



Monarch Recovery Initiative: Gearing Up to Establish 15-Million Milkweed by 2030

Presented by:

Halie Goeman

Restoration Biologist

River Partners



“We create wildlife habitat for the benefit of people and the environment.”

Who is River Partners?

Since 1998 we have...

- Restored over 18,000 acres along 212 river miles
- Planted more than 4 million plants
- Developed technological advancements in plant propagation and field design
- Captured over a million tons of greenhouse gasses
- Conserved over 1 billion gallons of fresh water



Declining Populations & Potential Threats

- Western monarch overwintering in coastal California have declined
- Population growth and conversion of habitat
- Disease
- Climate Change
- Predation



Overview & Goals

With generous funding from the California Department of Fish and Wildlife the goal was to...

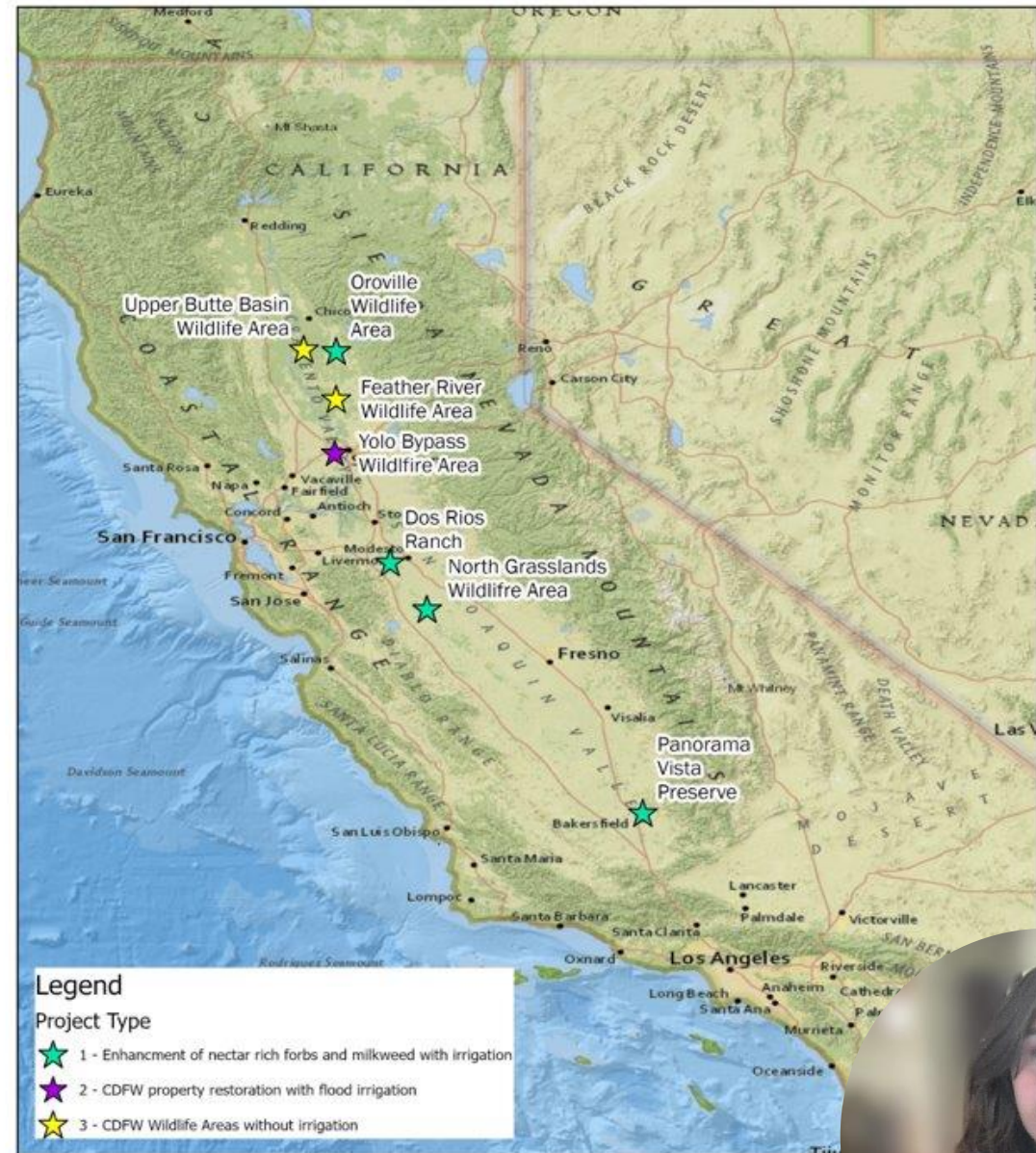
- Enhance over 600 acres statewide
- Easily repeatable experiment
- Study monarch egg deposition preferences
- Provide flowering resources from early spring to late fall
- Increase the diversity and abundance of pollinators on each site

Narrowleaf milkweed, Oroville Wildlife Area



Site Types

1. Enhancement of existing restoration sites
2. California Department of Fish and Wildlife (CDFW) property with flood irrigation
3. CDFW property without irrigation



Pollinator Habitat Enhancement
Central Valley Monarch Butterfly Habitat

Date: 12/07/2021
Data: USDA, Esri, CDFW, WCB, River Partners
Created by: F. Ulep



Plot Based Experimental Design Guidelines

Treatment

- Plot size
 - Small plots – 50m x 10m
 - Large plots – 100m x 100m
- Conditions
 - Distance from water
 - Vertical structure/shade

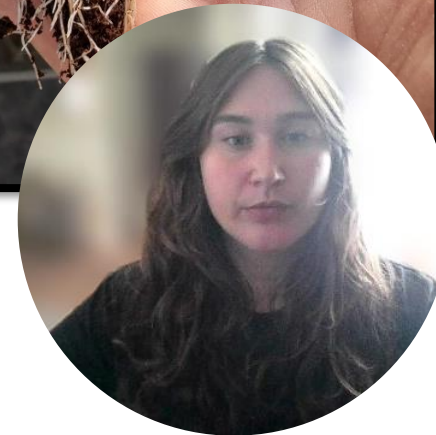
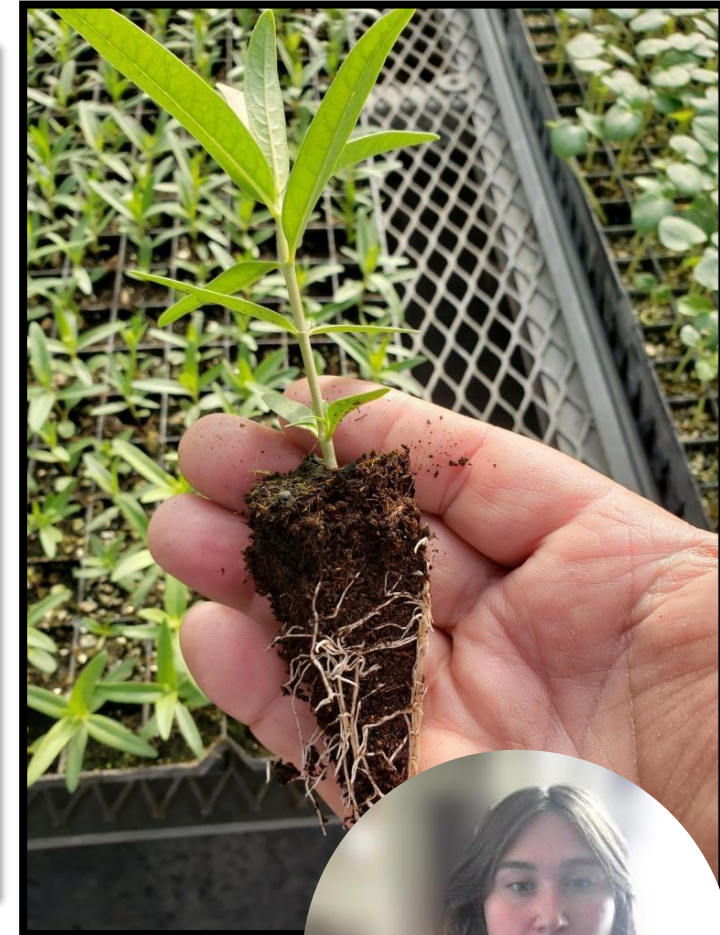
Planting

- Density of milkweed – 2989 plants/hectare
- Pollinator Plant Seed mix

Showy milkweed rhizomes
ready to be planted



milkweed plugs



Monitoring

- Xerces Society site visits
 - Monarch sampling
 - Pollinator sampling
- Plot based design sites – relevés
- Non plot based design sites – full census

Hollenbeck Canyon Wildlife Area,
Rancho Jamul Project, San Diego



Photo: Angela Laws, Xerces Society

Xerces Society

Monarch Sampling

- Search all stems for monarchs
- Record number of eggs and caterpillars found (by instar)
- Record number of stems searched for each milkweed species (vegetative, fruiting, flowering stems)
- If more than 500 stems present, milkweed was sampled along six 25m transects

Hollenbeck Canyon
Wildlife Area,
Rancho Jamul Project,
San Diego



Relevés & Census

- Techniques for vegetation surveys
- Plot-based design sites – relevés (5 sites)
 - Followed the California Native Plant Society (CNPS) protocol
 - Size and number of relevé plots determined by size of pollinator plot
- Non-plot-based design – full census (3 sites)



Monarch Results

- 6 sites had monarchs
- 4 sites with monarch breeding

Total number of monarchs (eggs, larvae, or adults)

	2021	2022		2023	
Site	# larvae	# eggs	# larvae	# adults	# adults
Hollenbeck Canyon WA	3	0	0	0	0
Panorama Vista Preserve	0	2	15	0	1
North Grasslands WA	0	0	0	0	0
Dos Rios Ranch	0	9	32	0	1
Yolo Bypass WA	0	0	0	0	0
Feather River WA	0	0	0	0	0
Upper Butte Basin WA	0	0	0	1	0
Oroville WA	0	0	6	0	0



Challenges

- Exotic floral resources
- Drought
- Varying landscapes – keeping the experiment consistent
- Land use/neighboring land use

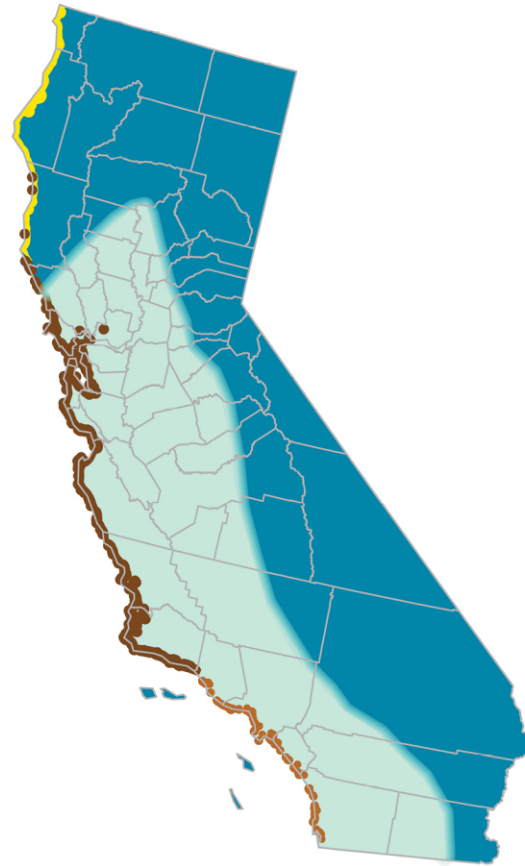
Showy milkweed seed pod, Upper Butte Basin Wildlife Area

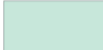



What Next?

- Develop projects in high priority zones
- Establishing 15-million milkweed across the state by 2030!

Priority Action Zones in California for Recovering Western Monarchs



- Priority #1**
-  **Early breeding zone:** Protect and plant pesticide-free early season native milkweed and nectar plants.
 -  **Central coast areas where monarchs overwinter:** Protect and restore overwintering habitat and plant pesticide-free native nectar plants. Avoid planting milkweed within 5 miles of the coast.

- Priority #2**
-  **South coast areas where monarchs overwinter:** Protect and restore overwintering habitat and plant pesticide-free native nectar plants. Avoid planting milkweed within 1 mile of the coast.
 -  **North coast areas where monarchs do not overwinter:** Plant pesticide-free native nectar plants.
 -  **Summer breeding zone:** Identify and protect existing native milkweed and nectar plants. Plant pesticide-free native milkweed.

County boundaries.



A big thank
you to our
partners and
funders!



CALIFORNIA DEPARTMENT OF
WATER RESOURCES



Earth
Discovery
Institute



CALIFORNIA
NATIVE PLANT SOCIETY



XEROPHYTE
SOCIETY
for Invertebrate Conservation



www.riverpartners.org
hgoeman@riverpartners.org
https://www.youtube.com/watch?v=w_qjYp_jxSg