

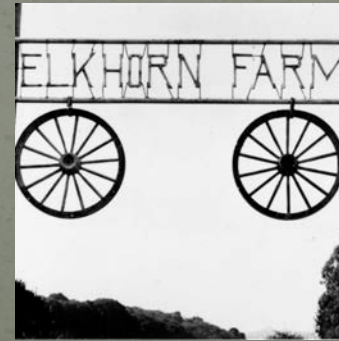
Historical Ecology of Wetlands in Vicinity of Elkhorn Slough

Andrea Woolfolk

Elkhorn Slough National Estuarine Research Reserve



and assembly, Geo. Robinson & M. Hall,
and William South of the City, and
others, State of California, parties of the
first part, vs. George S. Parsons of Washburn County,
State of Oregon, the party of the second
part, the said parties of the first part for
consideration of the sum of Five Thousand
in lawful money of the United States
to him in hand paid by the said
second part, the receipt whereof is
legally, have granted, bargained and
conformed, and by these presents
again and still, every one confirm
and ratify the said deed, and to his heirs



Objectives

- Share a work-in-progress – map of historical wetlands of north Monterey County
- Share historical data used to create map
- Provide web access to historical maps

Historical Ecology. What is it?

Historical ecology. What is it good for?

- Using reliable, firsthand accounts can help us understand past and current conditions
- Provides insight into forgotten habitat types
- Identifies landscape-level linkages and functions
- Can help us understand the potential to protect and/or restore land and water we manage

NOT a template from which to re-create the past

Historical wetlands, North Monterey County

A draft map



0 1.25 2.5 5 Miles



Pajaro River

Elkhorn Slough

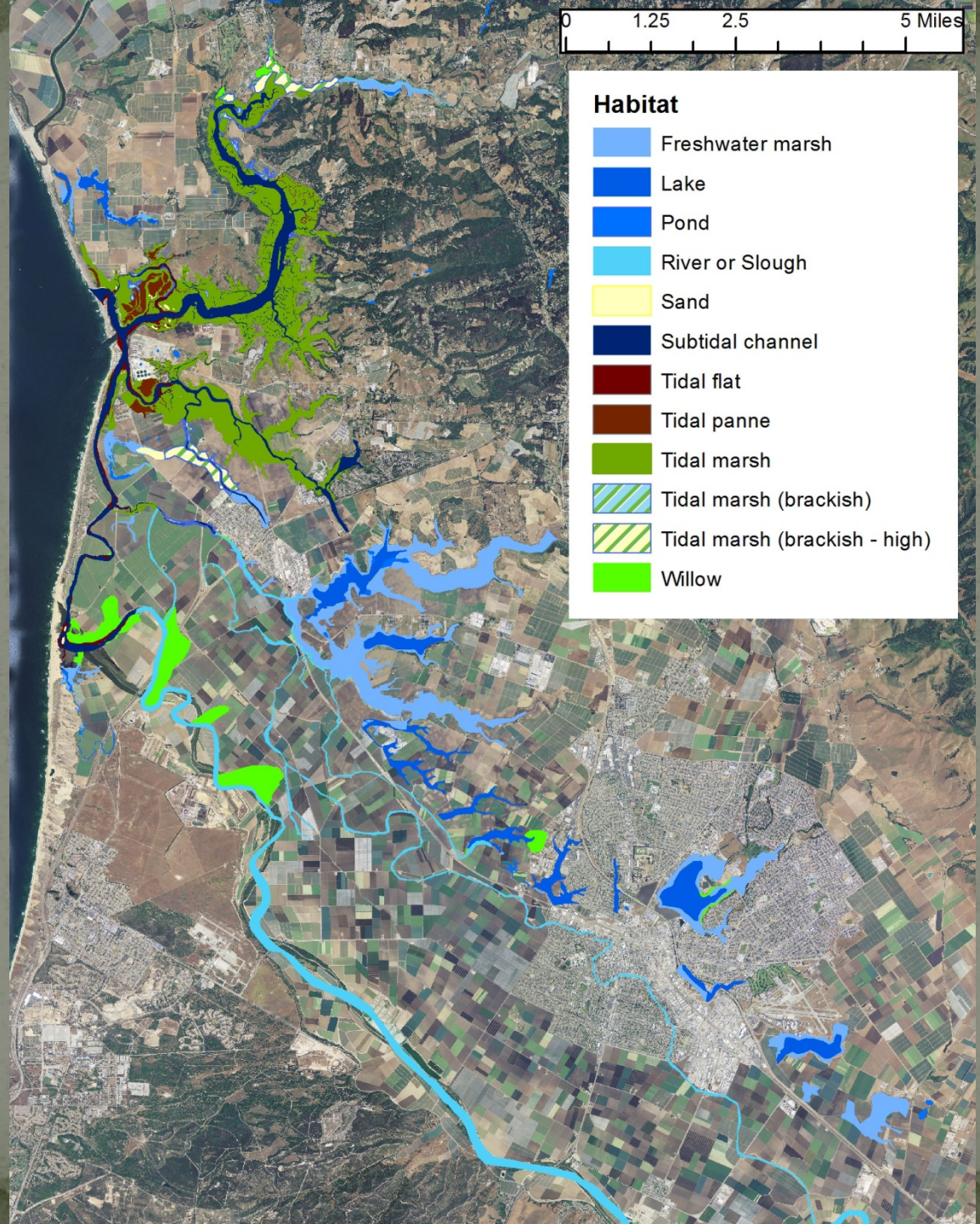
Castroville

Salinas River

Marina

Salinas

0 1.25 2.5 5 Miles



0 1.25 2.5 5 Miles

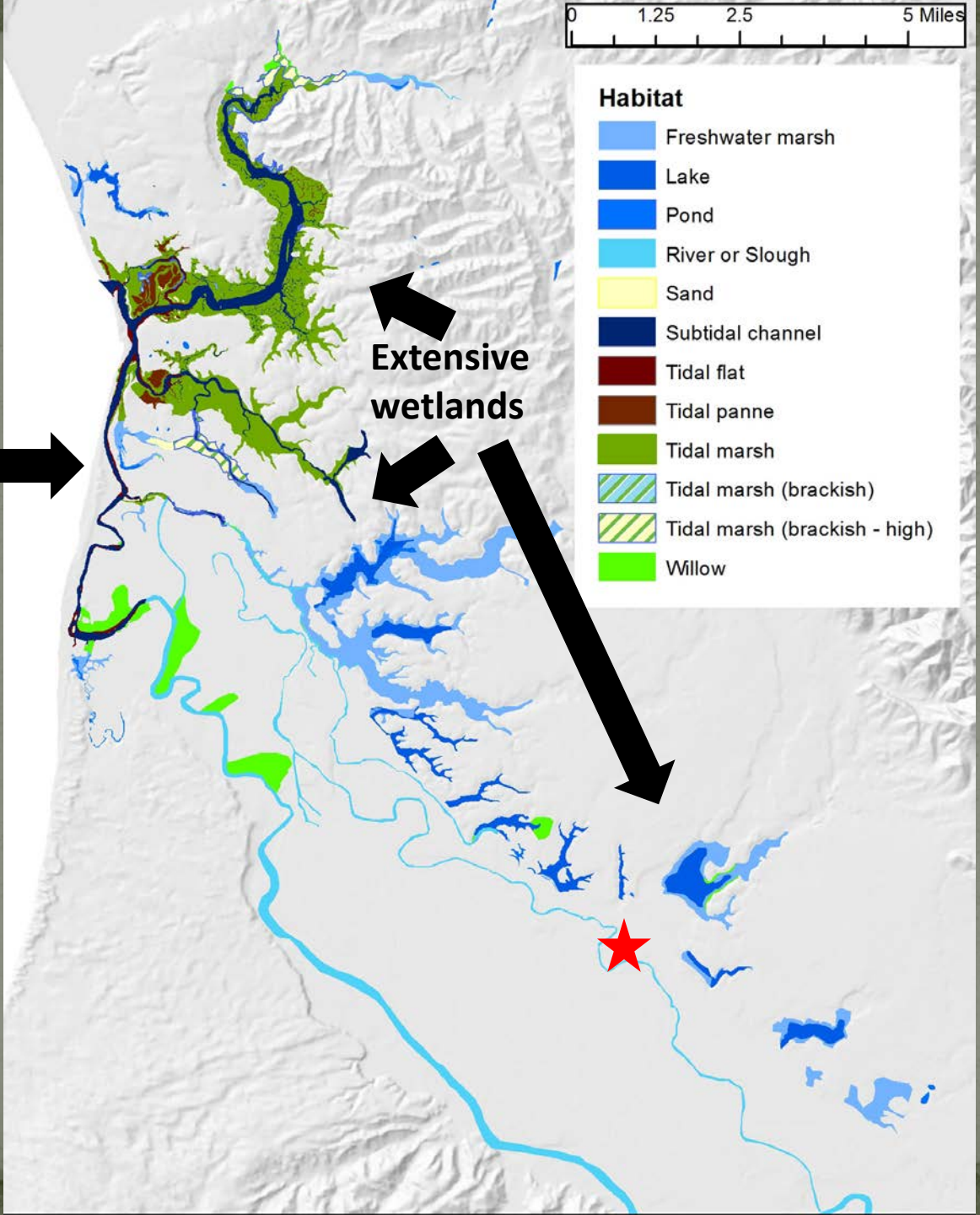
Habitat

- Freshwater marsh
- Lake
- Pond
- River or Slough
- Sand
- Subtidal channel
- Tidal flat
- Tidal panne
- Tidal marsh
- Tidal marsh (brackish)
- Tidal marsh (brackish - high)
- Willow

Connected channels



Extensive wetlands

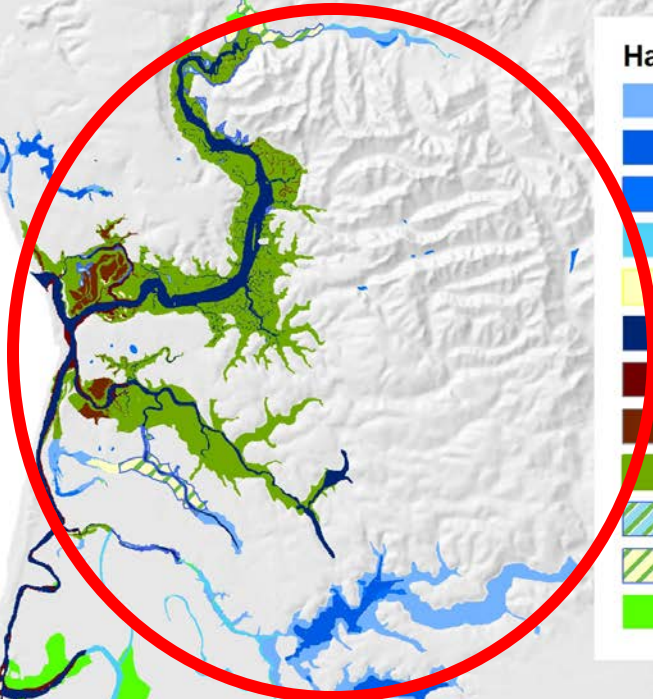


Primary data

A sampler of some of the sources for the map

Interconnected channels

0 1.25 2.5 5 Miles



Early 1800s – Mexican Rancho maps



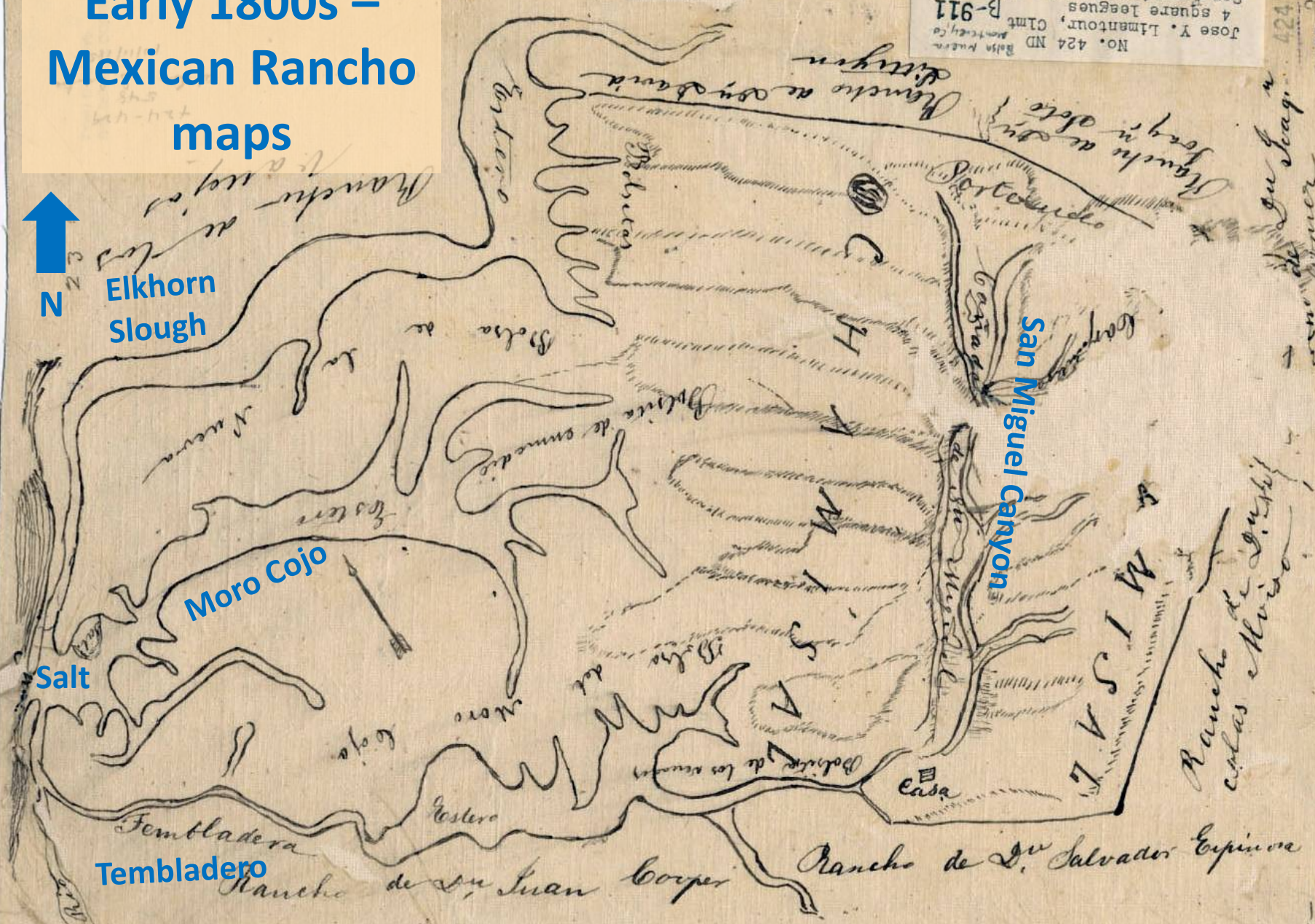
Elkhorn
Slough

Salt

Moro Cojo

Tembladero

River



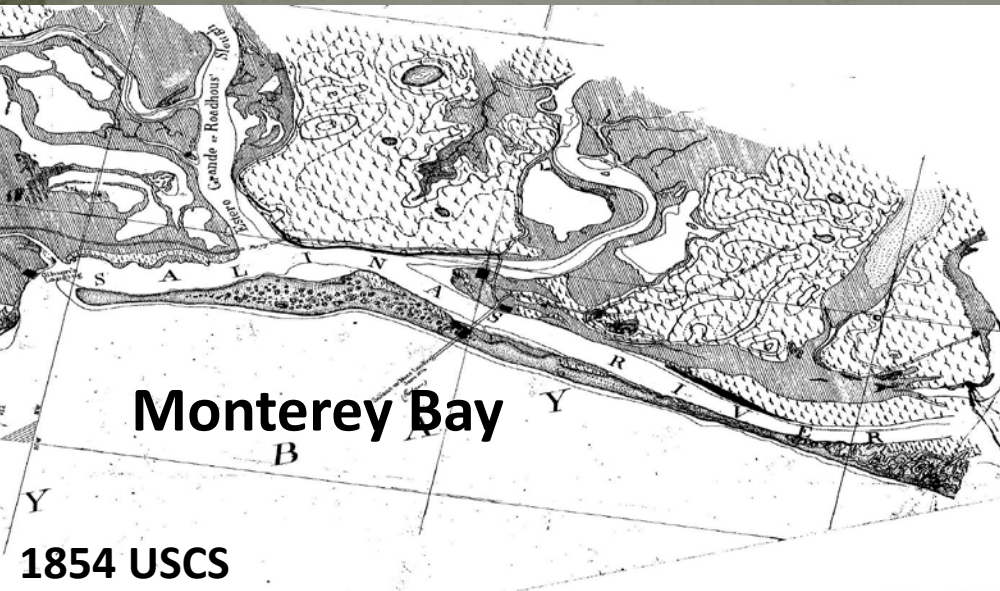
No. 424 ND
Jose Y. Limantour, Clint
B-911
San Francisco County-Attached
Expediente S. Castro, filed
Oct 11, 1858

424 ND
PAGE 3304

Rancho de San Juan
Caldas e Huevo

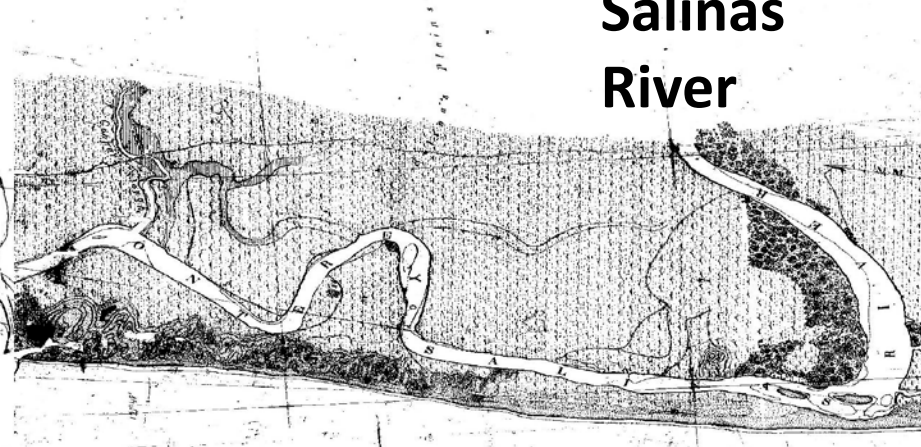
Mid 1800s – American Surveys

Elkhorn Slough



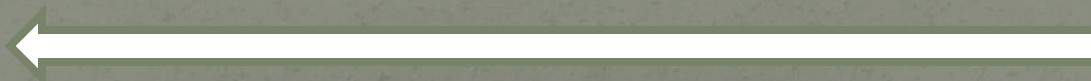
Monterey Bay

Salinas River



1854 USCS

North



John B. R. Cooper, claimant
"BOLSA DEL POTRERO,"
San Francisco, California, F. 953
San Francisco County

INITIATORY SURVEY
of
BOLSA DEL POTRERO.

or
MORO COJO.

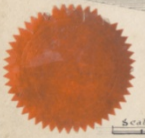
LA SACRADA FAMILIA

Confirmed by the Board of Land Commissioners
To

John B. R. Cooper

Containing 6521 ⁹⁵/₁₀₀ Acres

Surveyed by Nicholas Gray
Capt. San. U.S.
June 1854



Scale 200 ft to 1 inch

7543

I certify that this plot is a correct copy of
the original now on file in this office.
U.S. Geographer General's Office
San Francisco Cal September 1 1854
John A. Gray
U.S. Surveyor General

This plot abstracted from the original plat of a survey is
carefully compared with the original survey and the plat is
correctly and the abstract is hereby confirmed by the
confirmation of the U.S. Board of Land Commissioners
The land abstracting to make out this plat is 6521 acres
of 40 thousand feet hundred twenty five acres, which is
2133 95/100 acres less than the specific quantity of acre
mentioned in the return of the surveyor.
San Francisco Cal August 23 1854
Nicholas Gray
Surveyor General





INITIATORY SURVEY
of
BOLSA DEL POTRE
y
MORO COJO.
or

LA SAGRADA FAM

Confirmed by the Board of Land Commis
To

John B R Cooper

Containing 6526 ²⁵/₁₀₀

Surveyed by Nicholas
Dep: Sur
June 18



INITIATORY SURVEY

BOLSA DEL POTRE

y MORO Cojo.

or LA SAGRADA FAM

Confirmed by the Board of Land Commis
To

John B R Cooper

Containing 6521²⁵ wa

Surveyed by Nicholas
Dep: Sur

June 18

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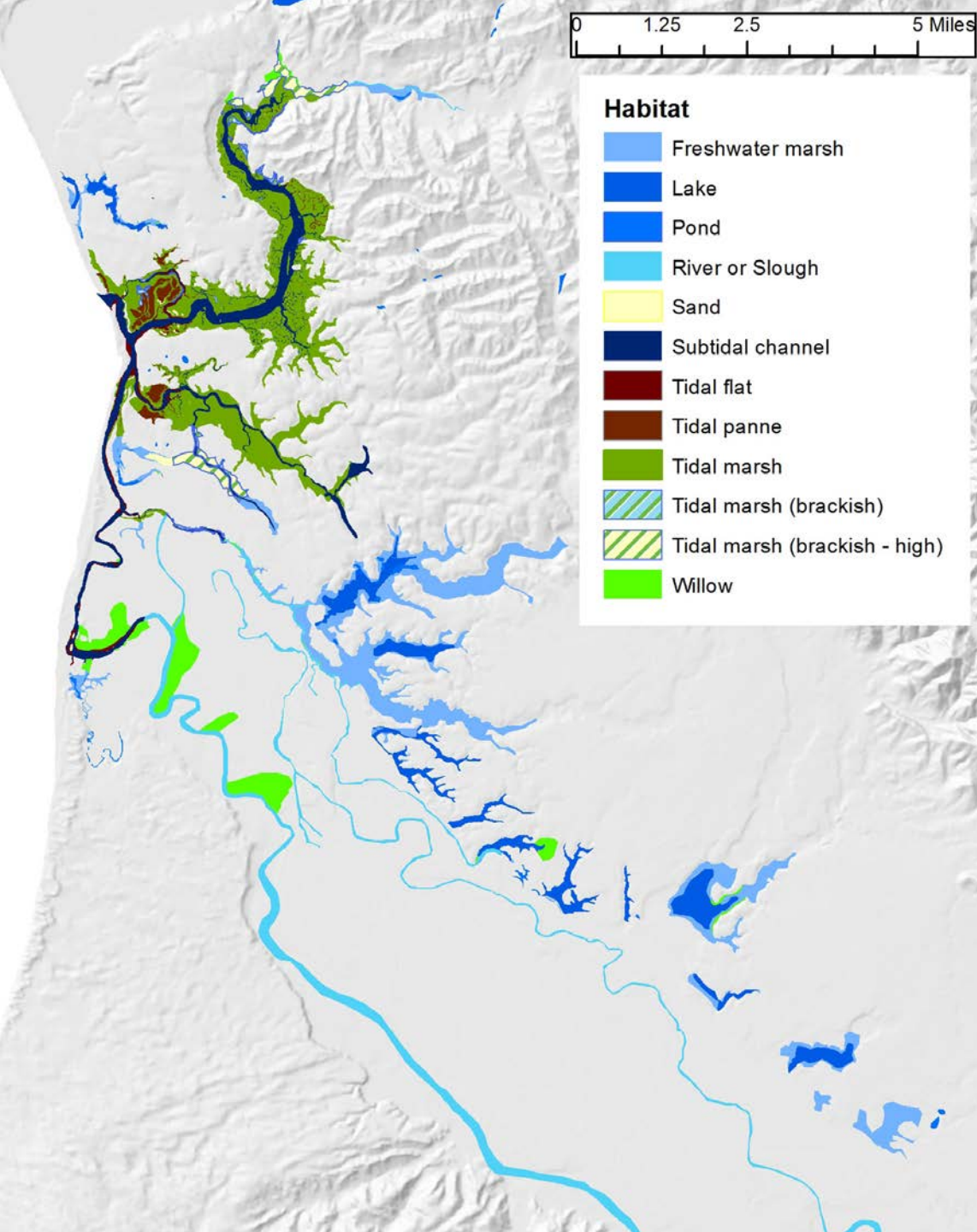
Y

Z



**A Boat Trip: Tembladero, Moro Cojo, and
Castroville Sloughs
1870**





The Castroville Argus,
January 15, 1870

“The Tembladera has its rise in, and is chiefly fed by two large and deep lakes, one lying about two miles east of Castroville, and the other about the same distance southeast. About a month ago. . .we in company with Mr. Juan B. Castro, Mr. Antonio Pomber and Mr. Anderson, made the voyage down one channel and up the other. About 1 o’clock pm we got into a skiff on the Tembladera, near Hick’s Mill, and proceeded leisurely down the stream, three miles to the Salinas. . .”

Salinas River, 250-350' wide, low tide, sand bars

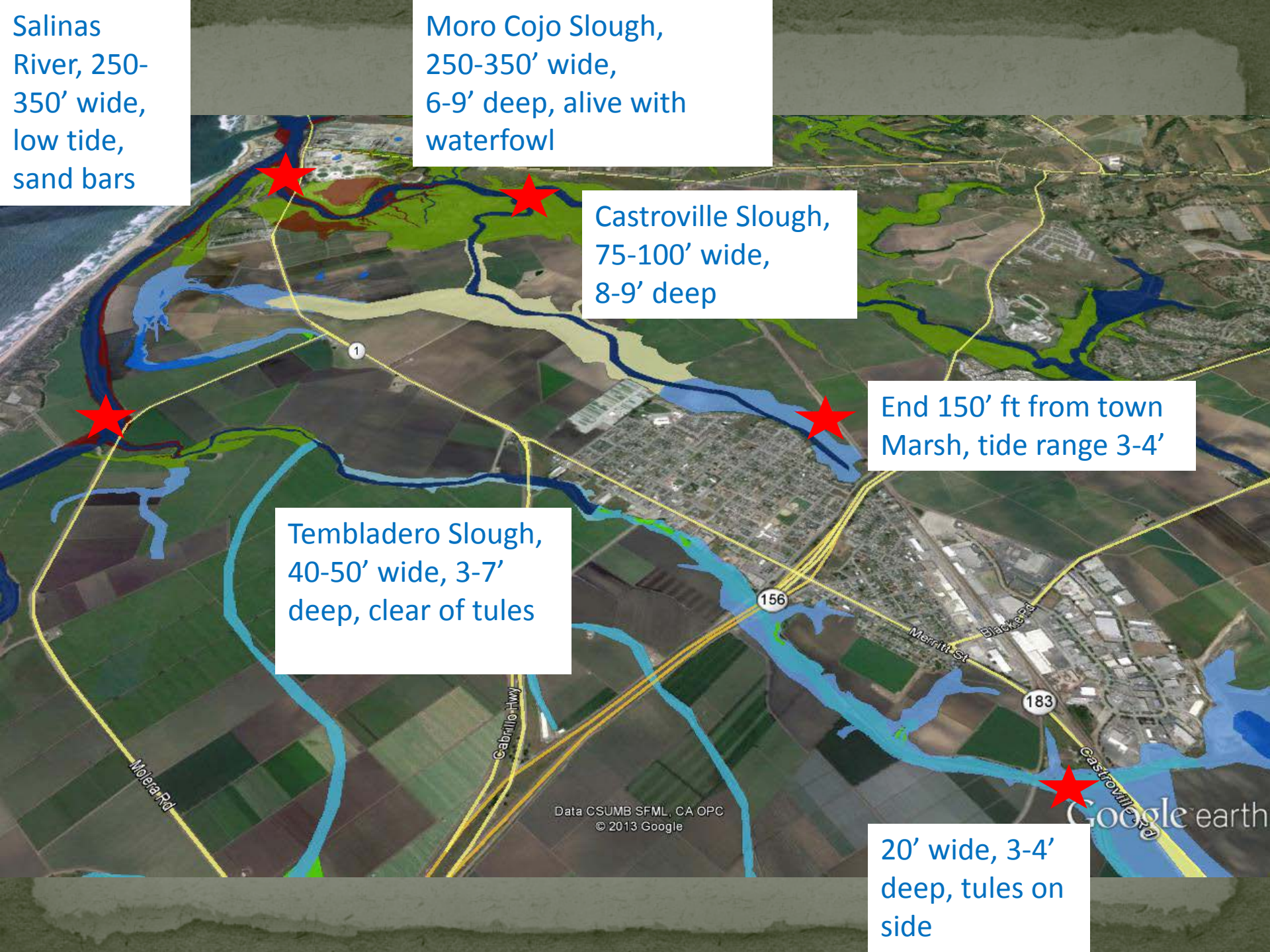
Moro Cojo Slough, 250-350' wide, 6-9' deep, alive with waterfowl

Castroville Slough, 75-100' wide, 8-9' deep

End 150' ft from town Marsh, tide range 3-4'

Tembladero Slough, 40-50' wide, 3-7' deep, clear of tules

20' wide, 3-4' deep, tules on side

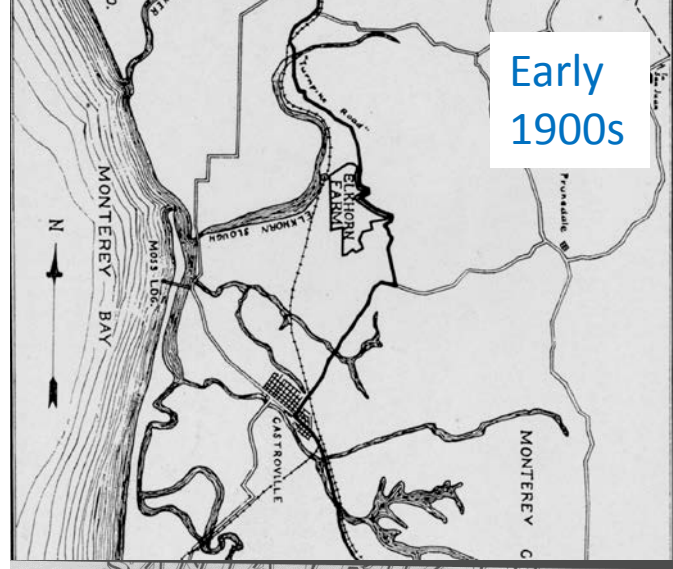
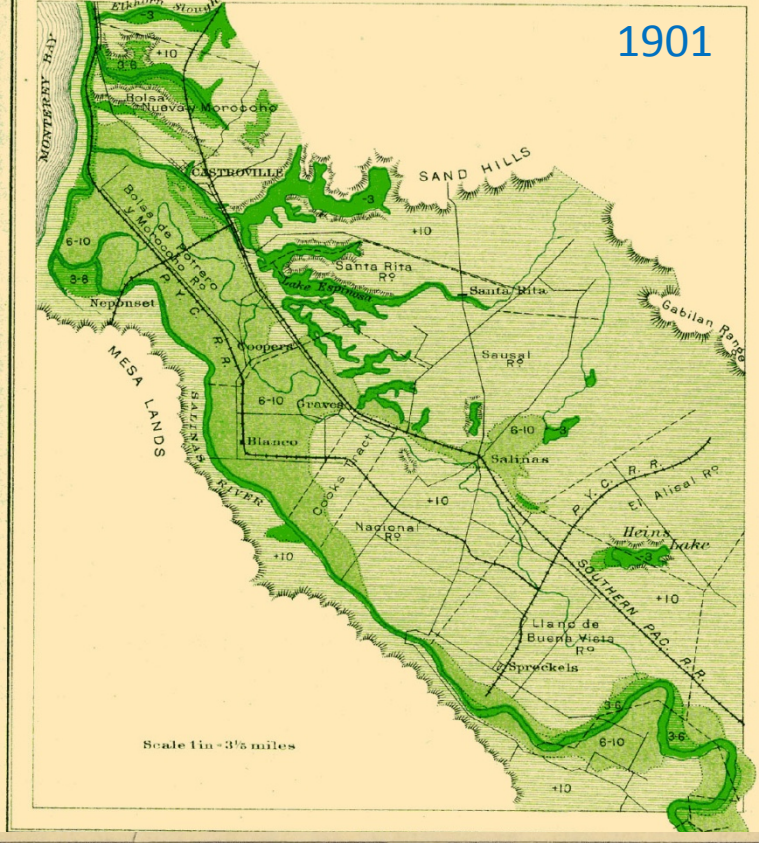


Data CSUMB SFML, CA OPC © 2013 Google

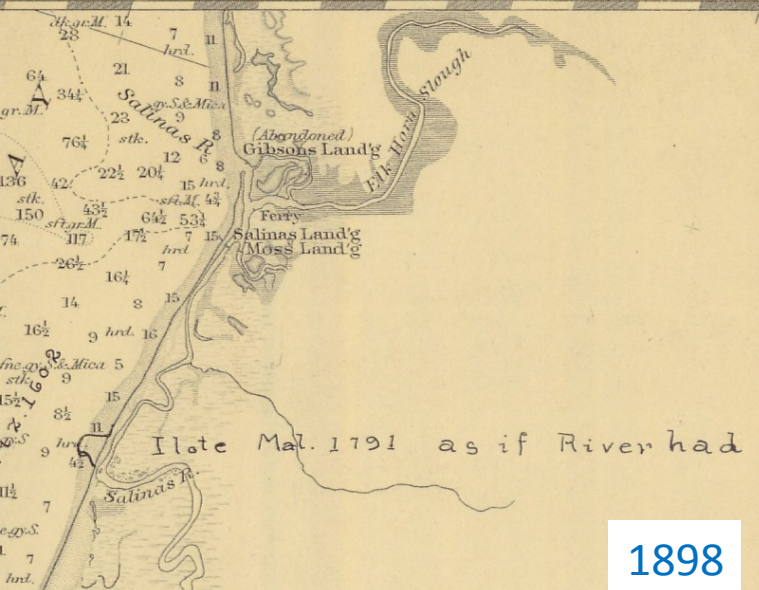
Google earth

Castroville Channel today – 5-20 feet wide for most of its length



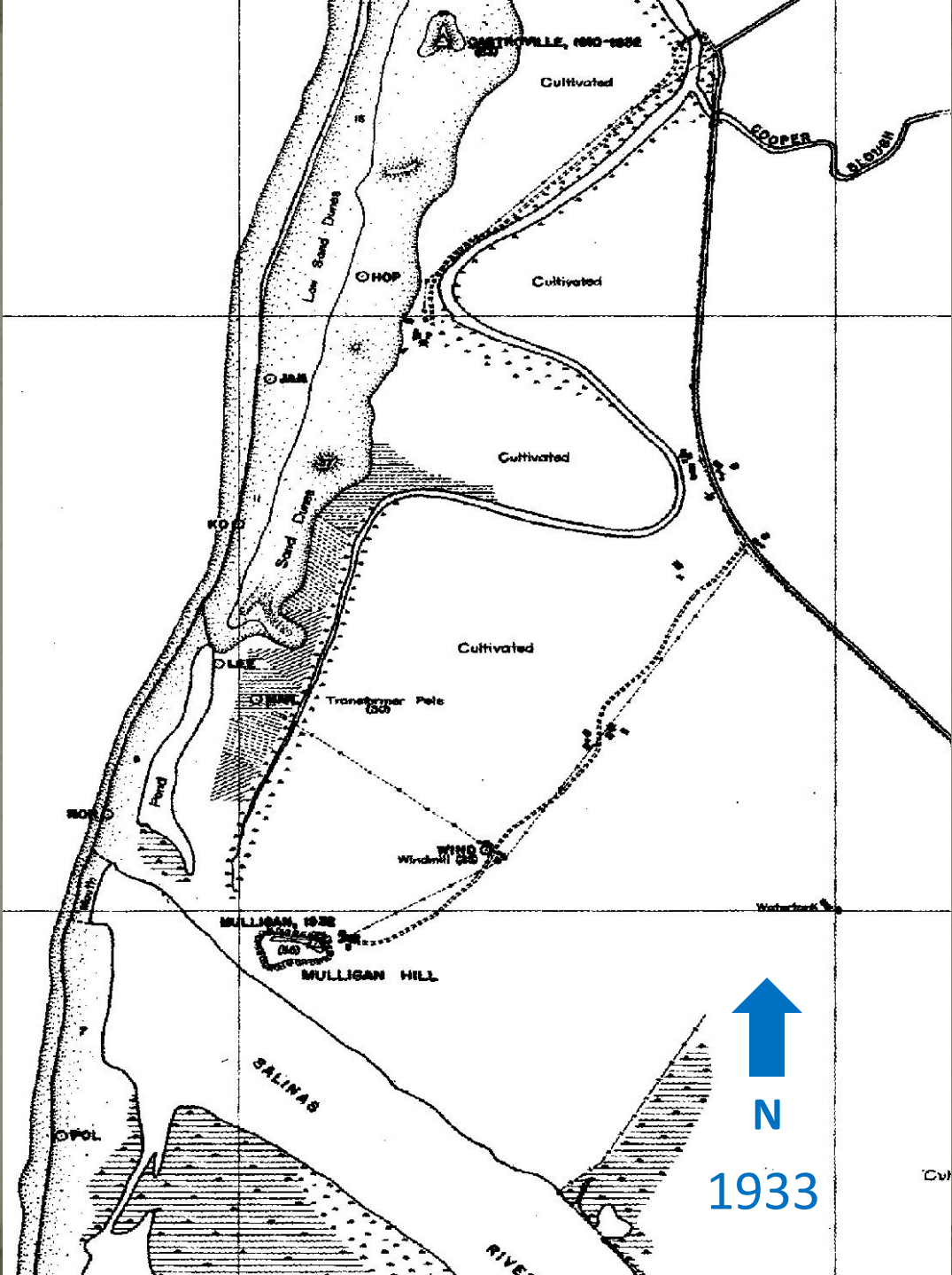


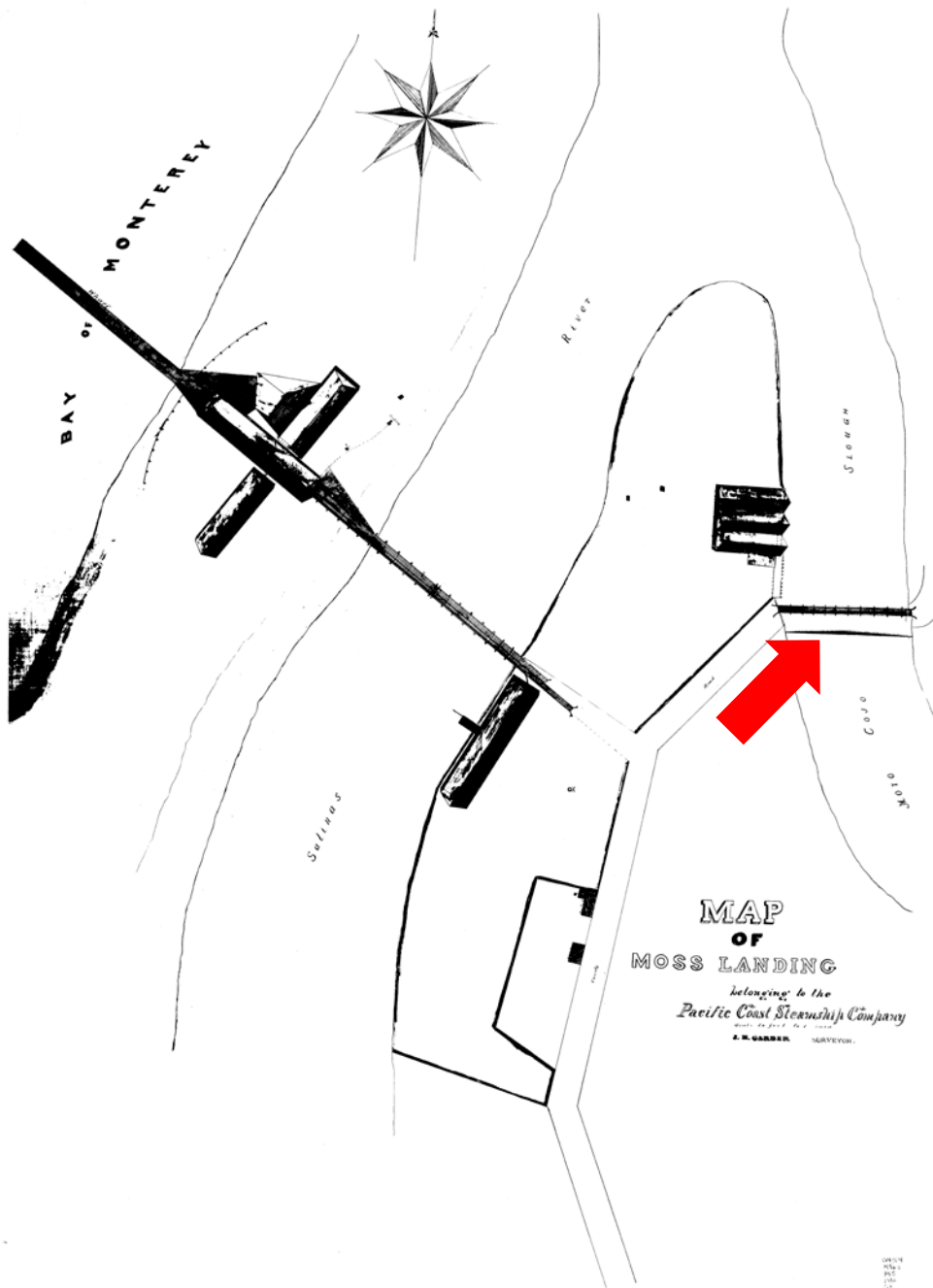
Interconnected channels mapped repeatedly



What changed?

Water control structures

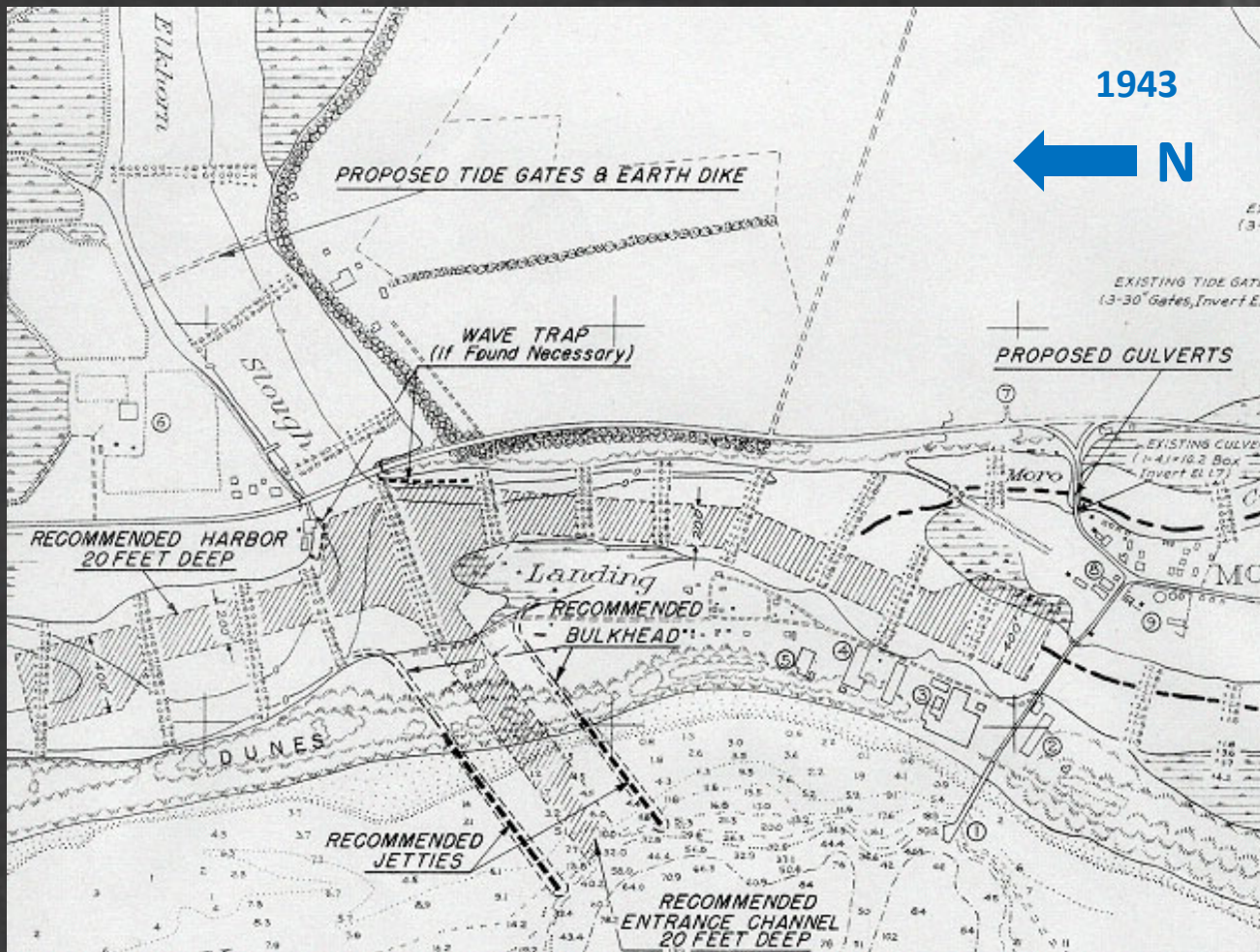




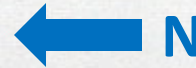
Bulkhead installed to prevent tides in Moro Cojo Slough (erroneously called "Elkhorn" below)

Santa Cruz Sentinel,
May 11, 1886

—The bulkhead at Moss Landing is finished. The structure is eighty feet at the base, and fifty feet at the top, and about six hundred feet in length. The flood gates are arranged so that at low tide the fresh water will open the gates, letting the water into the ocean, but the tide water will close them, permitting no water to pass up Elk Horn slough.



1943



N

1946



Extensive wetlands – estuarine
marshes and freshwater lakes,
sloughs, wetlands

October 7, 1769. Portola Expedition heads north from Salinas River



Castroville

Salinas City

Data CSUMB SFML, CA OPC

Google earth



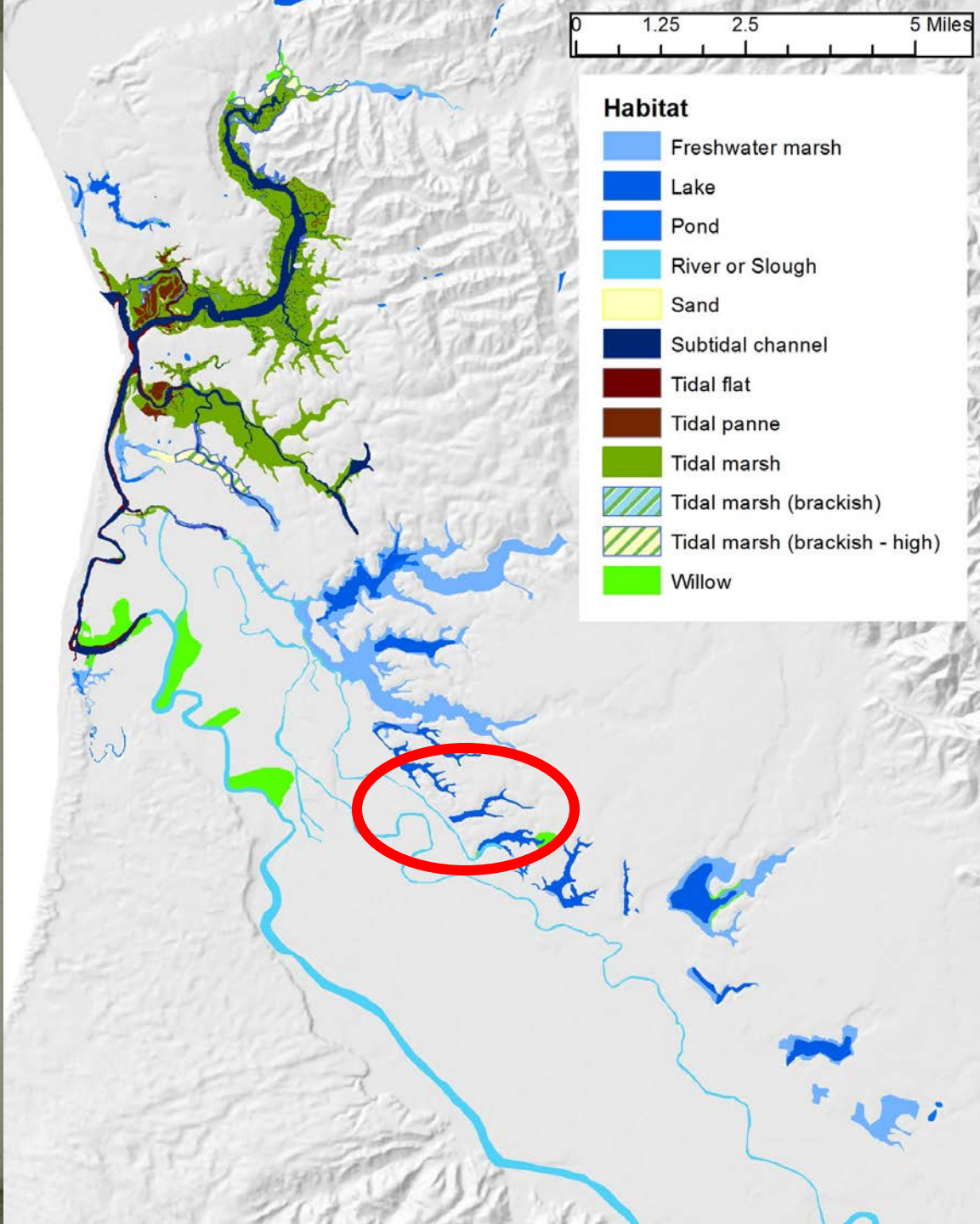
Data CSUMB SFML, CA O



0 1.25 2.5 5 Miles

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- Tidal panne
- Tidal marsh
- Tidal marsh (brackish)
- Tidal marsh (brackish - high)
- Willow



532-2
A 845

SELLO CUARTO
Para los años de mil
y mil ochocientos

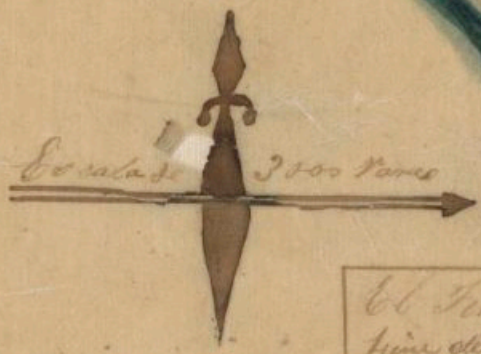


UNA CUARTILLA.
ochocientos cuarenta
cuarenta y uno.



Revuelto por los años de mil y ochocientos

Michael Peter



El Territorio de San
Juan de los Rios. Seis mil
quienientos y ochocientos
y ochenta y uno pasos
mil.
A. Bayon grande -
B. al churo junto de la casa
C. hincal de las gatas gley
D. M. ad.
E. Camino del Puerto
F. in real
G. Pasos -
H. lagunita
I. Limero de Frumido

No. 244 S.D.
Eusebio Boronda, Cmt
"Rinconada del Sanjon"
Monterey County
B-1280

244 SD
PAGE 57



American accounts

Daily Evening Bulletin,
San Francisco.
Feb 25, 1880

rauches. The chief peculiarity in the location of Salinas City is that it is in the midst of natural lakes, some of them of considerable depth, and fed by springs. Entering Salinas on the Santa Rita road the traveler passes between two of these lakes, one of great depth. Entering by way of the Castroville road, we pass several other lakes. On the south of the town, and some miles distant, there are several similar lakes. In fact, there is a chain of lakes of varying sizes, reaching from Salinas City to Castroville. Some of these lakes are deep and permanent. Others are shallow, and surrounded with wide belts of marsh and tule.

Now, the future of these lakes is a question of much importance. Can they be drained, so as to utilize the marvelously rich soil and age-old deposits of vegetable matter, now worse than idle? The natural outlet is the Tembladera Slough, a deep and wide channel, which could easily be made navigable for small vessels, and doubtless the work of deepening the short channels between the lakes would not be anything enormous. But the fundamental question, so

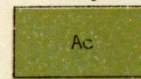
Soil Survey of the Salinas Area, CA 1925



Tidal marsh



Alviso
clay



During extremely high tide the soil is occasionally overflowed. Saline deposits are present. Salt grasses, pickleweed and other water loving salt-resistant grasses or sedges.

What changed?
Wetland reclamation

FIG. 2.-RECLAMATION OF TIDAL FLATS BY RIDGE CULTIVATION AND SHALLOW-SURFACE DRAINAGE .



“The land in proximity to the sea is often rendered unfit for cultivation by the effects of brackish tide water. In a few cases existing slough channels afford an outlet for drainage of limited areas of this land. Much of the land of the Monterey County farm and vicinity has been drained into such sloughs.” -1901 Soil Survey of the Lower Salinas Valley, California.

Maps and aerials you can use at home

- USGS maps from 1914 and 1917
- Lou Hare's lake maps from early 1900s
- Aerial photos from 1930s - 1980

- Files available at elkhornslough.org/habitat-restoration/historical-ecology-tools.htm

ElkhornSlough.org

The official website of the Elkhorn Slough Foundation and Elkhorn Slough National Estuarine Research Reserve

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Home > Habitat Restoration > Stewardship Methods > Restoration Science > Historical Ecology Tools

Elkhorn Slough Restoration: Historical Ecology Tools

- Habitat Restoration ▶
- Restoration Projects
- Stewardship Methods ▶
- From the field...
- Elkhorn Slough Plants
- Volunteer

Digging into the Past - Historical Ecology Tools You Can Use at Home

On January 25, 2014 we talked about the history of our local area and ways we can try to apply that knowledge to land we own and manage. Here are some resources you can use at home.

For more information about using these KMZ files below [download this ReadMe file.](#)

Historical Maps

1. United State Geological Survey topographical maps, early 1900s.
 - Just want to view or print these maps as pdf files? Visit <http://nationalmap.gov/historical/>.
 - Click on "Historical Topographic Map Collection search" and search for the map you want.
 - To see maps for the Elkhorn Slough area, search for "Capitola" and "San Juan Bautista."
 - Want to view historical USGS topos for the Elkhorn Slough region in Google Earth? Elkhorn Slough staff have converted portions of the 1914 and 1917 images into kmz files. Download the files below, and then open in Google Earth.
 - [1914usgsWest.kmz](#) (6.5 MB)
 - [1917usgsEast.kmz](#) (13 MB)
 - Interpreting the maps. Some of the historical USGS maps include legends. others do not.



Historical USGS topographic map of Elkhorn Slough as viewed in Google Earth.

ElkhornSlough.org

The official website of the Elkhorn Slough Foundation and Elkhorn Slough National Estuarine Research Reserve

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[Slough Life](#)
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Home > Habitat Restoration > Stewardship Methods > Restoration Science > Historical Ecology Tools

Elkhorn Slough Restoration: Historical Ecology Tools

- Habitat Restoration ▶
- Restoration Projects
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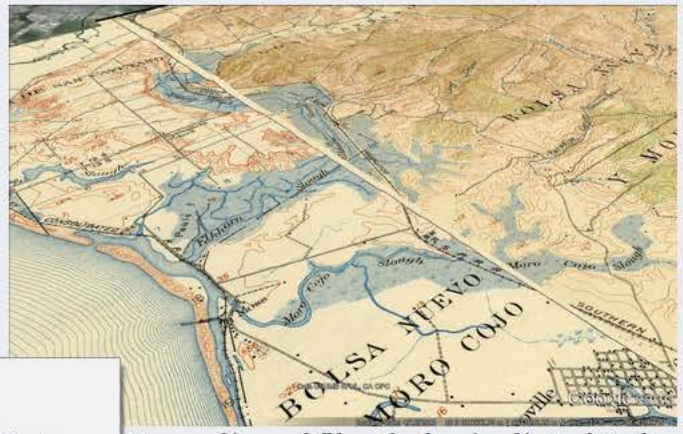
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- Open Link in New Tab
- Open Link in New Window
- Open Link in New Private Window
- Bookmark This Link
- Save Link As...
- Copy Link Location
- Inspect Element (Q)
- Convert Link Target to Adobe PDF
- Append Link Target to Existing PDF



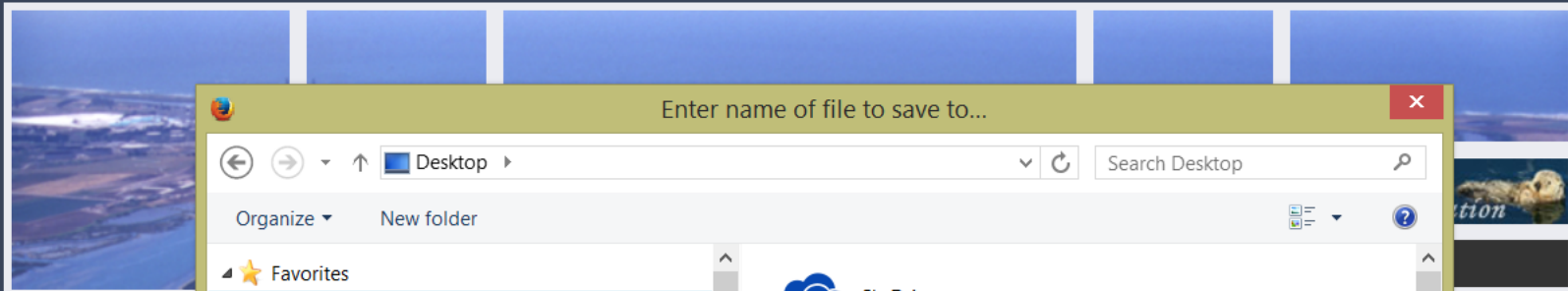
USGS topographic map of Elkhorn Slough as viewed in Google Earth.

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Organize New folder

Search Desktop

Favorites: Desktop, Dropbox, Google Drive, Recent places
 Desktop: SkyDrive, Homegroup, amwoolfolk, This PC

File name: 1917usgsEast.kmz

Save as type: (*.kmz)

Hide Folders

Save Cancel

[/historical/](#).

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Oct 2013
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Recovery

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1917usgsEast
kmz

Adobe
Acrobat ...

Lou Hare
notes v...



For Digging
in the Past...

Control Panel



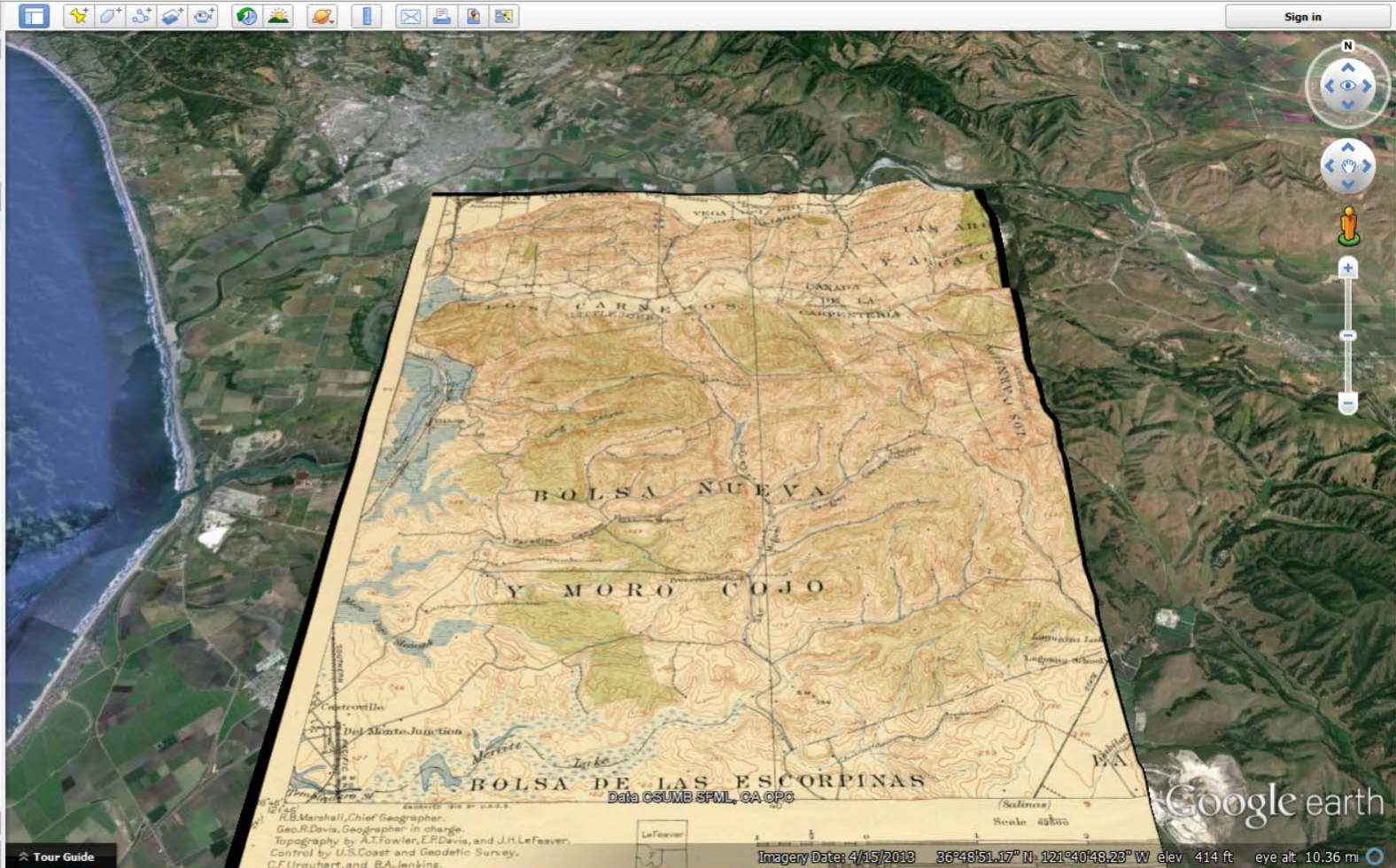
Google™ earth

The image features the text "Google™ earth" in a white, serif font, centered in the upper half. The background is a dark space scene with a curved horizon of Earth in shades of blue and white, and numerous stars of varying sizes and colors scattered across the black sky. The top and bottom edges of the image have a light-colored, textured border that looks like torn paper.

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Get Directions History

▼ Places

- My Places
 - Temporary Places
 - OkMap
- Created 01/20/14 20:56:52



Sign in



▼ Search

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Computer repair near Boston

Get Directions History

▼ Places

My Places

OkMap

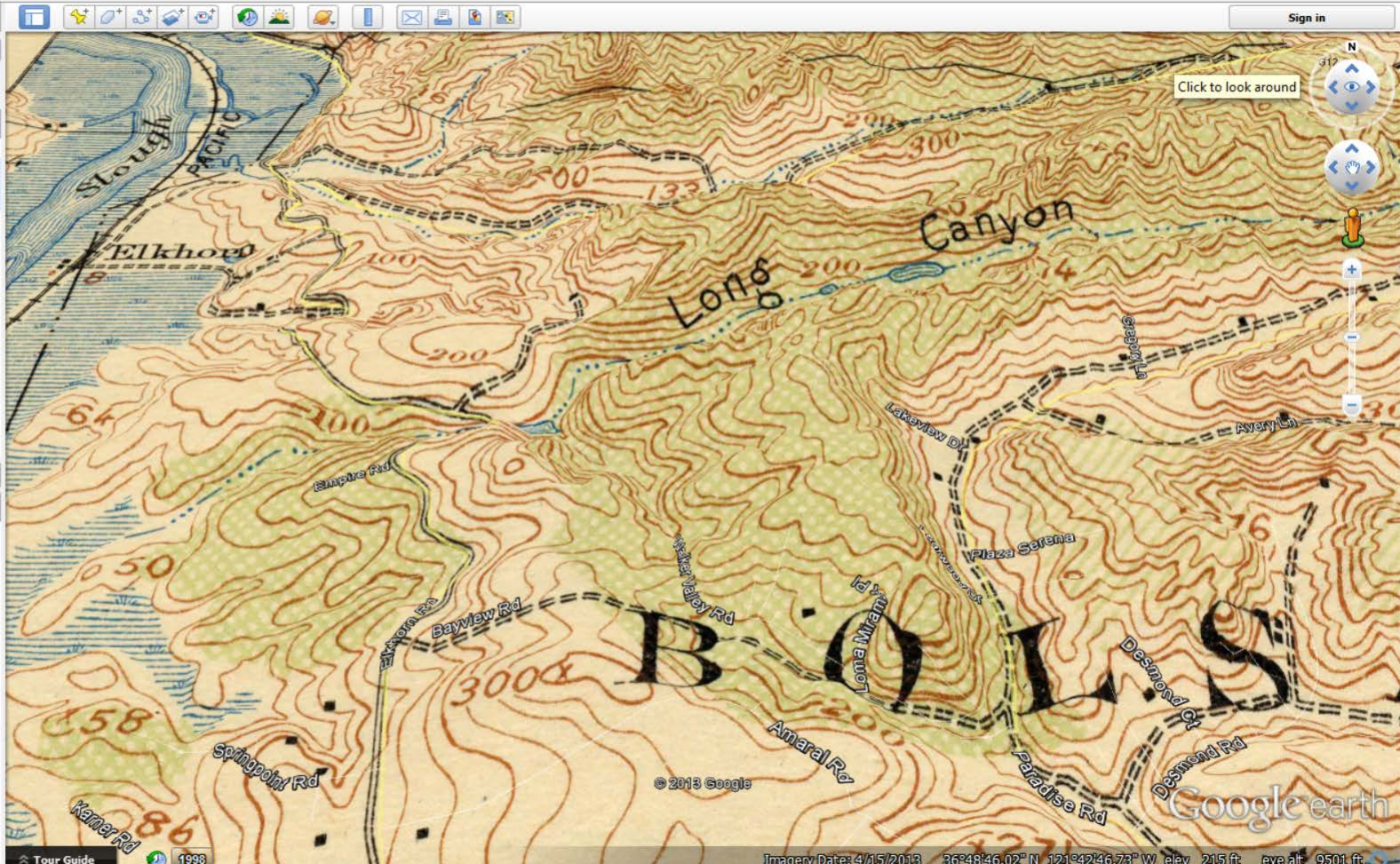
Created 01/20/14 20:56:52

Temporary Places

▼ Layers

Earth Gallery >>

- Primary Database
- Borders and Labels
- Places
- Photos
- Roads
- 3D Buildings
- Ocean
- Weather
- Gallery
- Global Awareness
- More



Tour Guide 1998

Imagery Date: 4/15/2013 36°48'46.02" N 121°42'46.73" W elev 215 ft eye alt 9501 ft

- My Places
- OkMap
- Created 01/20/14 20:56:52
- Temporary Places

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Andrea Woolfolk: amwoolfolk@gmail.com