

Historical Ecology of Wetlands in North Monterey County



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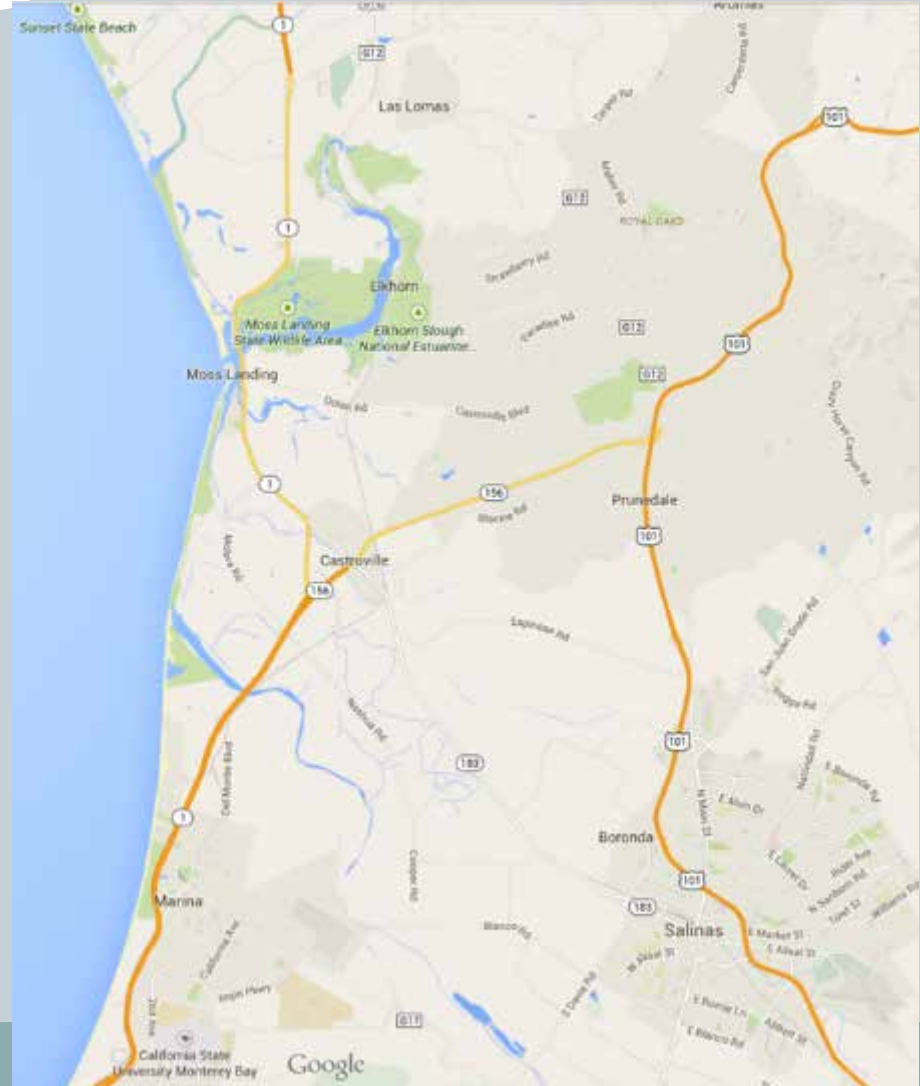
Objectives



- i Share a map of historical wetlands of north Monterey County
- i Share historical data used to create map, with an emphasis on Elkhorn Slough habitat and water

Methods

- Compiled, digitized and analyzed 35 historical maps, 1800s-early 1900s
- Supplemented with ~300 primary historical texts and images, 1700s+
- Created a GIS map of North Monterey County wetlands



Historical Wetland - mid 1700s to late 1800s

- Subtidal channel
- Tidal flat
- Tidal marsh
- Sand
- Freshwater marsh
- Pond
- Lake
- Seasonal lake
- River or Slough
- Streambed
- Intermittent Stream
- Willow

Elkhorn Slough

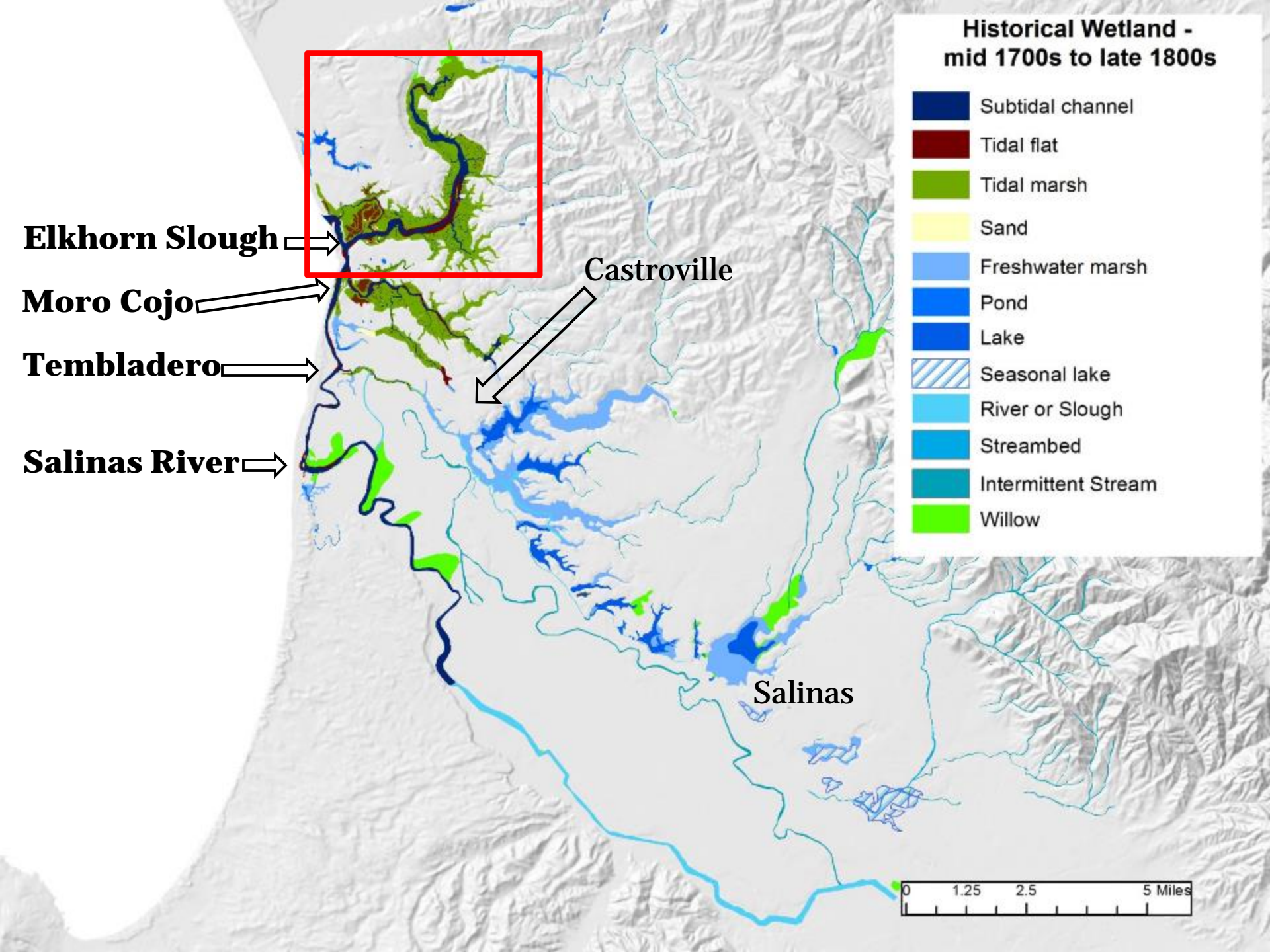
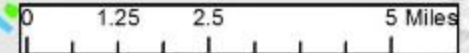
Moro Cojo

Tembladero

Salinas River

Castroville

Salinas



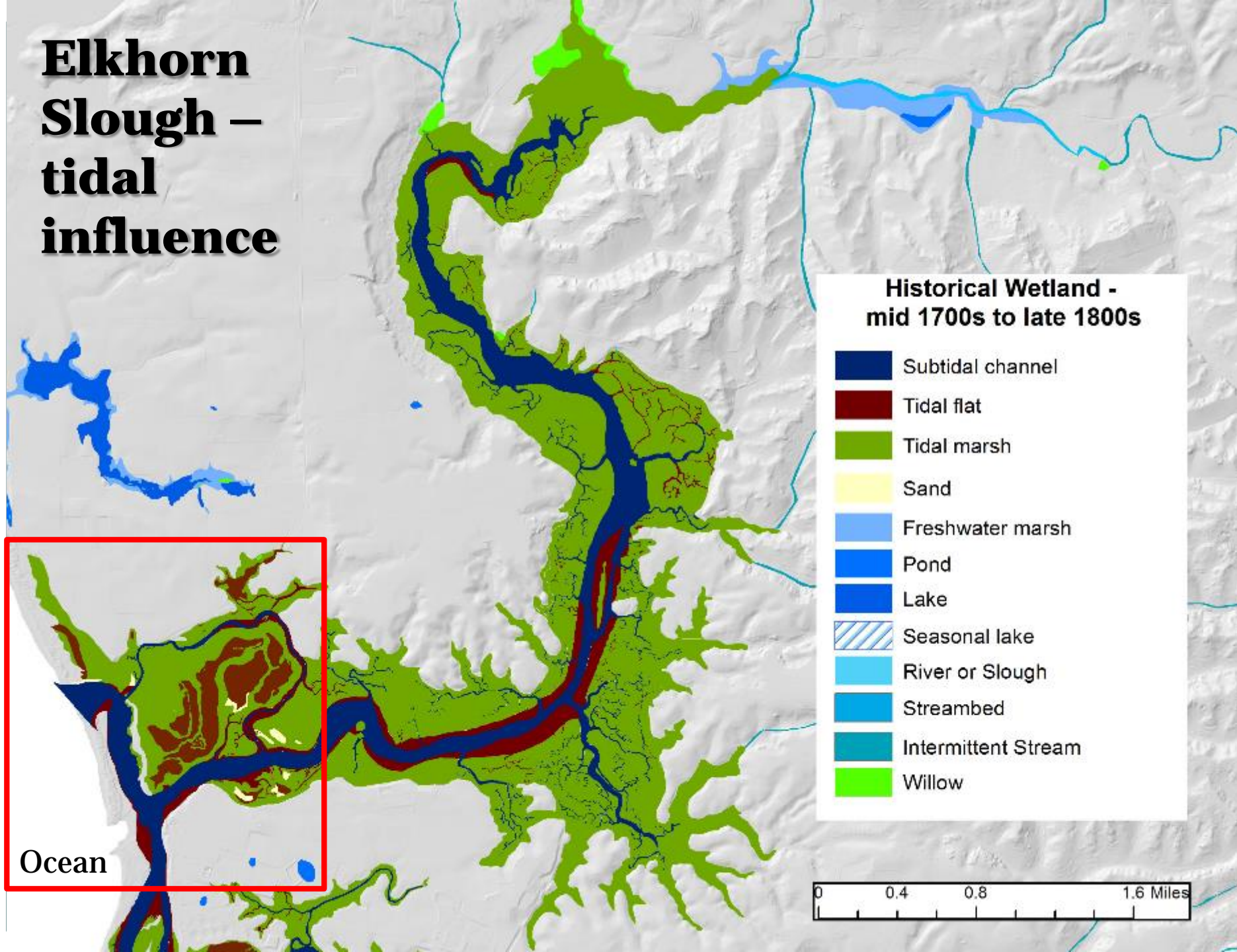


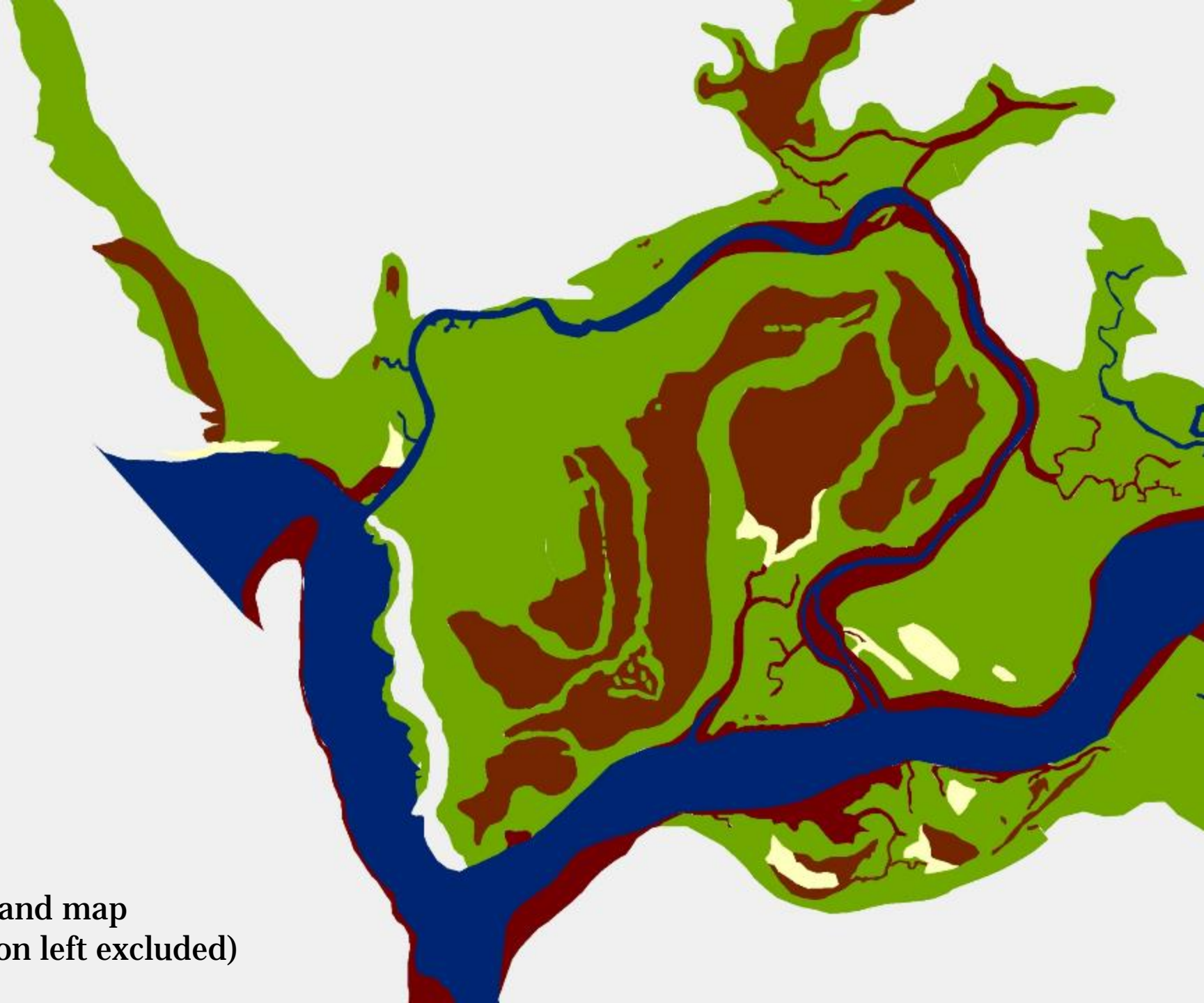
Elkhorn Slough

Primary data

A sampler of some of the sources that show estuarine habitat and function

Elkhorn Slough – tidal influence



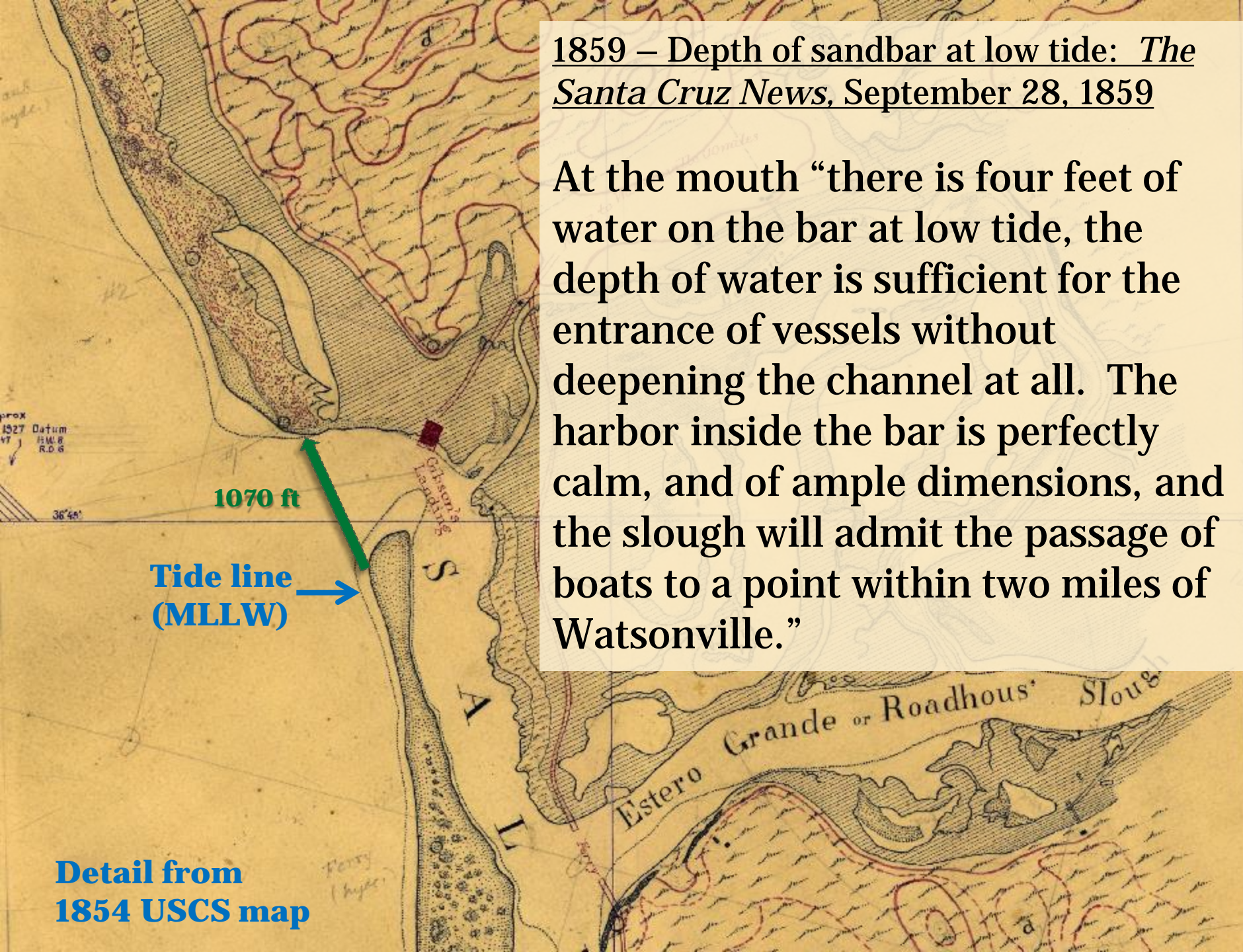


My wetland map
(Ocean on left excluded)



1859 – Depth of sandbar at low tide: *The Santa Cruz News*, September 28, 1859

At the mouth “there is four feet of water on the bar at low tide, the depth of water is sufficient for the entrance of vessels without deepening the channel at all. The harbor inside the bar is perfectly calm, and of ample dimensions, and the slough will admit the passage of boats to a point within two miles of Watsonville.”

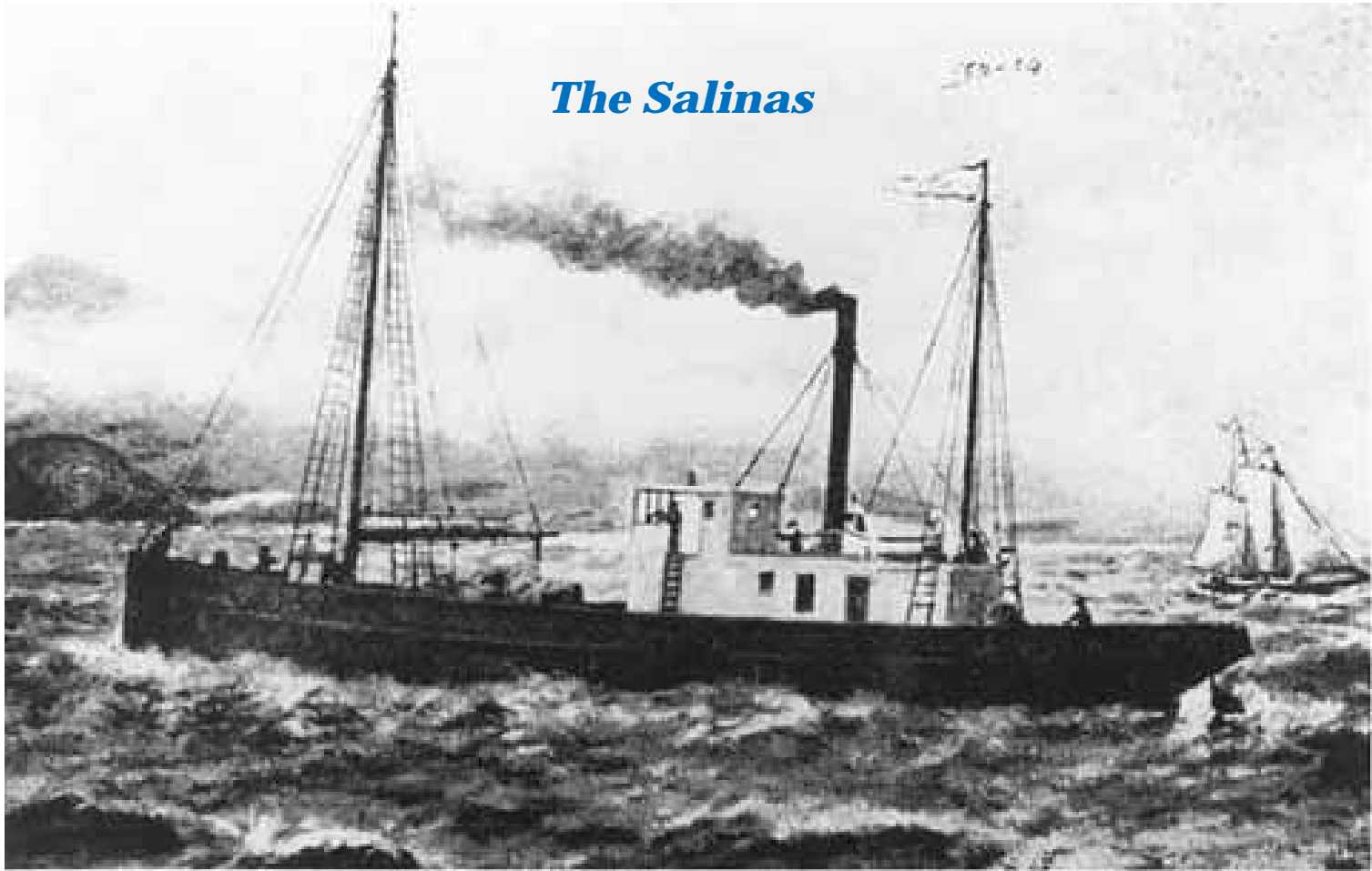


1070 ft

Tide line
(MLLW)

Detail from
1854 USCS map

The Salinas



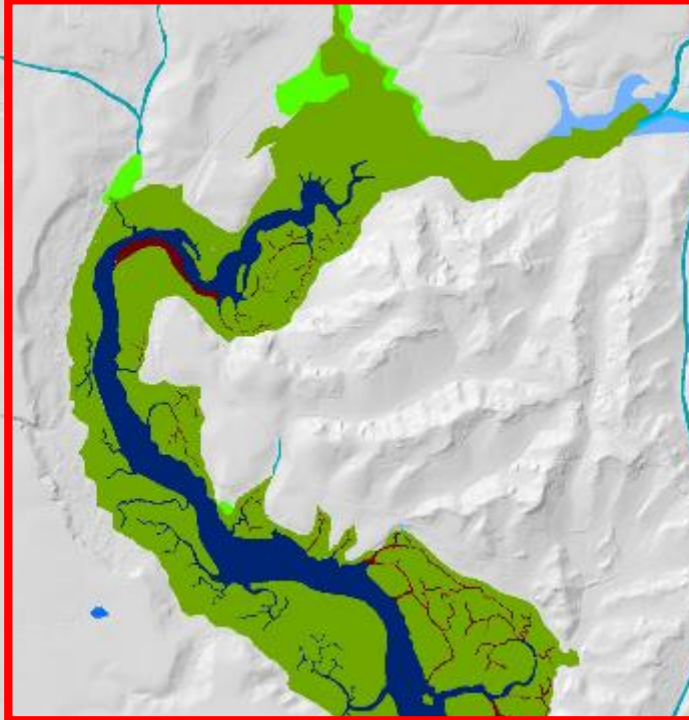
henceforth run in that trade, under the command of Capt. Sutton. She will draw 5½ feet when loaded and can thus easily cross the bar of the river, on which there are nine feet at high water. She is

- Jan 18, 1861 Daily Alta California

The mouth above Moss Landing would sometimes
close in the winter,
San Francisco Bulletin, February 28, 1871

A STEAMER SHUT IN.—Once or twice every winter the Salinas River takes a snap judgement on the steamboat men—frequently shutting in a steamer for weeks by the sudden filling up of the mouth of the river. This happens after a hard storm, when a heavy sea, breaking along the “blight” of the Bay, deposits so much matter that for the time being the channel is literally closed. This happened during the late storm; and the steamer *Salinas* is now detained in that river. In the meantime, her freight is to be taken out and taken to an outside landing on the bay, when it will be rehipped on one of the other steamers plying in the same line. Probably a few days of good weather will suffice to open the channel and let the steamer out of the river.

Elkhorn Slough – tidal influence

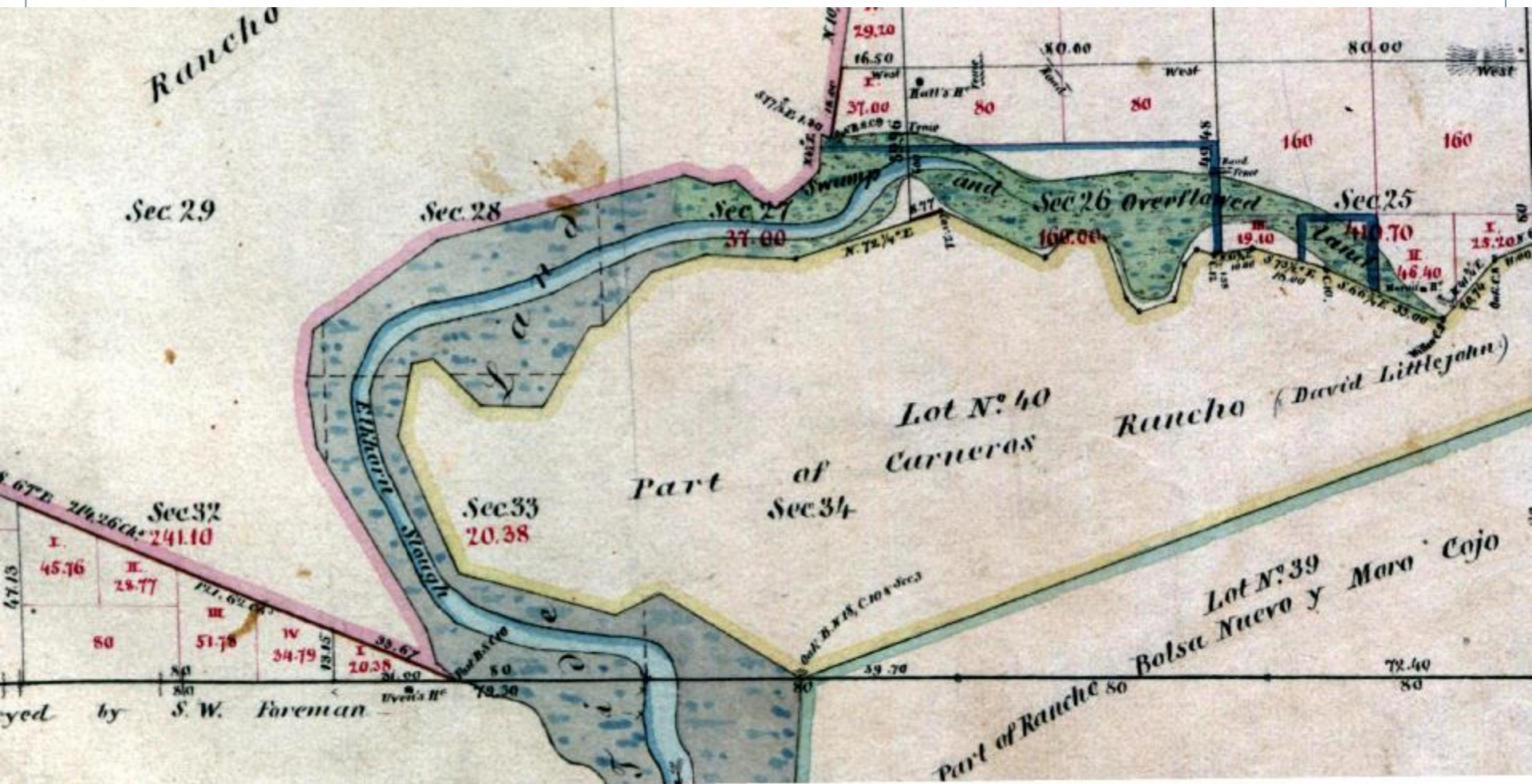


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0 0.4 0.8 1.6 Miles

Public Land Surveys 1867

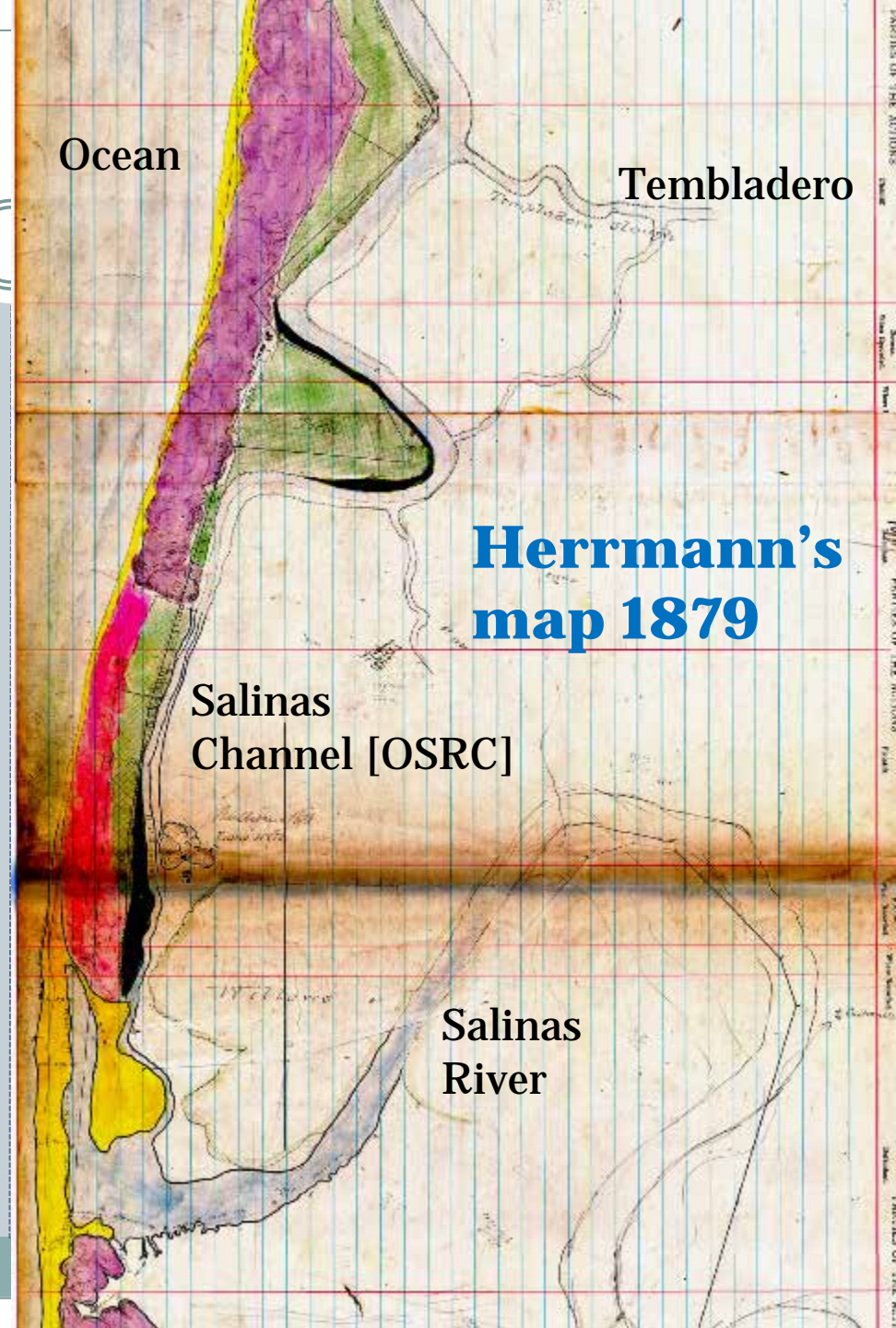


Freshwater inputs: Salinas River and Tembladero

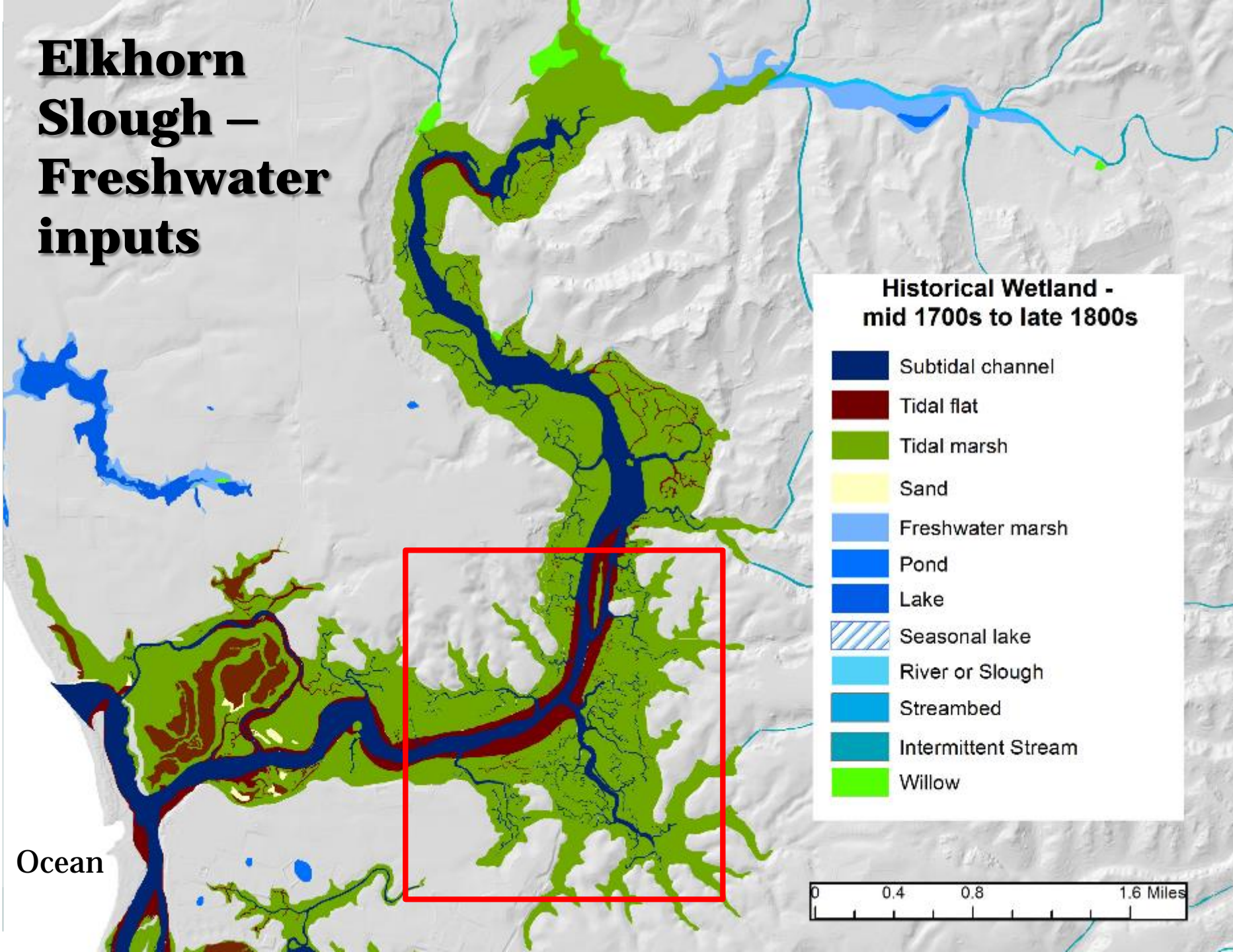
Salinas was seasonal, dynamic

- High flows in winter, but could break through dunes at bend
- In dry months, river water did not flow much, “the narrow and tortuous channel [OSRC] filled during the summer season with brackish nay salty water, ebbing and flowing with the Tides” (1879 Herrmann)

“The Tembladera slough... [is connected to] the principal lagoons of the valley...with a continuously flowing stream fifty to one hundred feet in width, and from five to ten feet in depth...producing a current of about four miles per hour “ (1877 Castroville Argus”



Elkhorn Slough – Freshwater inputs



Freshwater springs in the salt marsh (1913)



MARSH LAND 107.0 A.
HIGH LAND 12.5 A.
TOTAL 119.5 A

SPRINGS

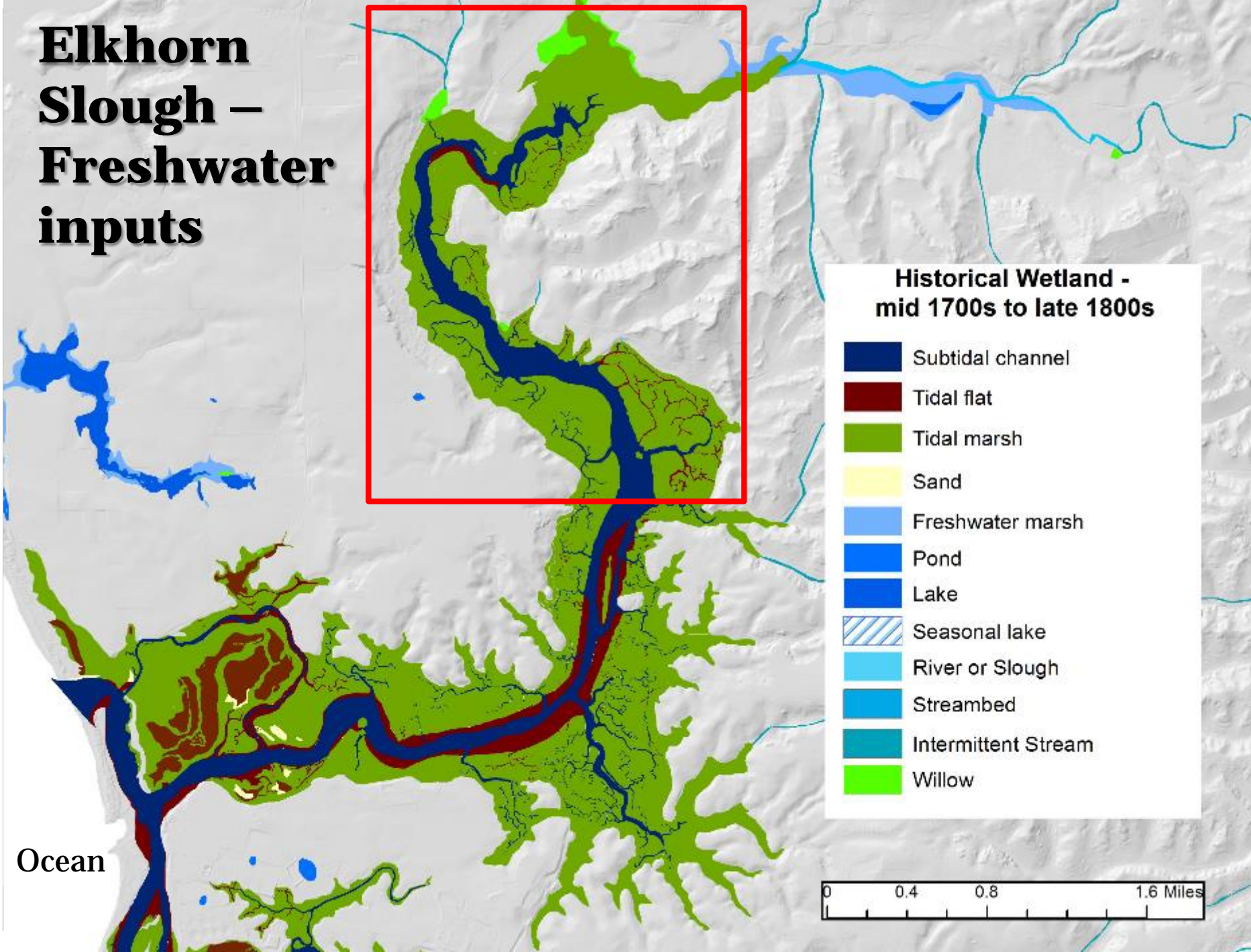


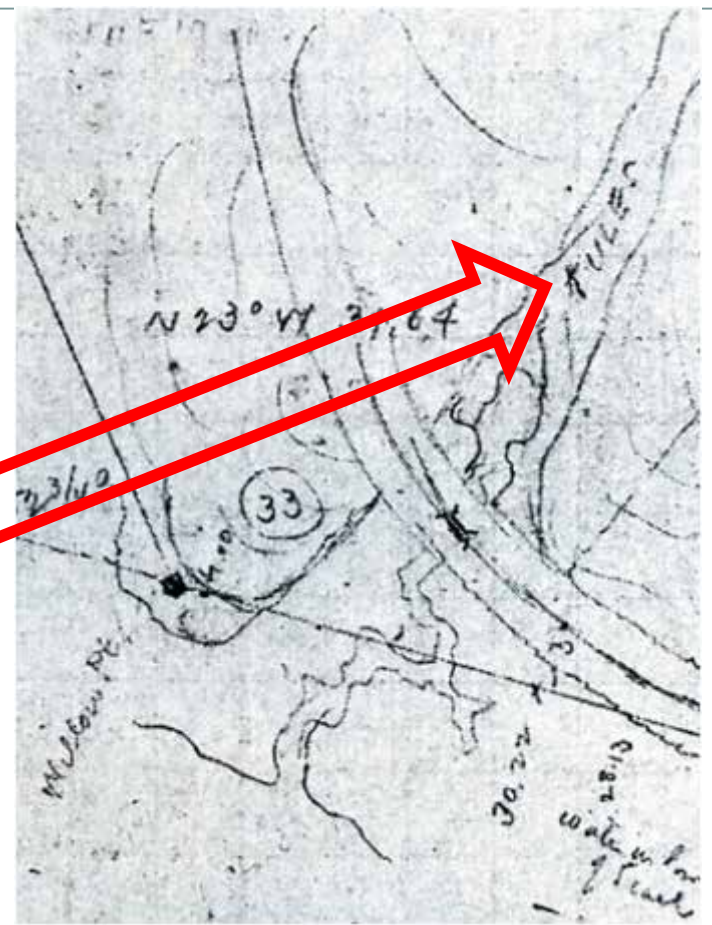
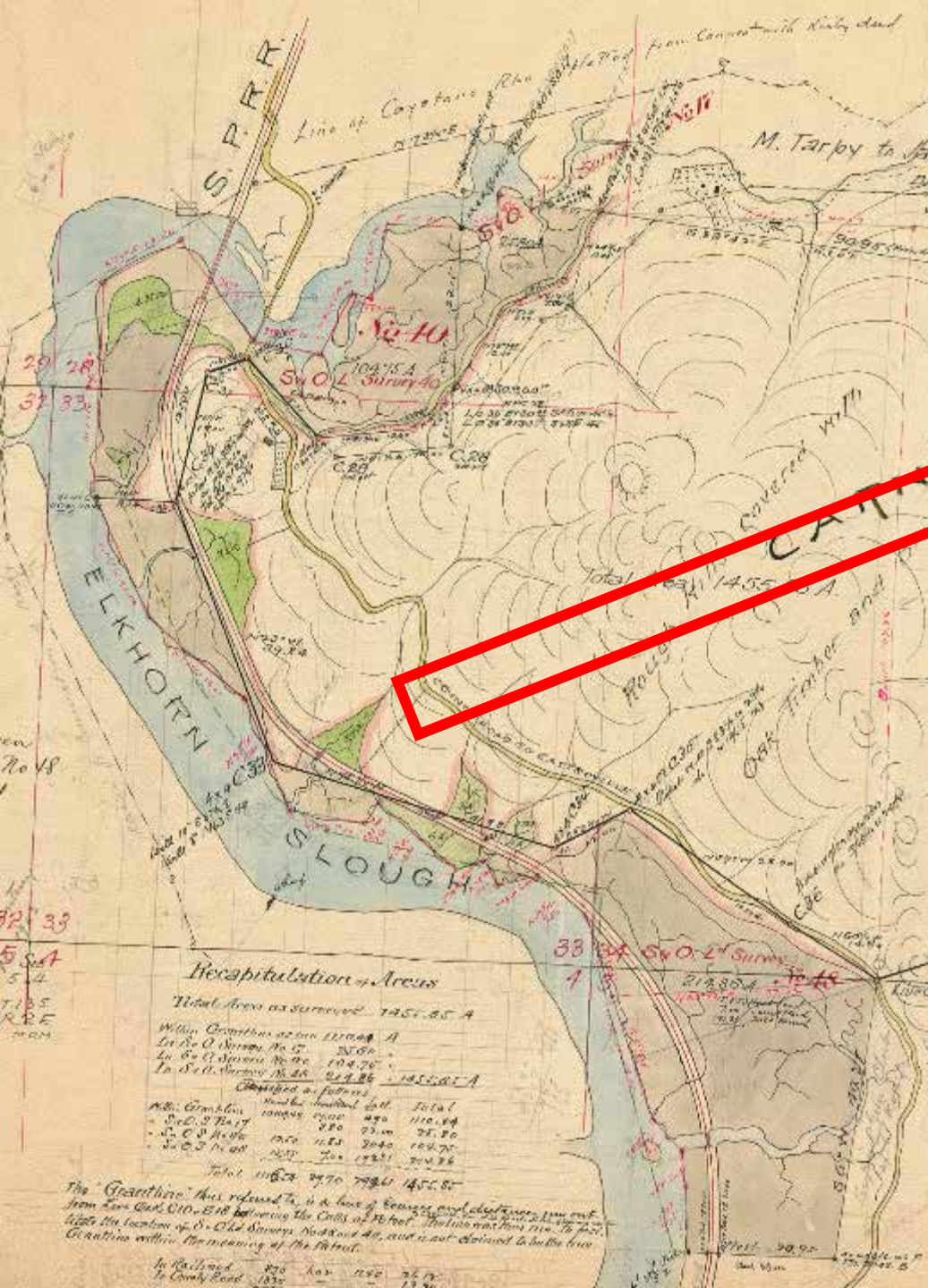
CULTIVATED
HIGH LAND
112 ACRES

6x4 R.W. Post
MAD. EGG. N.

529°

Elkhorn Slough – Freshwater inputs





1898 Survey
Upper Elkhorn
Brown: Salt marsh
Green: Sweetwater marsh (Scirpus spp.)

Leopard sharks in lower slough, 1904



This photo shows “an incident that occurred in the Elk Horn Slough. During the last hour of an ebb-tide, and as sloping banks of mud were gradually laid bare by the receding water... [we saw] what seemed like an army of propeller-blades protruding above the water-line... [that] clouded the shallow flats with the red tint of mud. We watched its slow approach and after a short interval we found it to be the dorsal fins of a shoal of leopard sharks. They appeared to be digging their noses in the mud, and were evidently bent on some object. . . many rammed their noses against [the boat’s] sides. . . It was a picnic with the gaffs, amidst much scrambling and splashing of water...”

-- Osmond Wilthew, *The Rod and the Camera*



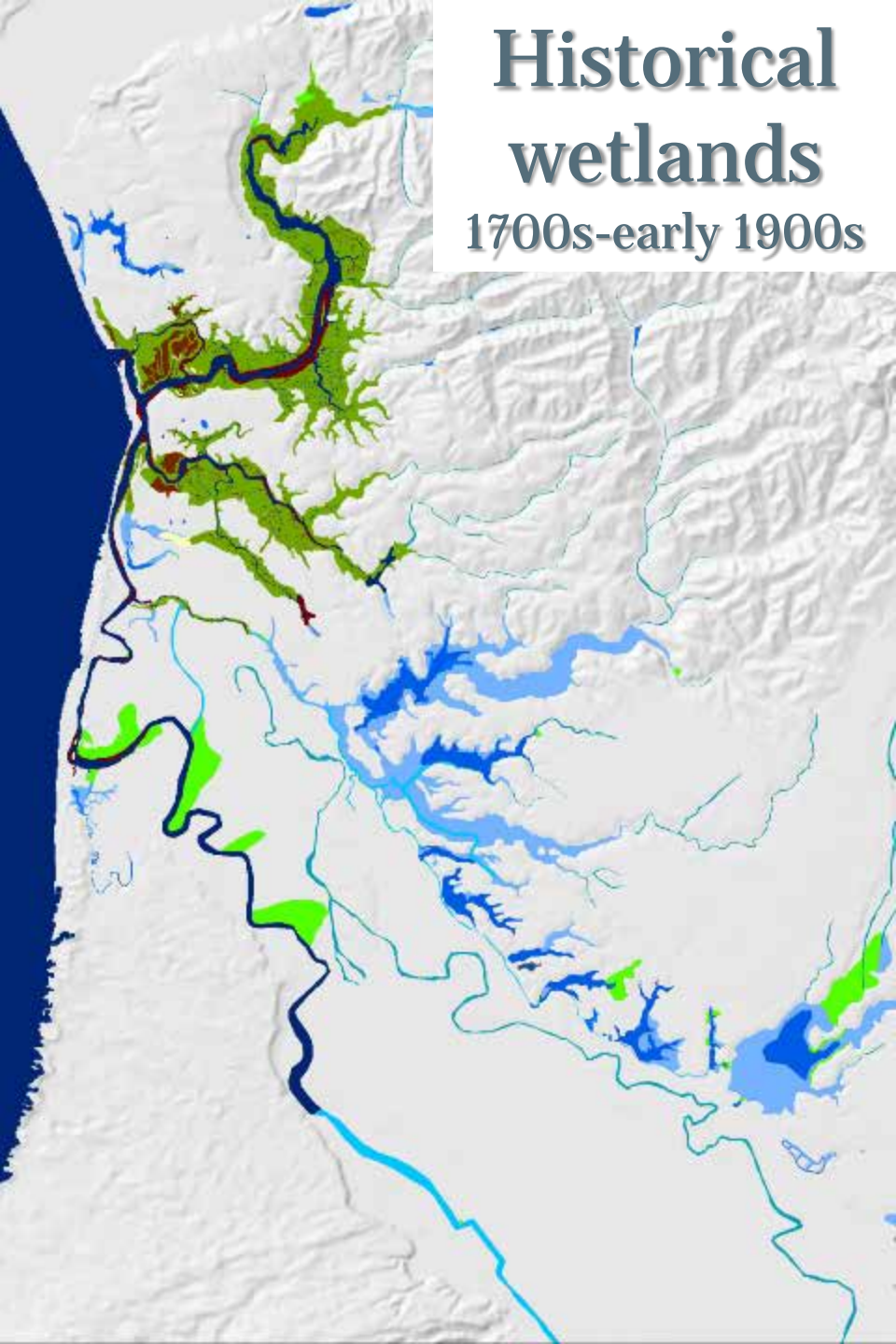
Conclusions

- Historically, there were extensive interconnected wetlands, ranging from freshwater lakes to tidal estuaries, in North Monterey County
- Elkhorn Slough was a tidal estuary to its upper end
- Freshwater influences included winter Salinas River flows and Tembladero flows, local streams and springs
- Conditions favored salt marshes with frequent patches of brackish/freshwater plants and allowed for at least some shark habitat

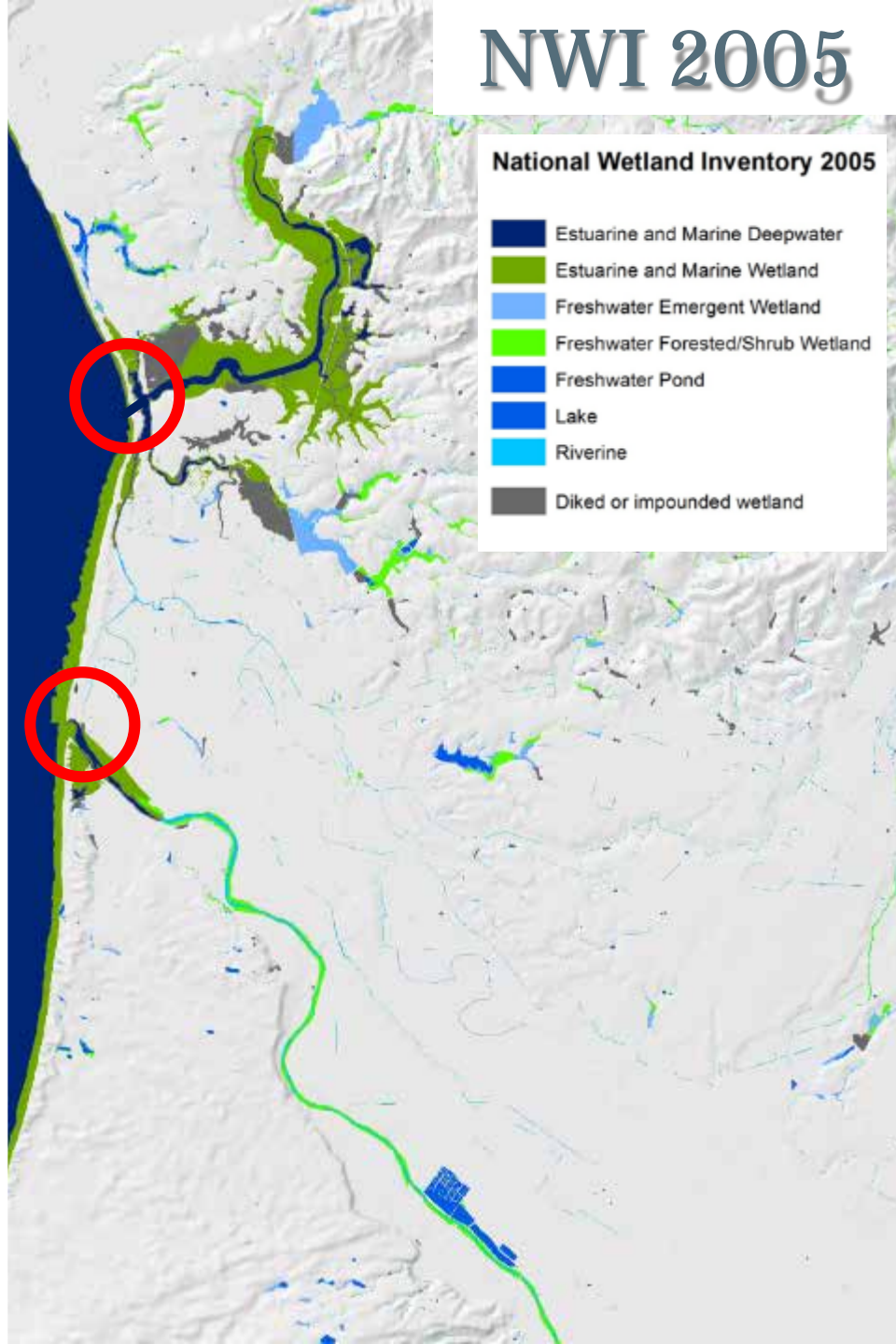
Elkhorn Slough, Charles Chapel Judson
(n.d. circa 1875-1907) – showing salt marsh and salt pans near mouth



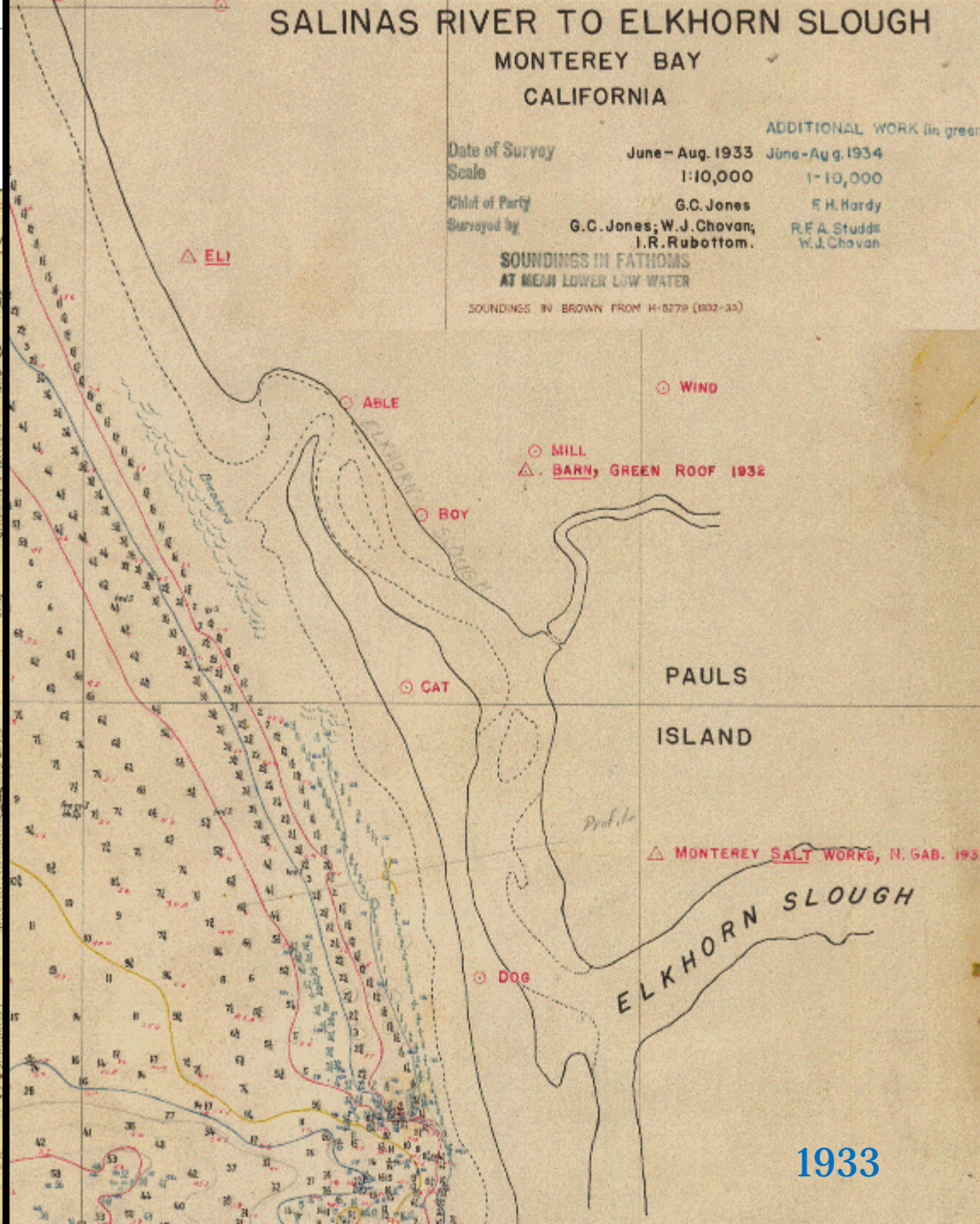
Historical wetlands 1700s-early 1900s



NWI 2005



Comparison to 1854 survey



SALINAS RIVER TO ELKHORN SLOUGH

MONTEREY BAY CALIFORNIA

ADDITIONAL WORK (in green)
 Date of Survey June - Aug. 1933 June - Aug. 1934
 Scale 1:10,000 1:10,000
 Chief of Party G.C. Jones F.H. Hardy
 Surveyed by G.C. Jones; W.J. Chovan; I.R. Rubottom. R.F.A. Studde W.J. Chovan

**SOUNDINGS IN FATHOMS
 AT MEAN LOWER LOW WATER**

SOUNDINGS IN BROWN FROM H-5279 (802-35)

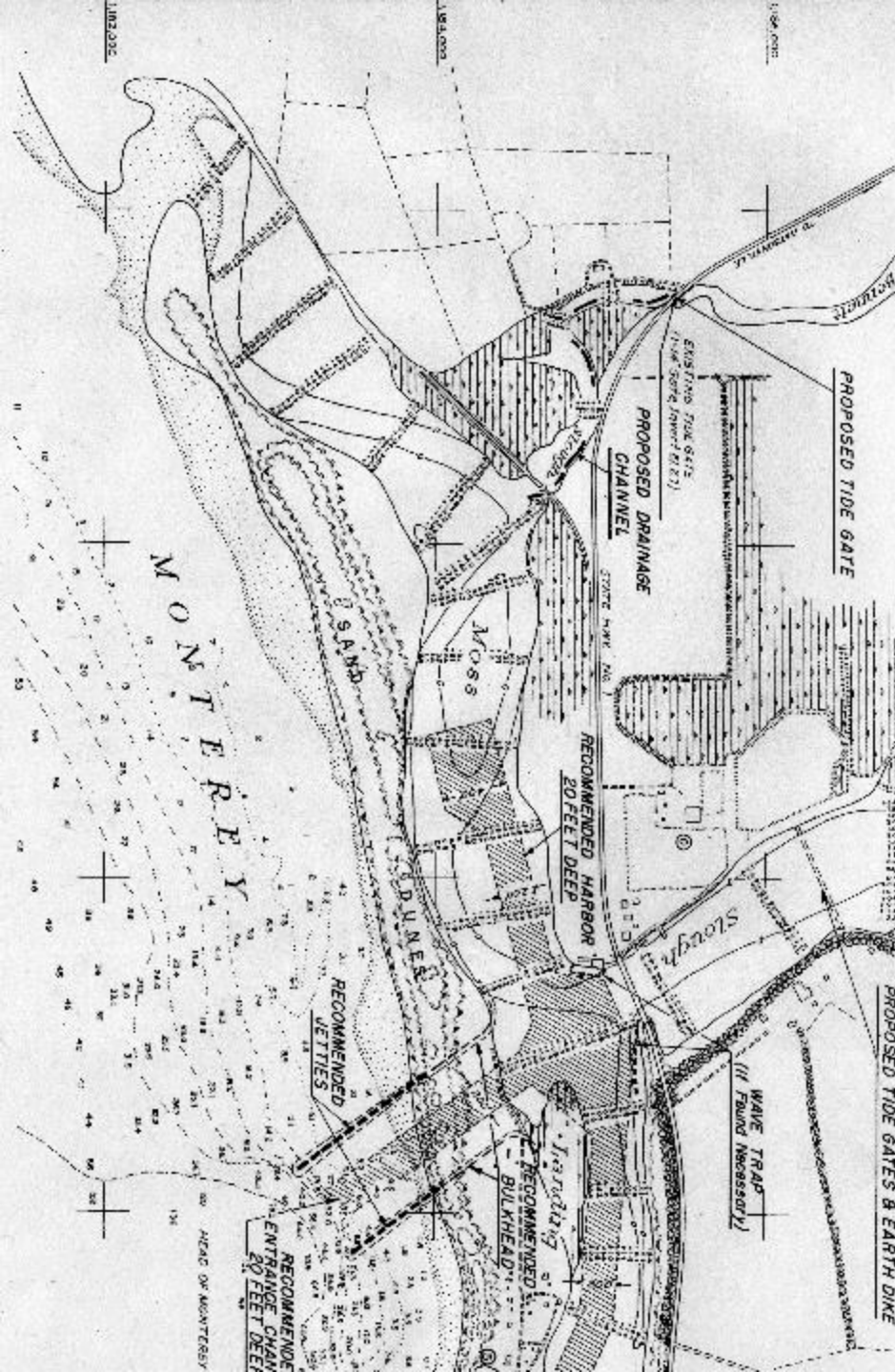
1854

1933

1943 ACOE Harbor Plan

Mouth closed by sand bar (dots across mouth)

“December 13, 1943. ..Moss Landing lagoon lies behind part of this beach and connects the mouths of Bennett, Elkhorn, and Moro Cojo sloughs. . .1.5 miles above the town of Moss Landing, the lagoon connects with the bay through **an unstable, intermittent mouth which is closed most of the time.**”





**Rowland, Leon.
Circuit Rider.
September 16, 1945.
Santa Cruz Sentinel.**

- .. "Construction by federal funds of a channel into Elkhorn Slough will be turning back the page of history for Moss Landing.
- .. "Seventy and eighty years ago the entrance to the Salinas river was sufficient to permit shallow steamers to navigate to 'Hudson's Landing' as a loading port for Watsonville, or several miles up the stream toward Castroville.