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**California's Coastal
 Freshwater Wetlands**

Lorraine Parsons
 Point Reyes National Seashore
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What are wetlands?

- Habitat Definition
 - Holland - e.g., Coastal and Valley Freshwater Marsh
 - Cowardin Classification

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What are wetlands?

"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water."

Classification of Wetlands and Deepwater Habitats of the United States
 Cowardin et al. (1979)

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What are wetlands?

Cowardin Definition

For classification, must have one or more:

- At least periodically, the land supports predominantly hydrophytes
- The substrate is predominantly undrained hydric soil; and
- The substrate is nonsoil and is saturated with water or covered by shallow water

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What are wetlands?

"...in order for any area to be classified as wetland by the Service, the area must be periodically saturated or covered by shallow water, whether wetland vegetation and/or hydric soils are present or not...."

A Clarification of the U.S. Fish and Wildlife Service's Wetland Definition
 National Wetlands Newsletter
 Tiner (1989)

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What are wetlands?

- Habitat Definition
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 - **Hydrogeomorphic Classification**

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What are wetlands?

- **Habitat Definition**
 - Holland - e.g., Coastal and Valley Freshwater Marsh
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 - Hydrogeomorphic Classification
- **Regulatory Definition**
 - Corps
 - CDFG/Coastal Commission

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What are freshwater wetlands?

Salinity Regimes

Saline	30 to > 40 ppt
Brackish	0.5 to 30 ppt
Freshwater	<0.5 ppt

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What are freshwater wetlands?

Hydrology

On permanent, seasonal, or temporary basis:

- **Inundation** or above ground ponding of water
- **Elevated Groundwater Tables** below ground within the root zone of wetland plants
- **Saturation** below ground within the root zone of wetland plants

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What are freshwater wetlands?

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What are freshwater wetlands?

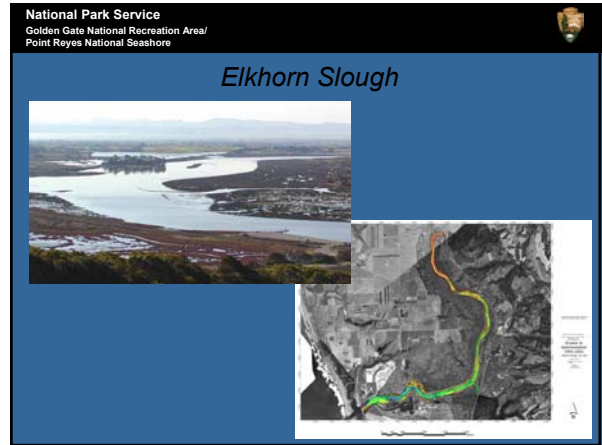
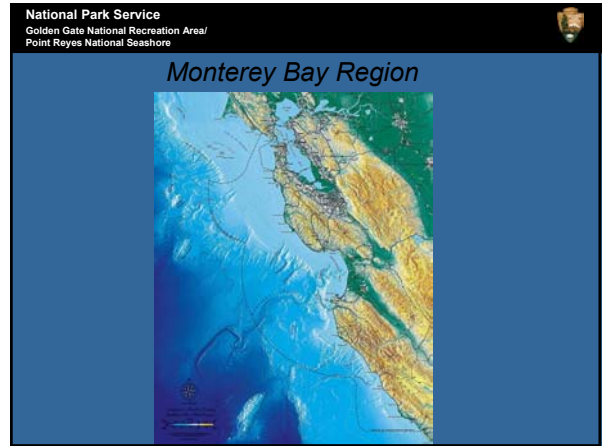
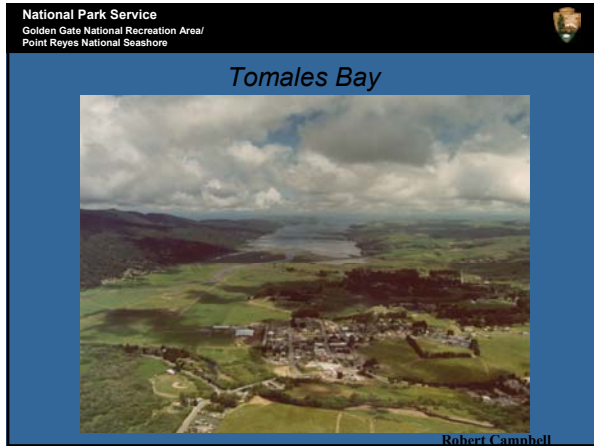
The role of geology

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What are freshwater wetlands?

The role of geology

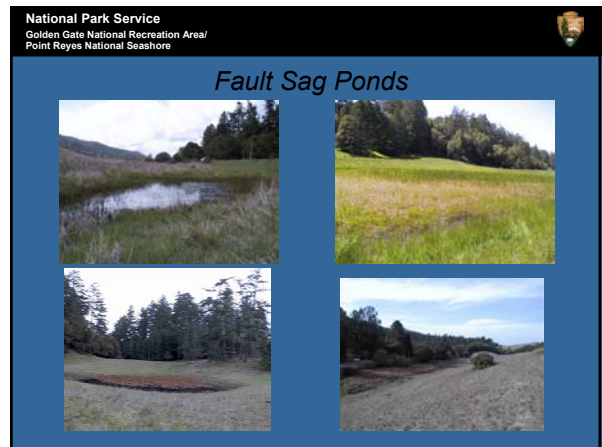
- Why Wetland and Wetland Landscapes Are Formed
 - Landscape Level



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What are freshwater wetlands?
 The role of geology

- Why Wetland and Wetland Landscapes Are Formed
 - Landscape Level
 - Community or Local Feature Level
 - Surface subsidence




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What are freshwater wetlands?
 The role of geology

- Why Wetland and Wetland Landscapes Are Formed
 - Landscape Level
 - Community or Local Feature Level
 - Surface subsidence
 - Ex. Sag Ponds
 - **Surface aggradation**


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Deltas
Mississippi River



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Giacomini Ranch
Tomales Bay




U.S. COAST SURVEY
 ALBATROSS SOUND
 SECTION X
 1862

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 Consultants in Wetlands

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Giacomini Ranch
Tomales Bay



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What are freshwater wetlands?
 The role of geology

- Why Wetland and Wetland Landscapes Are Formed
- **Why Wetlands are "Wet"**
 - Source of Water or Hydrology

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Seeps
"Stand-Alone"




Ecology and Conservation of California's Coastal Freshwater Wetlands

An Introduction to the diversity of coastal freshwater wetlands Lorraine Parsons

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Seeps Headwater



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Seep-Associated Wetlands




Freshwater Marsh

Riparian Wetlands

Fresh-Brackish Transition

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Giacomini Ranch Tomales Bay




Hydrologic Influences

- Groundwater - Freshwater
- Surface - Freshwater
- Surface - Freshwater/Groundwater - Freshwater
- Surface - Freshwater/Groundwater - Tidal
- Surface - Tidal
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Freshwater Marsh

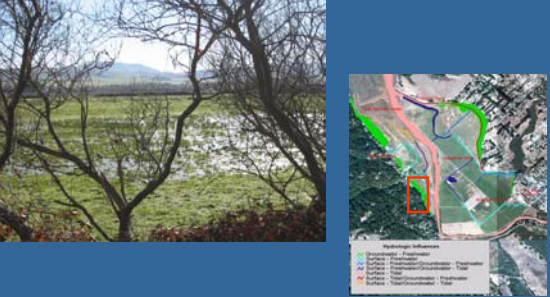


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Wet Meadow

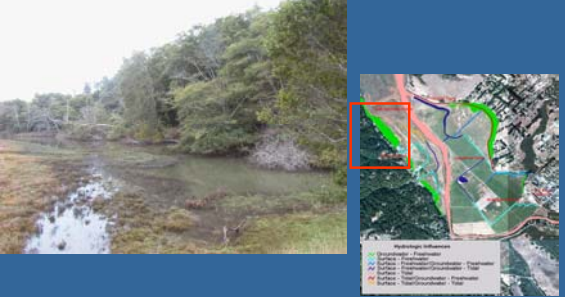


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Riparian



Hydrologic Influences

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Mesic Coastal Scrub

The slide features a title 'Mesic Coastal Scrub' in blue text. To the right is an aerial map with a red rectangular box highlighting a specific area. Below the map is a wide-angle photograph of a lush, green coastal scrubland with various shrubs and trees under a blue sky with light clouds.

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Wet Pasture

The slide features a title 'Wet Pasture' in blue text. To the right is an aerial map with a red rectangular box highlighting a specific area. Below the map is a photograph of a green pasture with several black cows grazing. In the background, there are rolling hills and a forested ridge.

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What are freshwater wetlands?

The role of geology

- Why Wetland and Wetland Landscapes Are Formed
- Why Wetlands are "Wet"
 - Source of Water or Hydrology
 - Groundwater
 - Seep Wetlands
 - Reason Why Water Ponds
 - Impermeable or Low Permeability Bedrock Layer or "Pan"

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What are freshwater wetlands?

Seasonal Wetlands versus Vernal Pools

- Seasonal Wetlands: Wetlands that pond water on a temporary or seasonal basis
 - Often support:
 - small, floating emergent plant species
 - algae
 - invertebrates
- Vernal Pools: Subset of Seasonal Wetlands
 - Characteristic geologic substrate
 - Characteristic flora and fauna
 - Higher percentage of native spp.

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Vernal Pools

The slide features the title 'Vernal Pools' in blue text. Below the title are four small photographs arranged in a 2x2 grid. The top-left photo shows a person standing on a wooden boardwalk next to a shallow, grassy pool. The top-right photo shows a circular, shallow pool with yellowish-brown water. The bottom-left photo shows a pool surrounded by trees and a fallen log. The bottom-right photo shows a grassy field with a small, shallow pool.


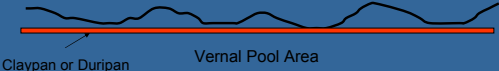
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Vernal Pools Bedrock Formation

The slide features the title 'Vernal Pools Bedrock Formation' in blue text. Below the title is a line graph with two lines. The x-axis is labeled 'Vernal Pool Area' and 'Sierra Nevadas'. The y-axis represents bedrock formation level. A red line shows a sharp increase in bedrock formation level towards the Sierra Nevadas, while a black line shows a more gradual increase.

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Vernal Pools Claypan or Duripan

Claypan or Duripan Vernal Pool Area

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What are freshwater wetlands?

Location of Vernal Pool Types



- **Volcanic - Basalt Flow/Volcanic Mudflow**
 - Western Sierra Foothills between Shasta and Tulare
 - Volcanic tablelands of Shasta, Lassen, Modoc Counties
 - Santa Rosa Plateau - Riverside County
- **Claypan**
 - Lower portions of Central Valley-Sacramento to Colusa
 - Mira Mesa - San Diego County
 - Santa Rosa Plain - Sonoma County
- **Duripan or Hardpan**
 - Higher portions of Central Valley - Fresno to Shasta
 - Mira Mesa - San Diego County

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Coastal Vernal Pools




Santa Barbara

San Diego

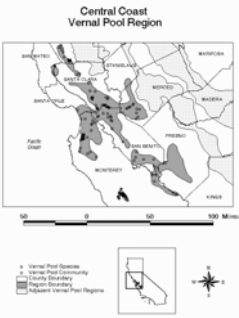


Point Reyes



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Coastal Vernal Pools Central Coast-Monterey Area



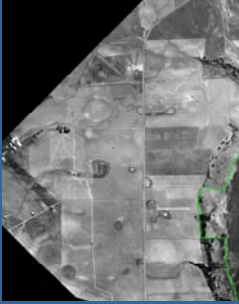
Central Coast Vernal Pool Region

0 50 100 Miles

Legend:
 • Vernal Pool Occurrence
 - Vernal Pool Community
 - County Boundary
 - Program Boundary
 - Subregion in Vernal Pool Region

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Coastal Vernal Pools Elkhorn Slough Area



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Seasonal Wetlands






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What are freshwater wetlands?
Seasonal Wetlands

- **Seasonal Wetlands:** Wetlands that pond water on a temporary or seasonal basis
- **Vernal Pools:** Subset of Seasonal Wetlands
 - Characteristic Flora and Fauna
 - Higher Percentage of Native Spp.
- **Dune Swale Ponds: Subset of Seasonal Wetlands**
 - Formed by groundwater and precipitation

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Dune Swale Wetlands



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The role of geology

- **Why Wetland and Wetland Landscapes Are Formed**
- **Why Wetlands are "Wet"**
 - Source of Water or Hydrology
 - Groundwater
 - **Reason Why Water Ponds**
 - Impermeable or Low Permeability Bedrock Formation or "Pan"
 - Vernal pools and some seasonal wetlands
 - **Water-Holding Soils**

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Flat Wetlands
Moist Grassland



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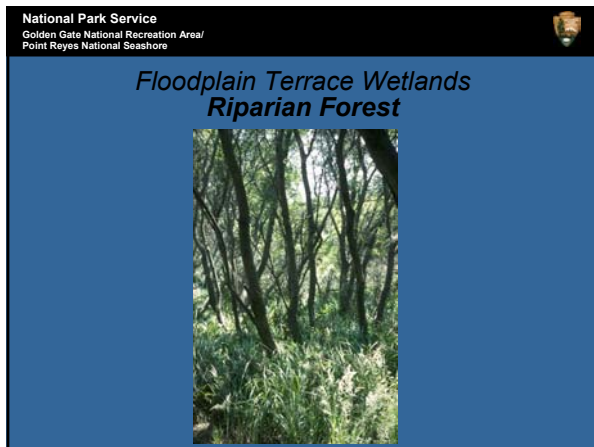
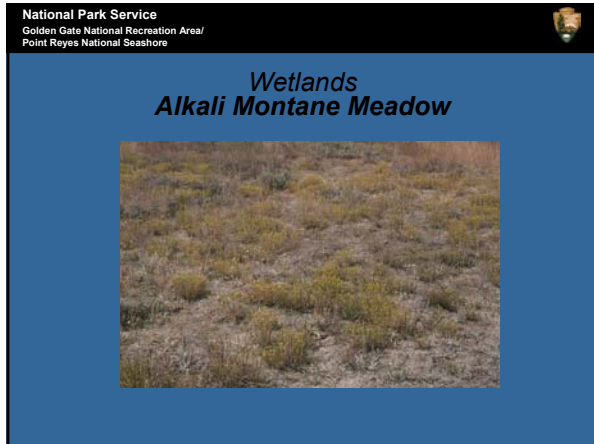
Flat Wetlands
Wet Pasture

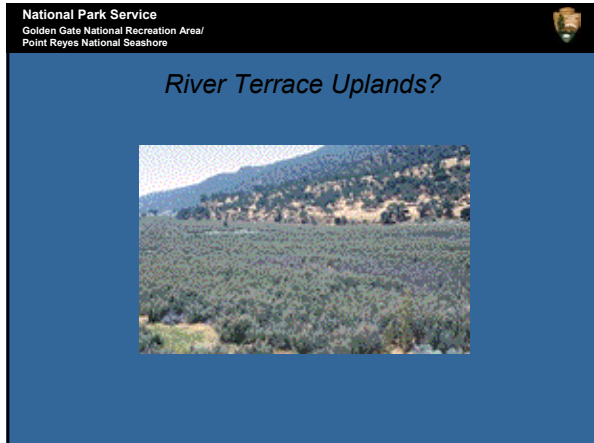
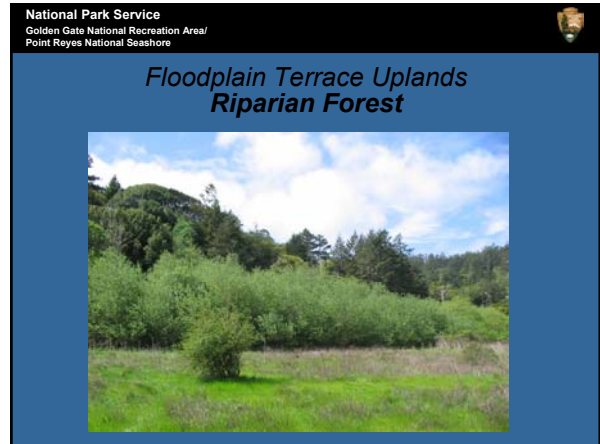
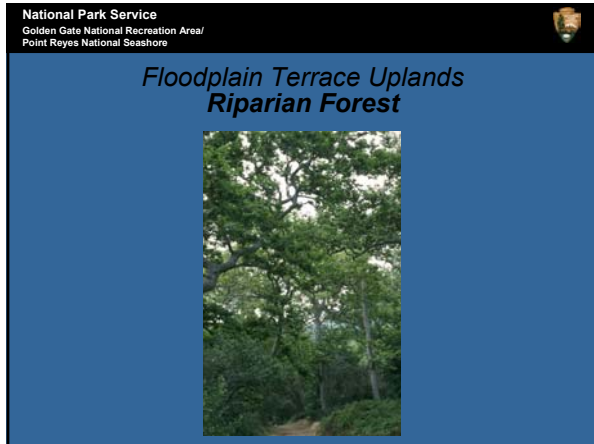


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Wetlands
Wet Meadow







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What are freshwater wetlands?

Loss of Freshwater Wetlands

- Development – filling of wetlands
- Loss of seeps due to groundwater withdrawal
- Loss of wetlands due to increasing salinity
 - Removal of source freshwater
 - Increasing tidal influence – Elkhorn Slough
- Reclamation for agriculture – Use as stock ponds

