




# Save The Bay x West Oakland Environmental Indicators Project

HABITAT RESTORATION & ECOSYSTEM SERVICES

# Agenda

- ▶ 10-11 Overview of Habitat Restoration
- ▶ 5 Minute Break
- ▶ 11-12 Ecosystem Services of Wetlands




Poll: What does “Habitat Restoration” mean to you?

# *Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.- Society for Ecological Restoration*

- ▶ Ecosystems are dynamic communities of plants, animals, and microorganisms interacting with their physical environment as a functional unit.
- ▶ Ecological restoration seeks to initiate or accelerate ecosystem recovery following damage, degradation, or destruction.





▶ *“If you don't know  
where you've come  
from, you don't know  
where you're going.” –  
Maya Angelou*

# California at a Glance

- The California Floristic Province is a global biodiversity hotspot and is the most biodiverse state in the United States
- Many of our plant and animal species are **endemic** to California, meaning they are found nowhere else on Earth.

**California Plants: 6,506 taxa, 2,264 endemic (34%)**



**Xerces Blue  
Butterfly (extinct)**



**Salt Marsh Harvest Mouse**



**San Francisco Garter Snake**

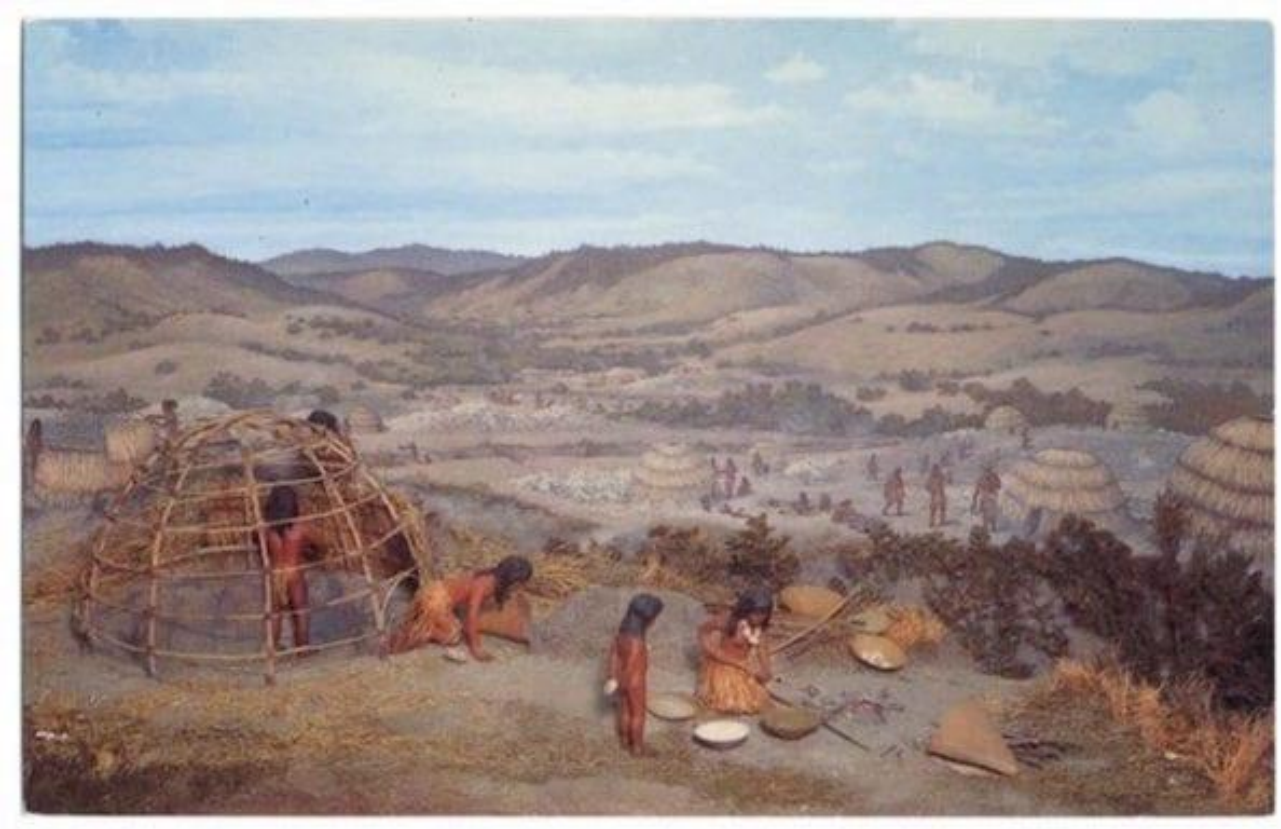


**Franciscan Manzanita**



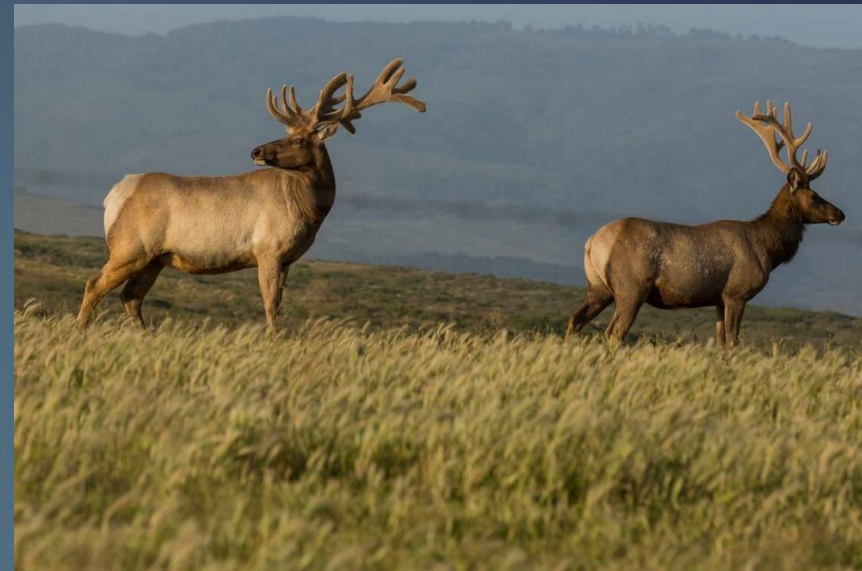
**Antioch Dunes Evening Primrose**

# California at a Glance



- ▶ Native Californians have a huge influence on the composition of Californian landscapes
- ▶ Indigenous land practices such as cultural burns kept forest understories clear, supporting habitat for desired plant and animal species
- ▶ Gathering practices tended to improve the overall health of the populations that were harvested
- ▶ Together these practices helped steward and maintain California's biodiversity

# Impacts of Contact and Colonization





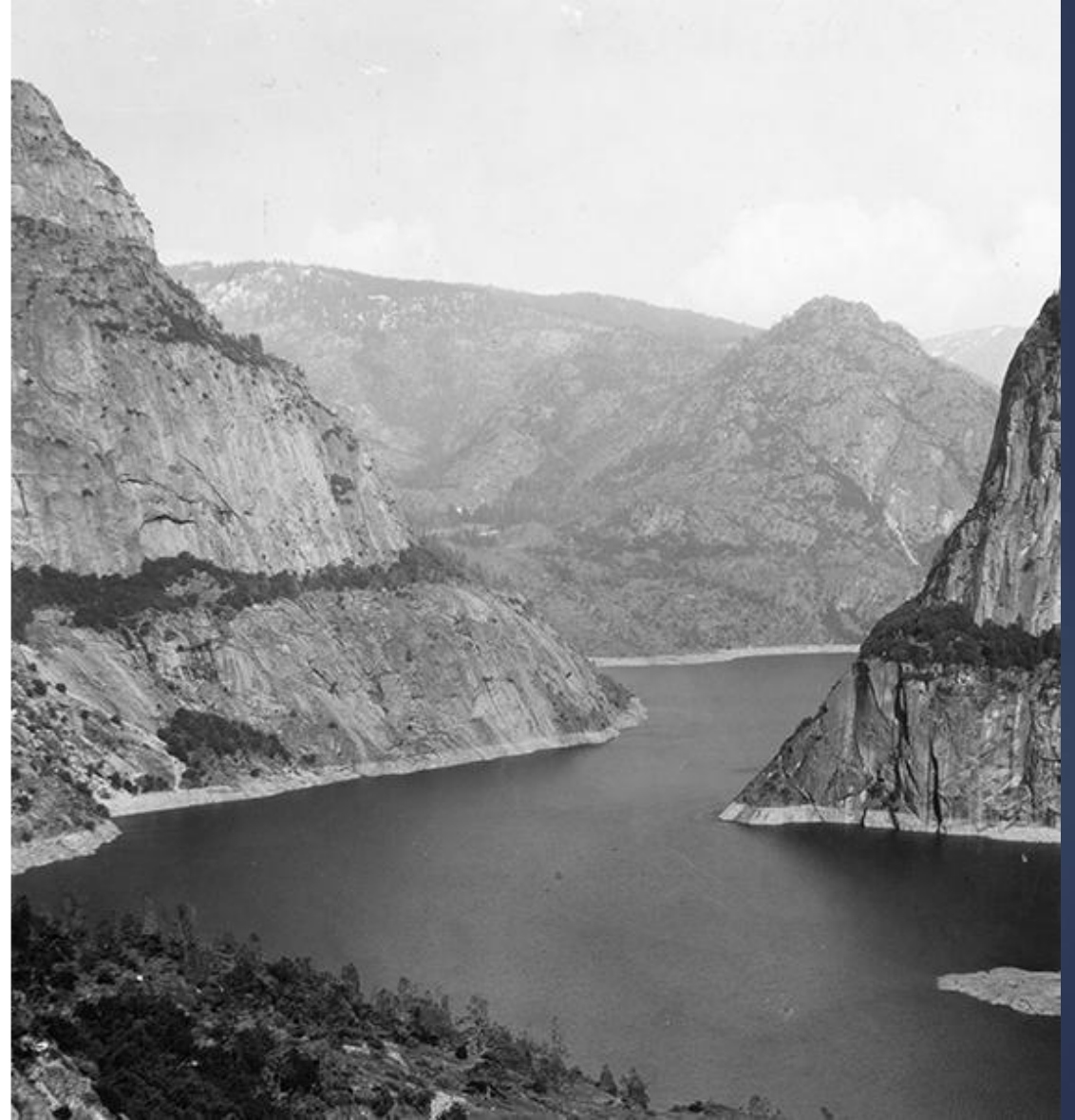
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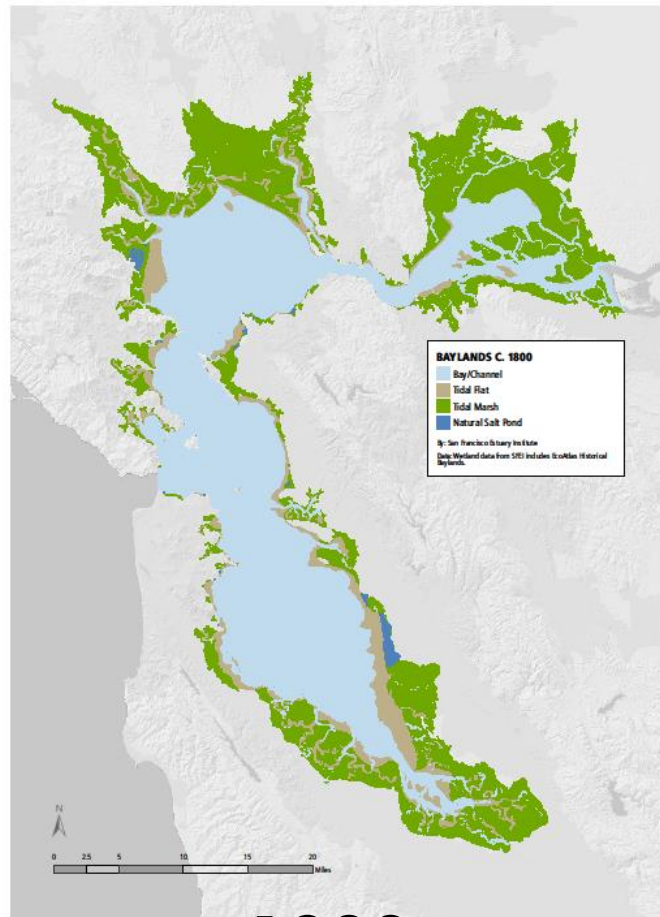




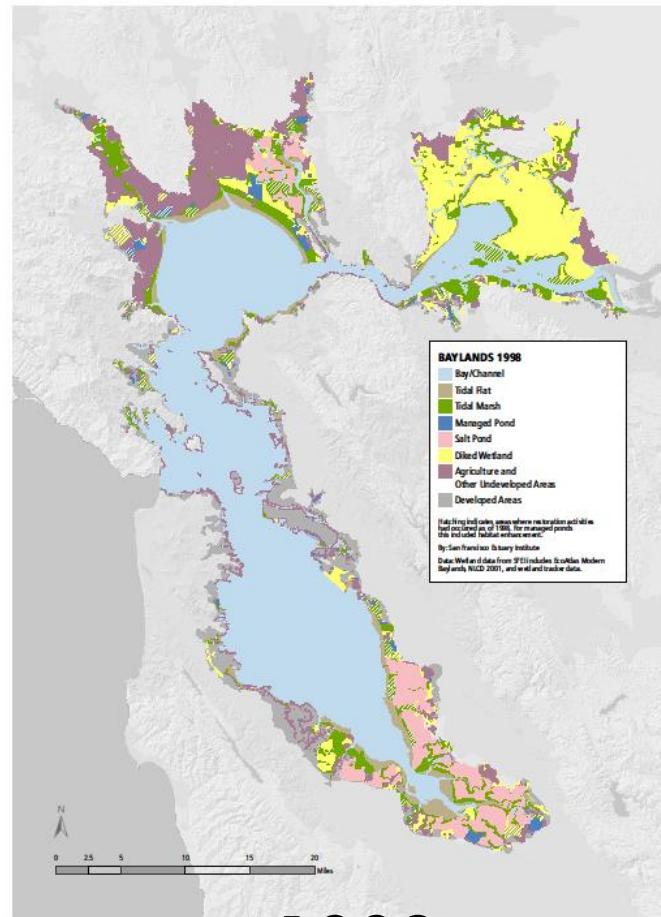




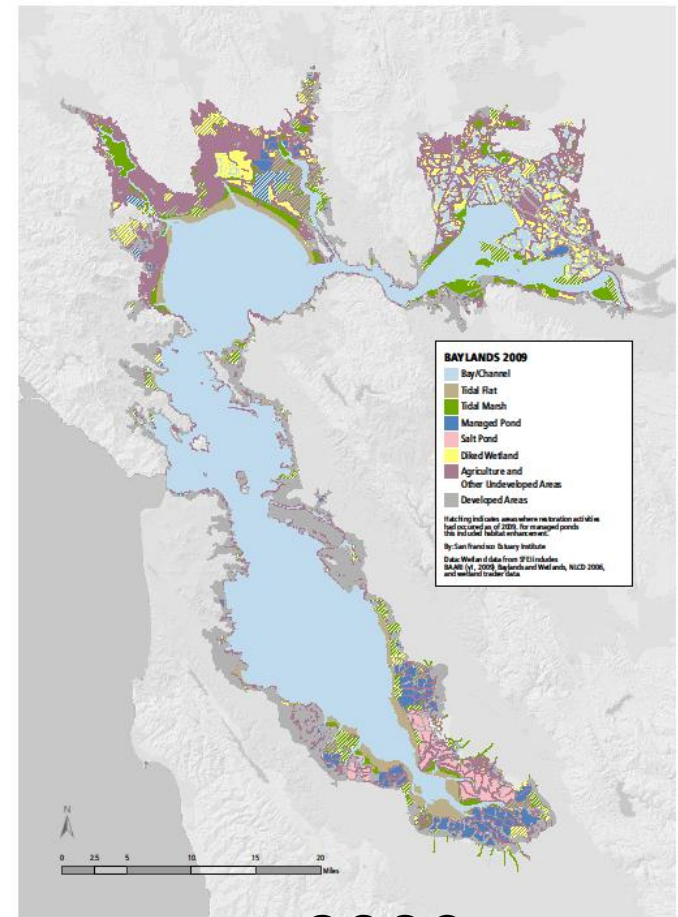
# San Francisco Baylands Past & Present



1800



1998



2009

# Limits to Ecological Restoration

- ▶ What were ecosystems like pre-colonization?
- ▶ Where are we able to restore ecosystems given societal needs (food, water, housing, etc.)?
- ▶ Is restoration enough to compensate for

# Planning a Restoration Project

## 1. Define your site

- ▶ Define the boundaries of where your restoration project will occur
- ▶ Make maps of your site to refer back to

# Planning a Restoration Project

## 2. Find a reference site

- ▶ Find an area that closely matches the habitat type you are trying to restore
- ▶ Observe what plant species occur there, and where they grow

# Planning a Restoration Project

## 3. Determine baseline conditions

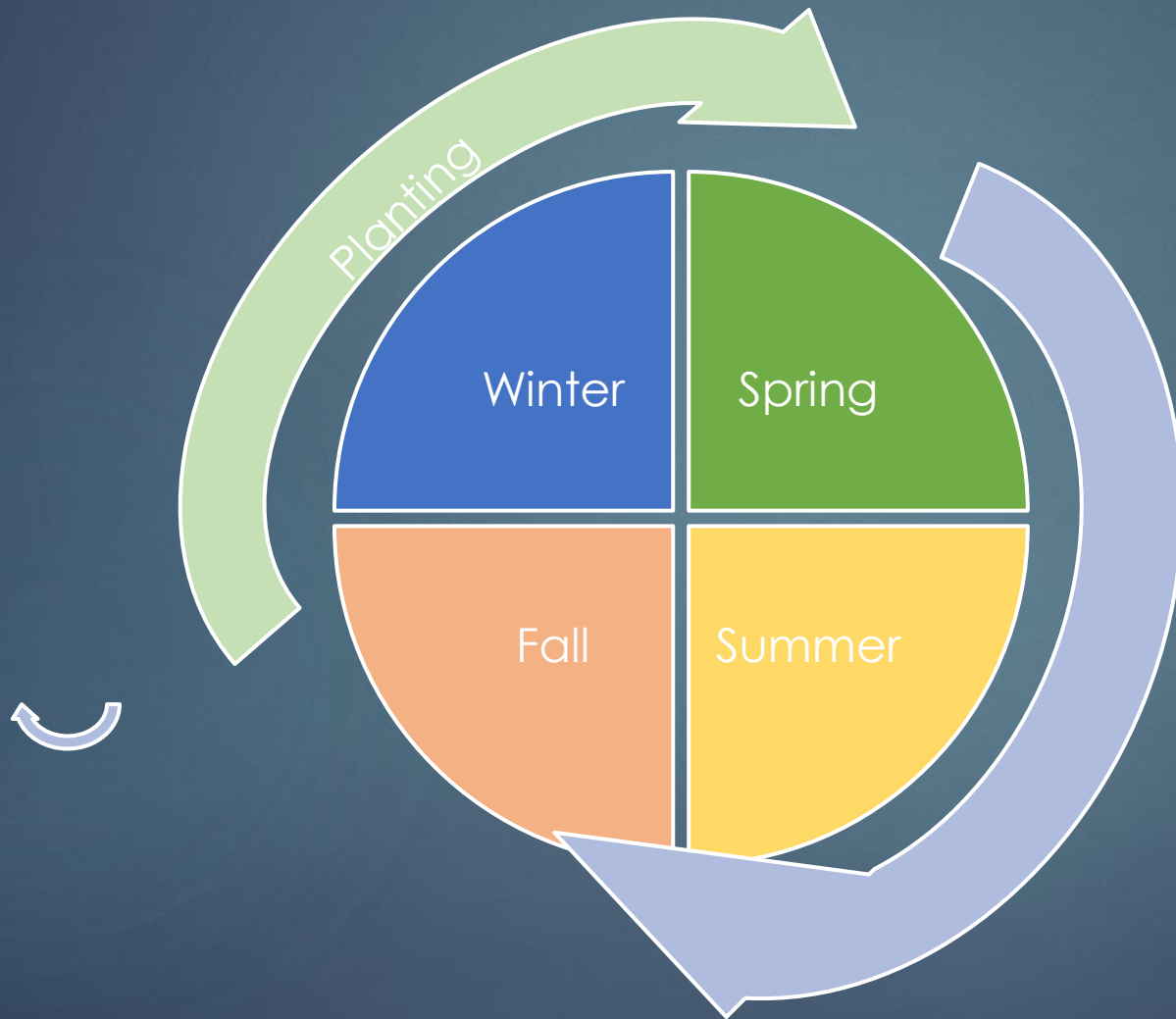
- ▶ What plants (native or non-native) are present at or near the site?
- ▶ What's the soil like at your site? Will it need amending?
- ▶ Take baseline photos to show what your site looks like before you begin restoration

# Planning a Restoration Project

## 4. Make a restoration plan

- ▶ Decide which plant species are appropriate to plant at your site and which are available for you to install at your site
- ▶ Decide what soil amendments are possible or feasible
- ▶ Make a plan for maintenance work after planting is finished
- ▶ Get whatever permits or permission is required to do your restoration project
- ▶ Determine what “success” looks like for your project

# Restoration Cycle





# Seed Collection

- Seeds of selected native plant species are collected beginning in the late spring through fall
- Ideally, seeds are collected from areas that closely resemble the restoration site, are geographically near the restoration site, or share similar climate, soil characteristics
- Collection only takes place where we are permitted to collect from or where we are given permission to collect from
- Special care is given to never over-collect from a single population: rule of thumb is no more than 5% of a population



# Seed Storage and Cleaning

- ▶ Seeds are dried to remove excess moisture and cleaned to remove chaff (plant material) from clean seed
- ▶ Seeds are labeled and stored in a dry place until they are needed



# Plant Propagation



- In early Spring, seeds are sown into flats containing peat moss and stored in the greenhouse until germination occurs
- Throughout the Spring and Summer, plants are transplanted into individual containers and stored in a shadehouse to receive exposure to the elements. Here, plants are regularly watered, and receive regular maintenance such as pruning or fertilizing.



# Planting Season

- Installing native plants occurs in late fall through early spring to coincide with the rainy season
- Plants are often mulched with a 3" layer of wood chips to suppress germination of weeds and to retain moisture in the soil



# Maintenance and Weed Management



- Removal of weedy and invasive plants occurs throughout the spring, summer, and fall
- Weeds can be removed using hand tools or mechanically with brushcutters
- Installed plants are regularly watered and mulched for the first year after they are planted

# Monitoring

- Monitoring is the process we assess and track the progress of our restoration work
- Restoration success can be determined by measuring “Percent Cover” of native and non-native plants at our restoration sites, or how much space they occupy at a site





# Ecosystem Services

Poll: What does “Ecosystem Services” mean to you?





# HEALTHY WETLANDS PROVIDE:



## Clean Water

Wetland plants filter the pollution to actually clean the Bay by trapping polluted runoff before toxins can reach open water.



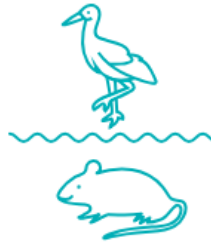
## Economic Benefits

California's wetlands provide tremendous benefits to the state from tourism, fishing, and recreation.



## Help Curb Global Warming

Tidal marshes are one of the natural systems that capture and store carbon from the atmosphere.



## Habitat for Sensitive Species

Healthy tidal marshes serve as foraging and breeding grounds, providing food for hundreds of species, including many that are threatened and endangered.



## Open Space and Recreation

Wetlands are beautiful areas of open space around the highly urbanized Bay Area, and many trails and parks near wetlands provide residents with places to hike, birdwatch, bike, kayak, and more.



## Protect Communities from Floods and Sea Level Rise

Many residents live and work at or below sea level. Wetlands can provide flood protection because they act as sponges, slowing down and soaking up large quantities of water from storms and high tides.