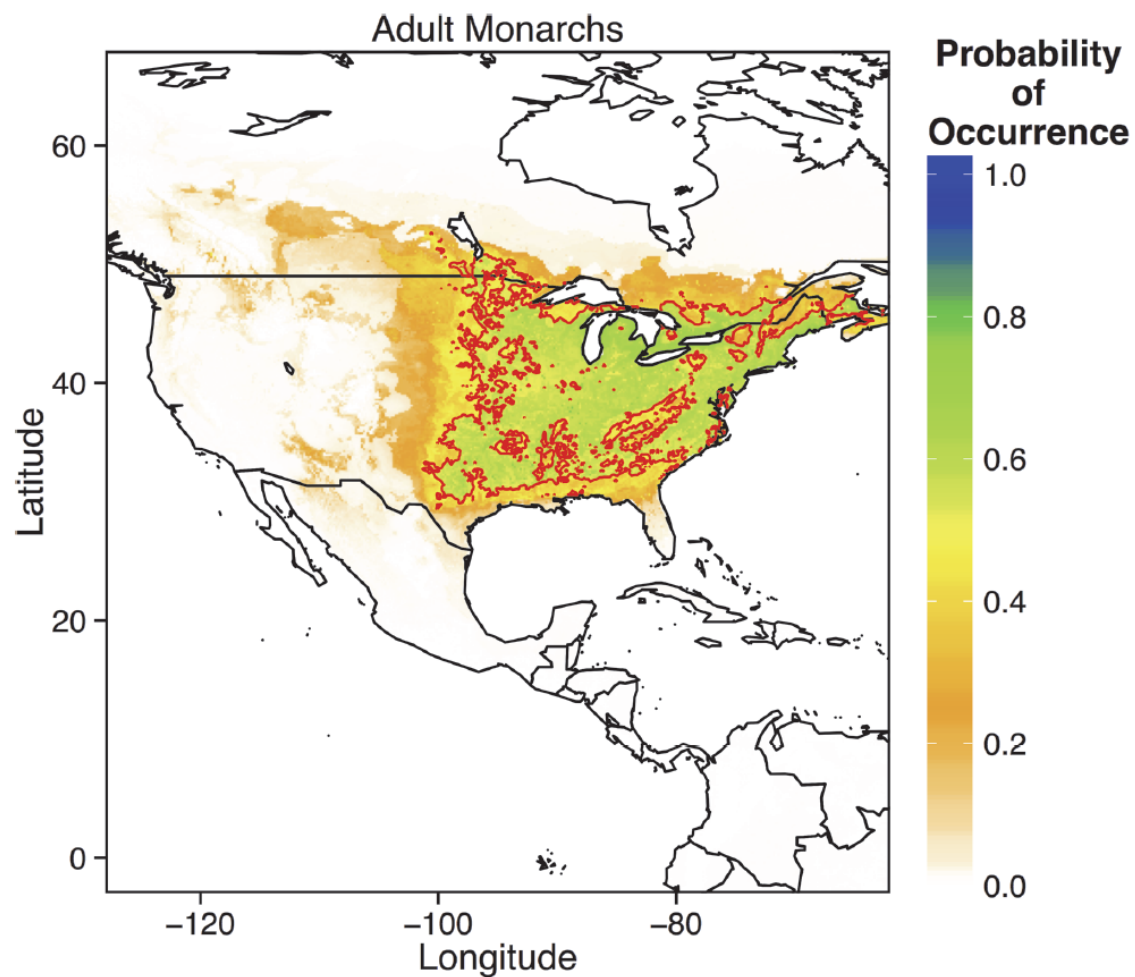
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Habitat Suitability Modeling Project

Maxent: A robust tool for species habitat suitability modeling

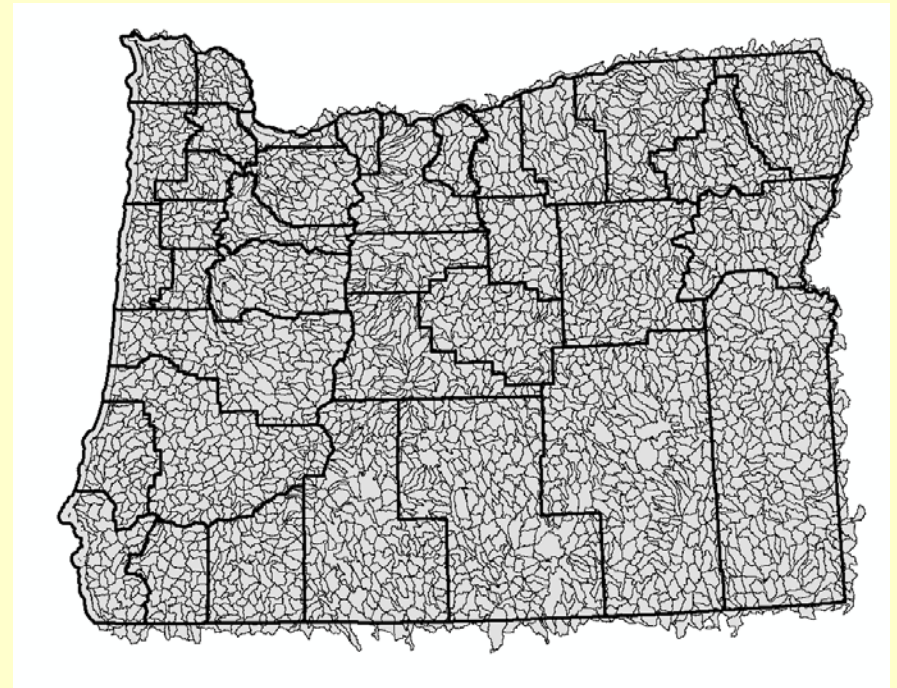
- Recently applied to eastern population
- Machine learning technique designed to use presence only data
- Models will be developed for key western *Asclepias* species as well as Monarchs





Decision support tool - prioritization

- Will be based on county prioritization tool developed for eastern population
- Maxent suitability outputs will be a key input
- Counties are very coarse in the west - we'll likely use HUC 6s
- EPA has already calculated many variables for HUC 6s in their EnviroAtlas
- Will use USGS scripts



Example of counties (thick lines) vs. HUC 6s (thin lines) spatial grain in OR



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Western Monarch Conservation Efforts



Photo: iStockphoto/Simon Phipps



Conduct field surveys for monarchs and milkweed on twelve refuges in Oregon, Washington, and Idaho





Monarch Habitat: Assessment Tool

Develop a natural lands pollinator habitat assessment tool with a subcomponent for monarch habitat





Management guidelines

Develop monarch habitat
management guidelines for
large natural landscapes





Monarch management and restoration workshops in California, Nevada and the Pacific Northwest





A Guide to Common Milkweeds of California



Milkweeds are a critical part of the monarch butterfly's life cycle. To protect monarchs in western North America, the Xerces Society for Invertebrate Conservation has launched an initiative to locate milkweed stands that serve as breeding areas for monarchs. If you know where milkweed grows, please help us by completing a brief survey at:

www.xerces.org/milkweedsurvey

A Guide to the Native Milkweeds of Oregon



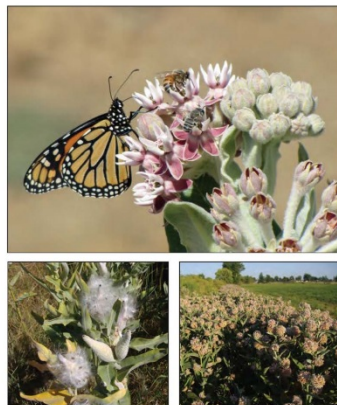
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Great Basin Pollinator Plants

Native Milkweeds (*Asclepias* spp.)



October 2012

The Xerces Society for
Invertebrate Conservation
www.xerces.org

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Guide to the Native Milkweeds of Washington



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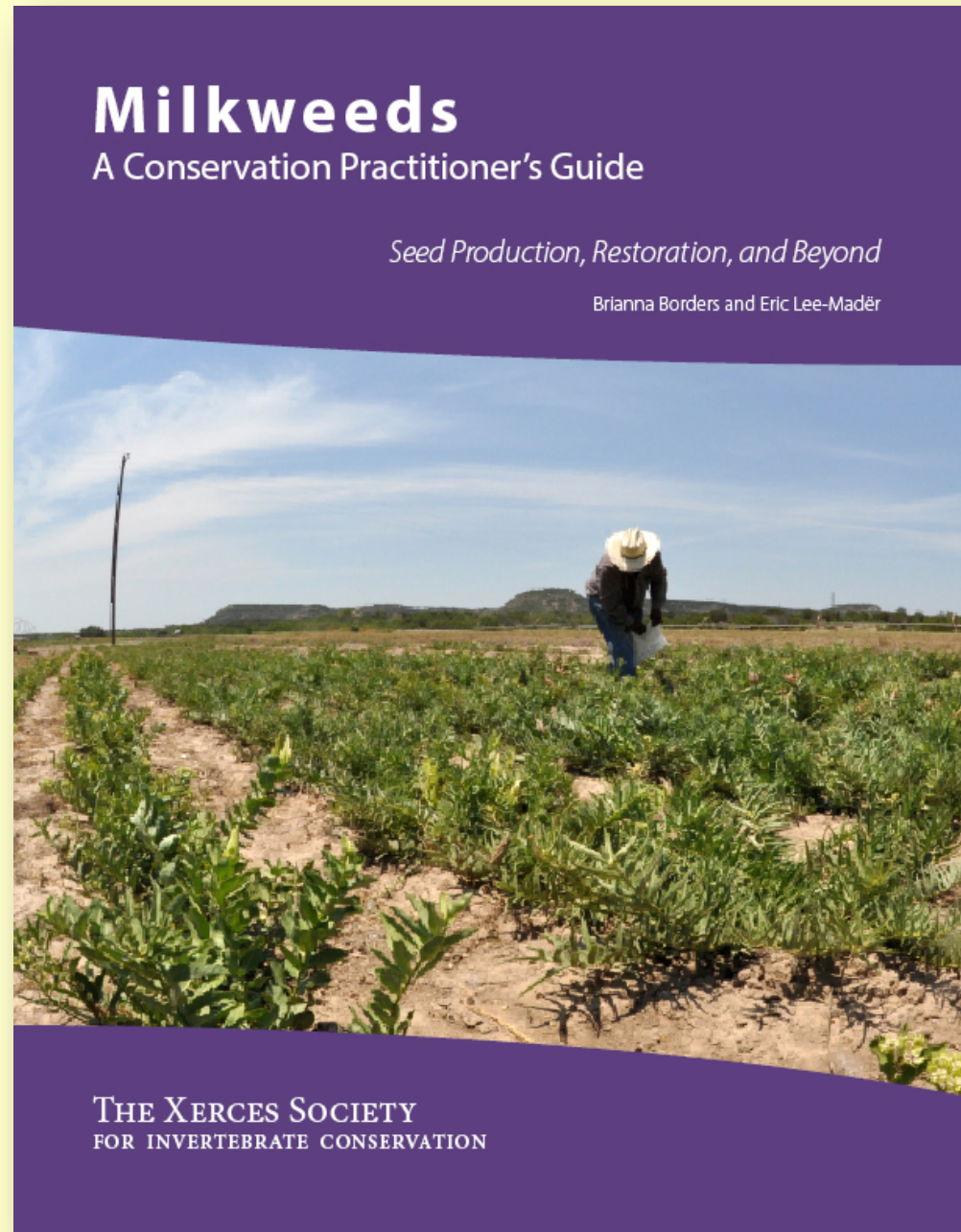


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Monarch Habitat: Resources

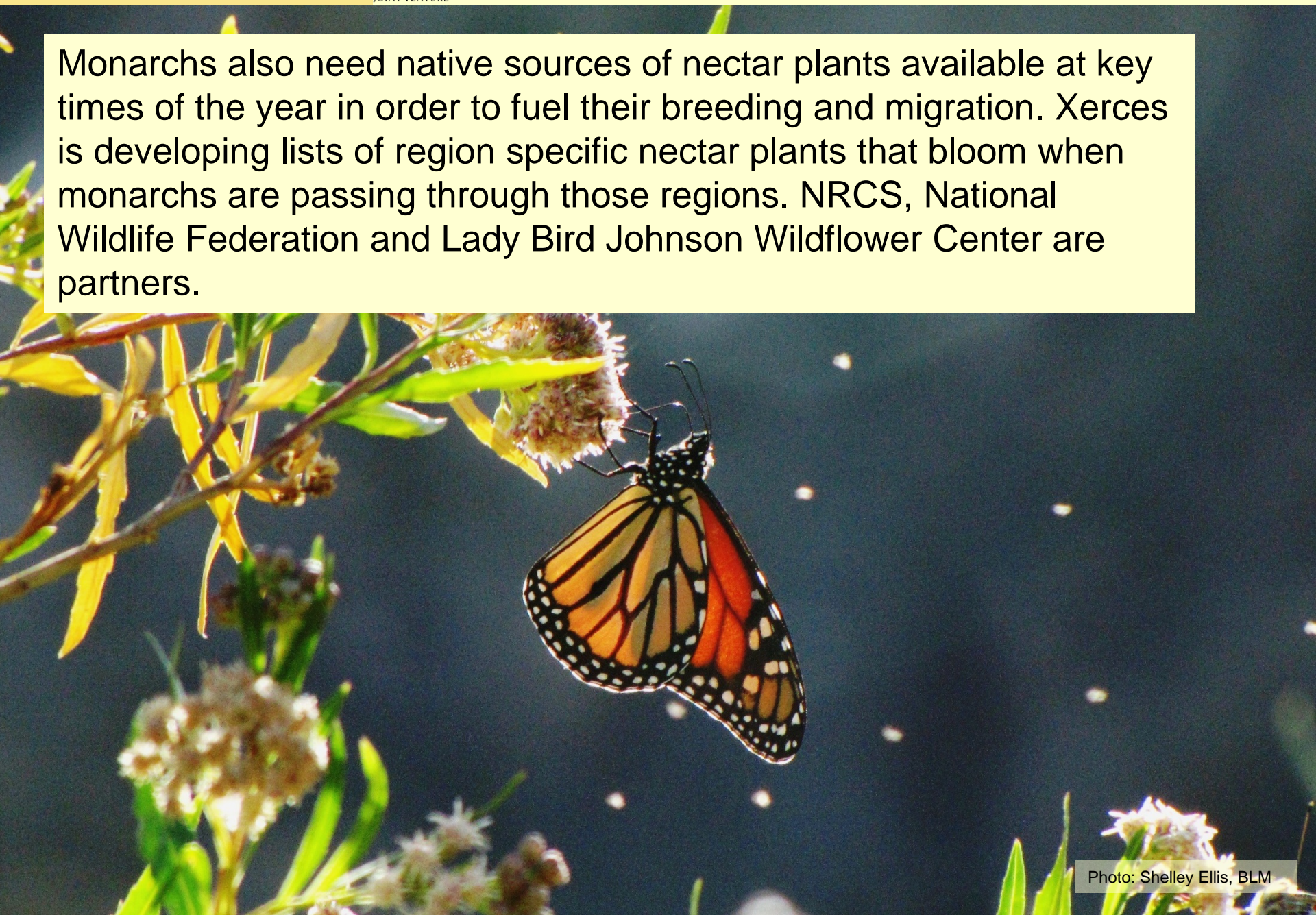
Xerces has guidance on harvesting, propagating and growing milkweeds.





Protecting Monarchs: Nectar Plants

Monarchs also need native sources of nectar plants available at key times of the year in order to fuel their breeding and migration. Xerces is developing lists of region specific nectar plants that bloom when monarchs are passing through those regions. NRCS, National Wildlife Federation and Lady Bird Johnson Wildflower Center are partners.



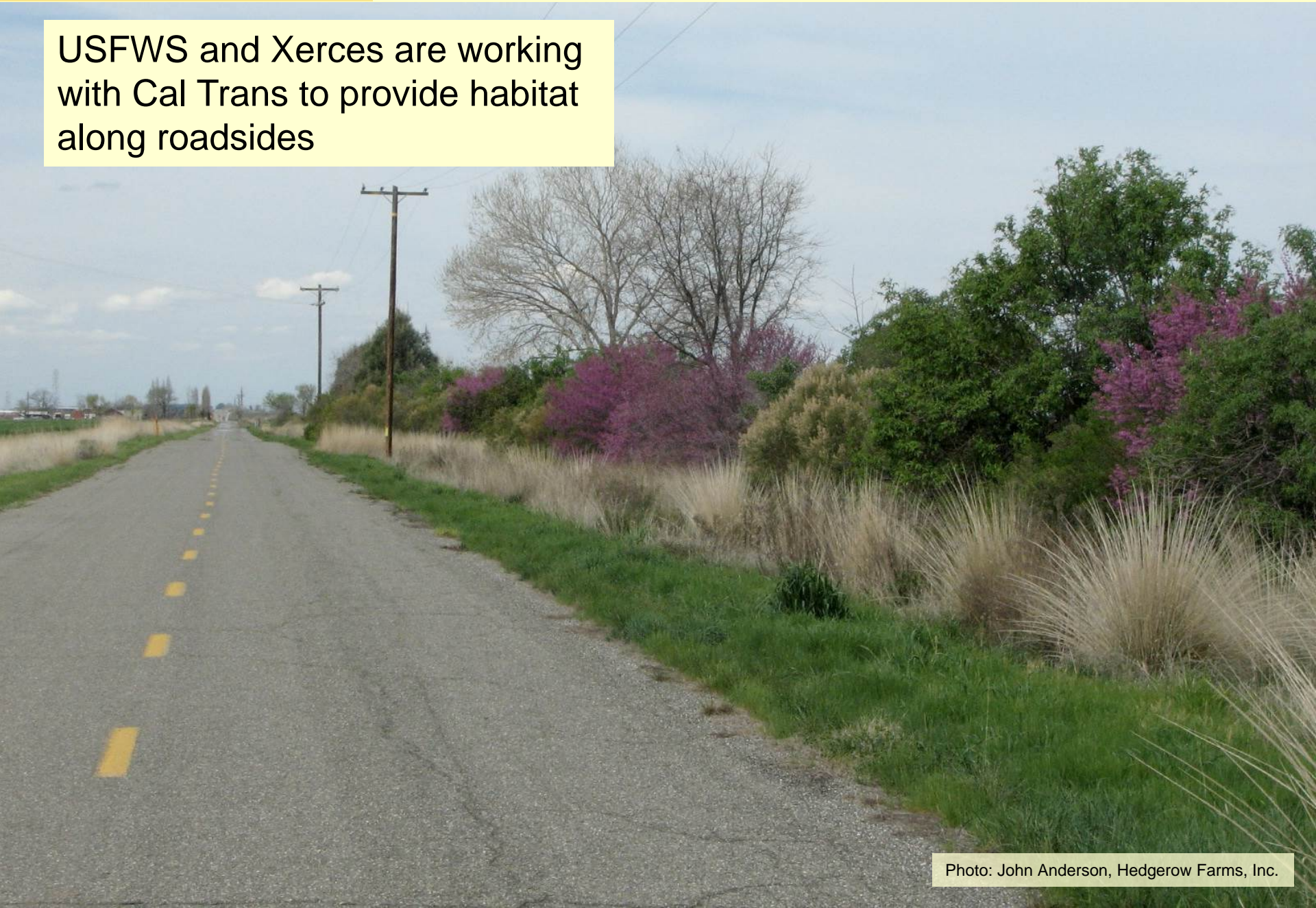


Restoration on refuges and partner lands as well as other public and private lands across the west.





USFWS and Xerces are working with Cal Trans to provide habitat along roadsides





Research Needs





Where do monarchs breed in the west?

Xerces and USFWS are working to better understand this issue.





What migratory pathways do monarchs use in the spring and fall?

- Dingle 2005 and Pyle suggest that fall migrants use river corridors.
- Data suggests that Arizona is an important connection between Mexico and California.
- Increased Journey North participation and additional tagging efforts (and a database to manage results from all existing tagging efforts) could help answer this question.





Best practices for establishing milkweed – especially in the arid west.

With drought across California establishment success of milkweed in habitat restoration projects has been low. Xerces is working in partnership with NRCS to better understand how best to establish milkweed as well as the diverse floral resources monarchs need.

We also need more information on how to successfully manage milkweed in diverse stands.



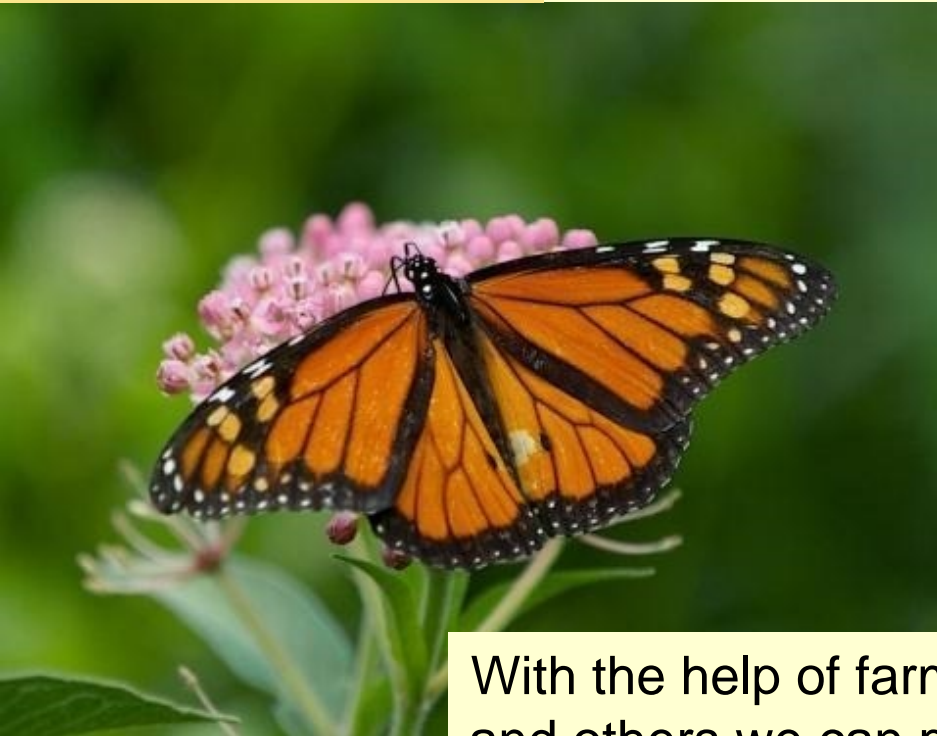


Best practices for restoring and managing overwintering sites in California.

- It takes years for trees to grow and develop the proper microclimate for monarch overwintering.
- Most overwintering sites are in *Eucalyptus* sp., but data suggests that given a choice, monarchs will choose native conifers.
- Many overwintering sites have old trees and need to be actively managed and restored.
- Need information on how best to restore native trees for the benefit of monarchs.
- Xerces is working with Dr. Francis Villablanca of UC San Luis Obispo on many of these issues.



Photo: The Xerces Society/Carly Voight



With the help of farmers, land managers and others we can provide for monarchs in the west.

