

Historical Ecology of Wetlands in Vicinity of Elkhorn Slough

Andrea Woolfolk

Elkhorn Slough National Estuarine Research Reserve



and assembly, Inc. Silvers & M. Hall.
and William Scotts of the city and
Miss. State of California, parties of the
of George de. Parsons of Contra Costa County
State represent the party of the second
that the said parties of the first for
consideration of the sum of Five Thousand
in lawful money of the United States
to him in hand paid by the said
said party the receipt whereof is
legally, have granted, bargained and
and confirmed, and by these presents
again and all, every one confirm
of the said party and to be



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

(adapted from San Francisco Estuary Institute)

Historical wetlands, North Monterey County

A draft map



0 1.25 2.5 5 Miles



Pajaro River

Elkhorn Slough

Castroville

Salinas River

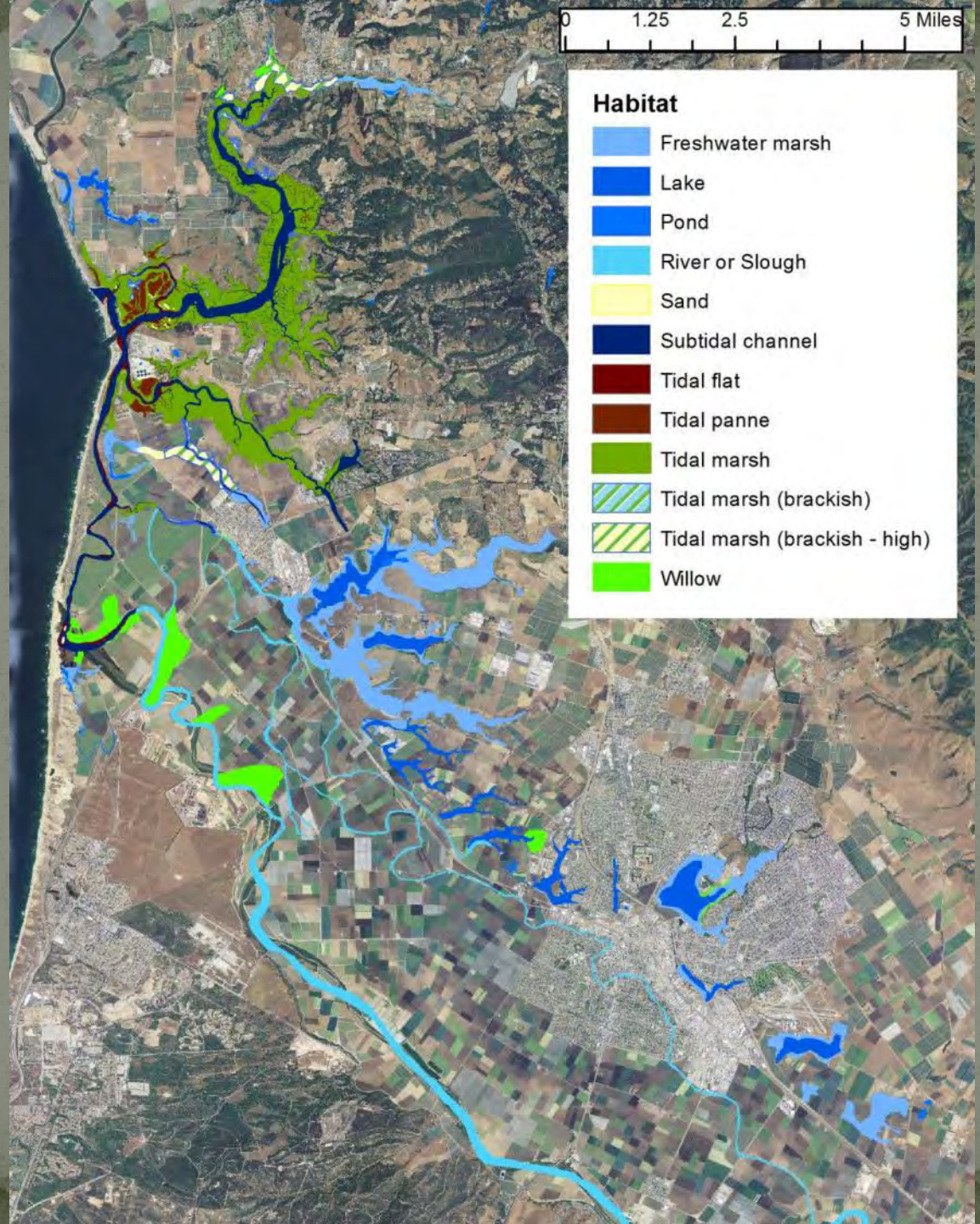
Marina

Salinas

0 1.25 2.5 5 Miles

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



0 1.25 2.5 5 Miles

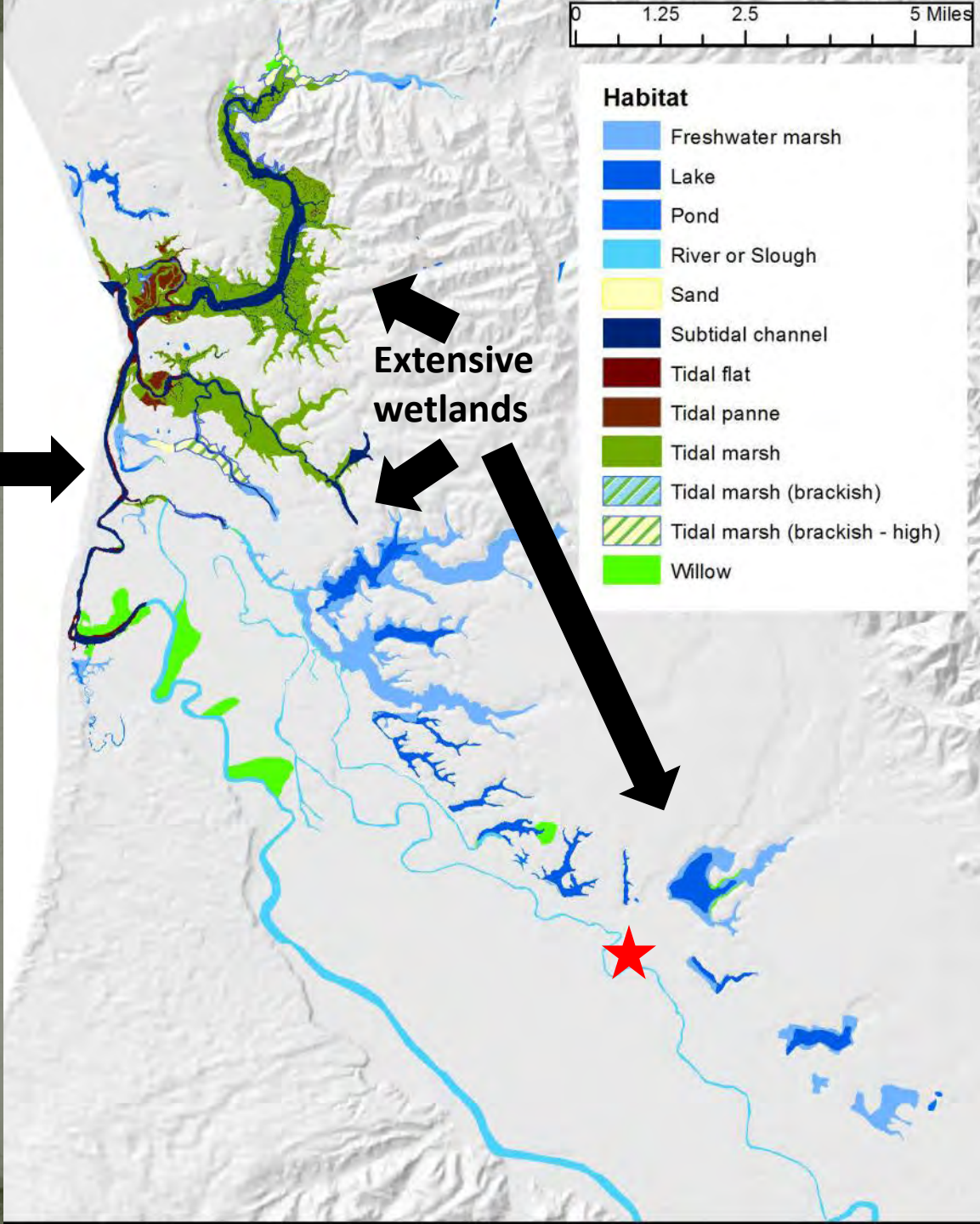
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Connected channels



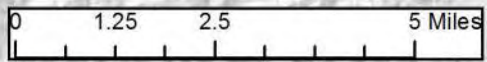
Extensive wetlands



Primary data

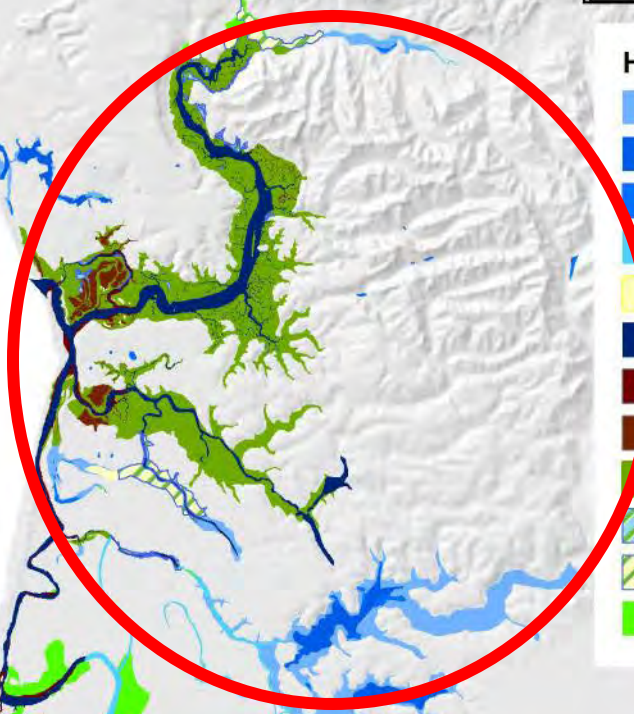
A sampler of some of the sources for the map

Interconnected channels



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Early 1800s – Mexican Rancho maps



Elkhorn
Slough

Salt

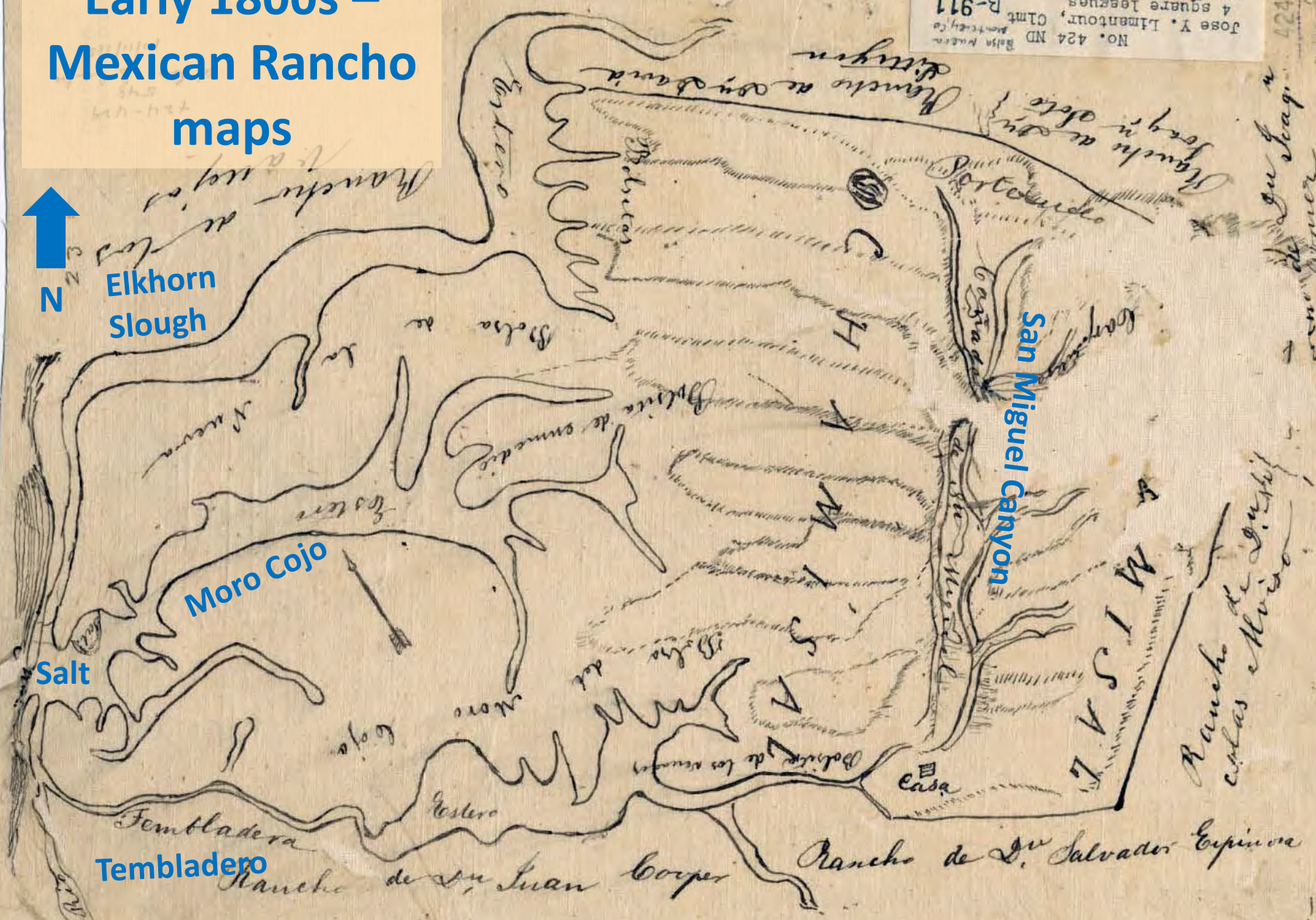
Moro Cojo

Tembladero

River

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

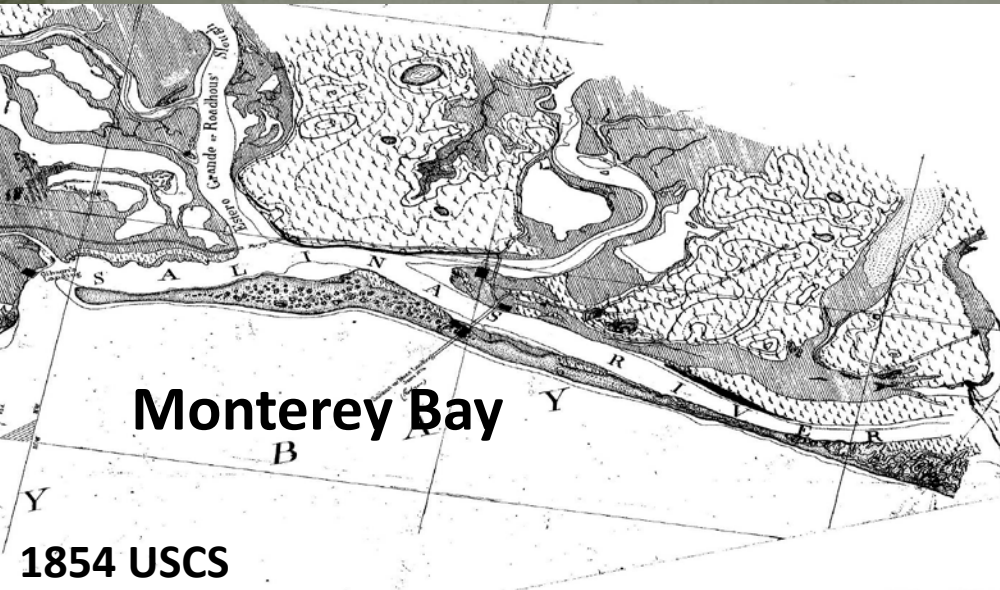
424 ND
PAGE 3304



Rancho de San Juan Cooper
Rancho de San Salvador Espinosa

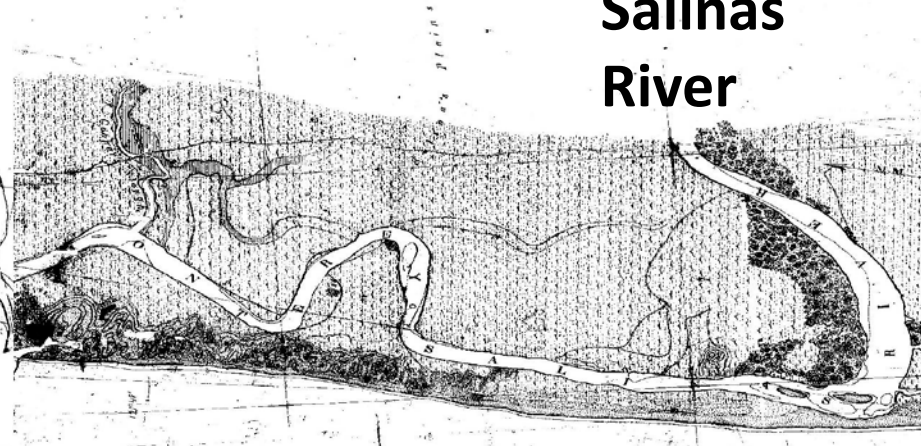
Mid 1800s – American Surveys

Elkhorn Slough



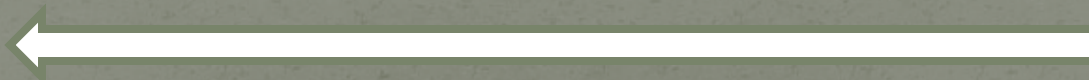
Monterey Bay

Salinas River



1854 USCS

North





INITIAL SURVEY
of
BOLSA DEL POTRERO.

MORO COJO.

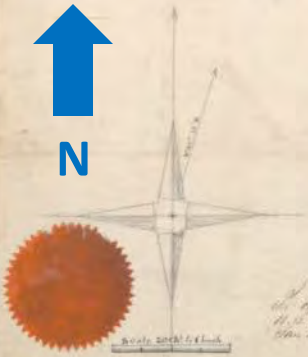
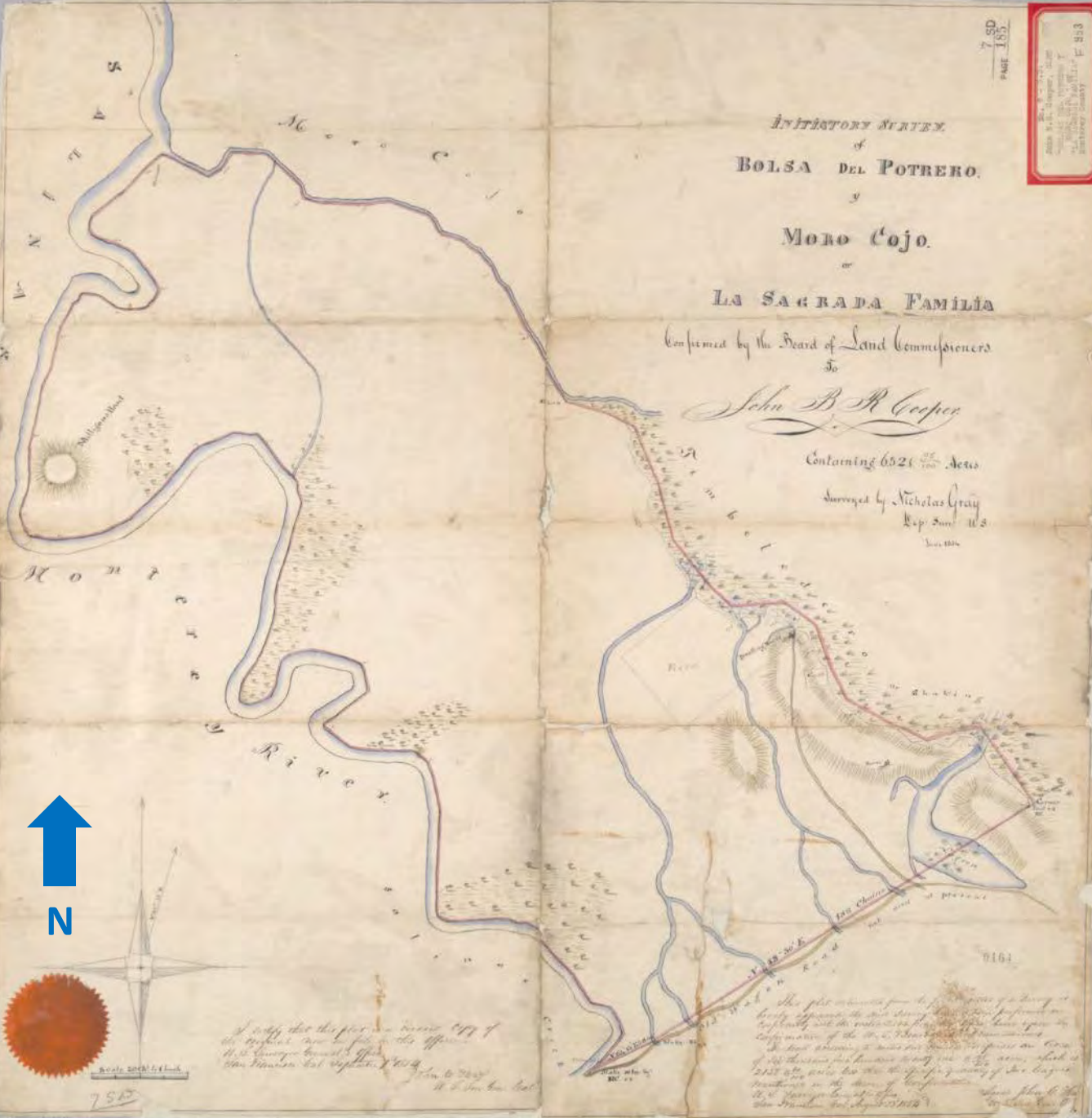
LA SAGRADA FAMILIA

Confirmed by the Board of Land Commissioners
To

John B. R. Cooper

Containing 6521 ¹/₂ Acres

Surveyed by Nicholas Gray
Exp. Sum. 1853



*I certify that this plan is a true and correct copy of the original now on file in this office.
W. B. Cooper Surveyor General
San Francisco Cal. August 1854*

*The plot contained in this plan is a true and correct copy of the original now on file in this office.
W. B. Cooper Surveyor General
San Francisco Cal. August 1854*





INITIATORY SURVEY
of
BOLSA DEL POTRERO
y
MORO COJO.

or
LA SAGRADA FAMILIA

Confirmed by the Board of Land Commissioners
To

John B R Cooper

Containing 6521 ²⁸/₁₀₀ Acres

Surveyed by Nicholas
Leop. Surber
June 12



INITIATORY SURVEY

BOLSA DEL POTRERO

y MORO COJO.

LA SAGRADA FAMILIA

Conformed by the Board of Land Commissioners
To

John B R Cooper

Containing 6526 acres

Surveyed by Nicholas
Lep. Sme

June 18

22

26

At the corner of the

M O M T



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



0 1.25 2.5 5 Miles

Habitat

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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

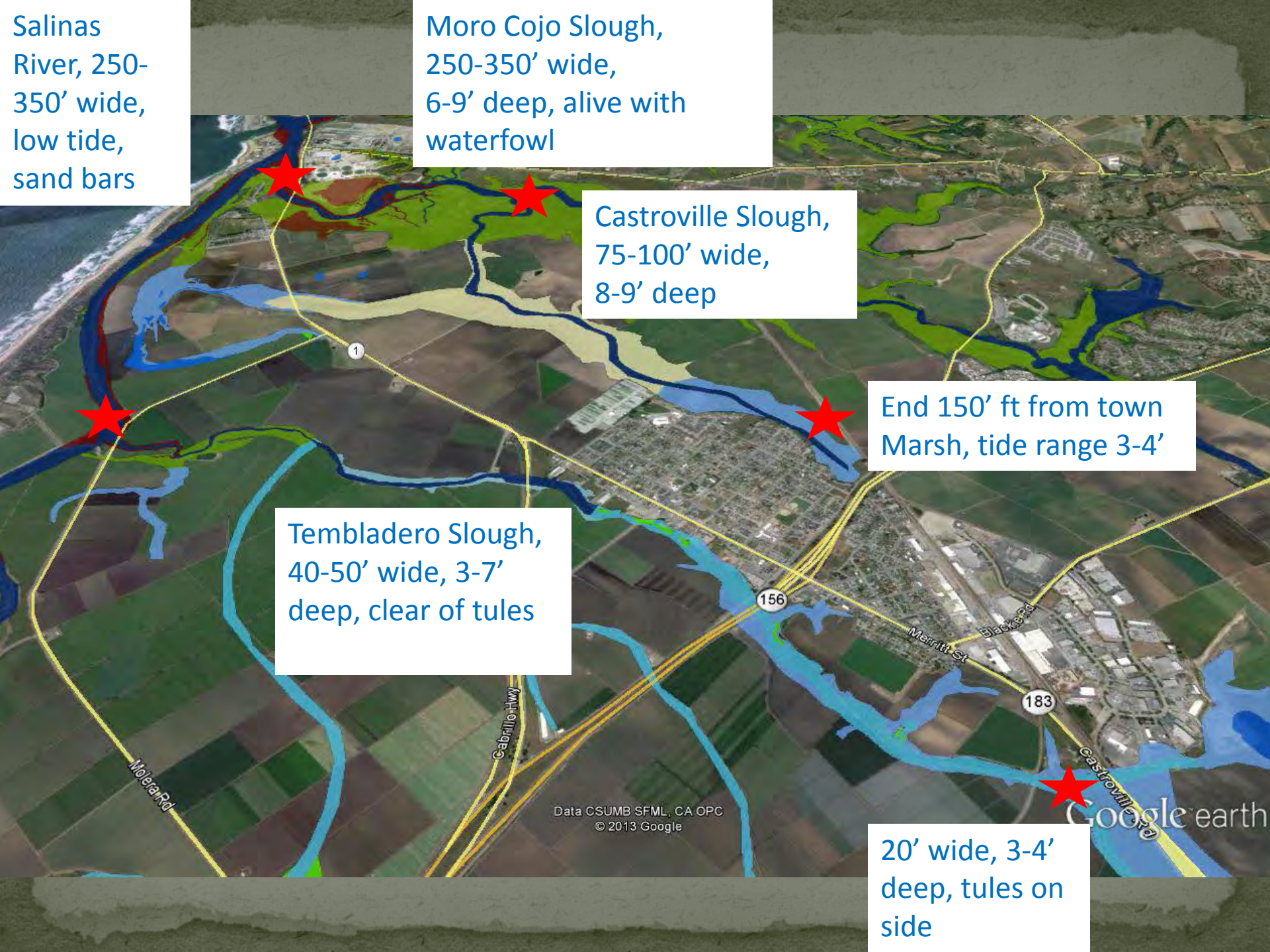
Moro Cojo Slough, 250-350' wide, 6-9' deep, alive with waterfowl

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

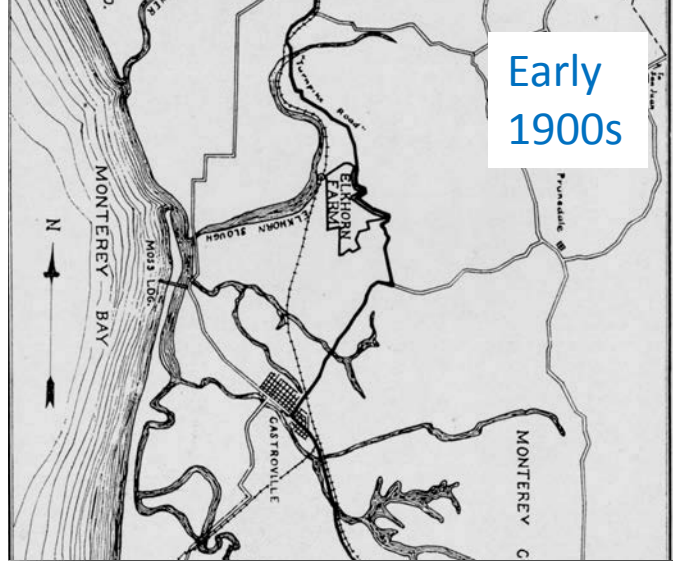


Data CSUMB SFML, CA OPC © 2013 Google

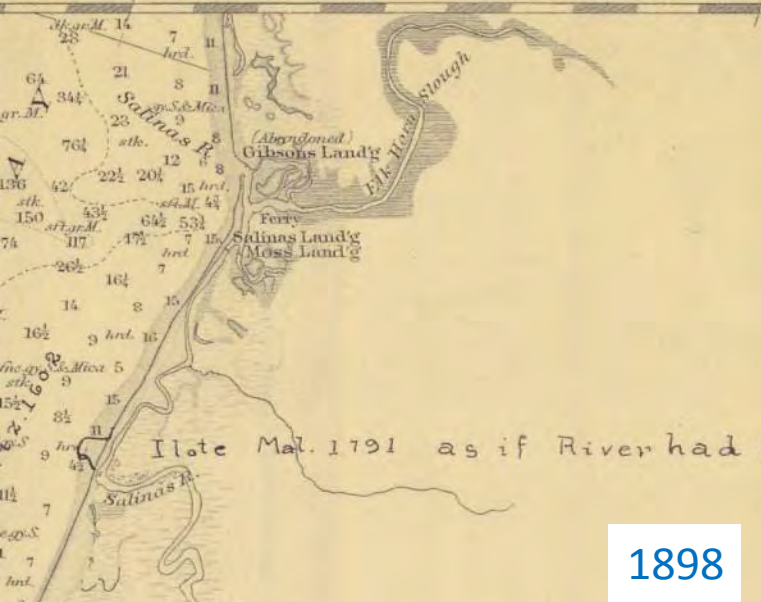
Google earth

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



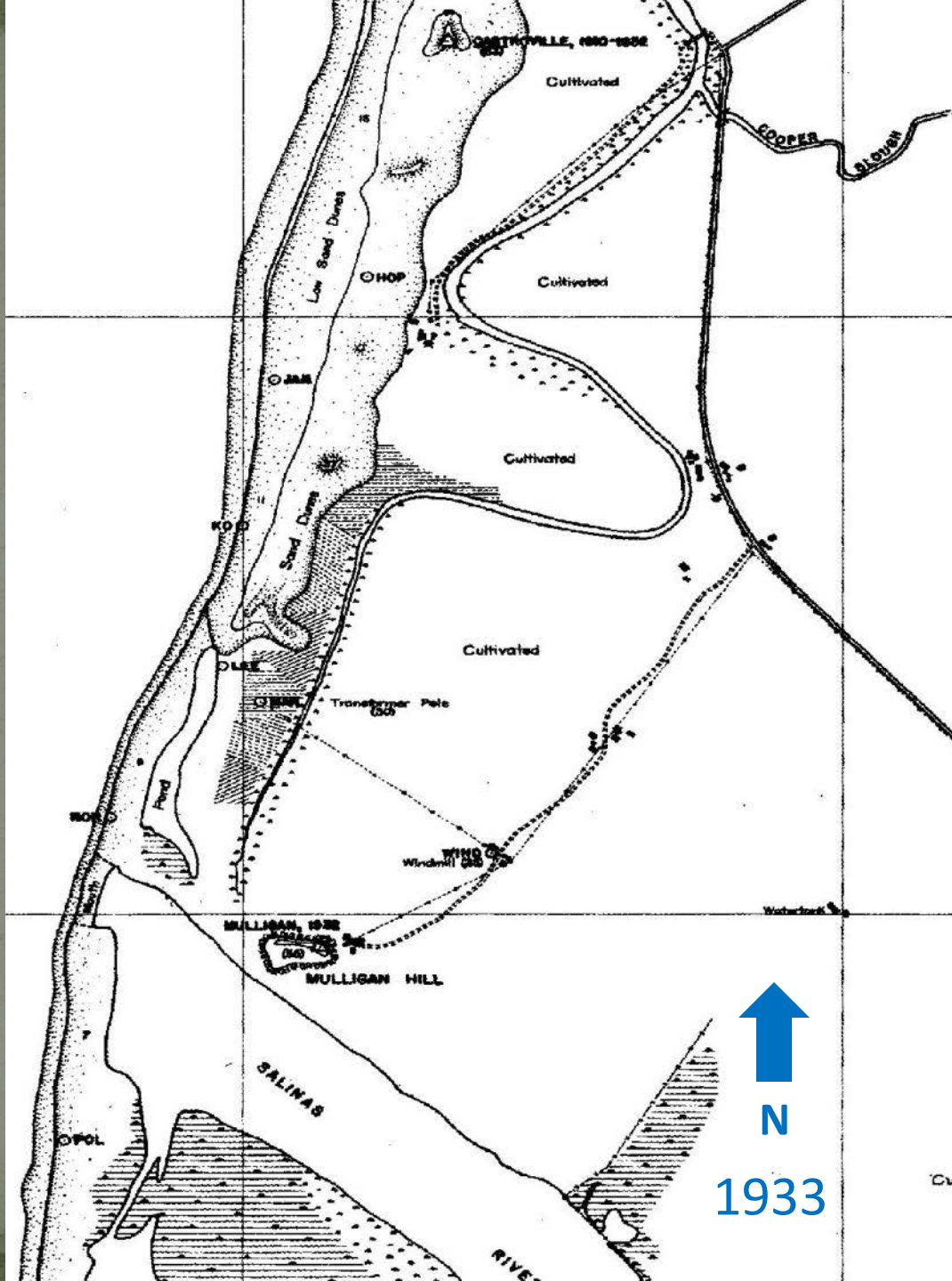


Interconnected
channels
mapped
repeatedly

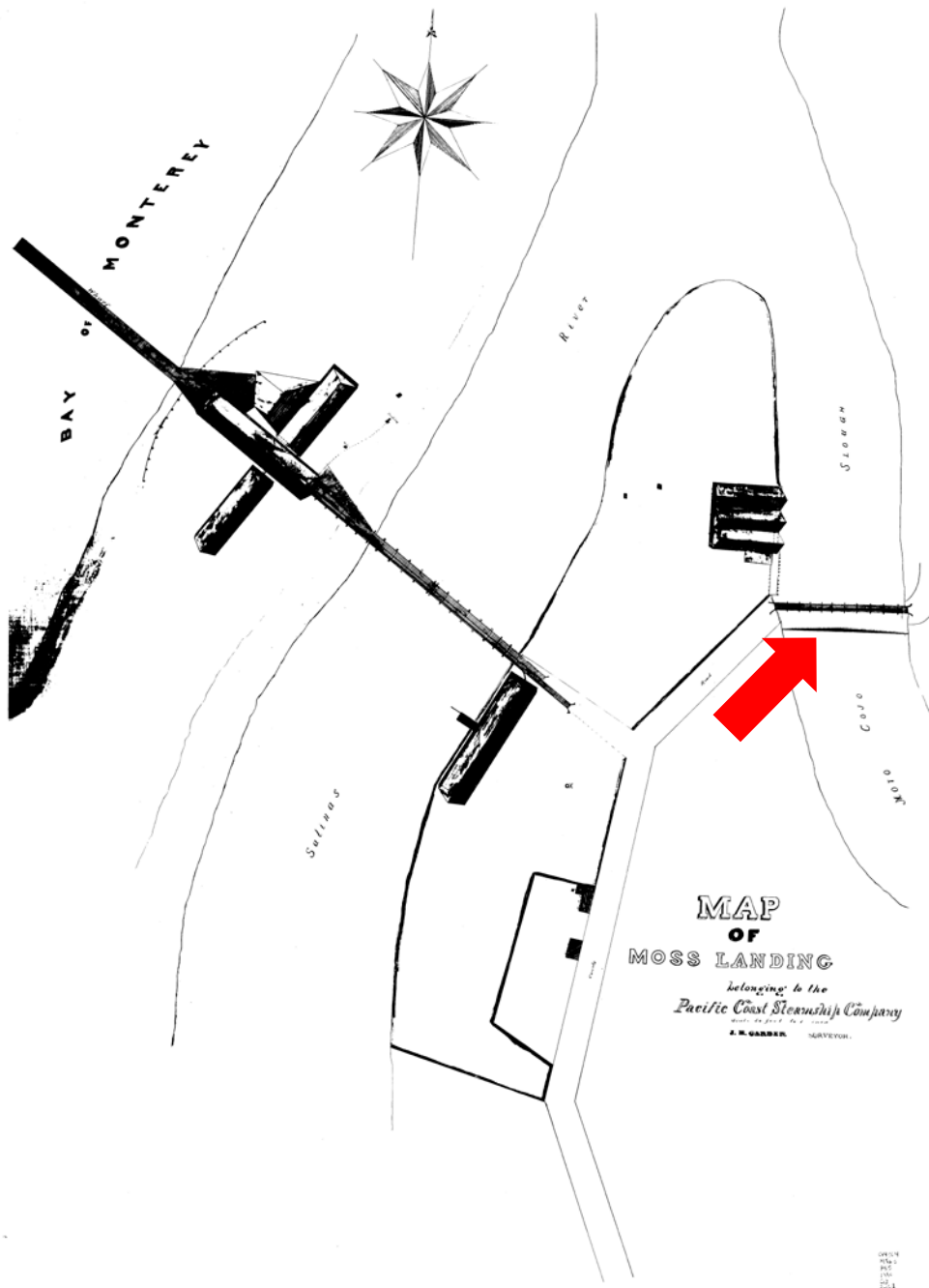


What changed?

Water control structures



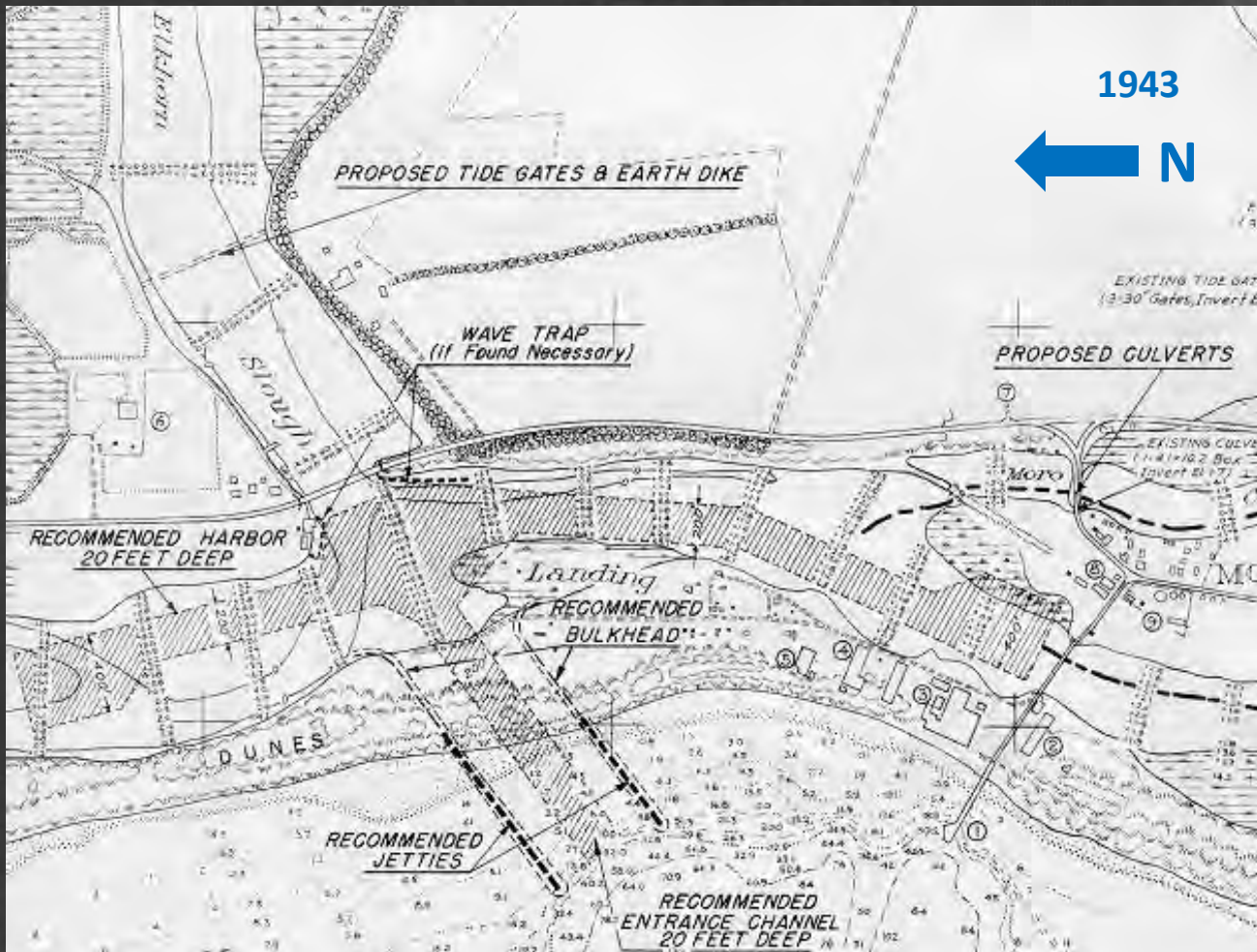
1933



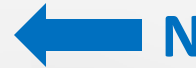
Bulkhead installed to prevent tides in Moro Cojo Slough (erroneously called "Elkhorn" below)

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

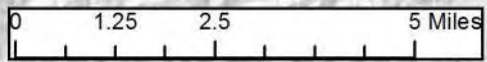
Data CSUMB SFML, CA OPC

Google earth



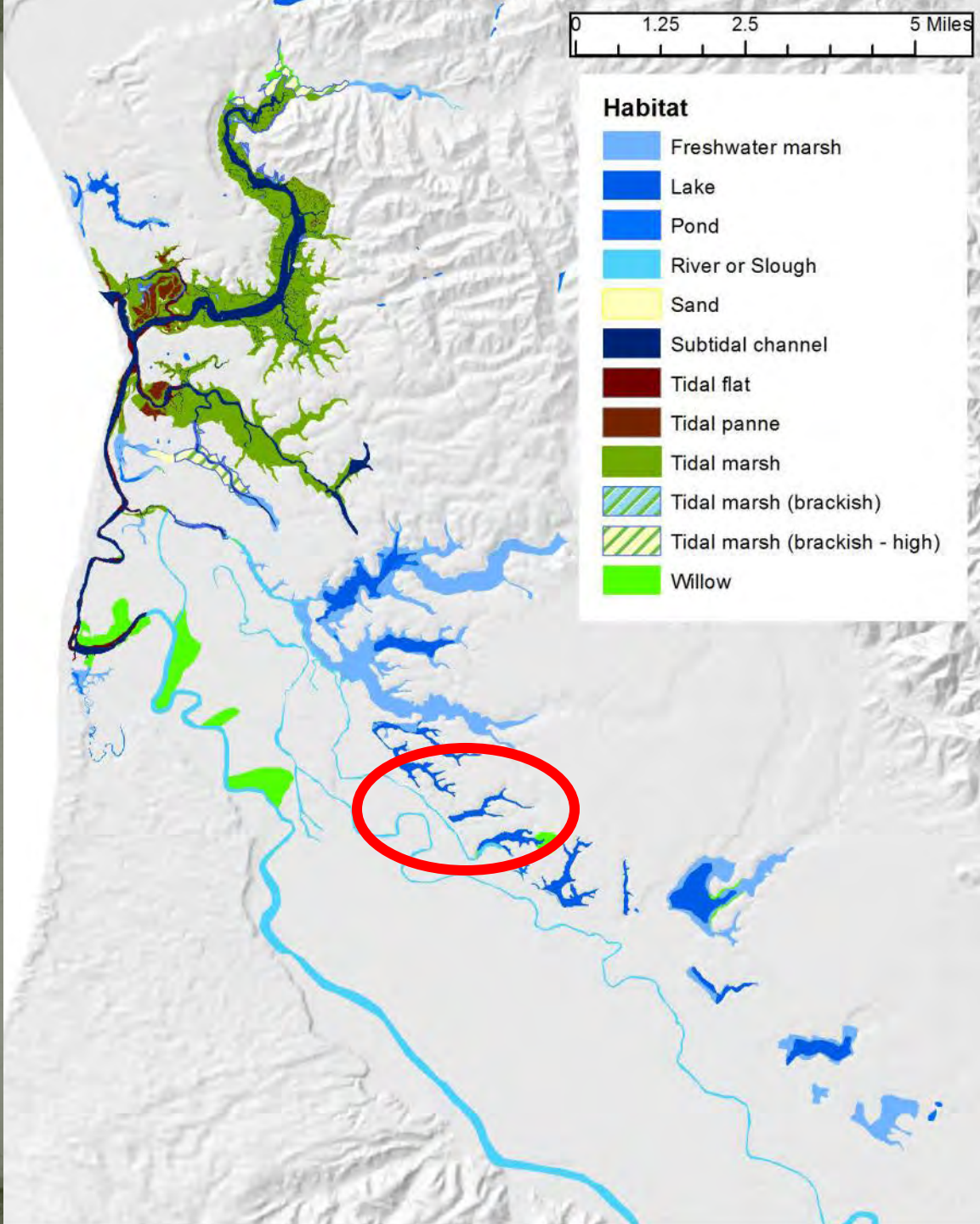
Data CSUMB SFML, CA O





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METRIC 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

52-2 A 847

SELLO CUARTO
Para los años de mil
y mil ochocientos



UNA CUARTILLA.
ochocientos cuarenta
cuarenta y uno.



Recibirse por los años mil ochocientos y uno

Wm. L. ...



*U. Termino de la ...
Lima de ...
quince ...
y de la ...
ms.
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C. ...
D. ...
E. ...
F. ...
G. ...
H. ...
I. ...
J. ...*



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

341 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
T

Alviso clay
Ac

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.

MAP and PROFILE
OF MAIN CANAL AND LATERALS
RECLAMATION DISTRICT No 1665

MONTEREY COUNTY, CALIFORNIA.

Being a Part of the Plans and Specifications for Construction.

TRUSTEES

HENRY BARDIN

J. J. HEBBRON

Y. G. HUDSON

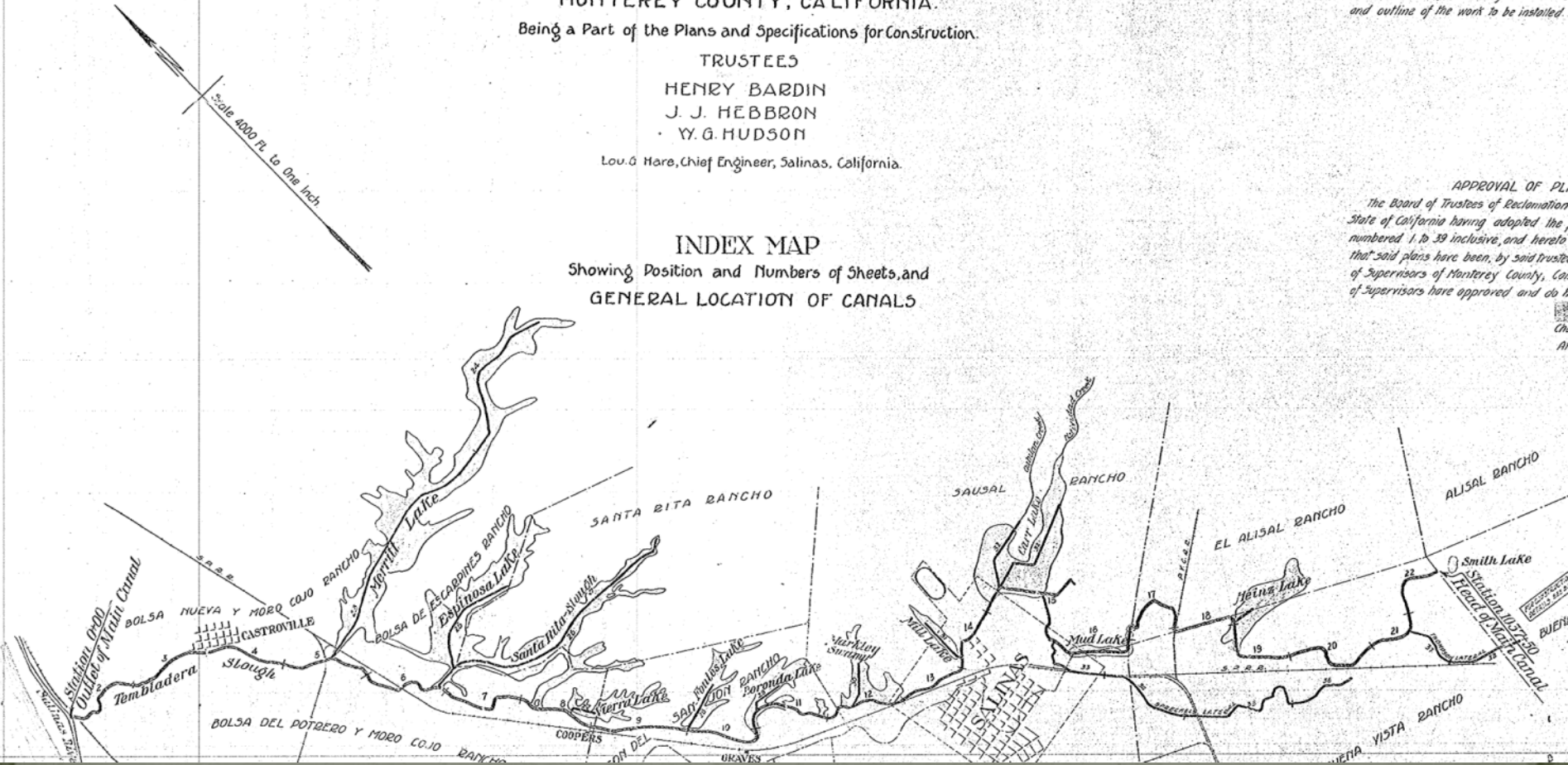
Lou. G. Mare, Chief Engineer, Salinas, California.

INDEX MAP

Showing Position and Numbers of Sheets, and
GENERAL LOCATION OF CANALS

ADOPTION OF PLANS
THIS IS TO CERTIFY that the Board of Trustees of Reclamation District No 1665 of the State of California, do hereby adopt, the plans shown on Sheets numbered 1 to 39 inclusive, and hereto attached, as showing and illustrating the location and outline of the work to be installed.

APPROVAL OF PLANS
The Board of Trustees of Reclamation District No 1665 of the State of California having adopted the plans numbered 1 to 39 inclusive, and hereto attached, and the same having been approved by the Board of Supervisors of Monterey County, California, I, the undersigned, do hereby certify that the same have been approved and do hereby approve and do hereby approve and do hereby approve.



Twentieth Century maps – created for
reclamation ditch

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



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.
 - o 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."
 - o 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)
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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



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

Elkhorn Slough Restoration: Historical Ecology Tools

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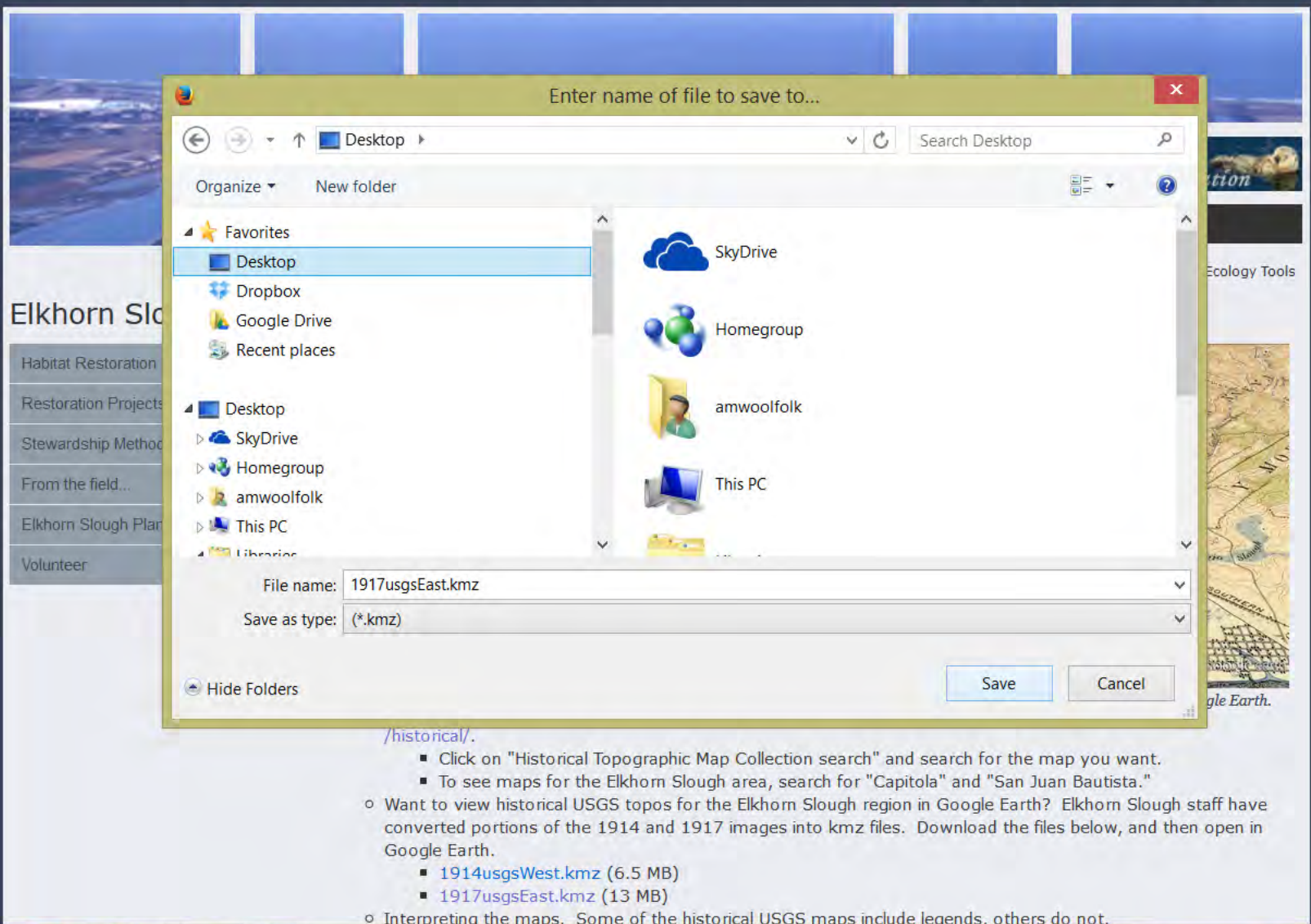
Search" and search for the map you want. For "Capitola" and "San Juan Bautista." Elkhorn Slough region in Google Earth? Elkhorn Slough staff have kmz files. Download the files below, and then open in

- 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

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Google Custom Search



</historical/>.

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Oct 2013
work pl...



Recovery



amwoolfolk

Open

Bitcasa

Move to Dropbox

Open with...

Share with

Send to

Cut

Copy

Create shortcut

Delete

Rename

Properties



Amazon
Cloud Player



Adobe
Reader X



TWP
hours.docx



1917usgsEast
kmz



Adobe
Acrobat ...



Lou Hare
notes v...



For Digging
in the Past...



Control Panel



The image features the Google Earth logo in a white, serif font, centered against a dark space background. The background includes the blue and white horizon of the Earth, a bright star with a lens flare on the left, and numerous smaller stars scattered across the black sky. The entire scene is framed by a light-colored, torn-edge paper border at the top and bottom.

Google™ earth

Search
en TTYC
Get Directions History

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



Sign in



Layers Earth Gallery Tour Guide

U.S. Marshall, Chief Geographer
 Geo. R. Davis, Geographer in charge
 Topography by A. L. Fowler, E. P. Davis, and J. H. LeFevre
 Control by U.S. Coast and Geodetic Survey
 C. F. Johnson and R. A. Jenkins

Imagery Date: 4/15/2013 35°49'51.17" N, 121°40'49.23" W elev. 414 ft eye alt. 10.36 mi

Google earth

Search



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Computer repair near Boston

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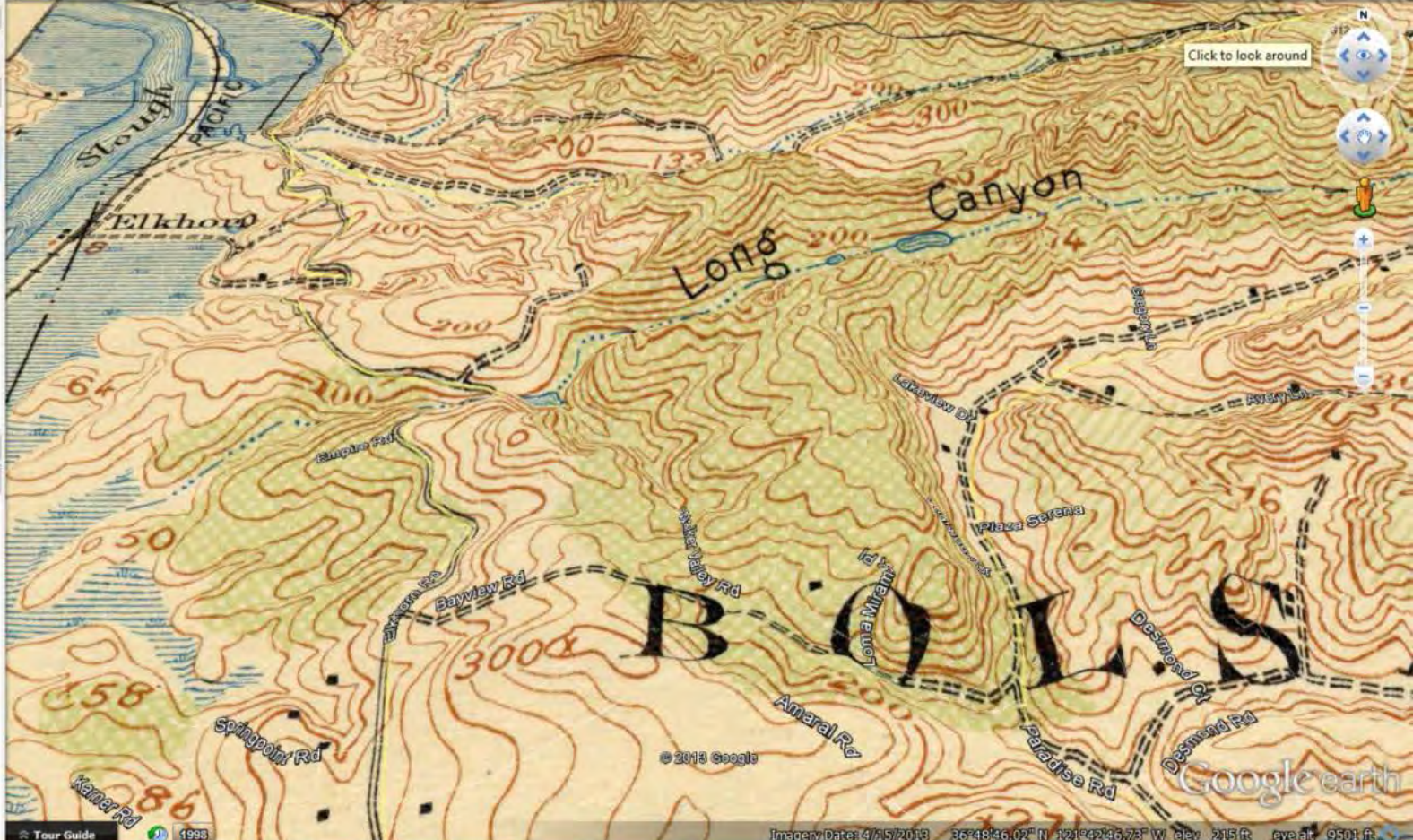
Places

- 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



Click to look around



Tour Guide

1998

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

File Edit View Tools Add Help

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Search

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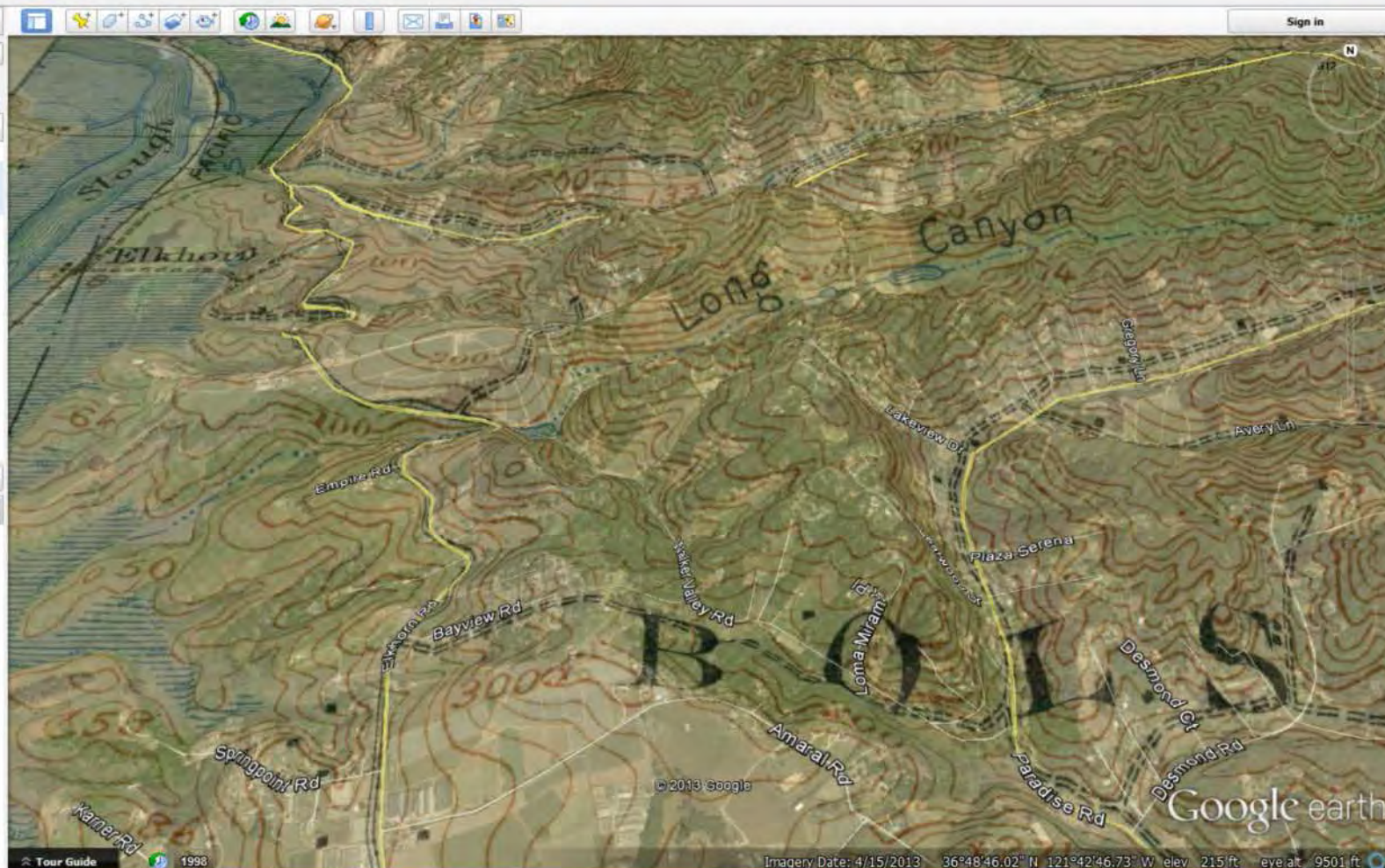
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Extensive wetlands



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Andrea Woolfolk: amwoolfolk@gmail.com