



Beavers and Why They Matter

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SLO Beaver Brigade
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Presentation Overview

- Beaver history and facts
- Benefits of beavers
 - Fire
 - Drought
 - Climate Change
- Obstacles for Beavers
- SLO Beaver Brigade
 - Education
 - Beaver Restoration
 - Beaver/Human Management
 - River Stewards
 - Beaver Festival!



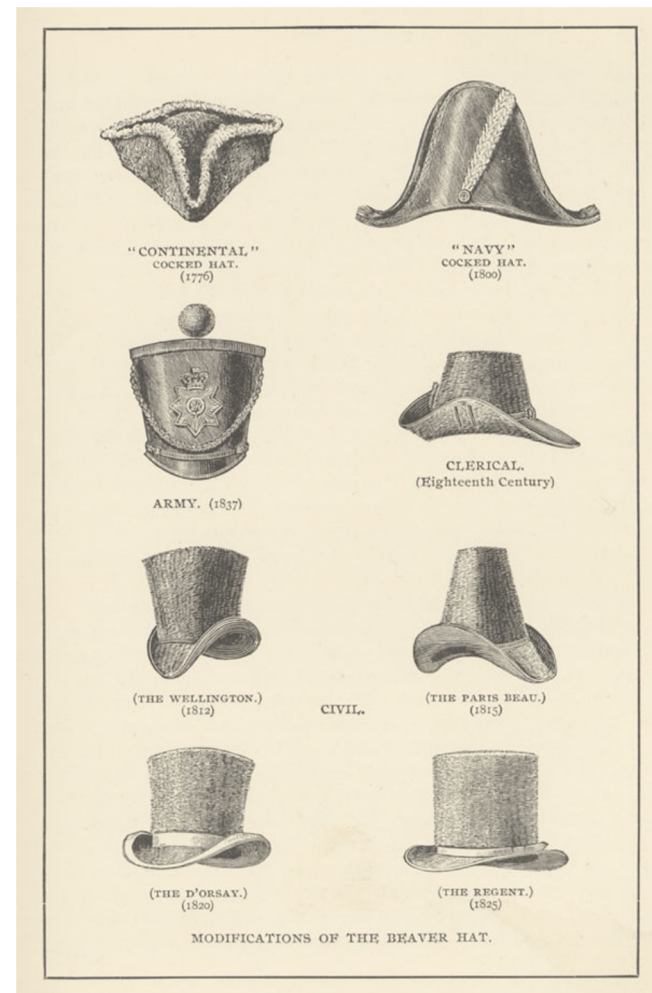
Beavers Were Abundant

- 200-400 million beavers in North America prior to European contact
- **10-20% of the land were wetlands, now less than 2%**
- Reduced to 100,000 beavers in North America by early 1900
- Hunted for their valuable fur

Result: **False belief that beavers are a non-native pest.**

Sources:

- (1) Ernest Thompson Seton, *Lives of Game Animals*, 1929
- (2) FUR BEARING ANIMALS OF CALIFORNIA Their Natural History, Systematic Status, and Relations to Man BY JOSEPH GRINNELL JOSEPH S. DIXON, AND JEAN M. LINSDALE, 1937
- (3) [Fur, Fortune, and Empire](#) by Eric Jay Dolin, 2010



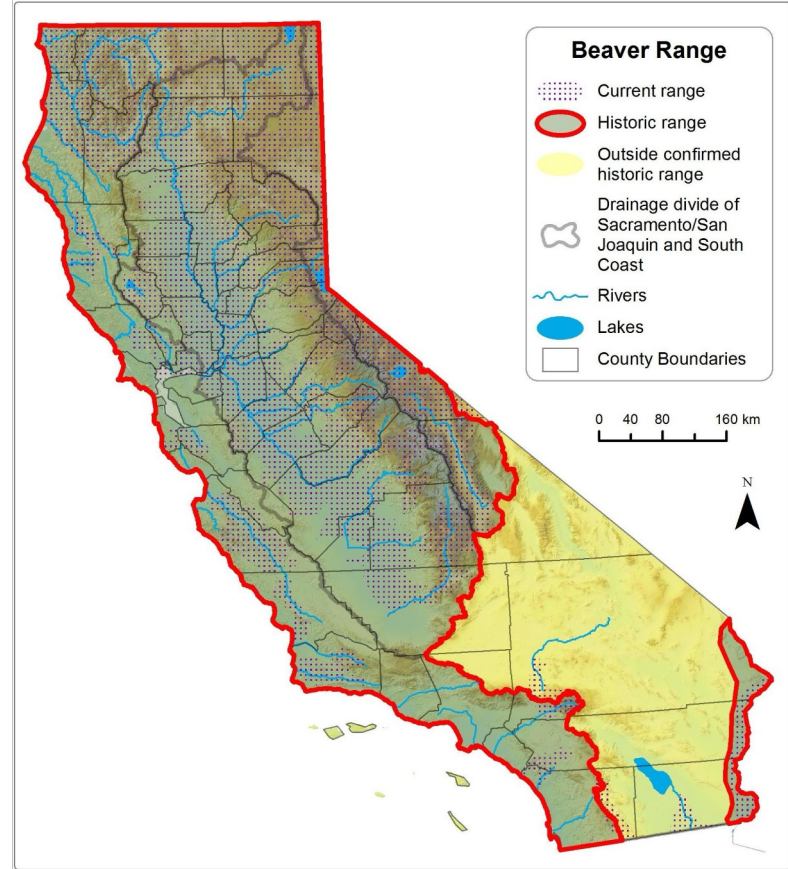
Historic Range of Beaver in California

2013 California Fish and Game 99(4):193-221;

The historical range of beaver (*Castor canadensis*) in California: an updated review of the evidence

Christopher W. lanman, Kate lundQuist, heidi perryman, J. eli asarian, BroCK dolman, riChard B. lanman*, miChael m. polloCK

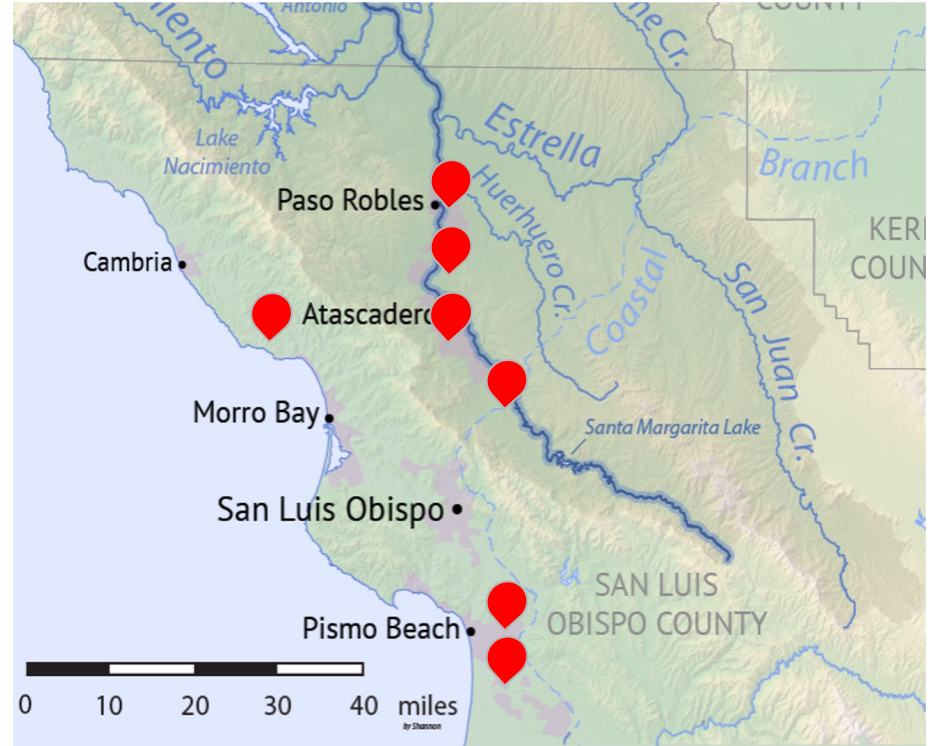
Graphic Courtesy of Eli Asarian, Riverbed Sciences



Current Beaver locations SLO County

- Salinas River and some of its tributaries
 - Santa Margarita
 - Atascadero
 - Templeton
 - Paso Robles
- Arroyo Grande Creek
- Pismo Creek
- Nipomo Creek
- Oceano Lagoon
- Old Creek, Cayucos
- No official population data

We hosted a series of Citizen Science Beaver Survey events this summer to begin collecting accurate population data.



Beaver Facts

- Beavers live in family groups, and they mate for life
- 2-8 beavers per family/colony
- Adults 40-100lbs
- Largest rodent in North America
- Very awkward on land and graceful in water



More Fun Facts

- Webbed back feet, 5 fingered hands
- Broad tail warns of danger
- Second set of clear eyelids to see underwater
- Vegetarian diet: prefer the inner cambium layer of bark
- Orange teeth are hardened with an iron enamel



Beavers Build Dams

Photos courtesy of Dr. Emily Fairfax, Salinas River, Atascadero, CA





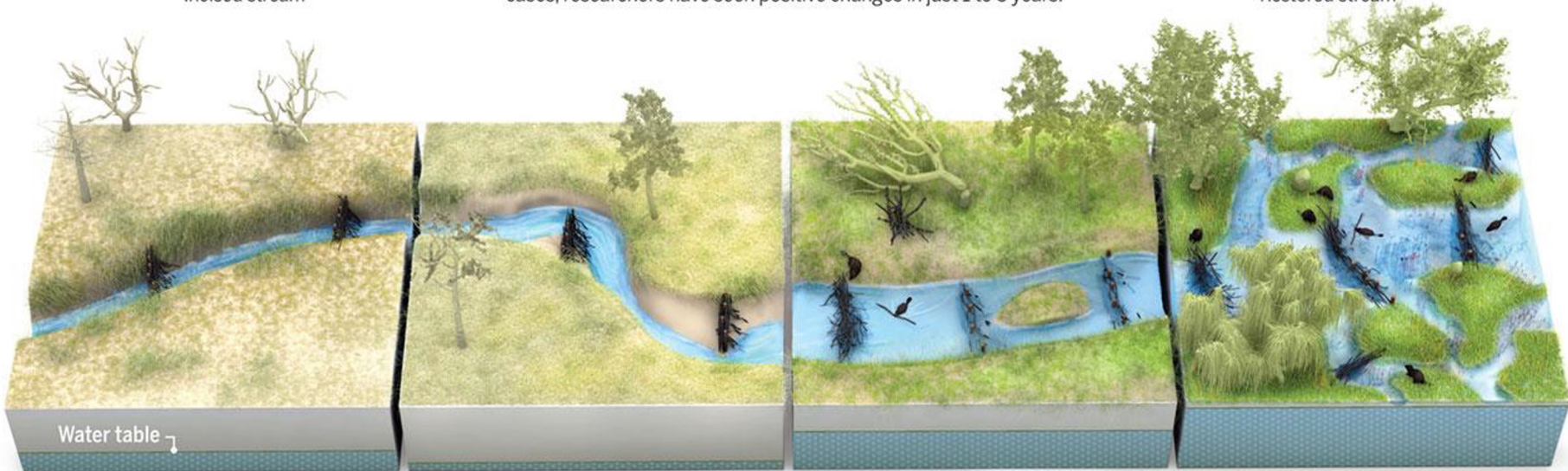
Incised stream

A stream comes back to life

Across the U.S. West, scientists and land managers are using beaver dam analogs (BDAs) to heal damaged streams, re-establish beaver populations, and aid wildlife. In some cases, researchers have seen positive changes in just 1 to 3 years.



Restored stream



Adding dams

Beaver trapping and overgrazing have caused countless creeks to cut deep trenches and water tables to drop, drying floodplains. Installing BDAs can help.

Widening the trench

BDAs divert flows, causing streams to cut into banks, widening the incised channel, and creating a supply of sediment that helps raise the stream bed.

Beavers return

As BDAs trap sediment, the stream bed rebuilds and forces water onto the floodplain, recharging groundwater. Slower flows allow beavers to recolonize.

A complex haven

Re-established beavers raise water tables, irrigate new stands of willow and alder, and create a maze of pools and side channels for fish and wildlife.

Beavers and Fire:

- Sharps Fire, 2018, Idaho, 65,000 acres
- Beaver complex provides important refugia for wildlife during wildfire.
- Dr. Emily Fairfax published *“Smokey The Beaver: beaver-dammed riparian corridors stay green during wildfire throughout the western United States”*
- Can create firebreaks that aid our firefighters



Photo Courtesy of Joseph Wheaton (Utah State University)
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Drought: Beaver dams keep water on the landscape and underground



Photos taken August 2020, Atascadero, CA, 6 months after the last rainfall.

Store 5-10 times more water underground than above ground

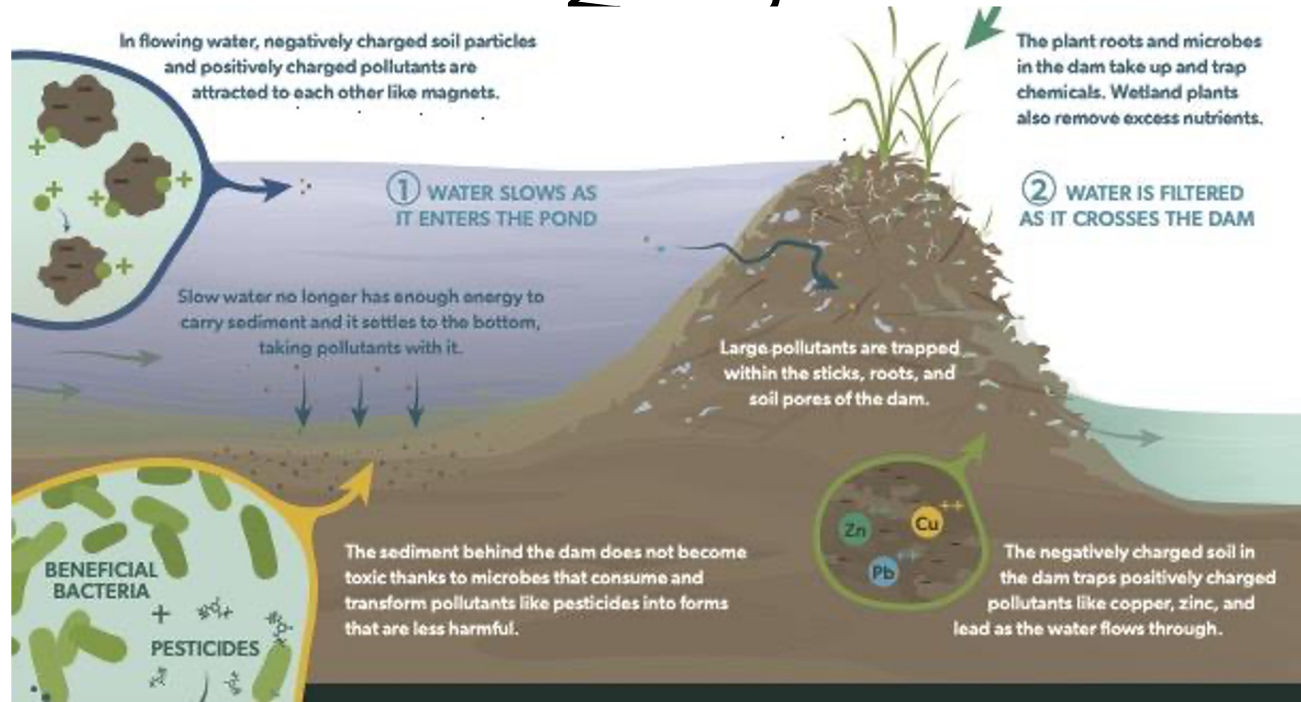
Photo by Brittany App

Beavers and Water Quality

Pollutants are removed as (1) water entering the pond slows down and again as (2) water is filtered through the dam.

1. Sediment settles to the bottom, taking pollutants with it.
1. The plant roots and microbes in the dam take up and trap chemicals, remove excess nutrients, copper, zinc, and lead as the water flows through.

Reference: ProjectBeaver.org



Dewey, C., Fox, P.M., Bouskill, N.J. *et al.* Beaver dams overshadow climate extremes in controlling riparian hydrology and water quality. *Nat Commun* 13, 6509 (2022). <https://doi.org/10.1038/s41467-022-34022-0>

Beavers & Steelhead

- Beavers and steelhead/salmon coexisted for 15-30 million years
- Beaver ponds provide slow water refuge and abundant food – critical for juvenile fish!
- Fish living in beaver habitat grow up to 40% bigger
- Study in Oregon: BDA and beaver restored stream increased juvenile Steelhead survival by 52%



Bouwes, N., Weber, N., Jordan, C. E., Saunders, W. C., Tattam, I. A., Volk, C., Wheaton, J. M., & Pollock, M. M. (2016). Ecosystem experiment reveals benefits of natural and simulated beaver dams to a threatened population of steelhead (*Oncorhynchus mykiss*). *Scientific Reports*, 6, 28581. B. Pollock, M. M., Pess, G., & Beechie, T. J. (2004). The importance of beaver ponds to Coho Salmon production in the Stillaguamish River basin, Washington, USA. *North American Journal of Fisheries Management*, 24, 749–760. C. Council, S. R. W. (2018). Restoring Priority Coho Habitat in the Scott River Watershed Modeling and Planning Report. Prepared for National Fish and Wildlife Foundation. D. Dauwalter, D. C., & Walrath, J. D. (2018). Beaver dams, streamflow complexity, and the distribution of a rare minnow, *Lepidomeda copei*. *Ecology of Freshwater Fish.*, 27, 606–616. E. Wathen, G., Allgeier, J. E., Bouwes, N., Pollock, M. M., Schindler, D. E., & Jordan, C. E. (2019). Beaver activity increases habitat complexity and spatial partitioning by steelhead trout. *Canadian Journal of Fisheries and Aquatic Sciences*, 76(7), 1086-1095.

Beavers Support Wildlife

- Keystone species
- Maintain water year-round
- Wetlands are 2% of land, but support 80% of native biodiversity
- Beaver wetlands are considered “biodiversity hotspots”
- Game cameras observed 85 different species



Beavers and Climate Change

- Wetlands are most efficient land ecosystem at absorbing and storing CO₂
- Wet soil holds 10-30x more carbon than dry soil
- Organic material gets locked underwater, and buried underground- creating rich, fertile soil

Photo Courtesy of Joseph Wheaton (Utah State University) Creative Commons Attribution 4.0 International License.

Wenjuan Huang, Steven J. Hall. **Elevated moisture stimulates carbon loss from mineral soils by releasing protected organic matter.** *Nature Communications*, 2017; 8 (1) DOI: [10.1038/s41467-017-01998-z](https://doi.org/10.1038/s41467-017-01998-z)



Obstacles for local Beavers

- Off-road vehicles **driving over beaver dams**
- Lack of education about **beavers**
- Lack of awareness on **coexistence tools**
- **Invasive Species** (Phragmites, Arundo, Tamarisk)
- Rivers and streams are **degraded & lack natural complexity**



SLO Beaver Brigade

Creating the conditions for beavers to thrive in SLO County

- Free guided tours twice a month to beaver habitat
- Educational presentations
- Restoration projects using human-built beaver dams (BDA)
- Beaver Management Tools
- Partnership with Morro Bay Open Space Alliance
- River Stewards: Monthly river cleanups /invasive removal
- **Annual Beaver Festival March 23 SLO Mission Plaza**



LEILA PHILIP

BEAVER LAND

How One
Weird Rodent
Made America

Beaver Festival photos by
Brittany App, April 1
2023, SLO Mission Plaza

Beaver Dam Analog (BDA)

Installations

Mimicking the beavers, so they can come back to our rivers and streams

**Nature's
Engineers™**



These training trips were made possible by a grant from a local organization, Biodiversity First!

Beaver Management Tools

We have the tools and technology to live peacefully with beavers!

Flow devices allow humans to set the height of beaver ponds. Wrapping trees protects them from beavers.



Photos © Mike Callahan, Beaver Institute



Morro Bay

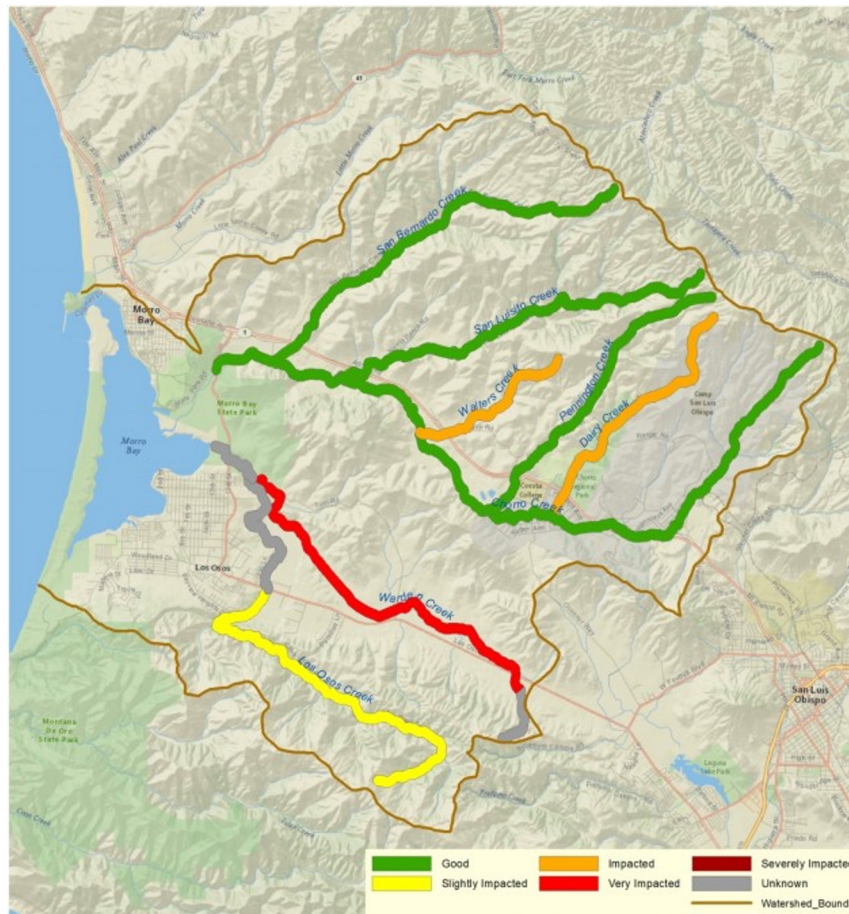


Environmental challenges facing Morro Bay:

- Sedimentation into the bay
- Sea water intrusion
- Incised, degraded creeks
- Steelhead trout facing extinction
- Poor water quality in some tributary creeks

Similar challenges in Monterey Bay and Carmel Bay?

Seminar at Cal Poly on May 18:
Bringing Beavers Back to Morro Bay Watershed



Dissolved oxygen levels in MB watershed creeks
Credit: Morro Bay National Estuary Program

Northern Chumash View of Beavers

“Beaver are one of the wonders of our environment, we love the Beaver, they are an integral part of all things that have to do with water, creating so many great benefits for our environment.

...let everyone know we are great supports of the Sacred Beavers, the work they do to bring life to our streams and rivers. They play a hidden connection to the great Spirit and the bringing of rains, recharging our aquifers, and the regeneration of life to our streams and rivers. Our Sacred Beavers can play a great part in climate change.”

-Fred Collins, former Chief of the Northern Chumash Tribal Council, warrior for the environment



What you can do to support beavers:

- **Get involved:** Volunteer at a cleanup, event or become a Dam Monitor: email info@slobeaverbrigade.com
- **Experience the habitat:** come out on a beaver tour
- **Plant** native riparian plants
- **Restore a creek** on your property
- **Donate to the SLO Beaver Brigade:** www.slobeaverbrigade.com/donate (tax-deductible through our fiscal sponsor)



Photo courtesy of Dr. Emily Fairfax, Atascadero, May 2022