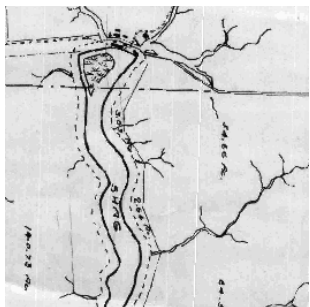
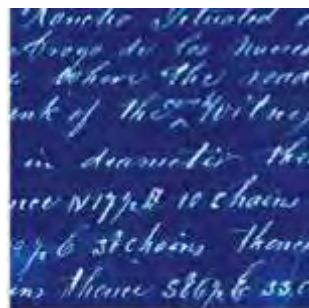


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# THE HISTORICAL YOLO BASIN LANDSCAPE

What parts make the whole?

**Alison Whipple**

San Francisco Estuary Institute/Aquatic Science Center



*Bay-Delta Science Conference*  
*September 29, 2010*

# TRANSLATING LANDSCAPE TO SPECIES SUPPORT FUNCTION

## Physical Drivers

FLUVIAL  
PROCESSES



TIDAL  
PROCESSES

## Habitats

Channels  
Marshland  
Ponds and lakes  
Floodplain basins  
Riparian forest  
Upland ecotone

## Function

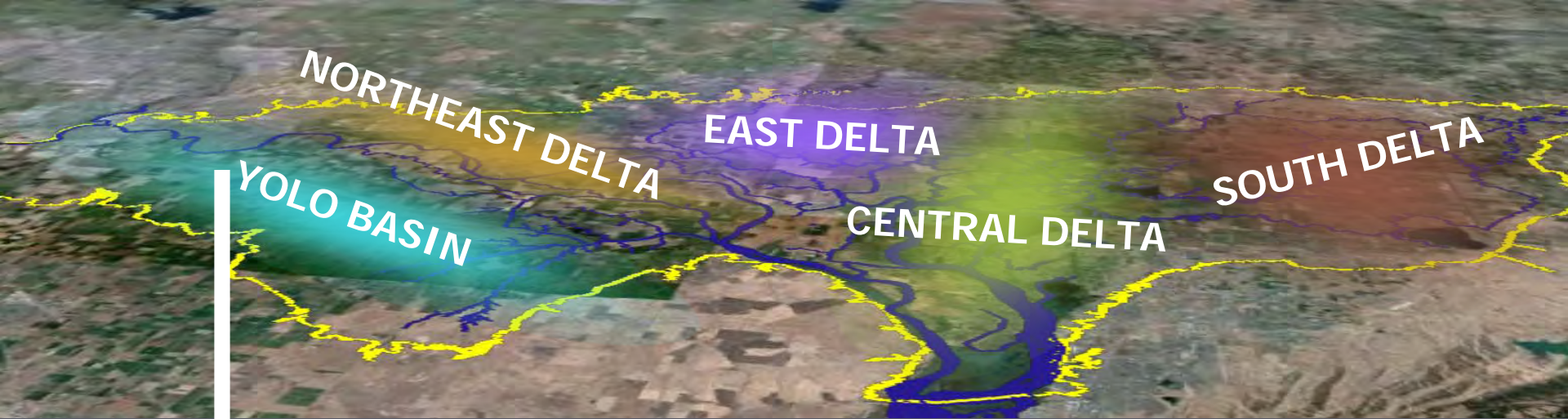


Resting  
Foraging  
Breeding  
Migration

# CENTRAL CONCEPT

**The spatial and temporal variability of the Delta  
reflected fluvial-tidal interaction**





NORTHEAST DELTA

EAST DELTA

SOUTH DELTA

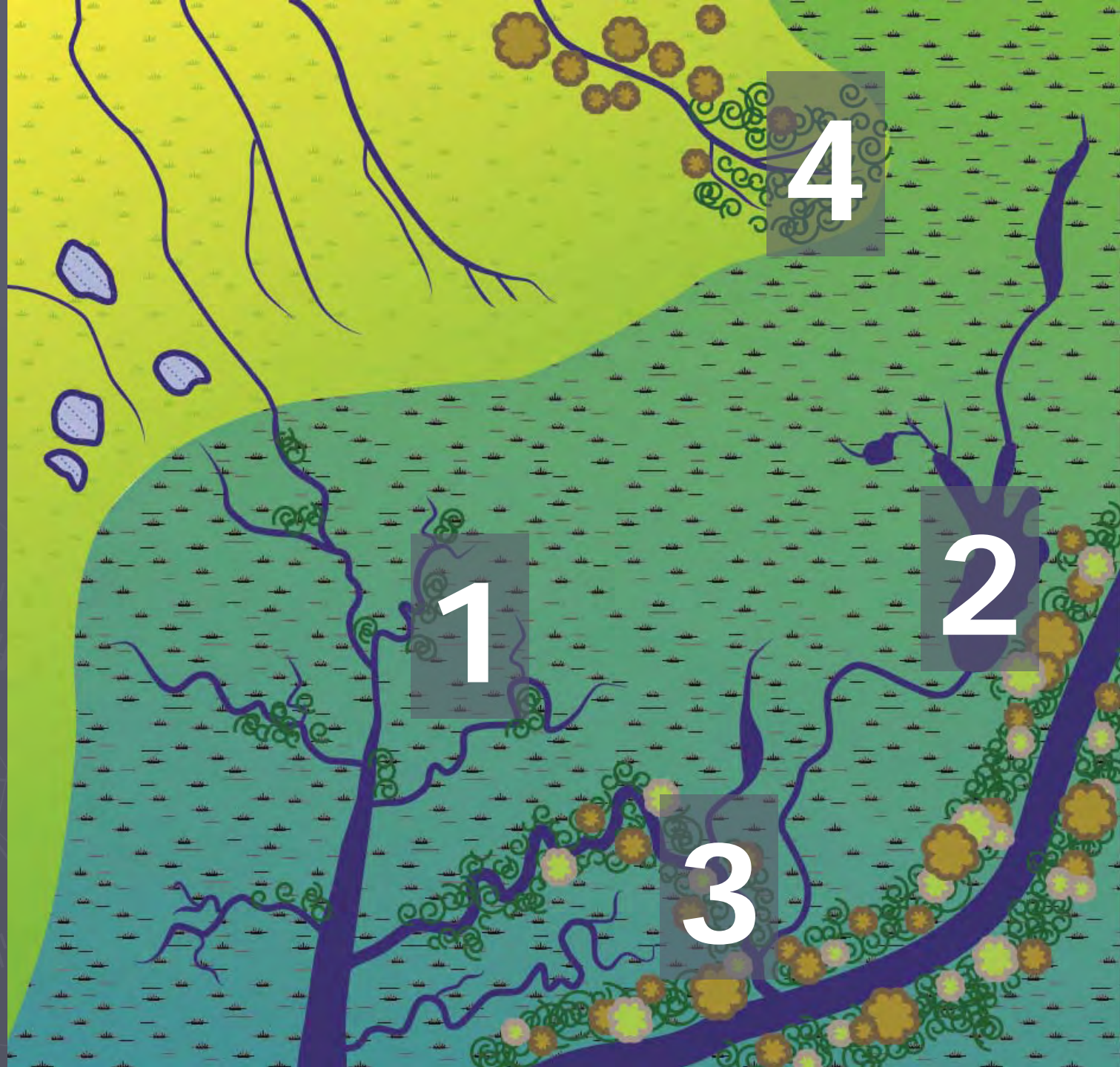
YOLO BASIN

CENTRAL DELTA



- high fluvial influence
- basin water storage
- variable channel density
- numerous large and small ponds/lakes
- riparian gallery forest on natural levees

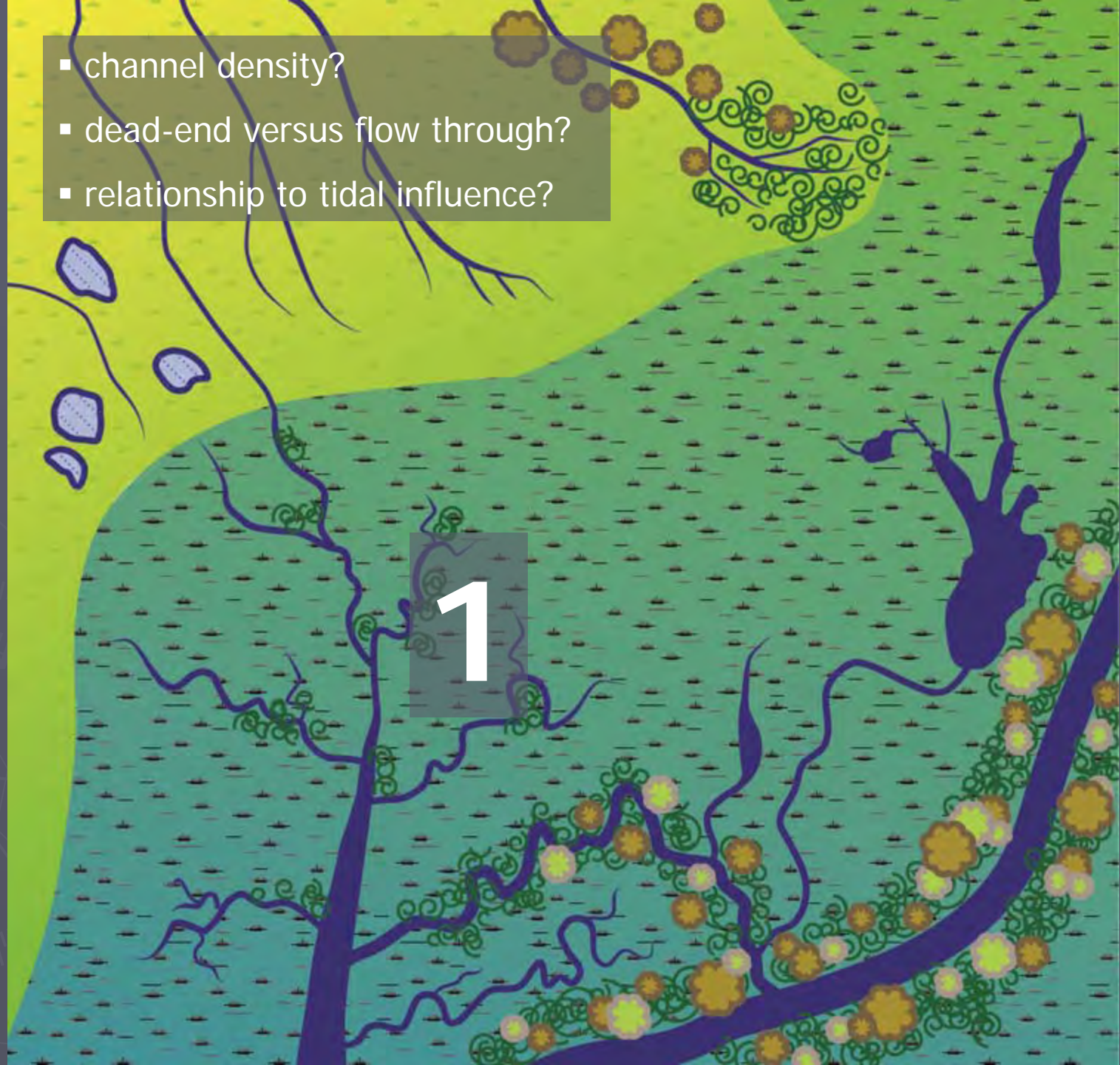




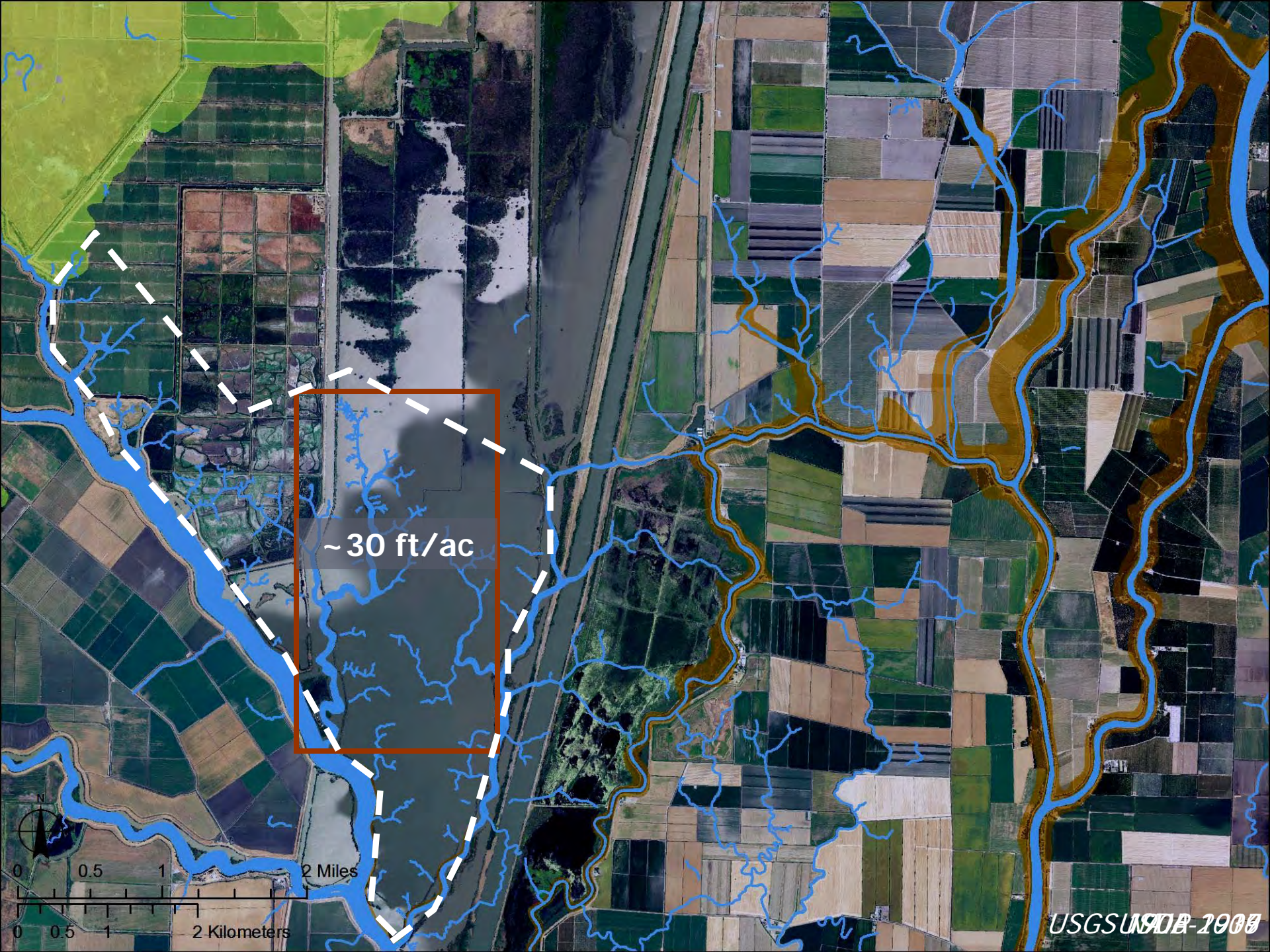


- channel density?
- dead-end versus flow through?
- relationship to tidal influence?

1







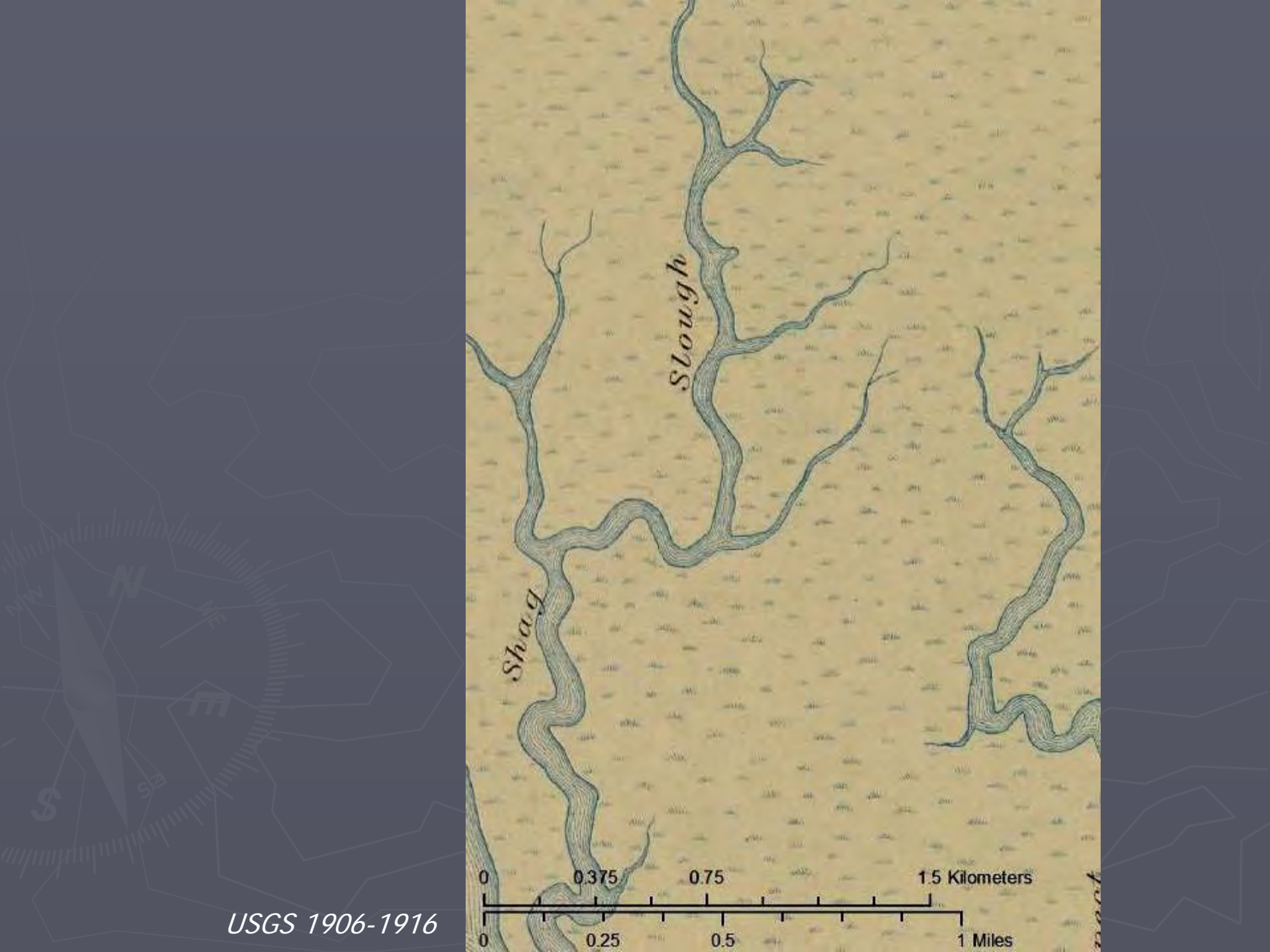
~ 30 ft/ac

2 Miles

2 Kilometers

USGS NDB-2000





USGS 1906-1916





Wheeler 1920



## Prospect Island in 1914:

"...**virtually in its natural state**. Tules covered the bulk of the island. **High tides flooded the lower lying portions of the land**. During flood seasons the entire area was inundated. **Willows were prevalent at the north end and along Miner Slough...**"

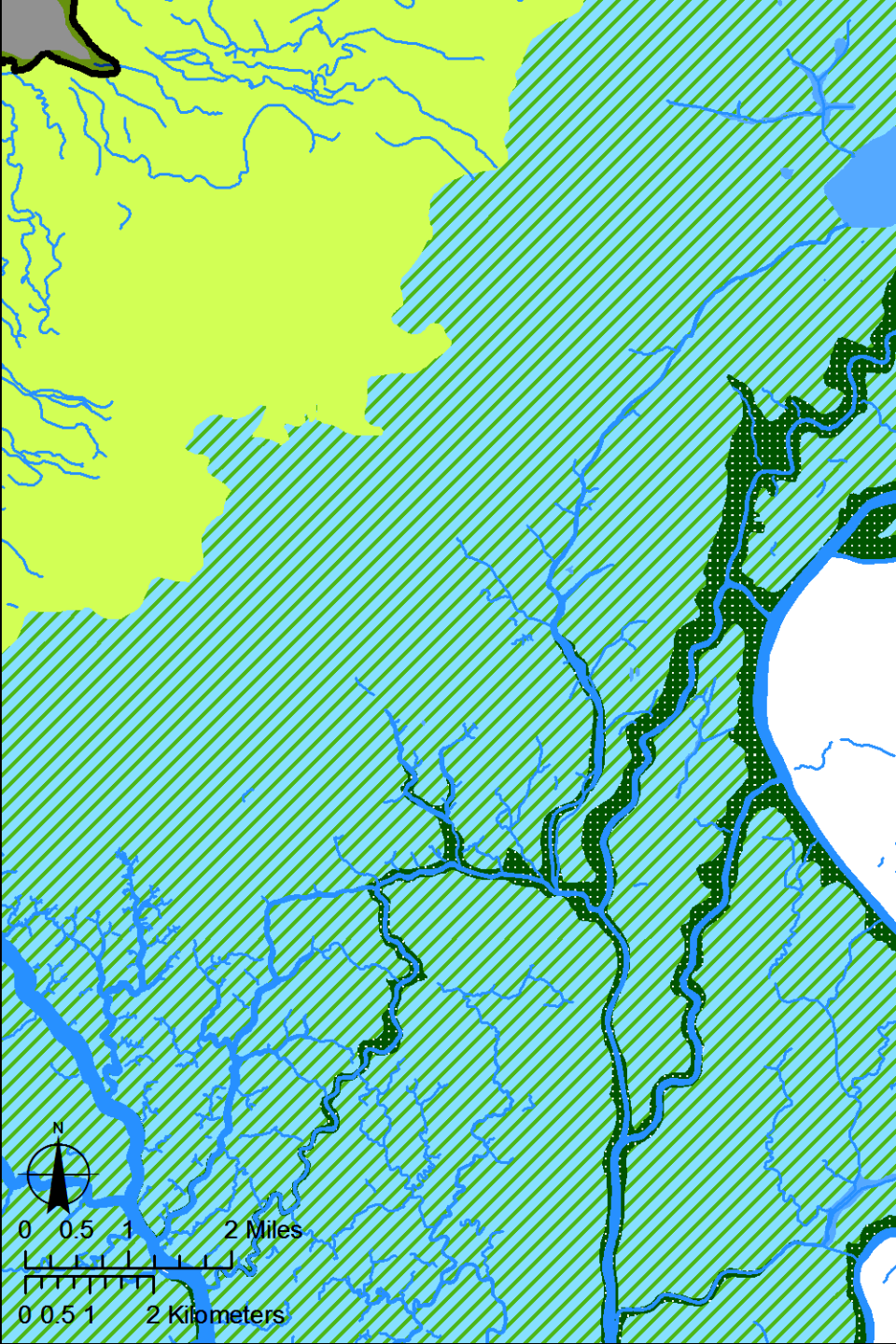
- Mellin 1918



North End Liberty Island Yolo By Pass 1938

Cache Slough 1921





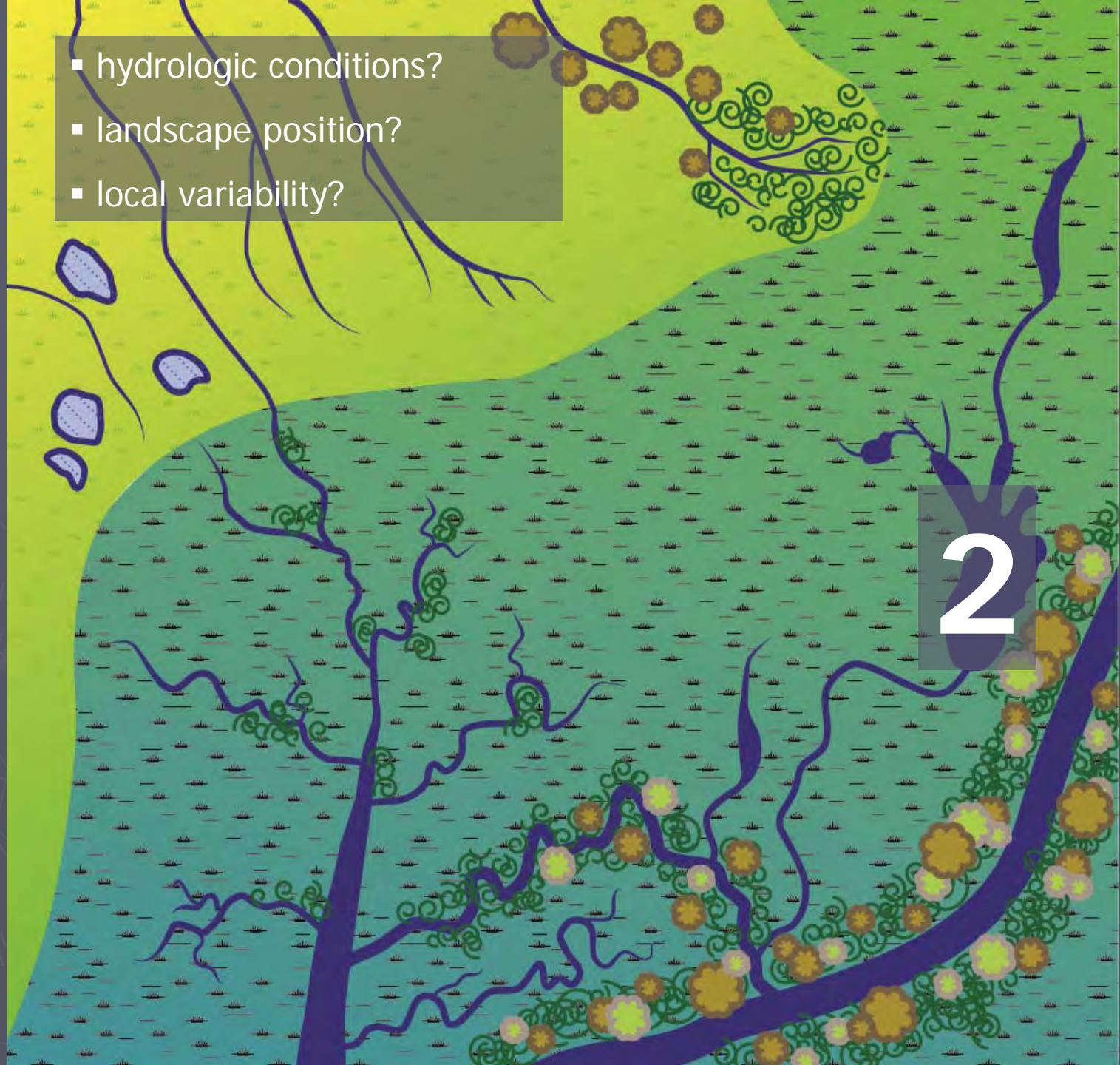
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USGS 1907

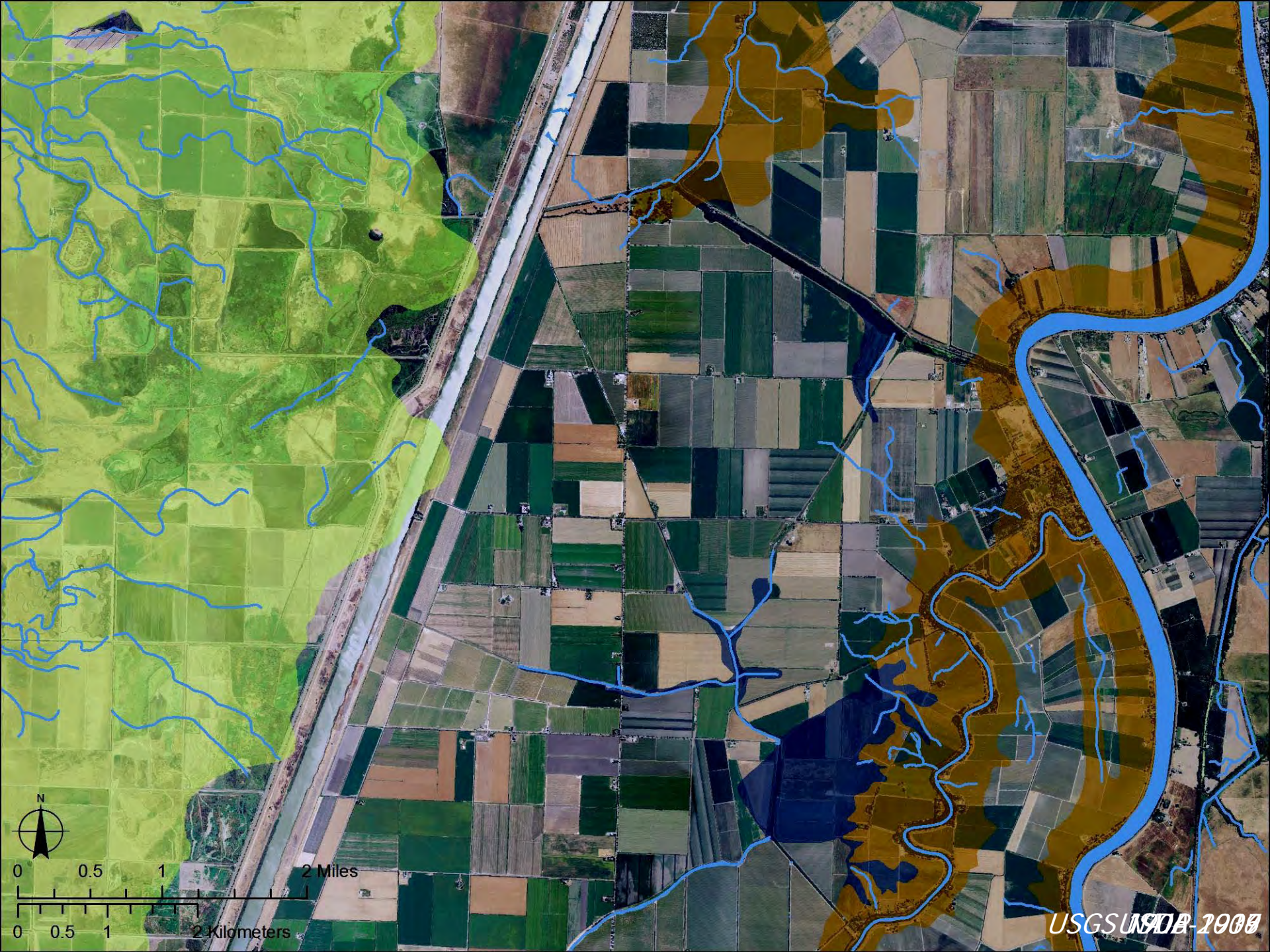
*Courtesy Center for Sacramento History*

- hydrologic conditions?
- landscape position?
- local variability?

2







0 0.5 1 2 Miles

0 0.5 1 2 Kilometers

USGS NDA-2000



# Interactions between flow, sediment supply, and vegetation influence the temporal conditions of habitat

“Putu [sic] and Cache creeks...form in the rainy season **a lake some 40 miles long, and from 5 to 10 miles wide**. In some years this lake is increased by the overflowing of the Sacramento...”

- *Californian*, 26 April 1848



# TULE CANAL

"...to facilitate the drainage of waters...**creeping slowly along toward tide water, not in a direct or free channel**, but across an uneven surface of miles in width, obstructed by a rank growth of new tule and masses of drifting tule of former seasons"

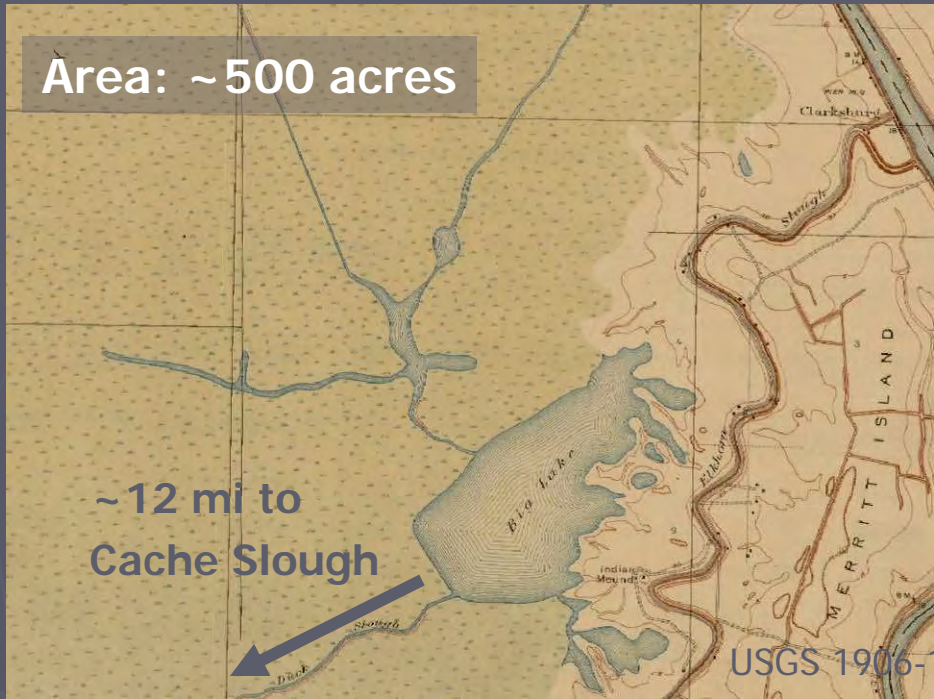
"...thus keeping the entire belt of land under or **thoroughly saturated with water until later in the summer months**, usually until July – sometimes a month later."

*- Office Board Swamp Land Commissioners 1864*

"...The tules would thus become dry and fit for cultivation much earlier in the year; unless, indeed, the fall through the canal **should be found so light as to permit the tide to ebb and flow through it...**"

*- Sacramento Daily Union, 19 May 1853*

# BIG LAKE



- Low elevation depressions
- At the back of natural levees
- Filled by winter floods
- Slowly released water through the summer months

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# A duck hunter's view: locally complex habitat

"many coves and slough-like branches"

"...a region of **small pools** abounding in mallard"

"we struck no places in which the water came above our breasts... **subterranean excavations of the beaver** always gave us a perpendicular drop of about two feet "

"We found the edge of the lake for a distance of one hundred yards out **thickly covered with lily pads.**"

- Wright ca. 1850



Thomas Hill 1829-1908, "Early Morning Among the Tules"

country for game. The lake was situated far out in an impenetrable tule swamp of immense extent which lay on the south side of the Sacramento river. A

# Small fish...

"The **small fish run into the sloughs and lakes** as soon as the water gets sufficiently high, and **return to the river when it begins to get low**, at which times they are taken in unusually large numbers... During the high stage of water these lakes all communicate with the Sacramento."

- *Sacramento Daily Union, 6 June 1854*





- relationship to height of natural levees?
- local variability?

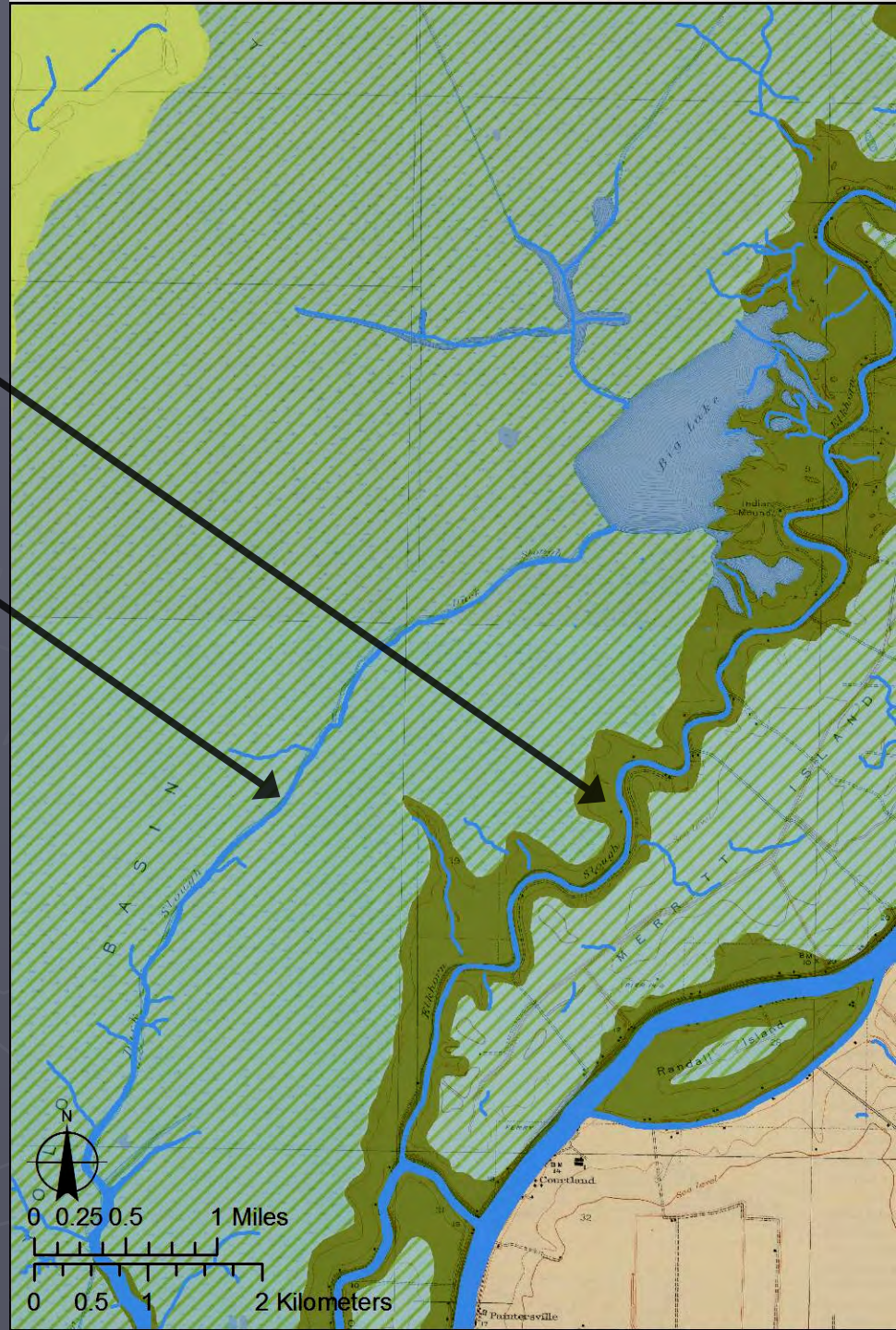
3



# NATURAL LEVEES

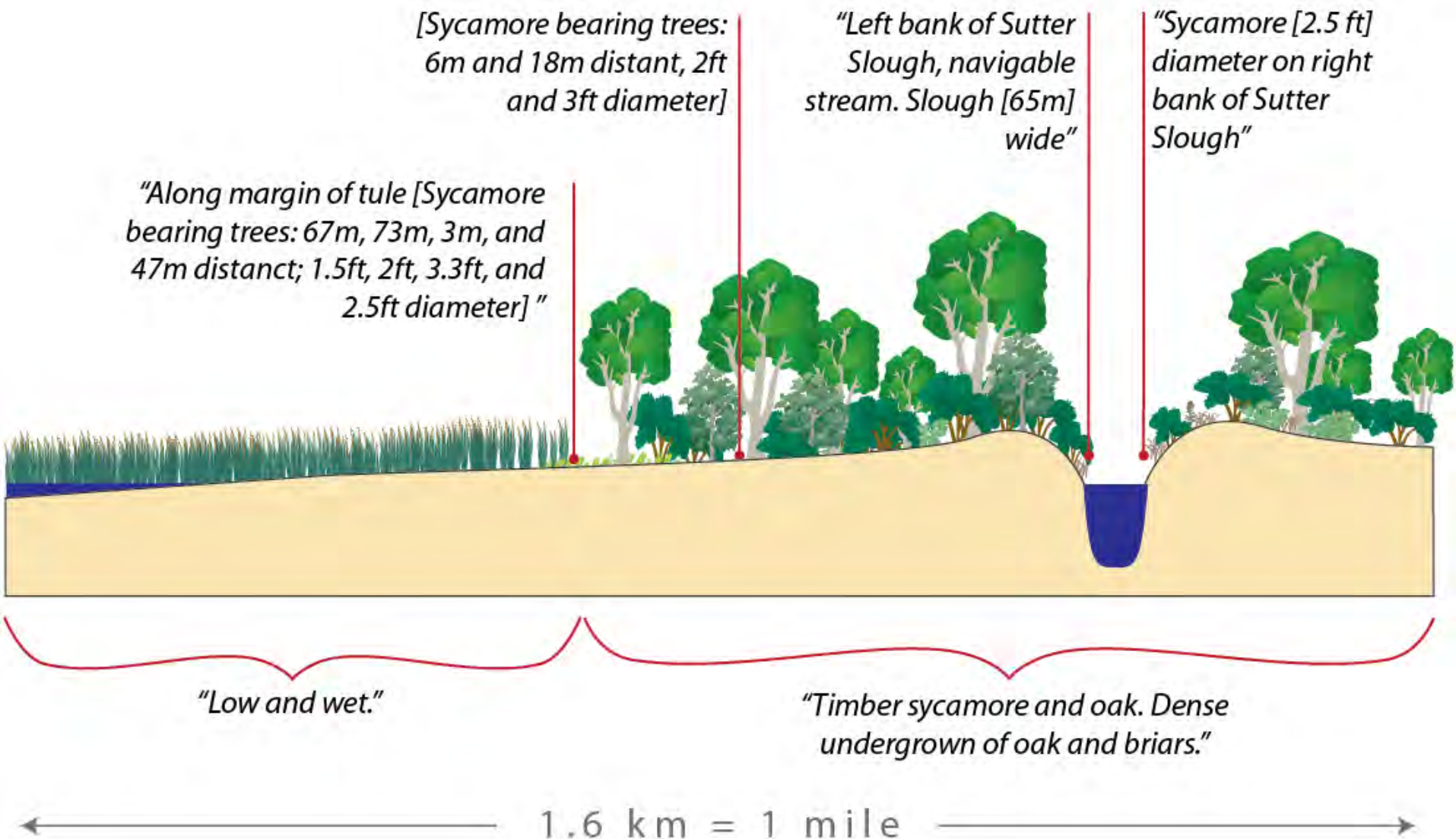
ELKHORN (ELK) SLOUGH

DUCK SLOUGH





# RIPARIAN



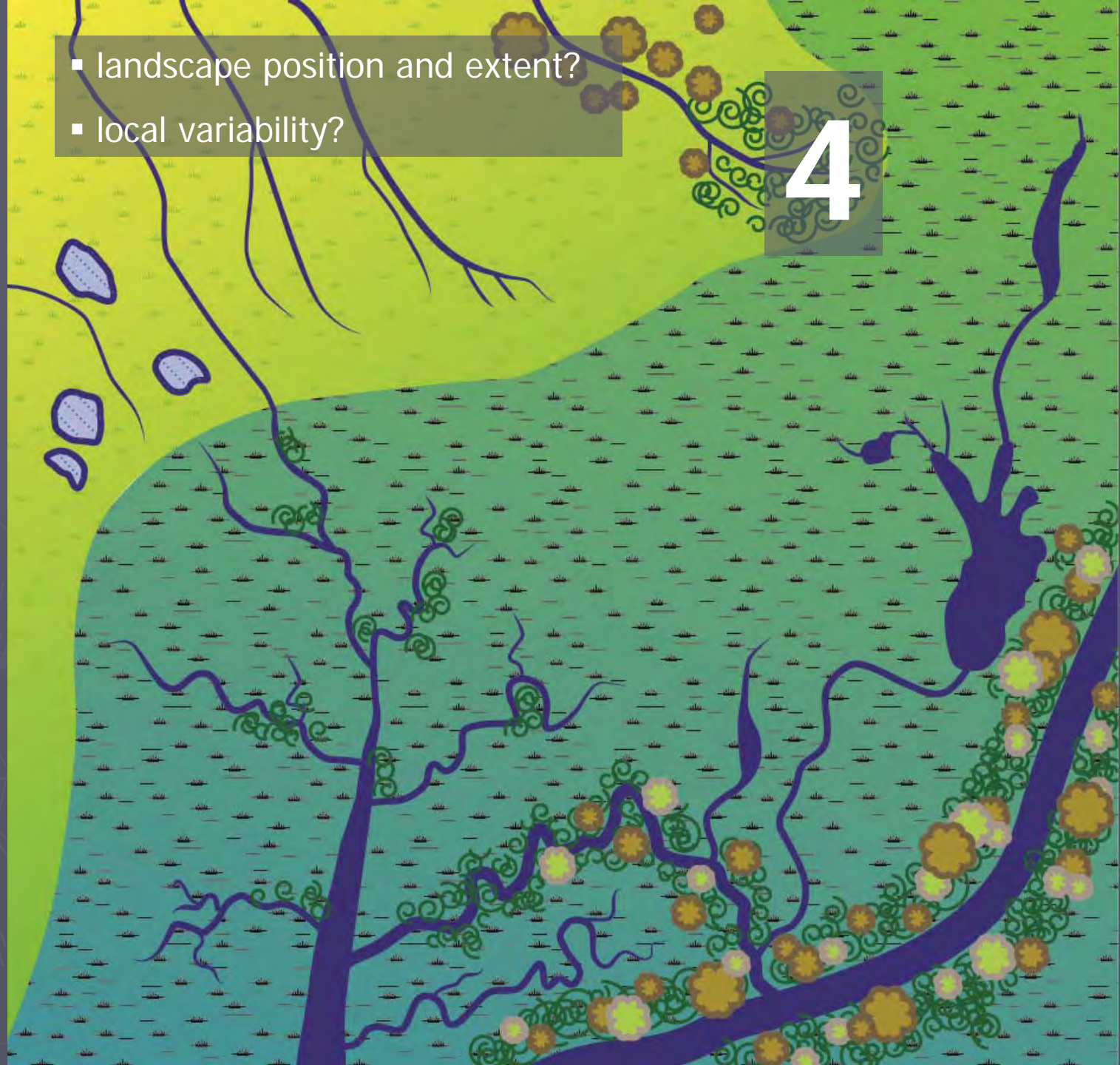
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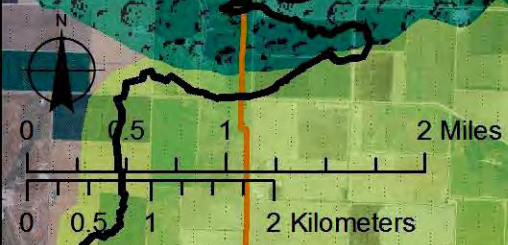
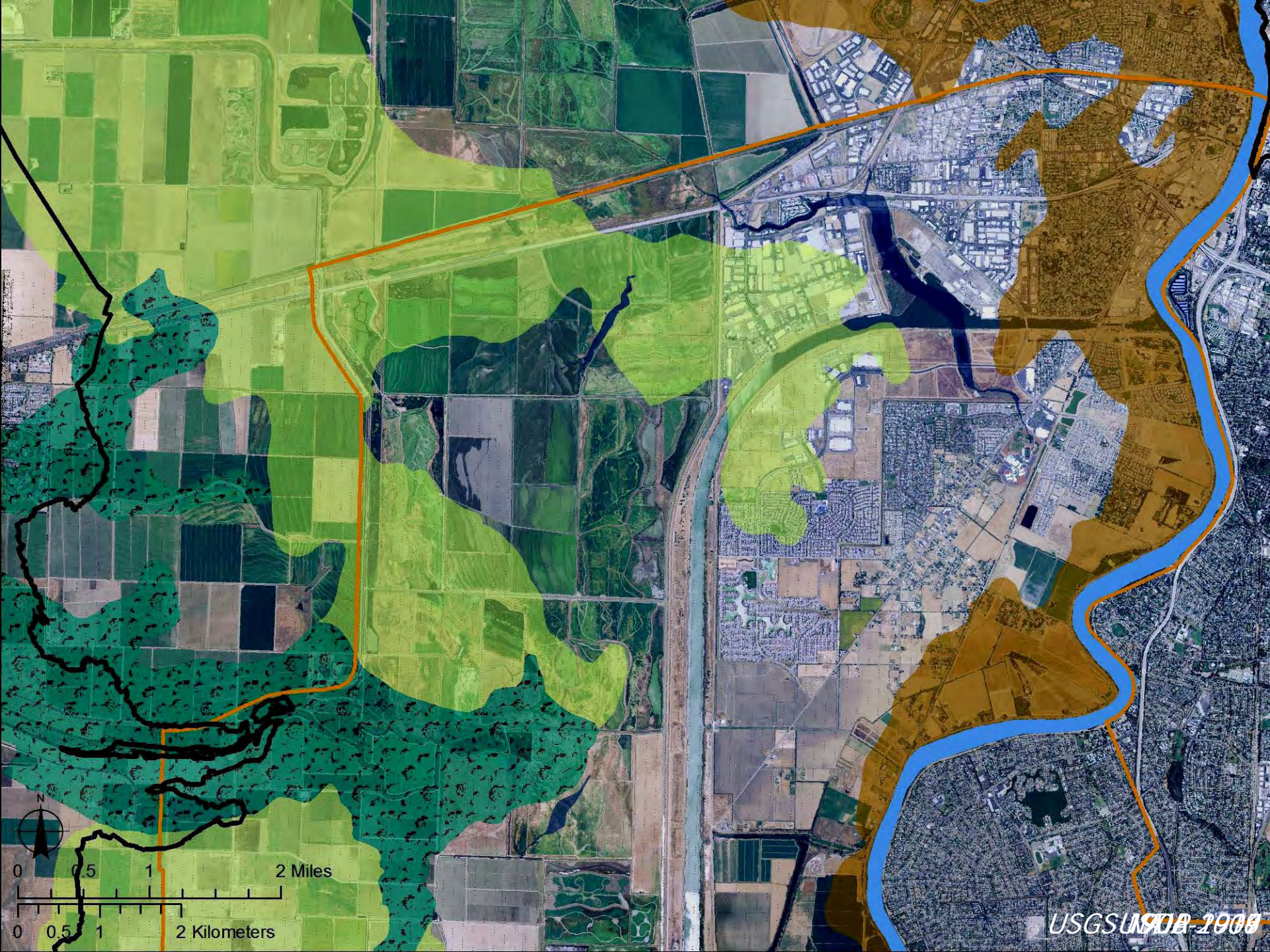


- landscape position and extent?
- local variability?

4







USGS N10A-1900





*Henning 1871*

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From Putah Creek toward Sacramento River "where the woods terminate and the country is plain"

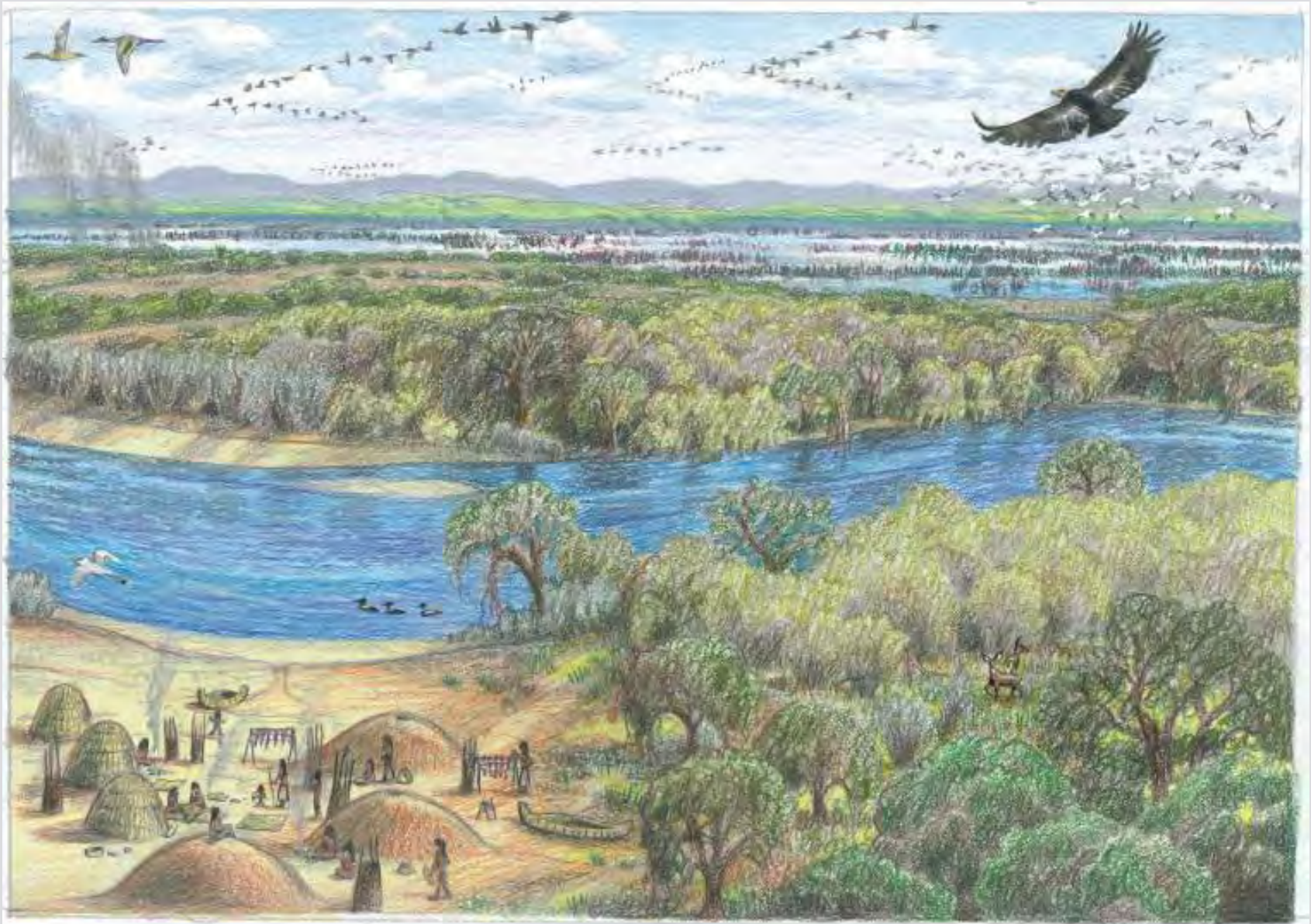
"...in two places where we attempted to pass the ground was so soft and swampy that we could not go on...farther to the Northward we got **entangled in such a thicket of willows and other bushes...**"

- Work 1833, May 28



# EMERGING CONCEPTS: LANDSCAPE FORM

- ▶ Interactions between fluvial and tidal process vary at multiple spatial and temporal scales
- ▶ Where habitats occupy specific locations along these physical gradients
- ▶ That together create a complex landscape
- ▶ The understanding of which we can use to inform expectations for the future





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# THANK YOU

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