Monterey Peninsula Water Management District

Carmel River Watershed: Water Supply Perspective

A presentation for the

Western States Source Water and Ground Water Protection Forum

Tuesday, May 5, 2009

Joseph Oliver, Water Resources Manager

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Preamble

Ground Water vs. Groundwater

- That is not an earthquake you felt, it was the USGS changing its longstanding policy on the two-word vs. one-word spelling.
- On March 26, 2009, USGS Tech Memo 2009.03 issued, reversing Tech Memo 75.03, and the 35-year old policy on the two-word spelling.
- Change becomes effective on August 1, 2009
- Additional information at http://water.usgs.gov/admin/memo/GW/gw09.03.html

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Topics

Overview

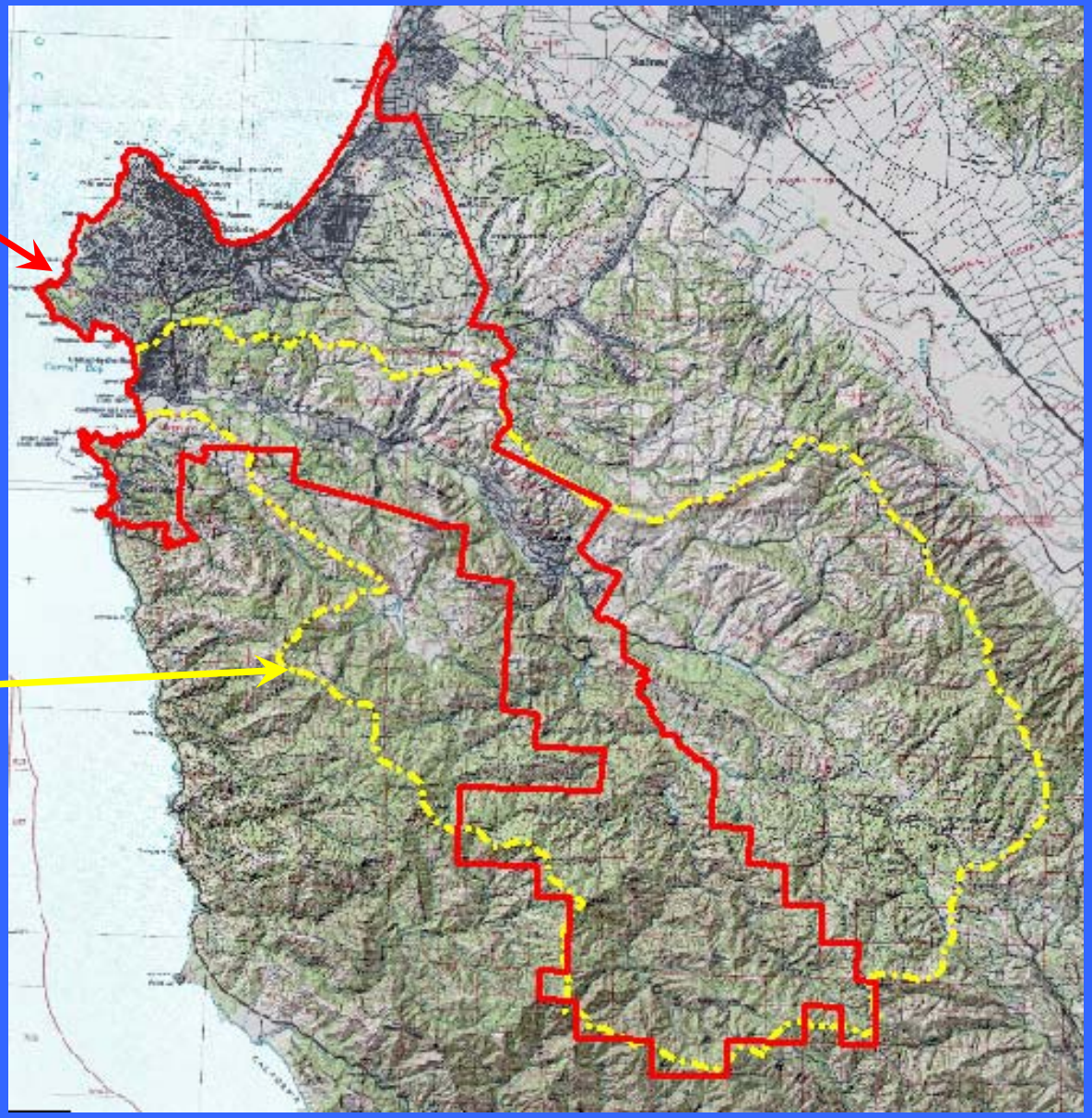
- Monterey Peninsula setting
- Water supply sources
- Historical water supply development

Issues, Constraints, Opportunities

- Water extractions
- Riparian vegetation, channel-bank stability
- Endangered Species Act
- Carmel River Dams: sedimentation, safety
- 2008 watershed fire
- Lagoon / wetland protection and enhancement
- Water supply planning

MPWMD Boundary

Carmel River Watershed Boundary



Monterey Peninsula Water Resource System

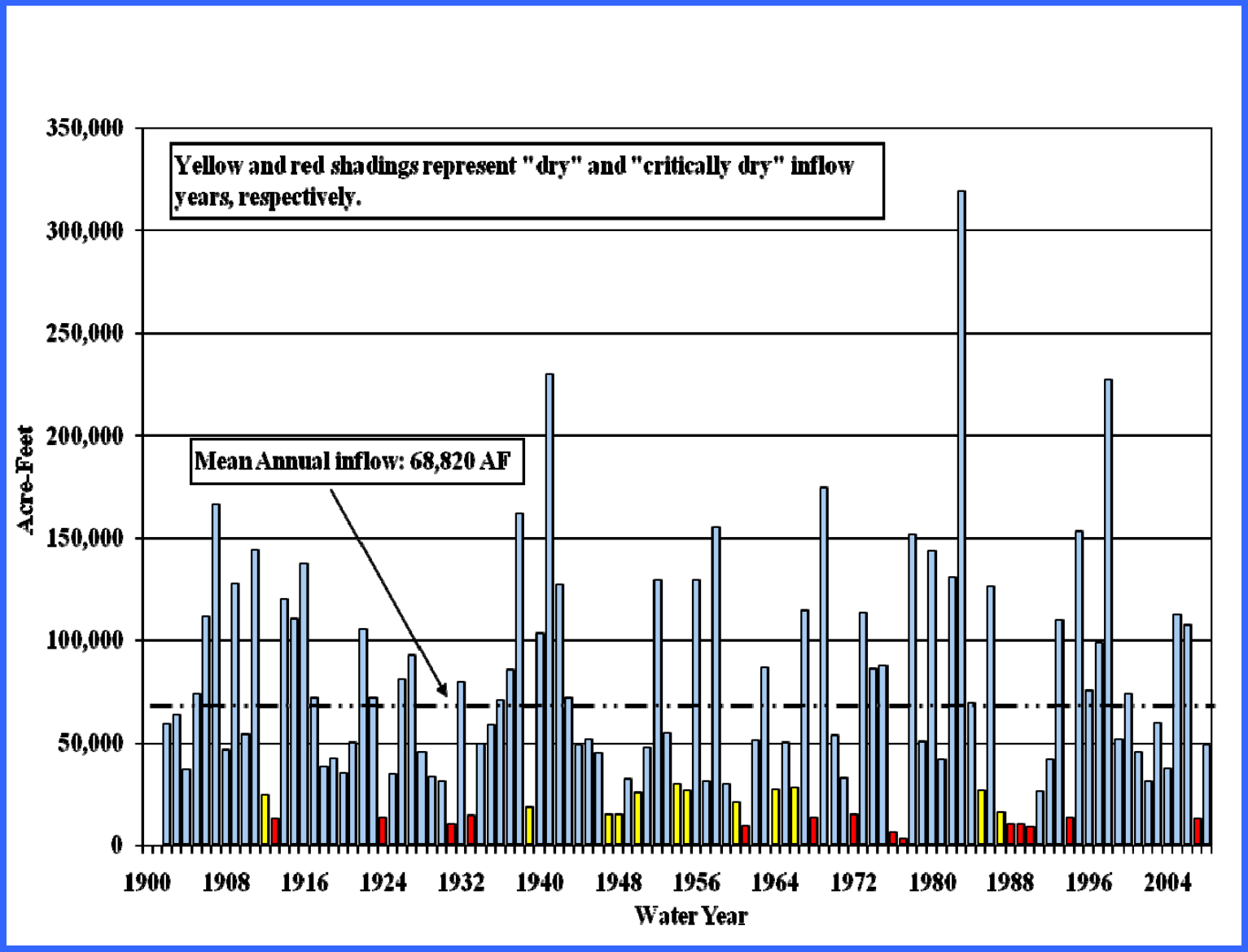
Carmel River Watershed - Physical Features

- **Area**: 255 square miles (163,000 acres)
- **River length**: 36 miles of main stem
- **Upper 20 river miles**: steep canyons, relatively undeveloped, headwaters in Ventana Wilderness Area
- **Lower 16 river miles**: alluvial valley floor, moderately to densely developed
- **River mouth**: Large lagoon and wetland (100 acres)

Rainfall in the basin

- Rainfall amounts vary significantly geographically and seasonally
  - annual rainfall at San Clemente Dam ranges from <3 inches to >46 inches
  - annual rainfall in the basin ranges from <15 inches at the coast to more than 40 inches in the headwaters
  - 10-inch overnight accumulations are rare, but occurred in 1995 and 1998

Unimpaired Carmel River Flow at San Clemente Dam Site: 1902- 2008



Mediterranean Climate

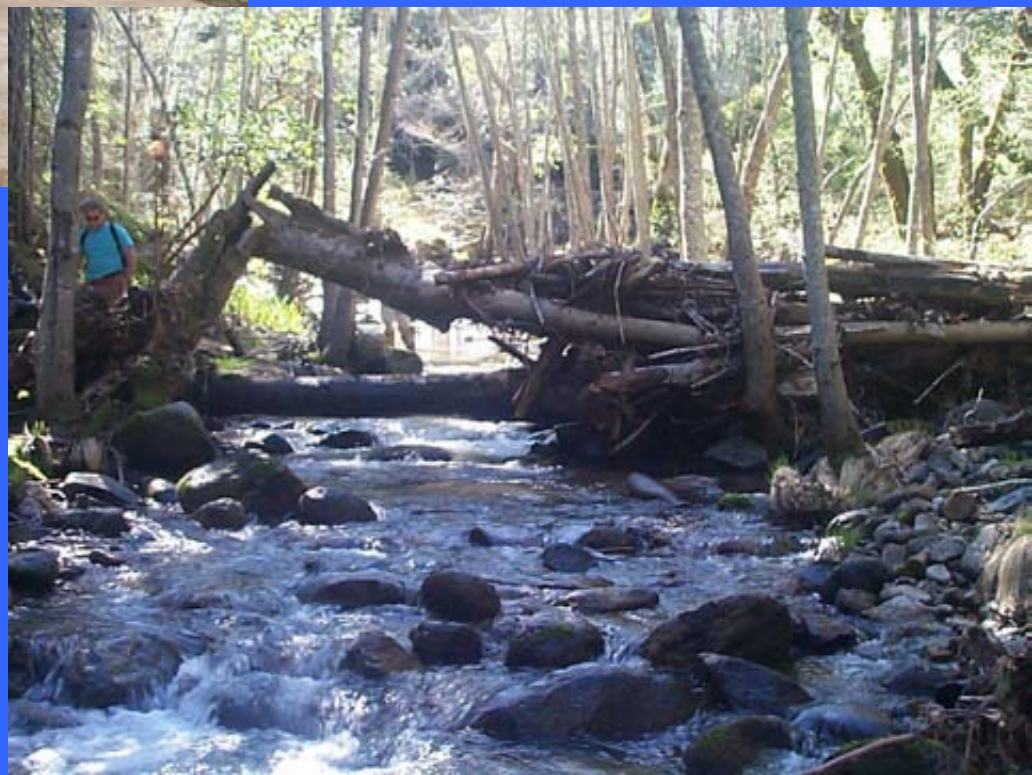
Above - Carmel River steelhead, June 1988 (photo: MPWMD).

Left - San Clemente Dam, March 10, 1995 (photo: California American Water).

Highly Variable Landscape from the ocean to headwaters

Above - river flow through the "slot" at the Carmel River mouth, April 25, 2008

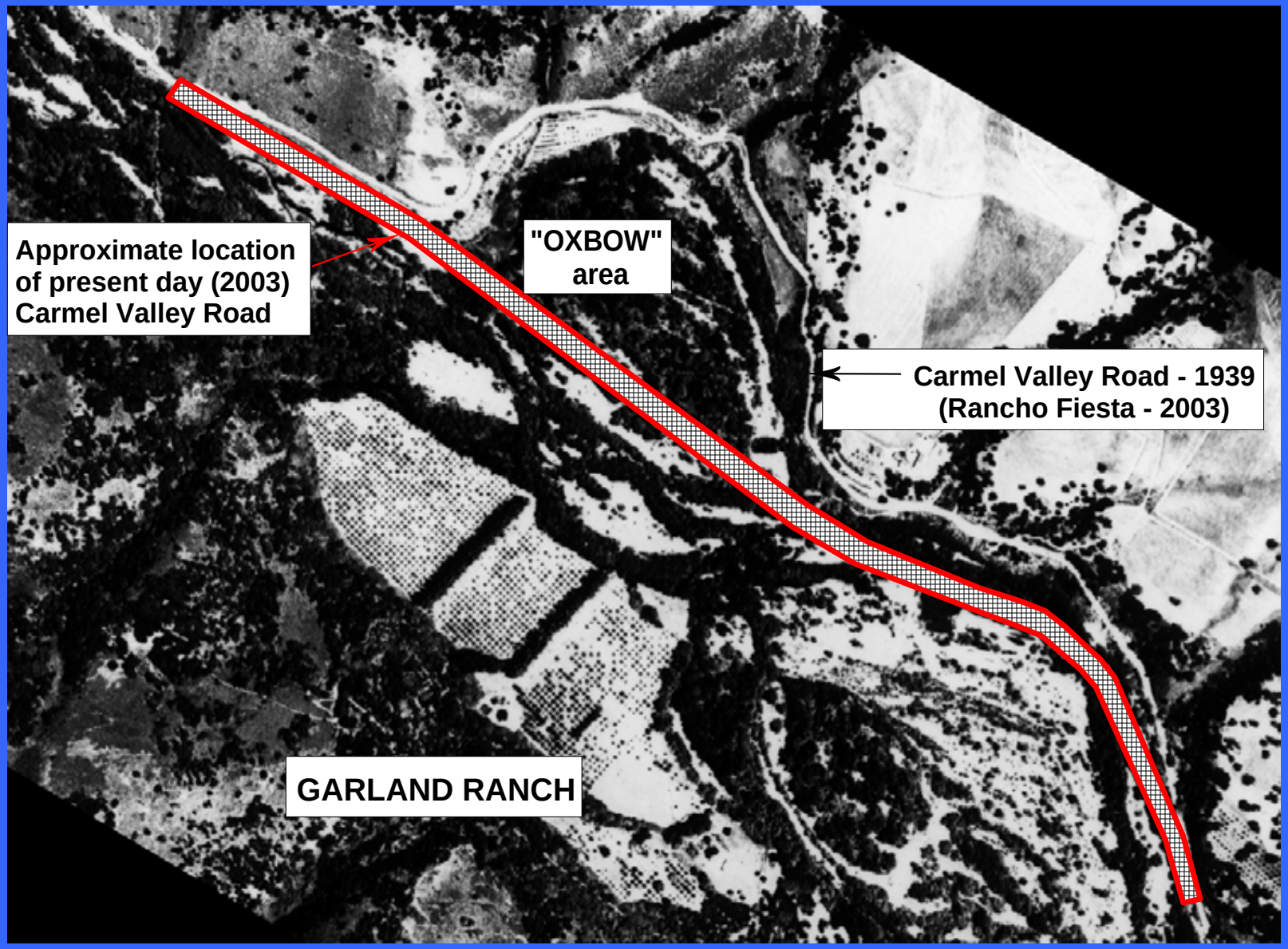
Right - Upper Carmel River, 2007



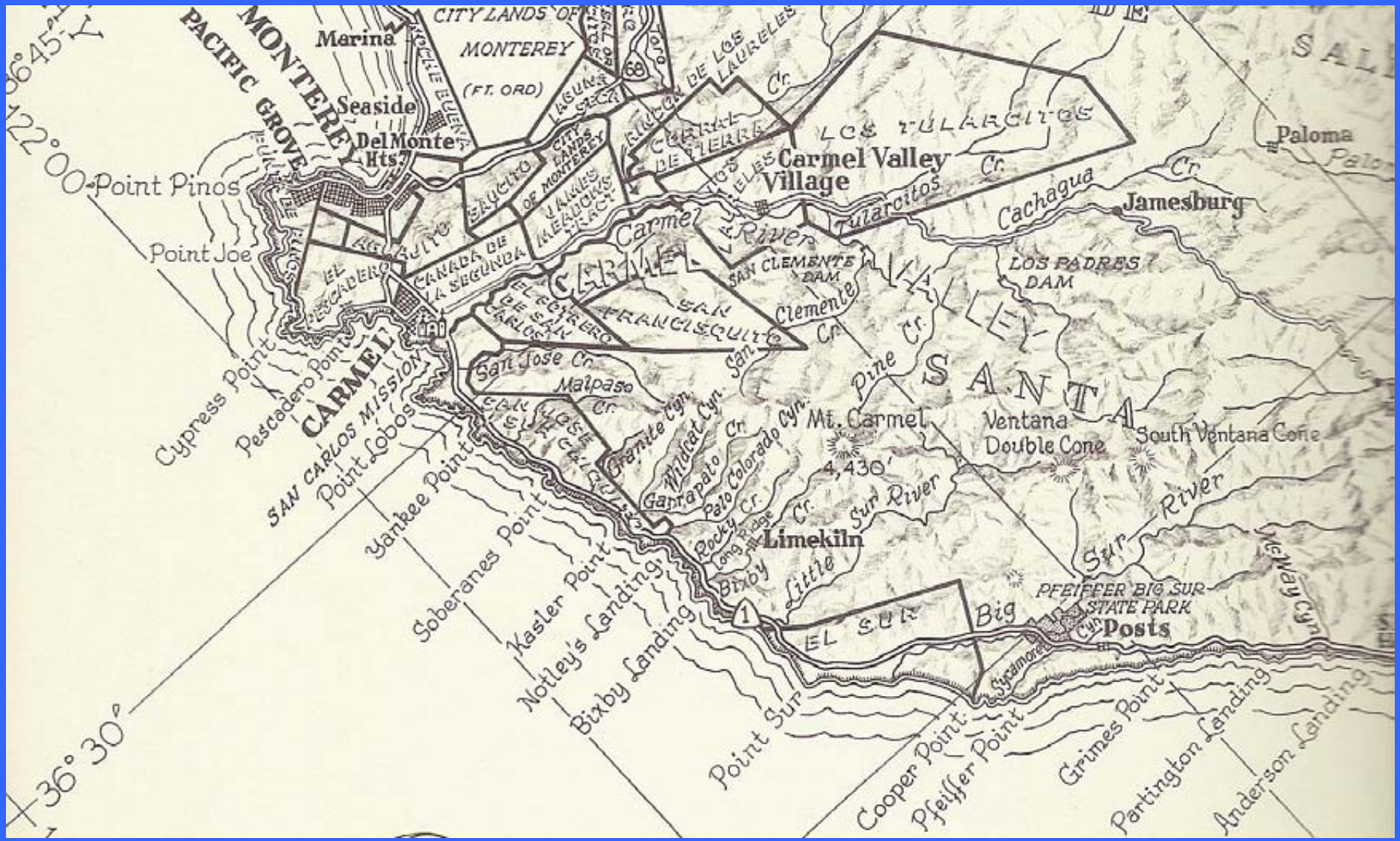
Lower Carmel River - Cultural Features

- Highly erodible channel banks
- 19 bridges, 3 dams
- >420 riverfront properties
- >1,500 parcels in 100-year floodplain
- Alluvial portion of the river has been straightened and narrowed since the early 1900's
- About 438 acres of riparian area along the lower 18.6 miles of the river

River Straightening



Early Carmel River Water Supply Development: Ranchos (granted 1820's-1840's)



Joining of Carmel Valley to the Monterey Peninsula

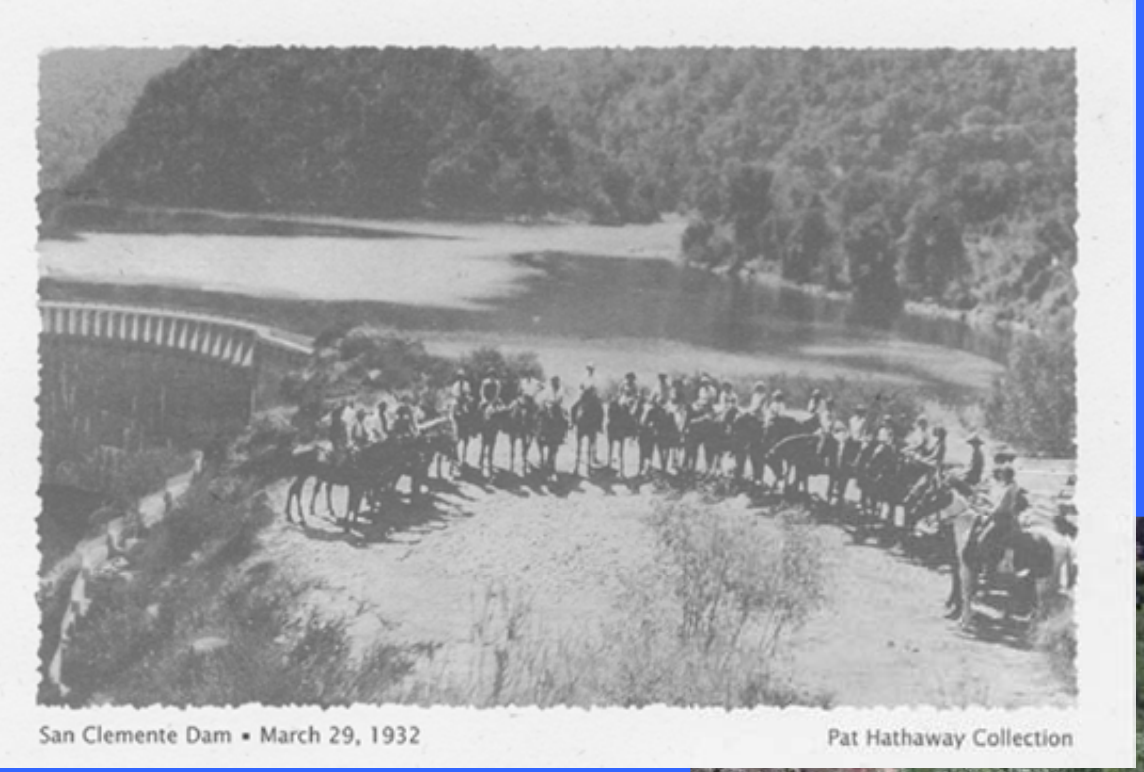
Hotel Del Monte opened June 10, 1880 by Charles Crocker (Pacific Improvement Company)

Old Carmel Dam

Constructed circa 1880

- 700 Chinese laborers
- 25 miles of 12-inch iron pipe crossed river in five places
- first Monterey Peninsula municipal water supply

San Clemente Dam


San Clemente Dam • March 29, 1932

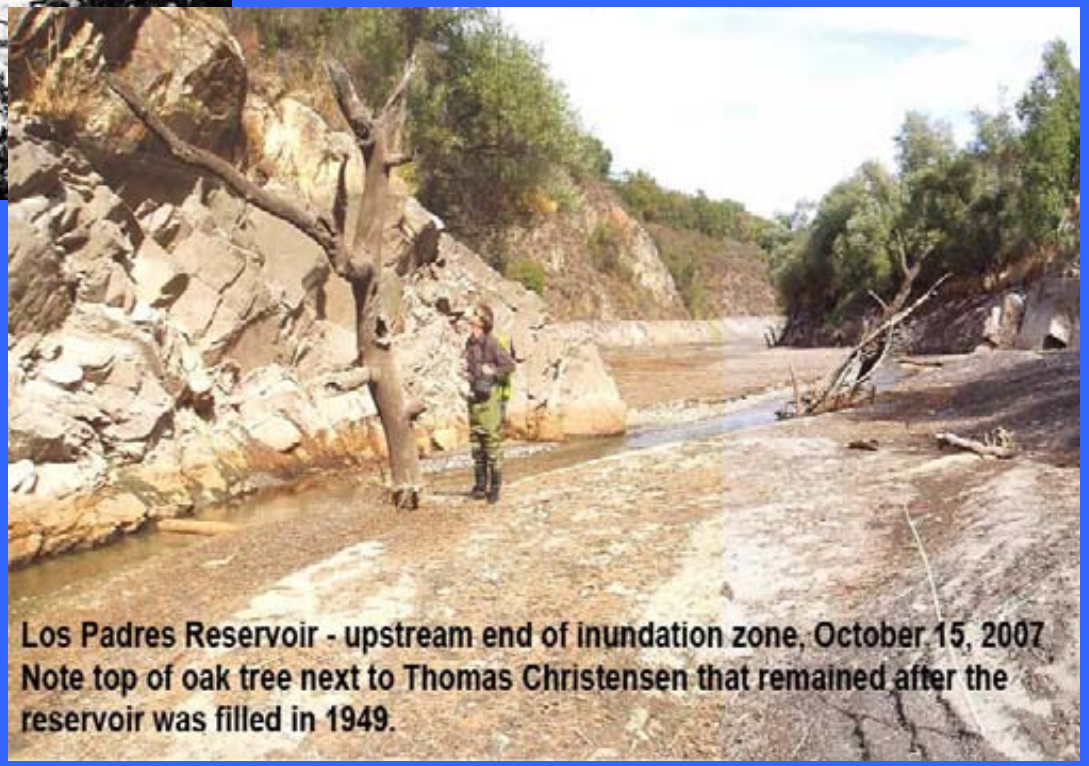
Pat Hathaway Collection

Constructed in 1921: $1-2 million


2007 cost to remove > $80 million

Los Padres Dam

Constructed in 1949: $1.5 million

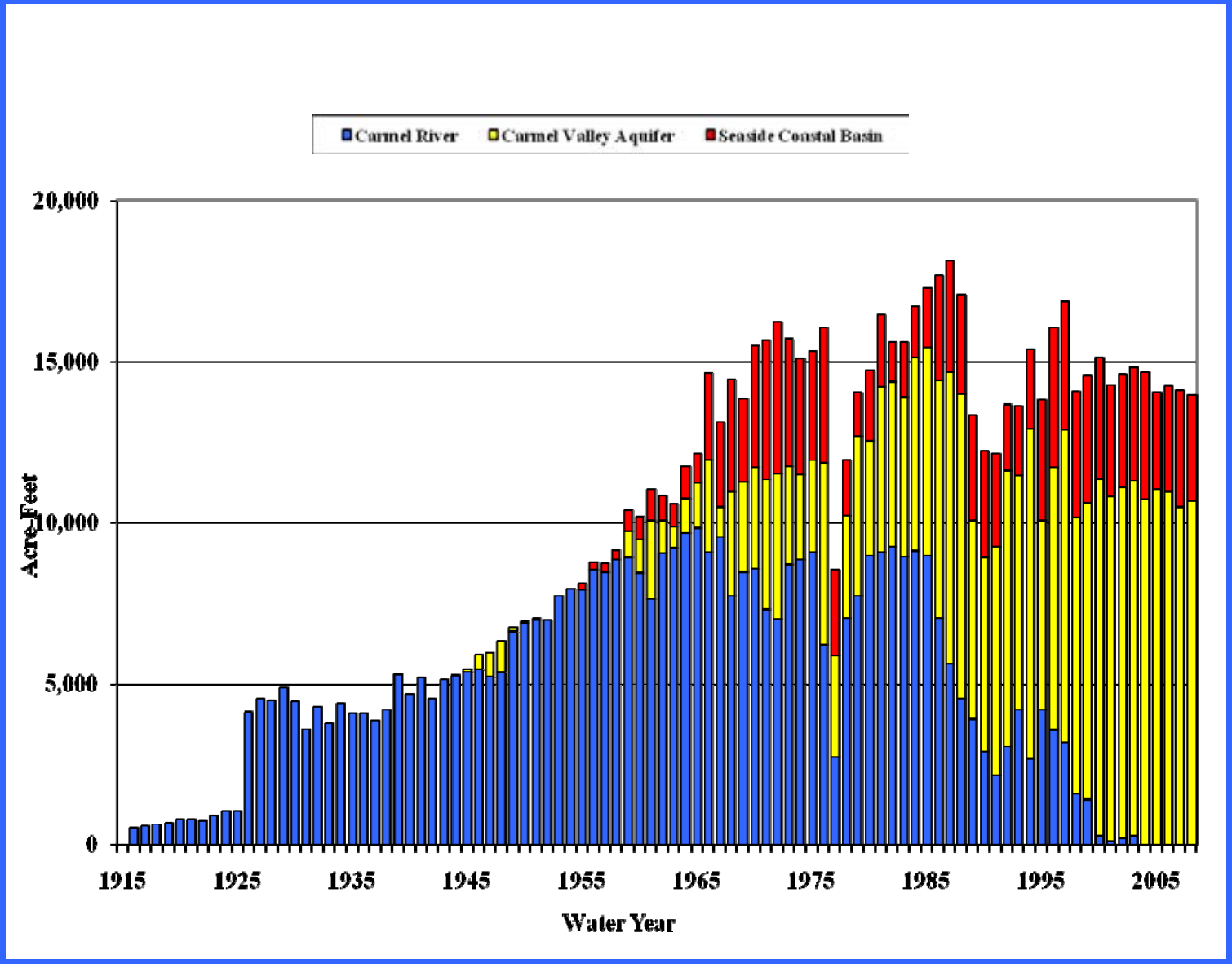


Los Padres Reservoir - upstream end of inundation zone, October 15, 2007
Note top of oak tree next to Thomas Christensen that remained after the reservoir was filled in 1949.

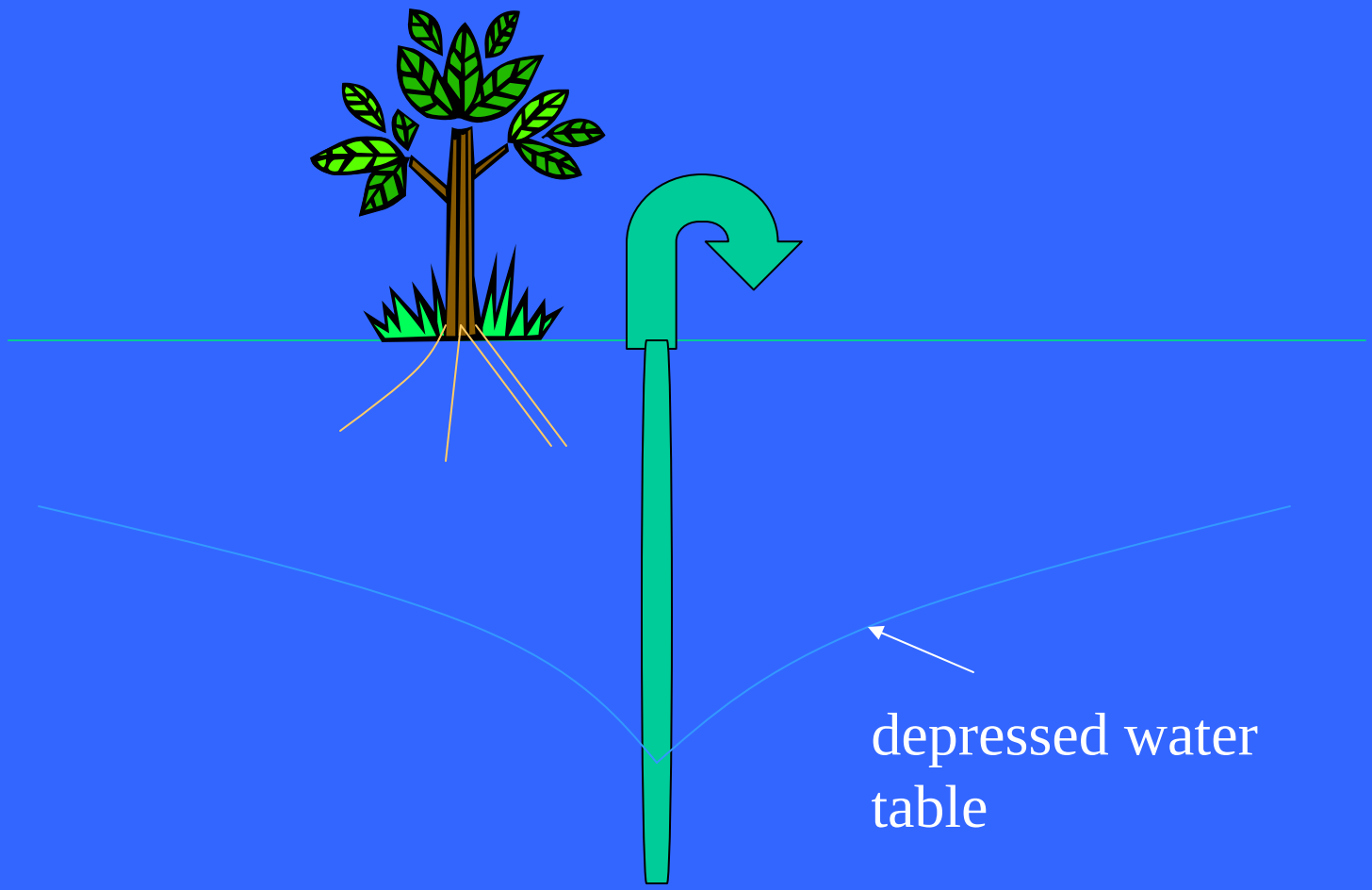
Monterey Peninsula Water Supply at a Glance

- Largest municipal water purveyor – California American Water – 15,000 AFY
- Cal-Am water supply from two source areas:
  1. Carmel River alluvial aquifer system – 75%
  2. Seaside Groundwater Basin – 25%

California American Water Production By Source: 1916 through 2008



Issue: Groundwater pumping impacts riparian vegetation and channel-bank stability



Schulte Project Area 1988

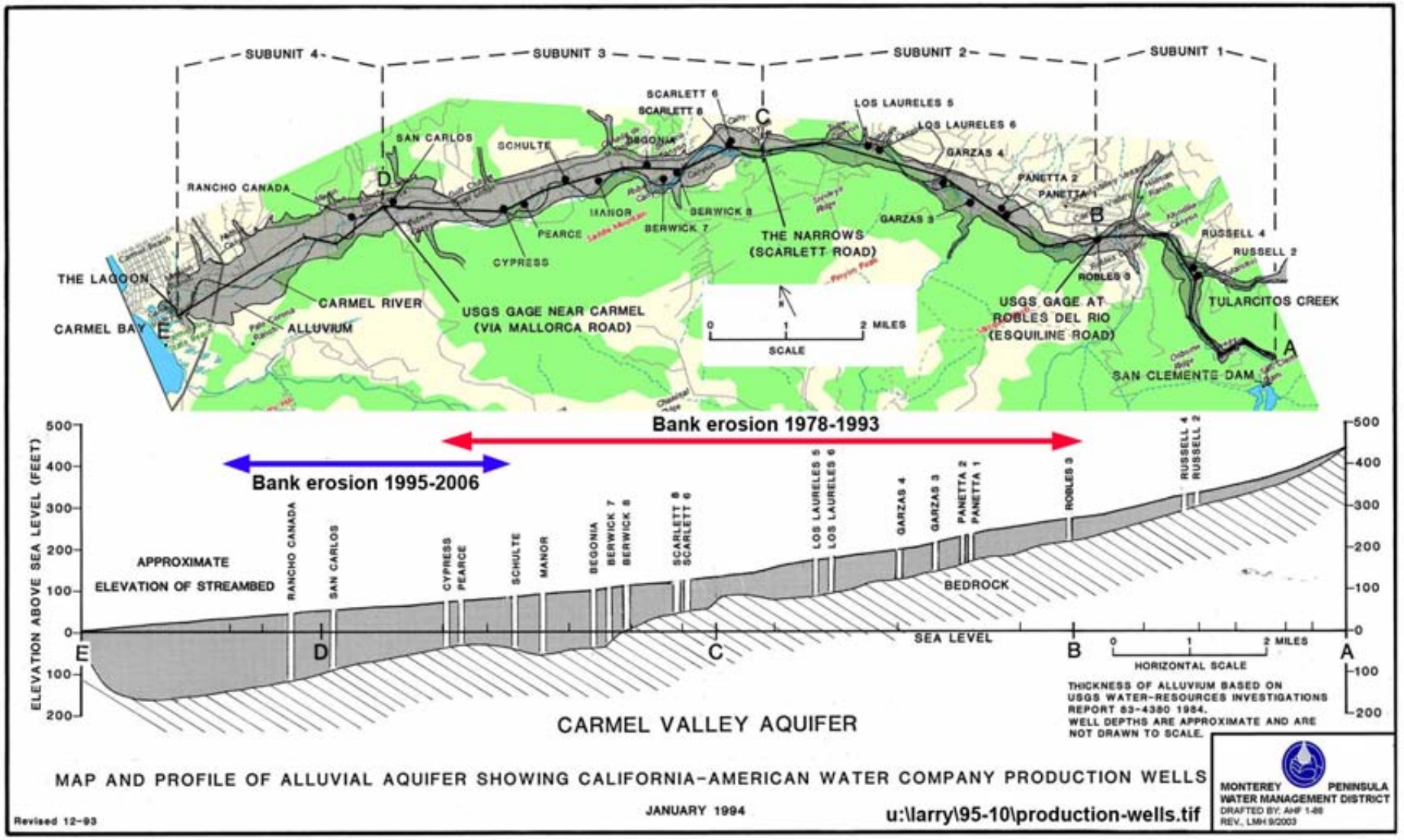
Schulte Project Area 2001

Schulte Project – 1982 and 2003

Left - Looking upstream from Schulte Bridge, April 1982. Note tires, wooden jacks, and concrete rubble dumped by the owner on the streambank to slow erosion.

Right - May 2003 - after MPWMD-sponsored restoration work. The arrow shows where the brown well pump building was at the upper left of the 1982 photo. MPWMD continues to maintain and monitor this project area.

Bank Erosion Problem Areas



Issue: ESA listings

- Red-Legged Frog, Steelhead listed as threatened species

Issue: Reservoir sedimentation and seismic safety

San Clemente Dam and Reservoir

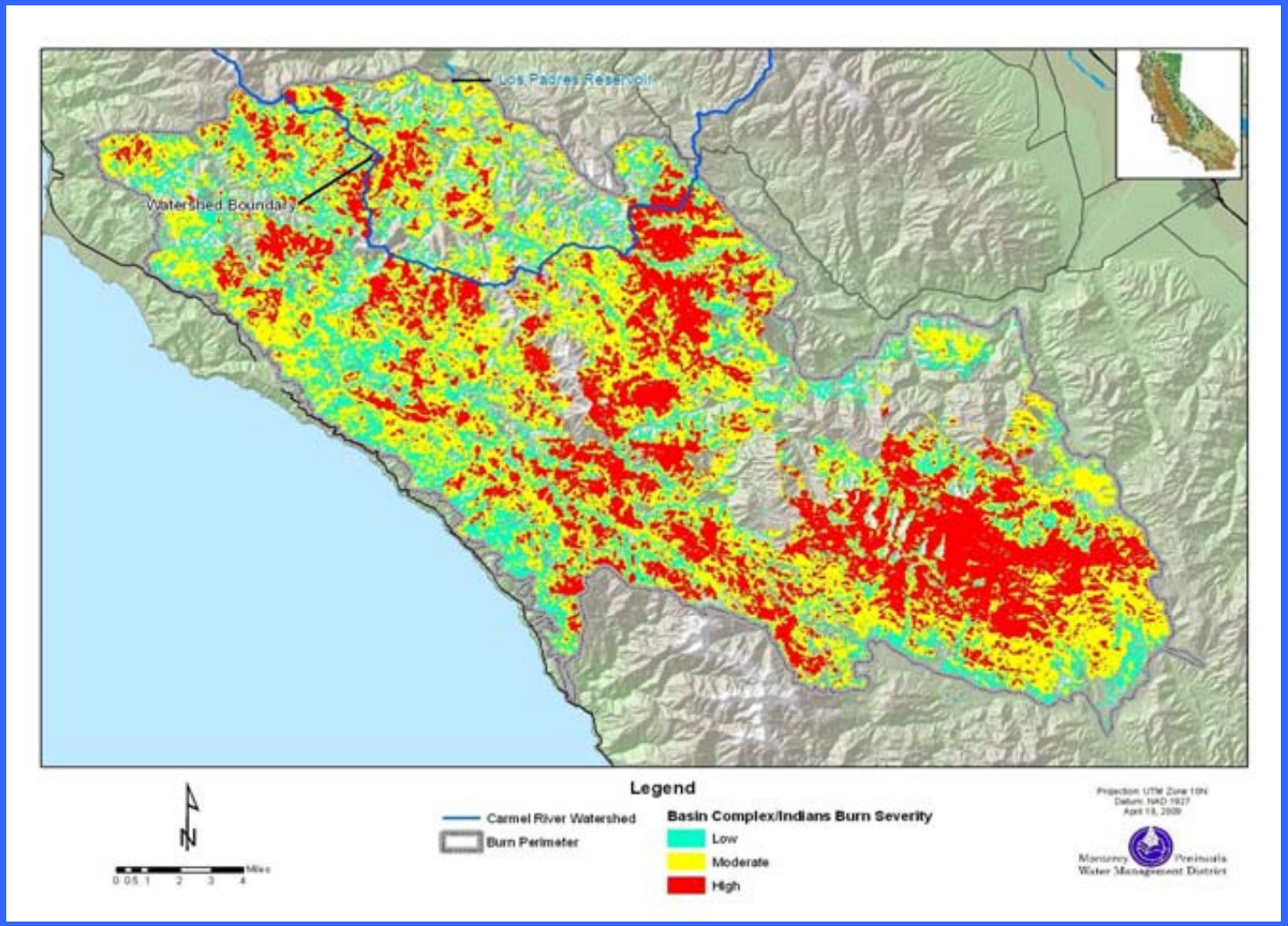
Storage loss

1921: 1,425 acre-feet
2008: < 100 acre-feet

Proposals:

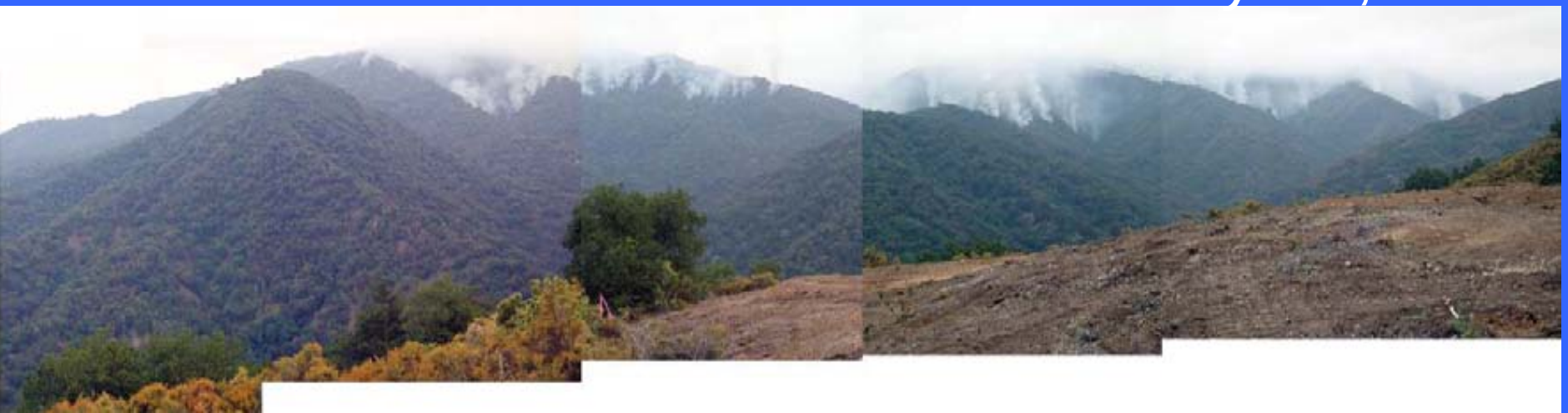
- Strengthen dam
- Remove dam and re-route river

Issue: 2008 Basin Complex Fire burned approximately 20% of Carmel River Watershed

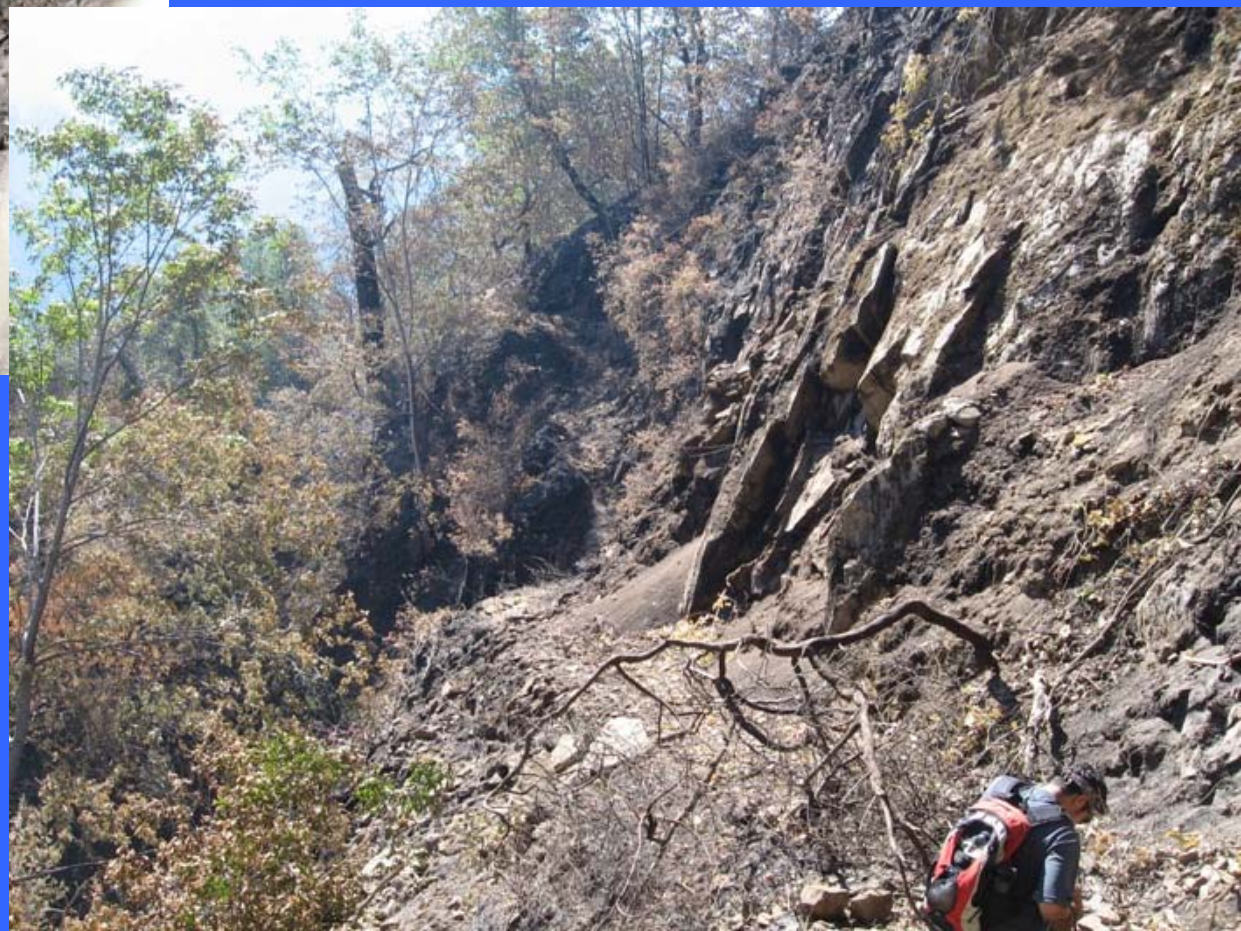


Fire Hastens Mass Wasting

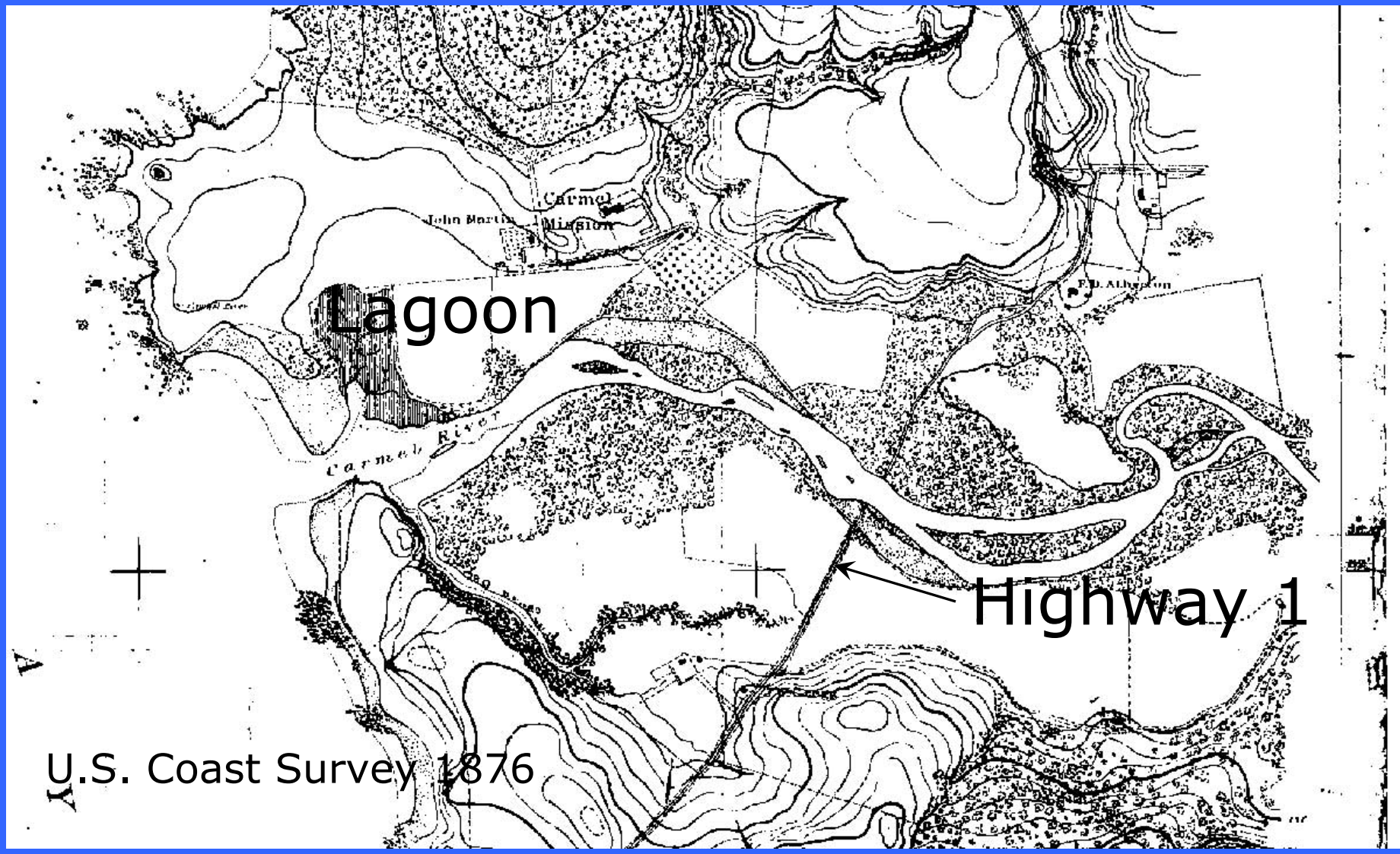
Below - Danish Creek watershed – July 12, 2008



Basin Complex Fire Will Increase Sediment Load into Los Padres Reservoir

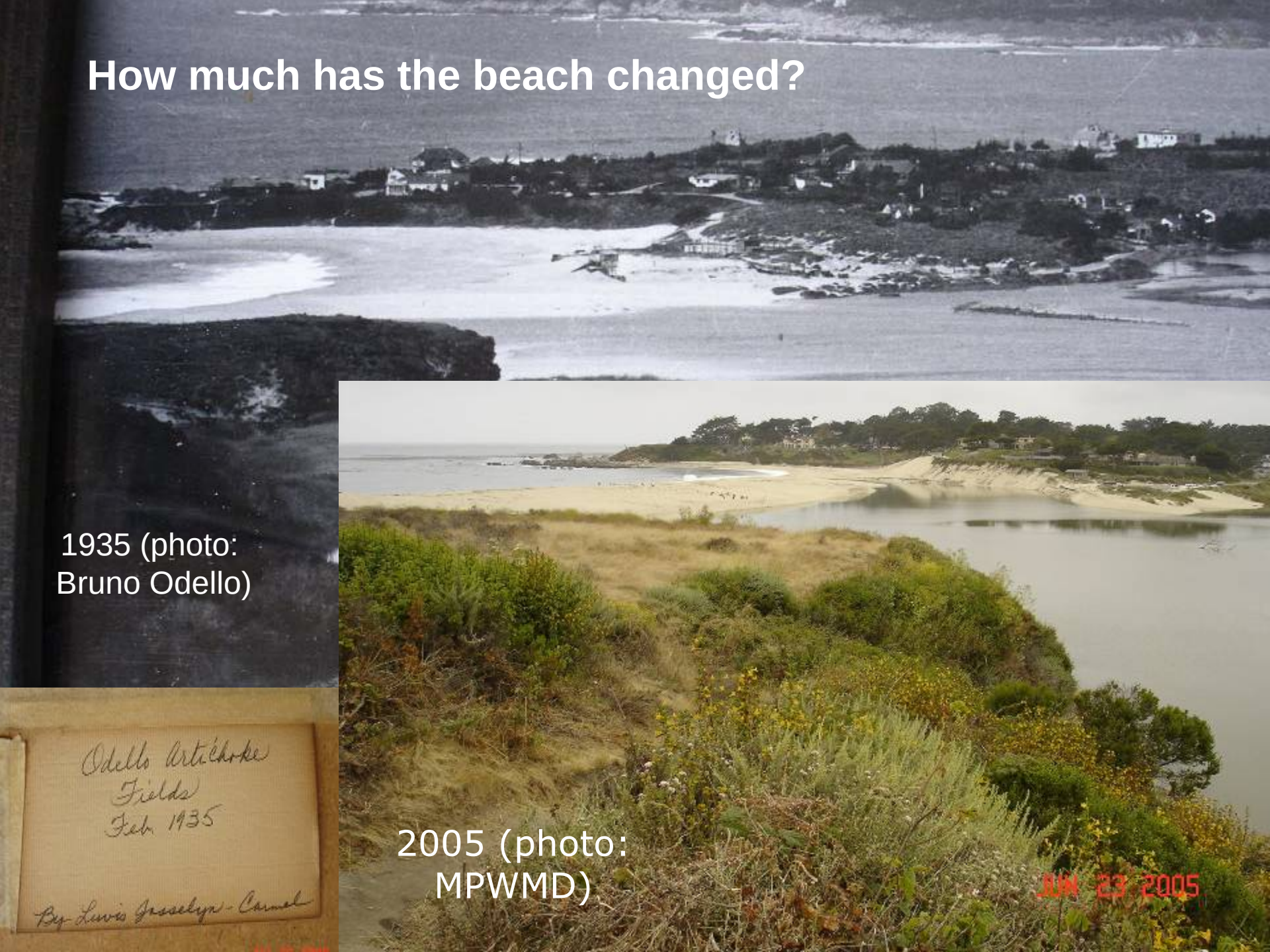


Issue: Lagoon and Wetlands Management

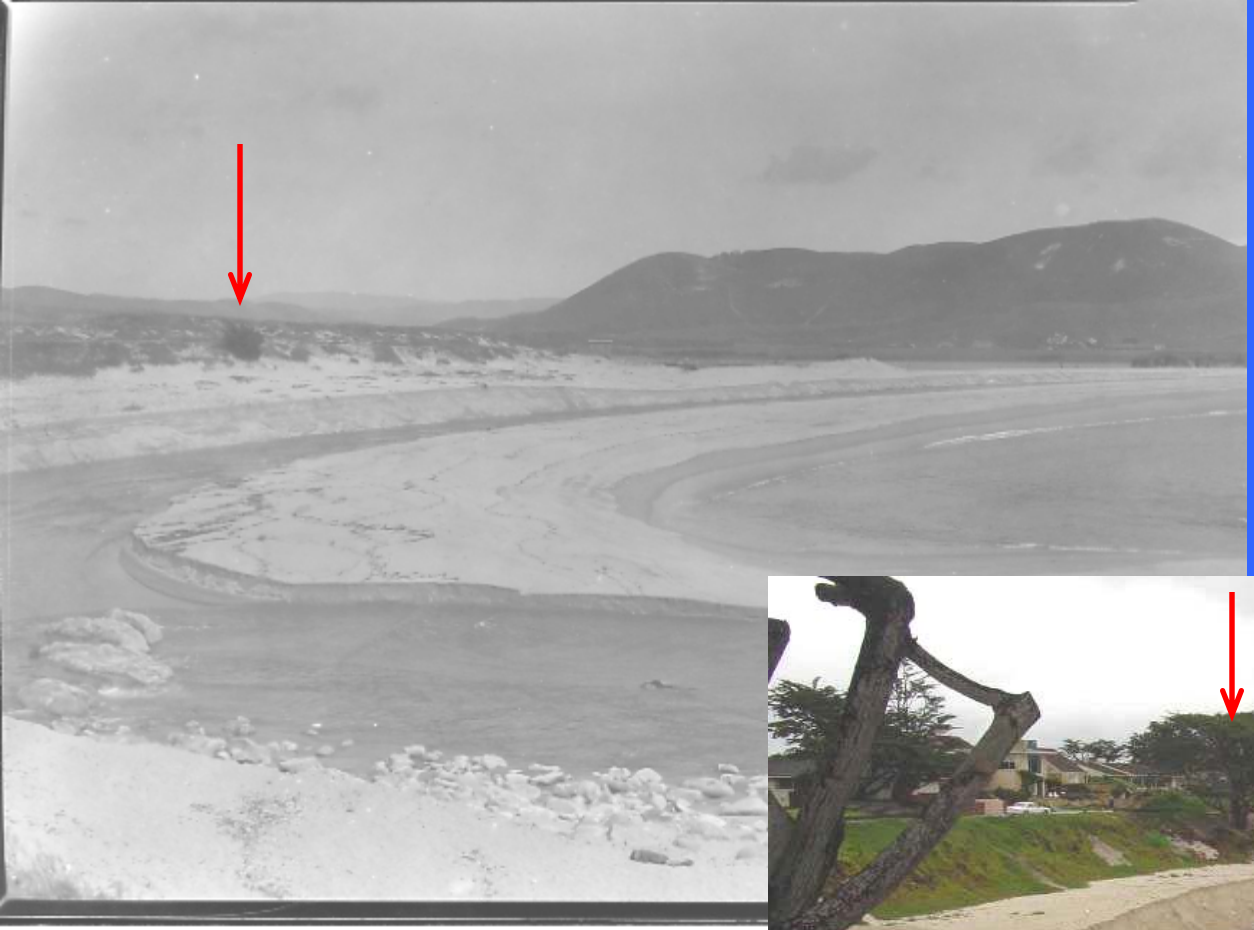


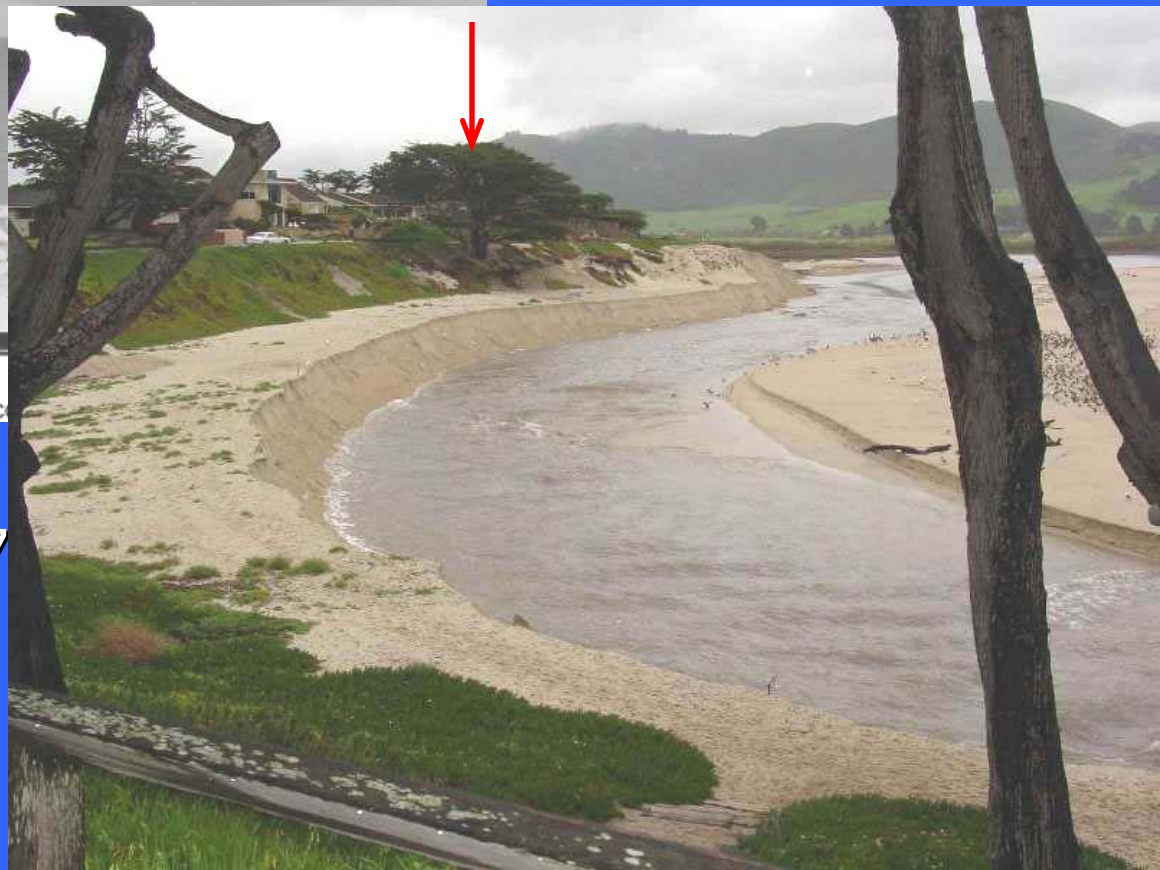
Breaching the the Carmel River State Beach – an old tradition

How much has the beach changed?



Stewart's Cove





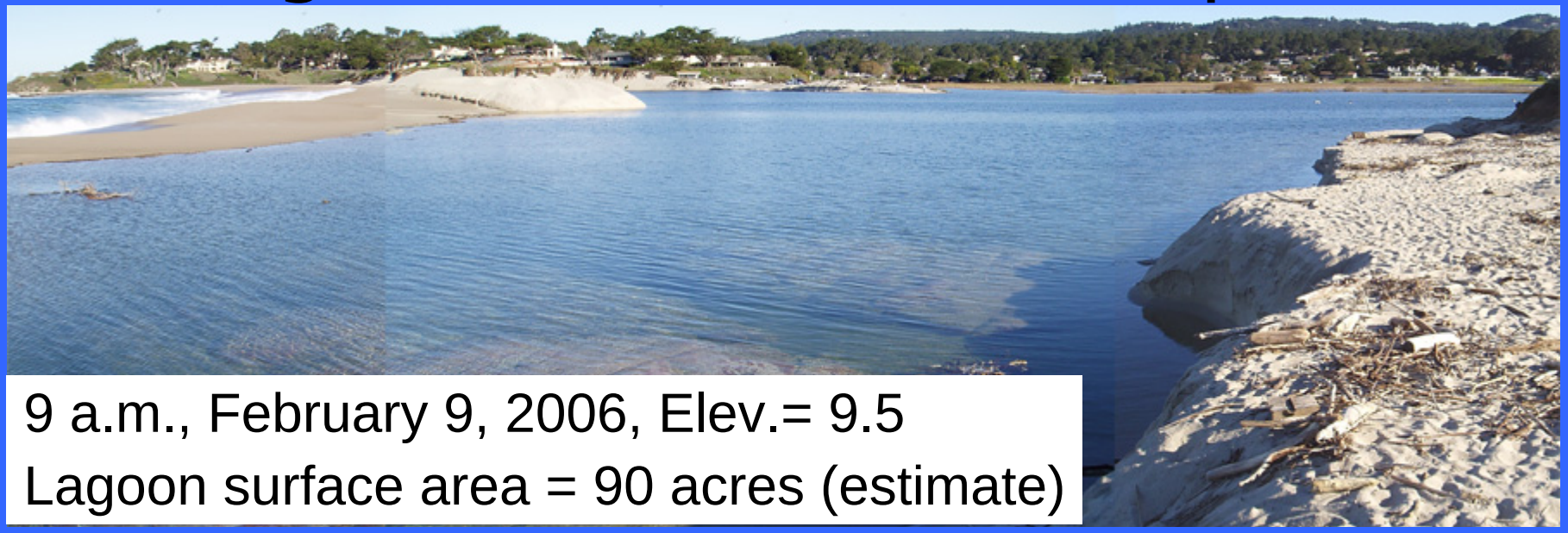
above – ca spring 1937

right - March 4, 2005

35-FOOT WAVES HIT THE BEACH

STORM SURGE
JANUARY 5, 2008

High and low water comparison



9 a.m., February 9, 2006, Elev.= 9.5
Lagoon surface area = 90 acres (estimate)

8:30 a.m., February 6, 2006, Elev.= 2.7
Lagoon surface area = 12 acres (estimate)

Constraints: Water Supply Regulations

- State Water Resources Control Board Order (1995): Orders reduction in Cal-Am Carmel River extractions by 70 %

- Seaside Basin Groundwater Adjudication (2006): Orders reduction by Cal-Am and other pumpers by 46 %

Opportunities:

- Coastal Water Project
- Regional Project

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Thank you for your attention.

Tuesday, May 5, 2009

Joseph Oliver, Water Resources Manager

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