Tulare Lake Restoration and Water Storage Project

ENNIS CONSULTING

Introduction

- John Ennis - Civil Engineer
  - Ennis Consulting – Fresno, CA (Est. 2004)
  - + 30 years experience
    - Utility master planning
    - Community master planning
    - Public works and infrastructure
- Grew up in the high desert of Southern California
- Camped and hiked around LA Aqueduct and the California Aqueduct

But I didn't grow up with Tulare Lake. I grew up with this….

Owens Lake

Key Elements and Minerals at the Bottom of Owens Lake

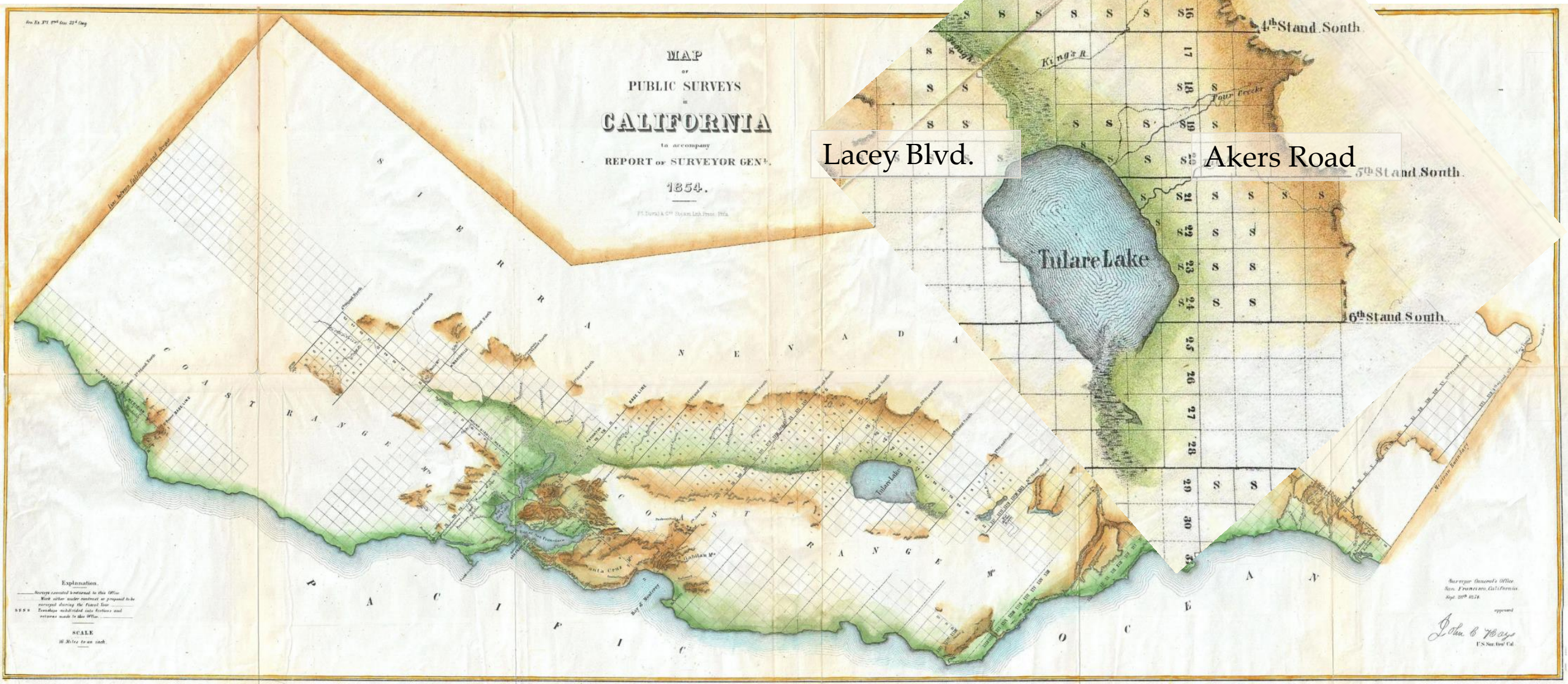
The lake bed is primarily a salt flat composed of a mix of clay, sand, and evaporite minerals. The most prominent elements and compounds include:

1. **Sodium (Na)** and **Chlorine (Cl)** – Found in **halite (NaCl)**, or common salt.
   - These are dominant components of the lake's crust due to the high salinity of the water that once filled it.
2. **Sulfur (S)** and **Oxygen (O)** – Present in sulfate minerals like **thenardite (Na_2SO_4)**.
   - These form as sulfates precipitate out of evaporating brine.
3. **Carbon (C)**, **Hydrogen (H)**, and **Oxygen (O)** – Found in carbonate minerals such as **trona ($Na_3H(CO_3)_2 \cdot 2H_2O$)** and **burkeite ($Na_6(CO_3)(SO_4)_2$)**.
   - These minerals crystallize from alkaline, carbon-rich waters.
4. **Calcium (Ca)** – Present in minerals like **pirssonite ($Na_2Ca(CO_3)_2 \cdot 2H_2O$)**.
   - Calcium combines with sodium and carbonate ions during evaporation.
5. **Magnesium (Mg)** – Found in **nesquehonite ($MgCO_3 \cdot 3H_2O$)**.
   - Magnesium precipitates under specific conditions of high salinity and alkalinity.
6. **Arsenic (As)**, **Fluorine (F)**, and Trace Metals (e.g., **Cadmium (Cd)**, **Nickel (Ni)**) – These occur in small but significant concentrations in the lake bed's groundwater and dust.
   - These trace elements are often associated with the surrounding geology and remain in solution or loosely bound due to the high pH of the brine.
7. **Silicon (Si)**, **Aluminum (Al)**, and **Iron (Fe)** – Found in clay and sand particles.
   - These are components of the sedimentary material washed into the lake.


But There's Hope....
Patsiata
(Salty water)
If LADWP can find some water for here
Pa'ashi
(Big water)
Then maybe we can find some water for here
Fowler
Kingsburg
Caruthers
Orosi
Three Rivers
Woodlake
Hanford
Visalia
Lemoore
Exeter
Tulare
Lindsay
Strathmore
Springville
Camp Nelson
Corcoran
Porterville
Kettleman City
Pixley
Terra Bella
Alpaugh
Earlimart
Ducor
California Hot Springs
Kennedy Meadows
Mt. Whitney
Lone Pine
Bartlett
Keeler
Olancha
Haiwee
Dunmovin
Little Lake
Pearsonville
Brown
Bradys
Kernville
Wofford Heights
Delano
Richgrove

A Visual History of Pa'Ashi

Public Survey of Lands
The 1854 Record Map



Public Survey of Lands
The 1867 Record Map

Fluctuations of the Lake's Surface.

High water of 1852 is known to have been as great as that of 1862. At low water of 1861 the surface stood about 204 feet above low tide in Suisun bay. At high water of 1862 it rose to 220 feet. Thence it receded to about 206 or 207 feet. High water of 1868 the surface was at 219.6. Low water of 1871, 210.7. High water of 1873, 216.6 feet.

From 1873 to 1883 the waters gradually receded, with 2 to 4 feet annual fluctuations, to the low water of 1883, which was 192 feet—the lowest known.

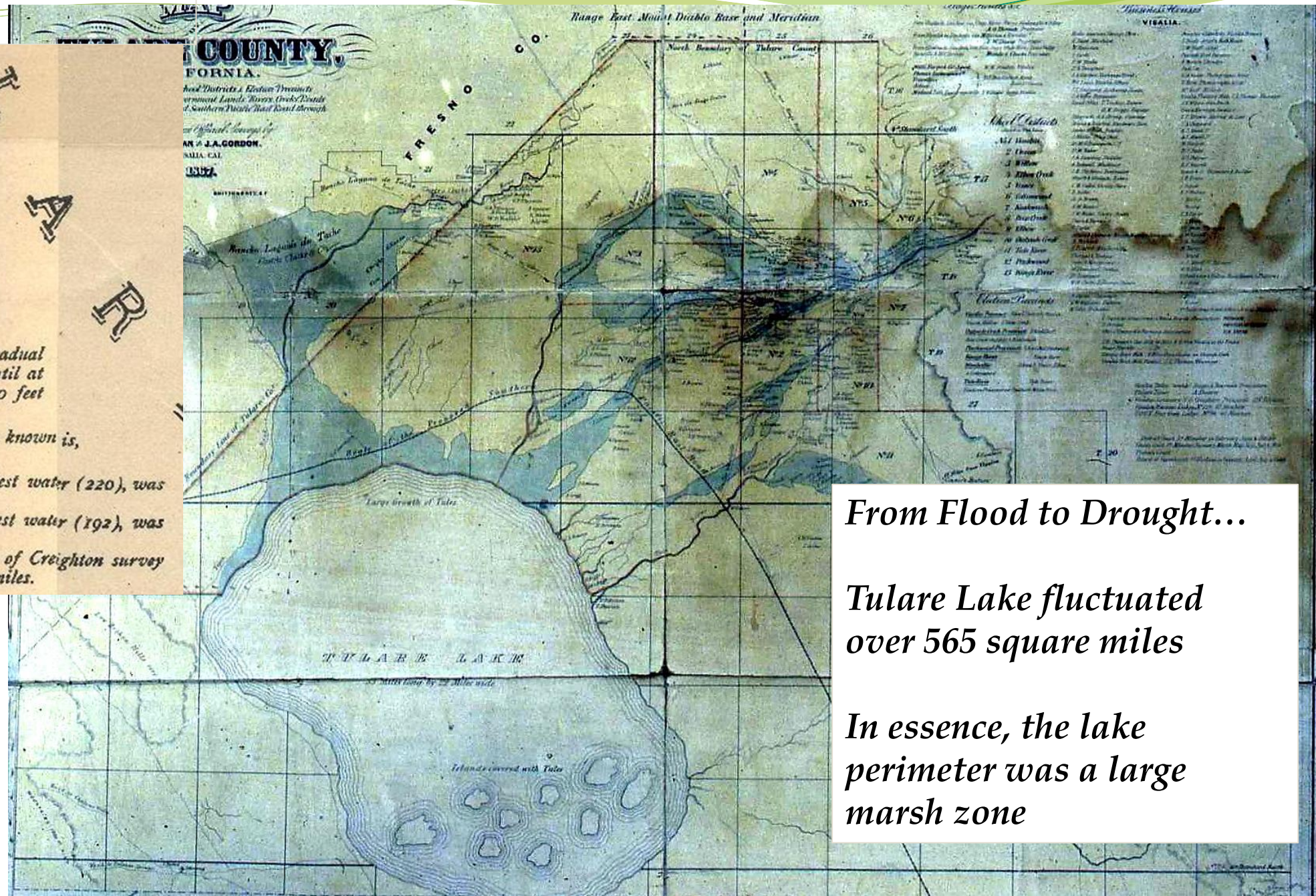
From 1883 there has been a gradual rising, with annual fluctuations, until at high water of 1886 it was about 200 feet above the reference plane.

The extreme of fluctuations known is, hence, about 28 feet.

The area at highest water (220), was 760 sq. miles.

The area at lowest water (192), was 195 sq. miles.

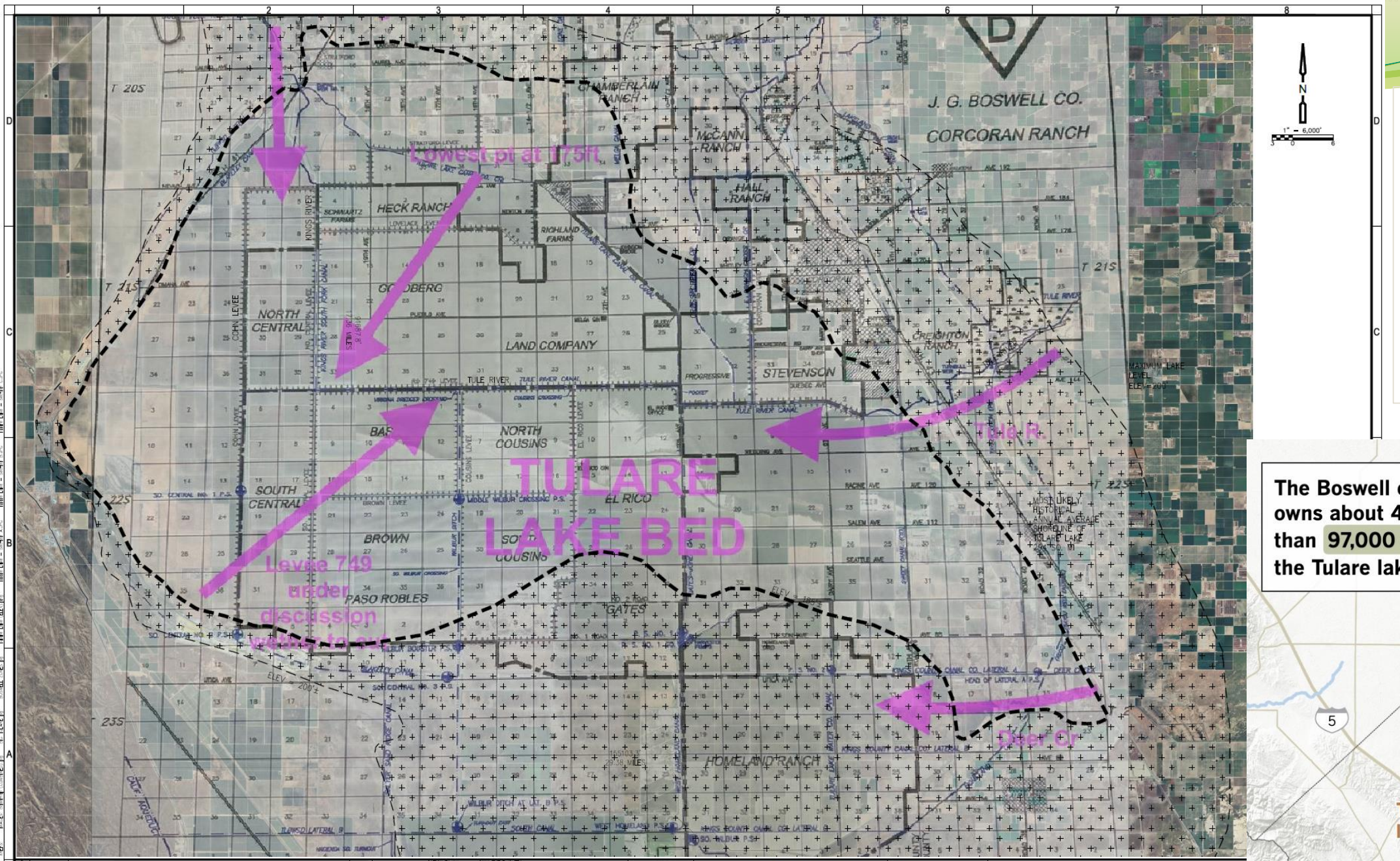
The area at time of Creighton survey (208), was 445 sq. miles.



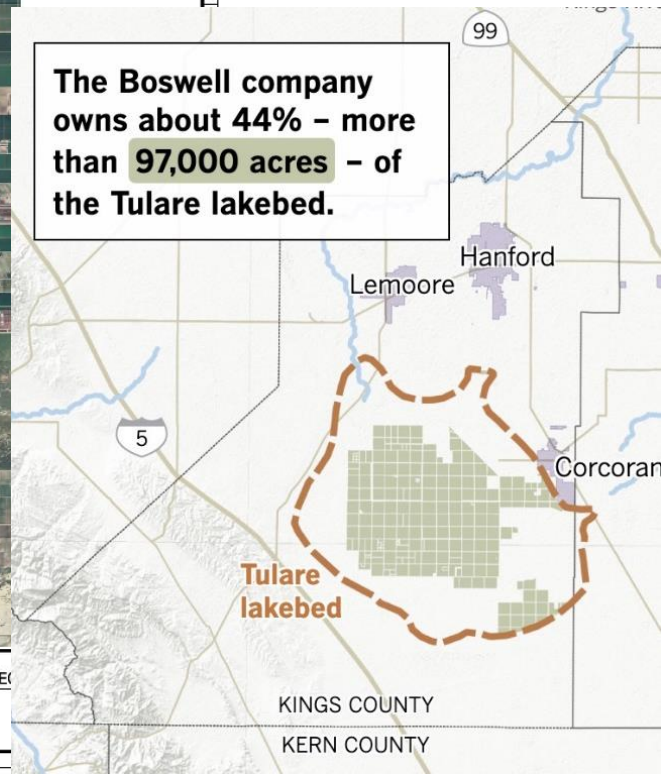
From Flood to Drought…

Tulare Lake fluctuated over 565 square miles

In essence, the lake perimeter was a large marsh zone



Today:
The vast majority of the ancient lands of Tulare Lake are farmed by the J.G. Boswell Corporation



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PROJECT NUMBER: –
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REGISTERED PROFESSIONAL ENGINEER JOHN T. ENNIS No. 55519 Civil STATE OF CALIFORNIA

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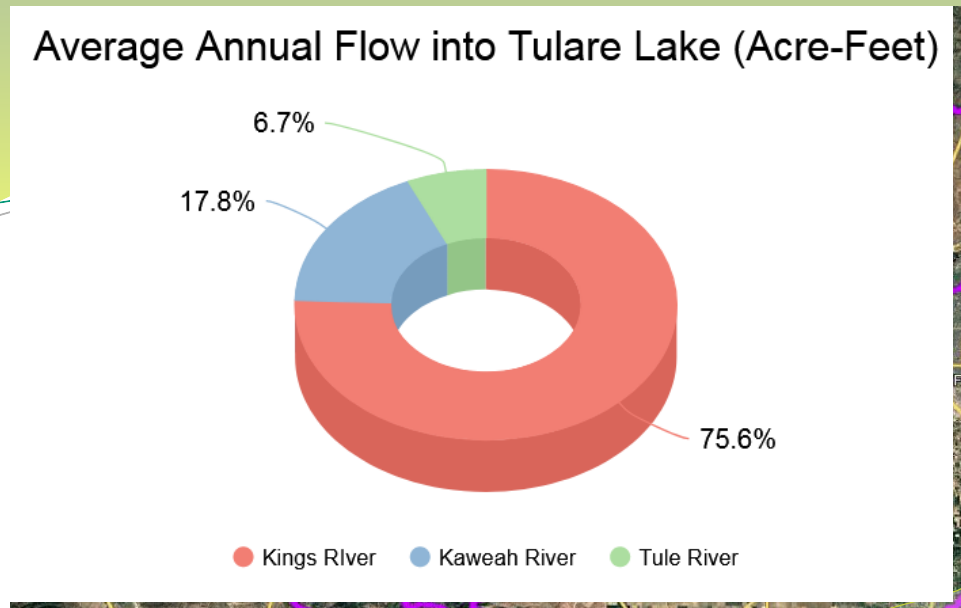
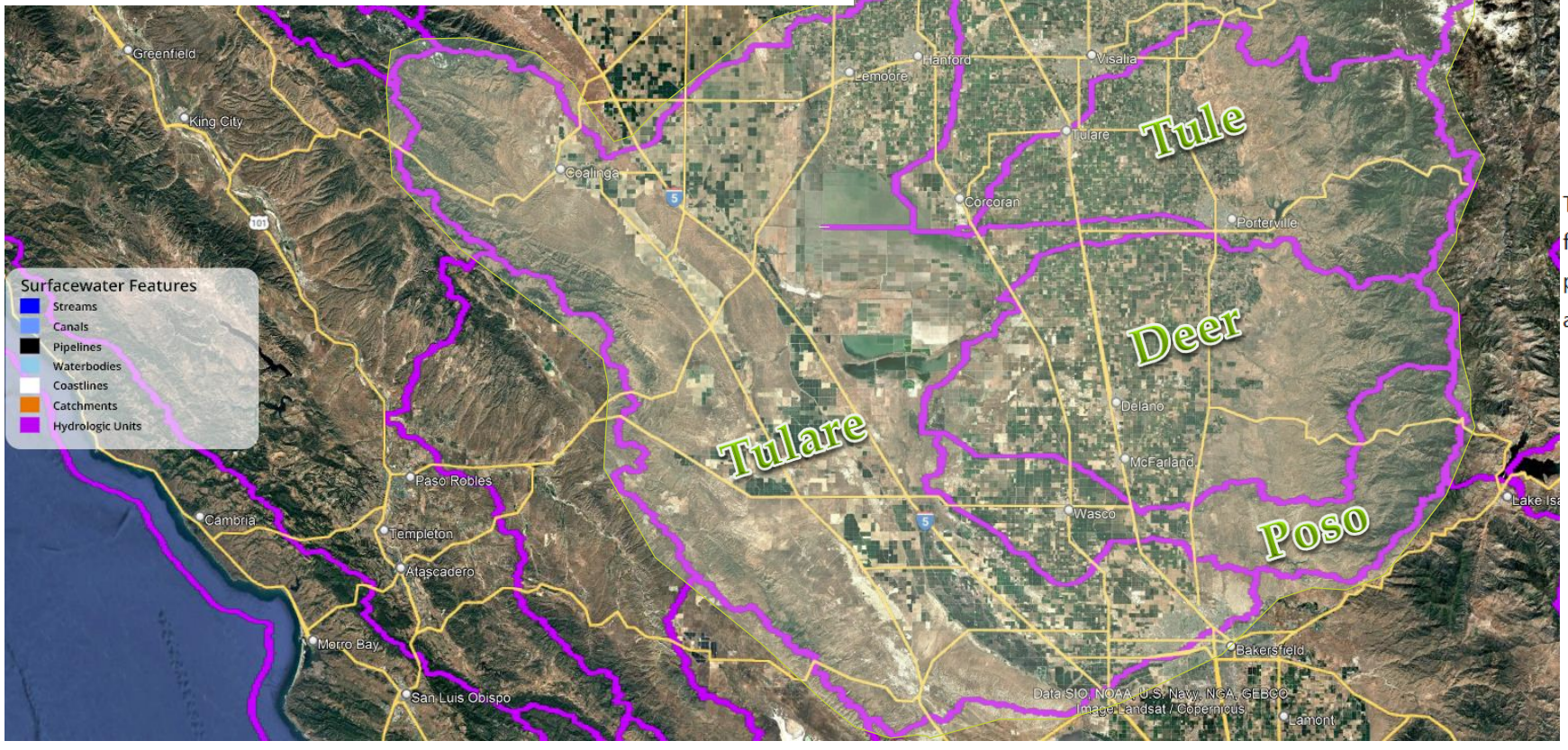
TULARE LAKE
RESTORATION AND WATER STORAGE PROJEC

BOSWELL FARMING ZONES

The Hydrology of Pa'ashi



Tulare Lake has a 10,000 sq. mi. Catchment area



WHAT IS THE TOTAL ANNUAL FLOWS, IN ACRE-FEET FOR THE KINGS RIVER, TULE RIVER, KAWEAH RIVER, POSO CREEK AND WHITE RIVER IN CALIFORNIA

The annual flows of rivers and creeks can vary significantly based on factors such as precipitation, snowmelt, and water management practices. Below are the estimated average annual flows, measured in acre-feet, for the specified water bodies in California:

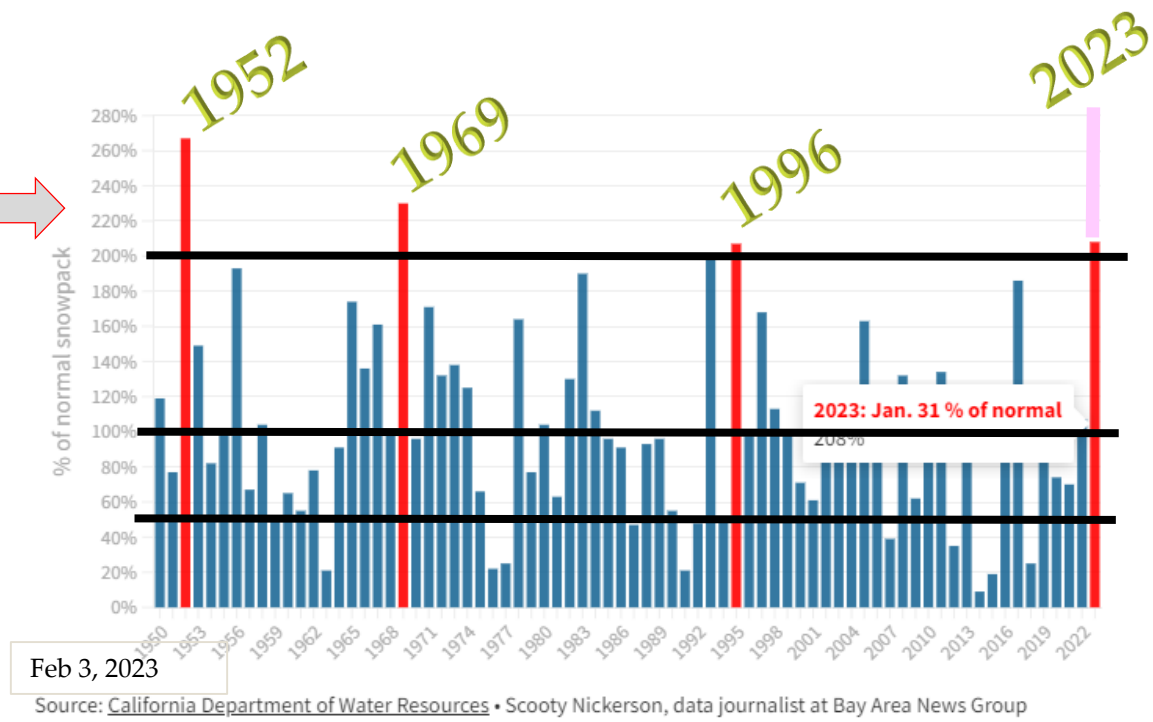
- **Kings River**: Approximately 1,689,700 acre-feet. GENERALPLAN.CO.TULARE.CA.US
- **Kaweah River**: Approximately 430,000 acre-feet. GENERALPLAN.CO.TULARE.CA.US
- **Tule River**: Approximately 136,000 acre-feet. GENERALPLAN.CO.TULARE.CA.US
- **Poso Creek**: Specific average annual flow data is limited. Poso Creek is an ephemeral stream, meaning its flow is highly variable and primarily dependent on seasonal precipitation.
- **White River**: Similar to Poso Creek, White River is also an ephemeral stream with highly variable flow. Specific average annual flow data is limited.


PBS
E D

Pa'ashi Disappears

- There was once a lake… and now there isn't
- We know the history…
  - Swamps versus Deserts
  - Farming
  - Diversions
  - And after awhile… the lake dried up
    - To further complicate matters, the southern Sierra Nevada has a snowpack that vascillates significantly
    - There are too many dams, diversions and upstream riparian water rights
    - This means for any restoration to last…

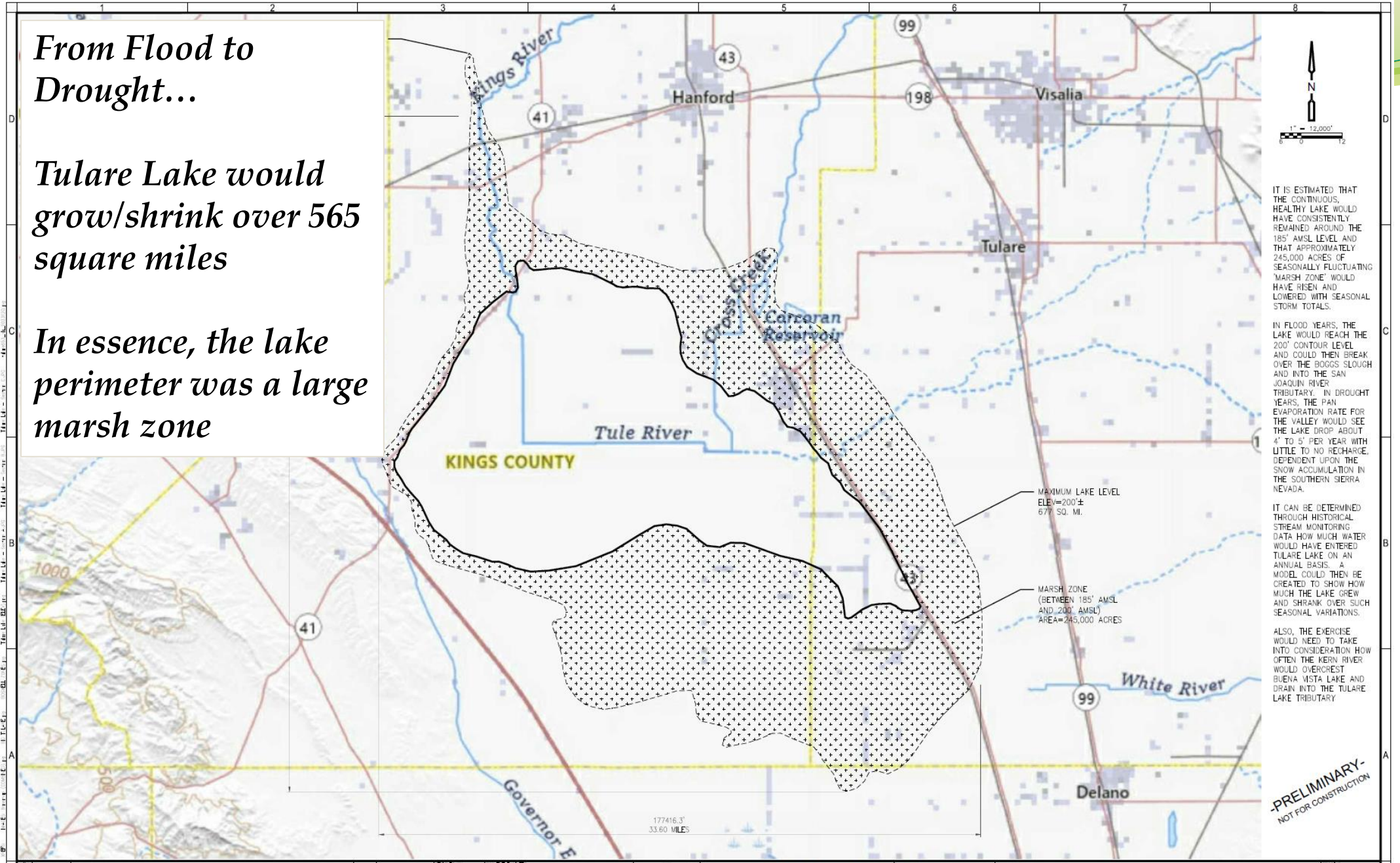
IT WILL HAVE TO BE AUGMENTED FROM OTHER WATER SOURCES



From Flood to Drought…

Tulare Lake would grow/shrink over 565 square miles

In essence, the lake perimeter was a large marsh zone



Maximum capacity:

677 sq. mi.

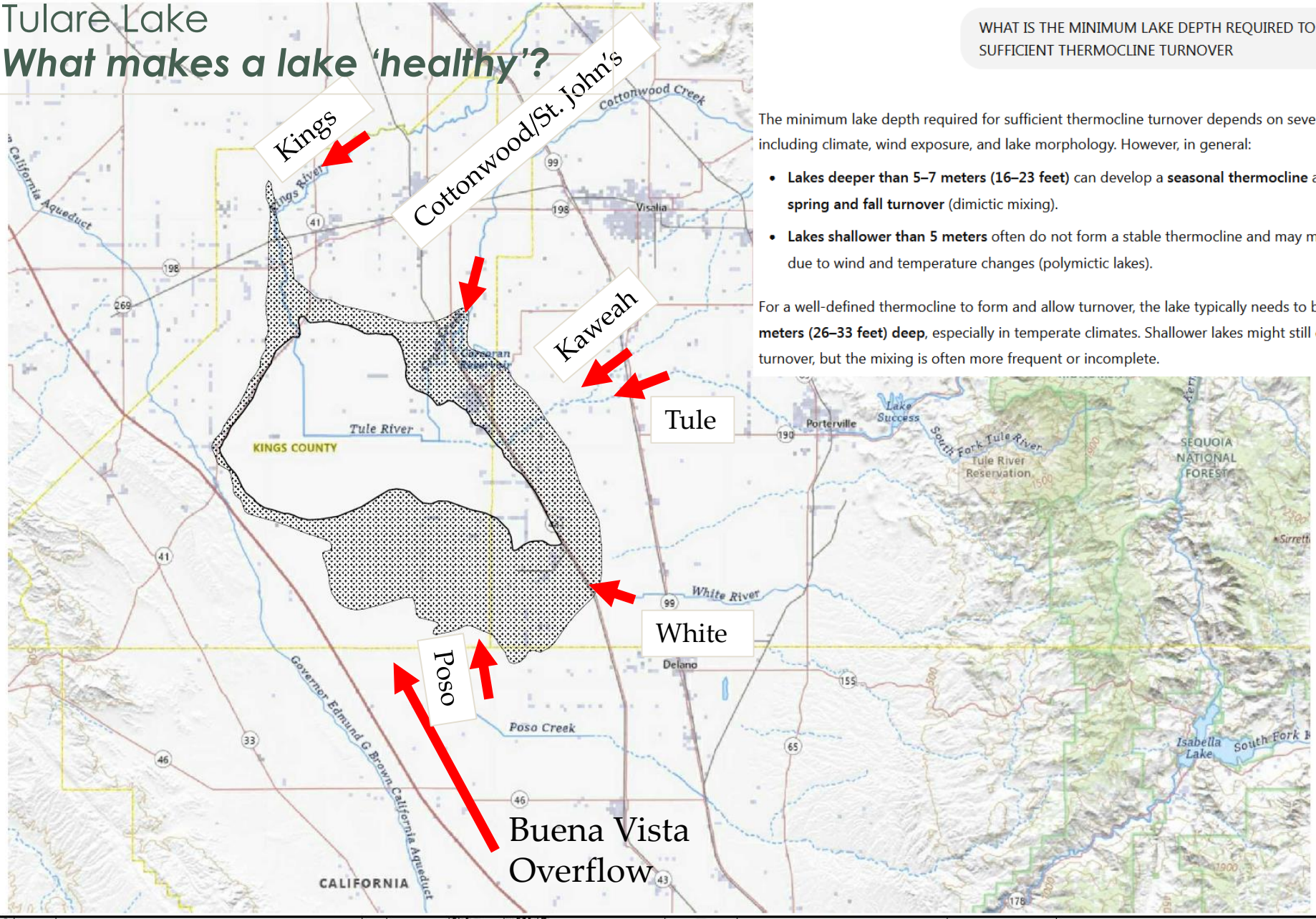
Avg. Depth = 18′

Est. Storage
7.8 MAF.

With such a small volume, it is easy to see that once diversions began, the lake would have dried up relatively quickly

Tulare Lake

What makes a lake 'healthy'?



WHAT IS THE MINIMUM LAKE DEPTH REQUIRED TO HAVE SUFFICIENT THERMOCLINE TURNOVER

The minimum lake depth required for sufficient thermocline turnover depends on several factors, including climate, wind exposure, and lake morphology. However, in general:

- **Lakes deeper than 5–7 meters (16–23 feet)** can develop a **seasonal thermocline** and experience **spring and fall turnover** (dimictic mixing).
- **Lakes shallower than 5 meters** often do not form a stable thermocline and may mix continuously due to wind and temperature changes (polymictic lakes).

For a well-defined thermocline to form and allow turnover, the lake typically needs to be at least **8–10 meters (26–33 feet) deep**, especially in temperate climates. Shallower lakes might still experience turnover, but the mixing is often more frequent or incomplete.

-PRELIMINARY-
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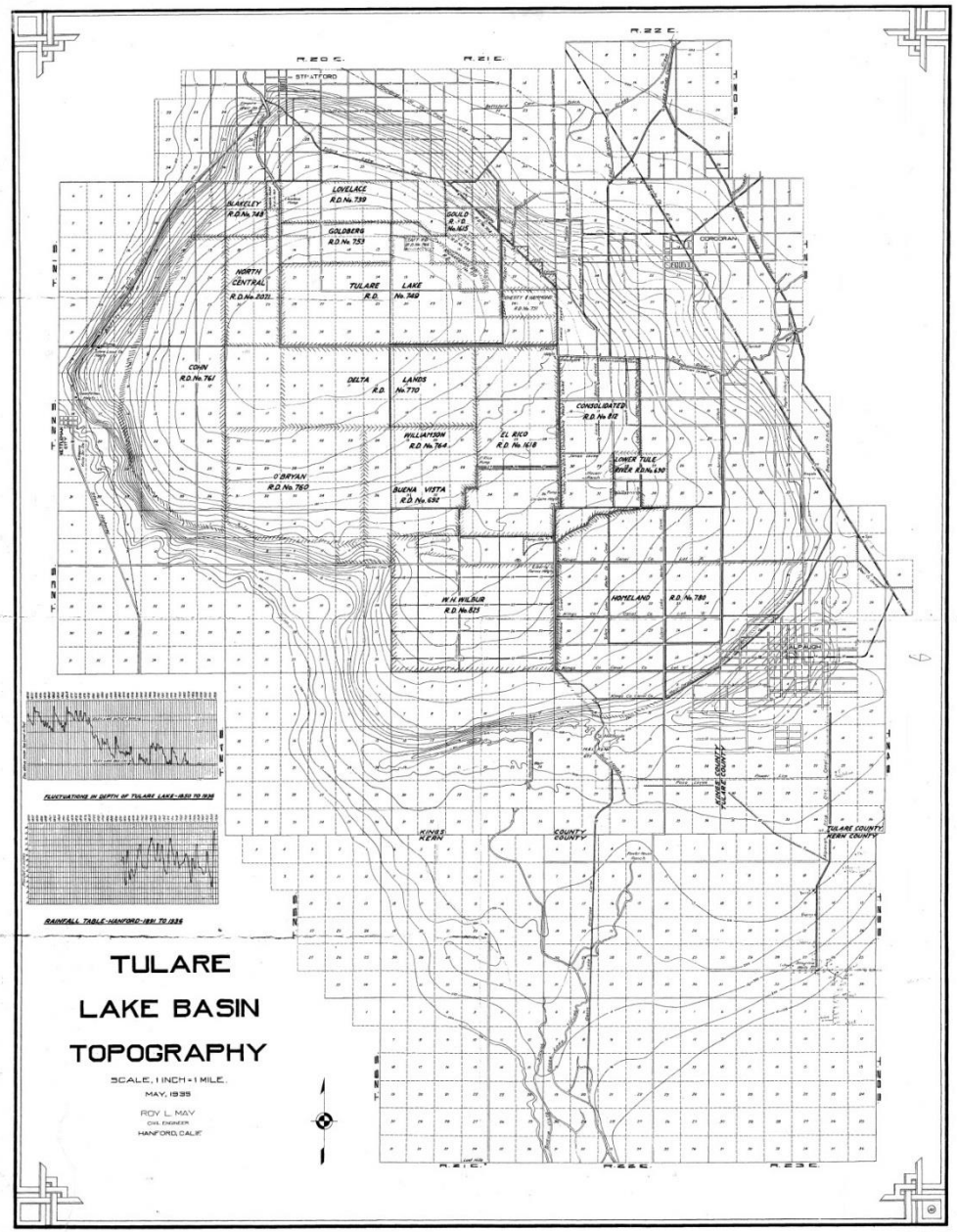
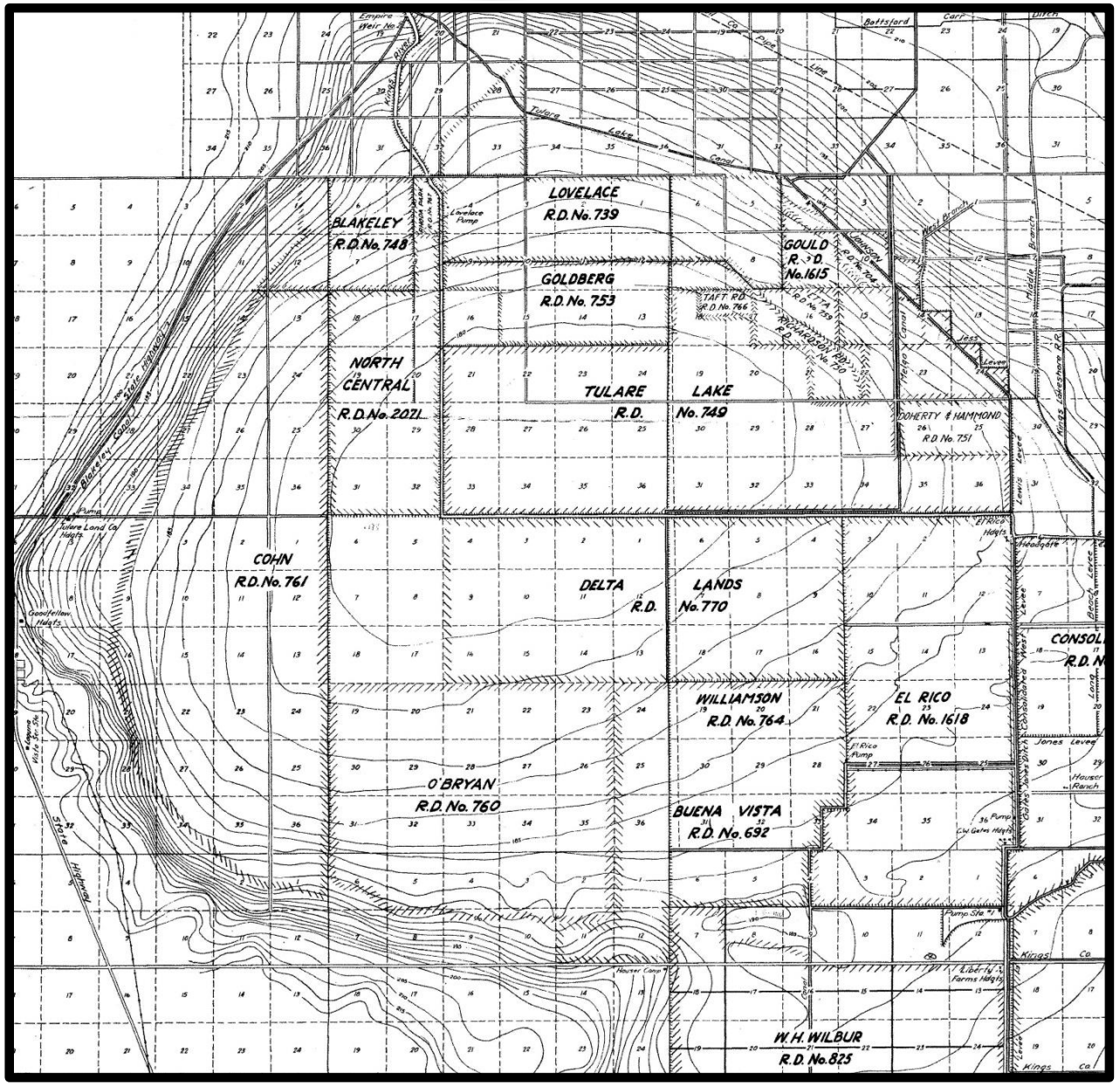
	736 W. Alluvial Ave., Ste. 104 * Fresno, CA 93711 * (559) 709-4888		VICINITY MAP	1

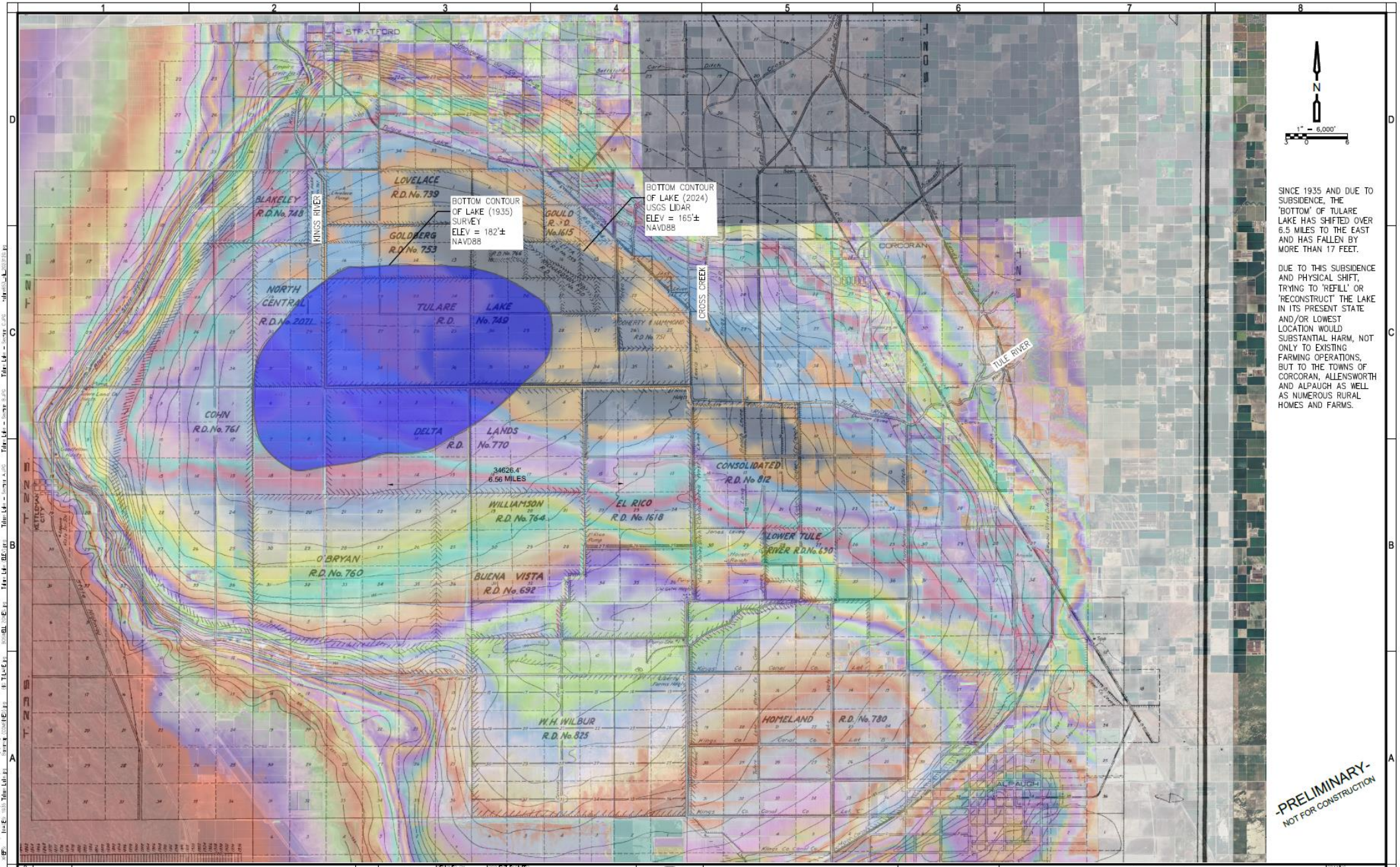
During a typical year, Tulare Lake would have received about

2.3 MAf

Public Survey of Lands
The 1935 Record Map







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TULARE LAKE
RESTORATION AND WATER STORAGE PROJECT

SUBSIDENCE MAP

DRAWING: SB-1
SHEET: 1 OF 1 SHEET

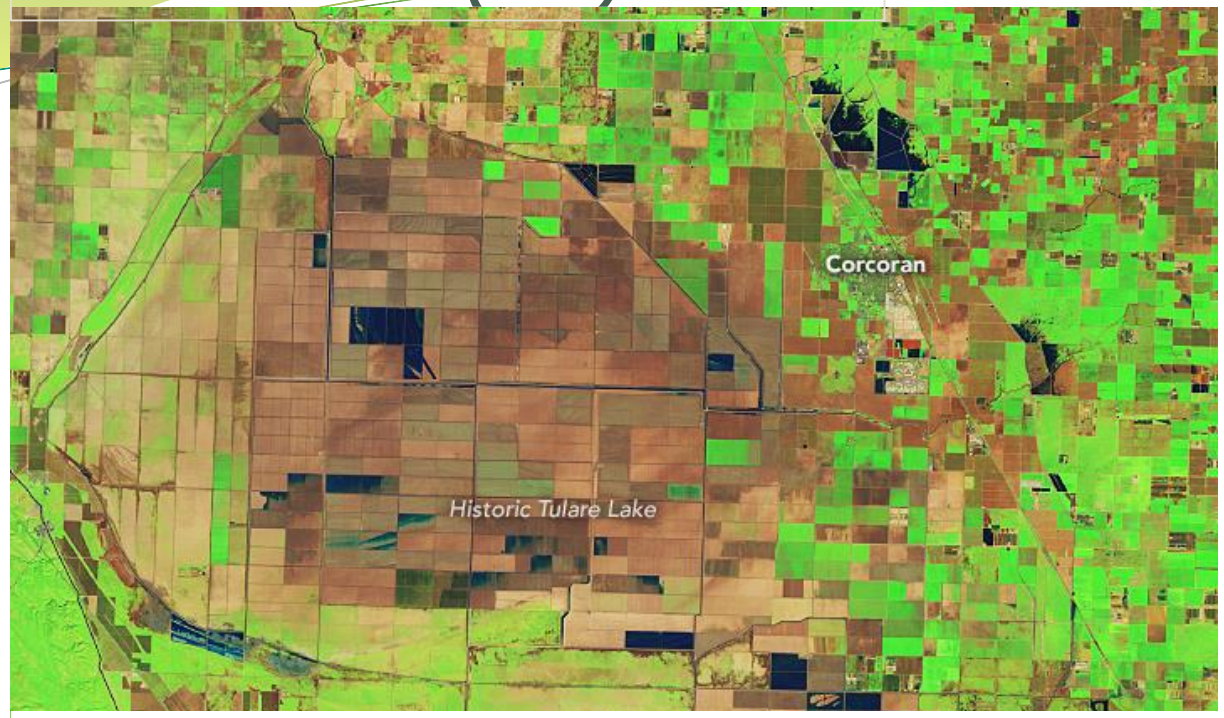
Since 1935 and due to subsidence…

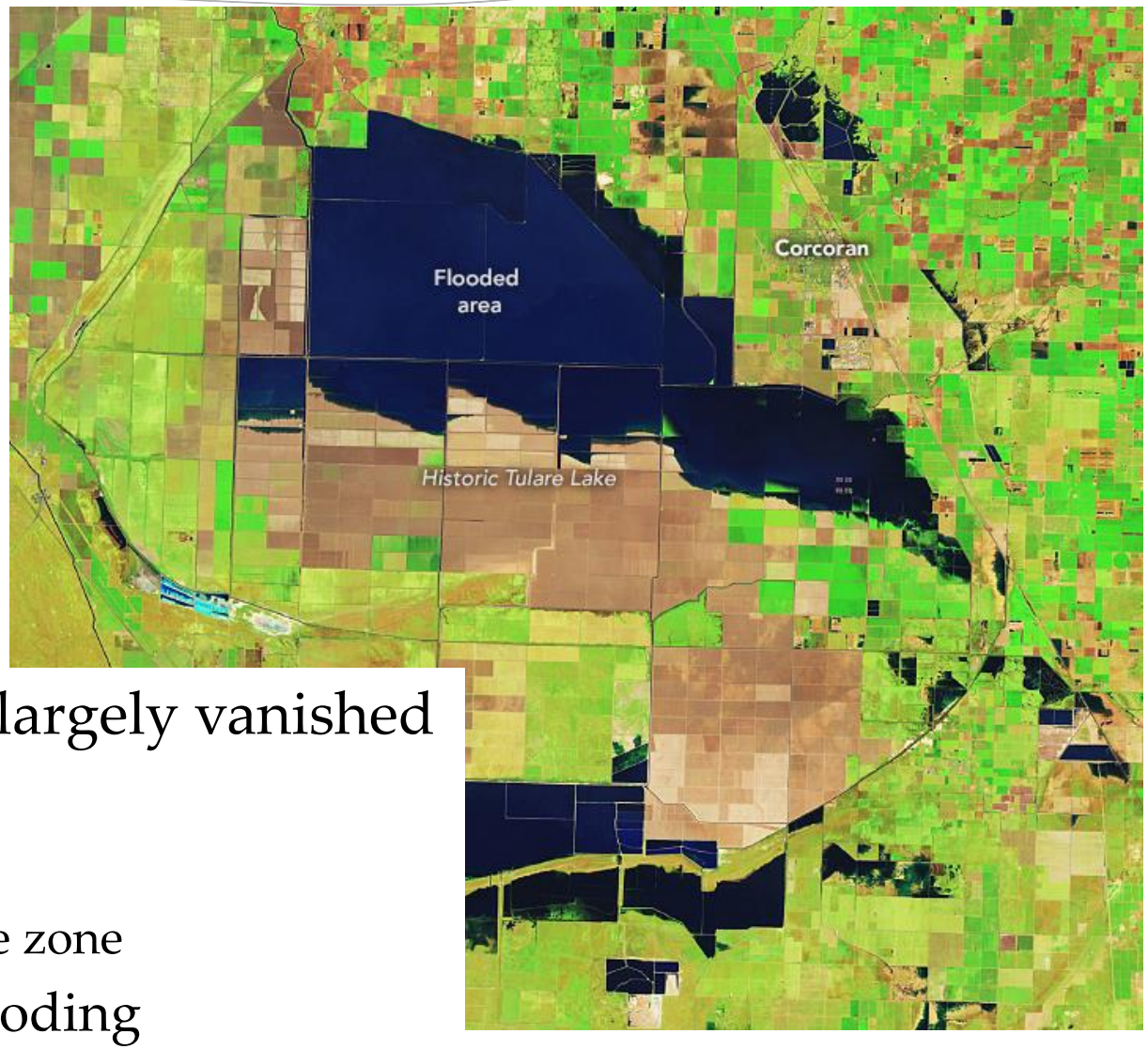
Tulare Lake has shifted 6.5 miles to the east…

And has fallen by more than 17 feet

The Flood of 2023

Tulare Lake
Before and After (2023)





- What should have been a fantastic flood… largely vanished
  - Diversions
    - Significant diversion via the James Bypass
    - Homeland Canal to the Boswell southern storage zone
  - Groundwater Recharge Facilities – Farm Flooding
  - California Aqueduct
    - Kern River water routed into the California Aqueduct

Kings

Cottonwood St. John's

Kaweah

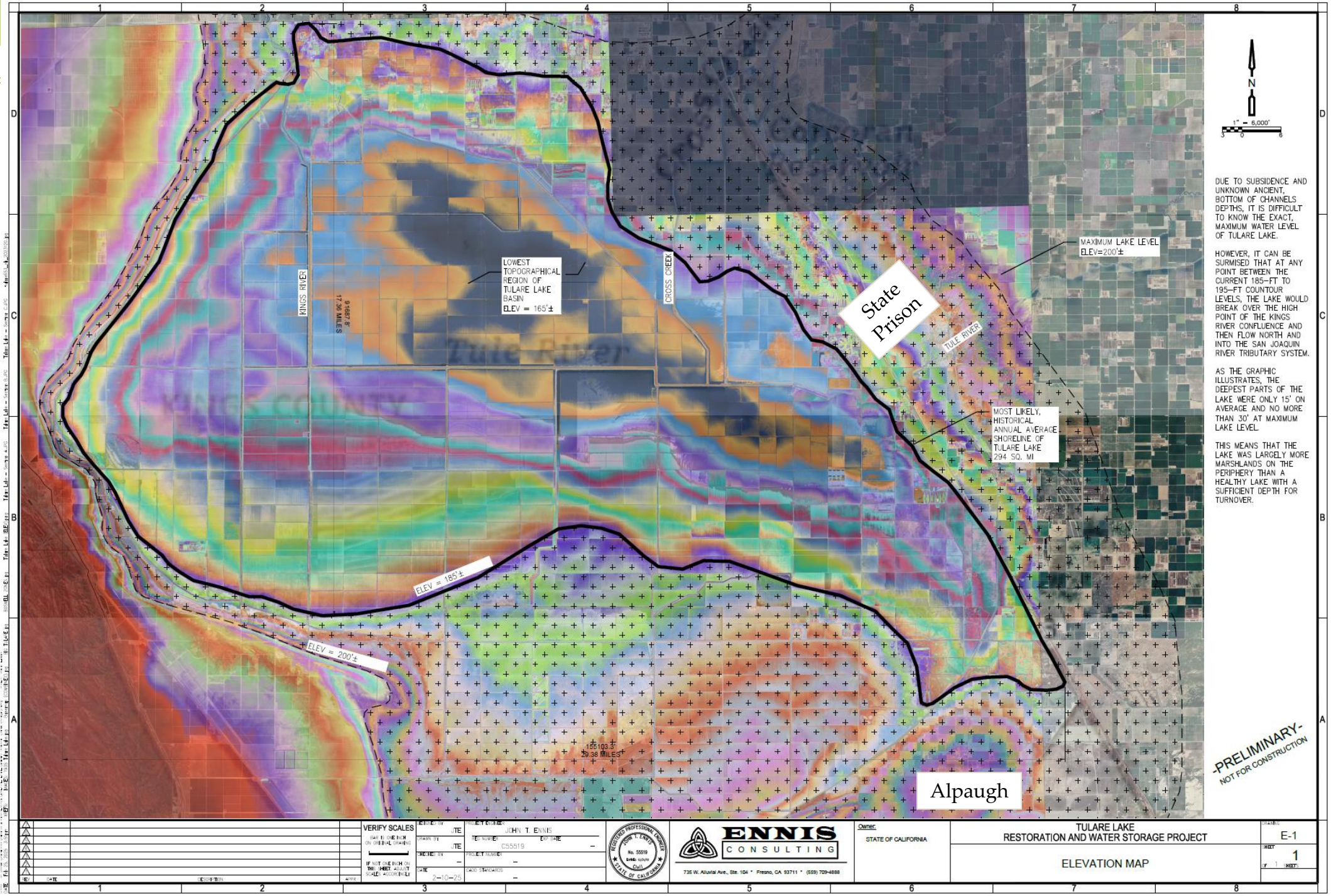
Tule

White

Homeland Canal

South Wilbur

Hacienda


N
1" = 6,000'
3 0 6
DUE TO SUBSIDENCE AND UNKNOWN ANCIENT, BOTTOM OF CHANNELS DEPTHS, IT IS DIFFICULT TO KNOW THE EXACT, MAXIMUM WATER LEVEL OF TULARE LAKE.
HOWEVER, IT CAN BE SURMISED THAT AT ANY POINT BETWEEN THE CURRENT 185-FT TO 195-FT COUNTOUR LEVELS, THE LAKE WOULD BREAK OVER THE HIGH POINT OF THE KINGS RIVER CONFLUENCE AND THEN FLOW NORTH AND INTO THE SAN JOAQUIN RIVER TRIBUTARY SYSTEM.
AS THE GRAPHIC ILLUSTRATES, THE DEEPEST PARTS OF THE LAKE WERE ONLY 15' ON AVERAGE AND NO MORE THAN 30' AT MAXIMUM LAKE LEVEL.
THIS MEANS THAT THE LAKE WAS LARGELY MORE MARSHLANDS ON THE PERIPHERY THAN A HEALTHY LAKE WITH A SUFFICIENT DEPTH FOR TURNOVER.
LOWEST TOPOGRAPHICAL REGION OF TULARE LAKE BASIN ELEV = 165'±
MAXIMUM LAKE LEVEL ELEV=200'±
MOST LIKELY, HISTORICAL ANNUAL AVERAGE SHORELINE OF TULARE LAKE 294 SQ. MI
KINGS RIVER
CROSS CREEK
TULE RIVER
State Prison
Alpaugh
ELEV = 185'±
ELEV = 200'±
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TULARE LAKE
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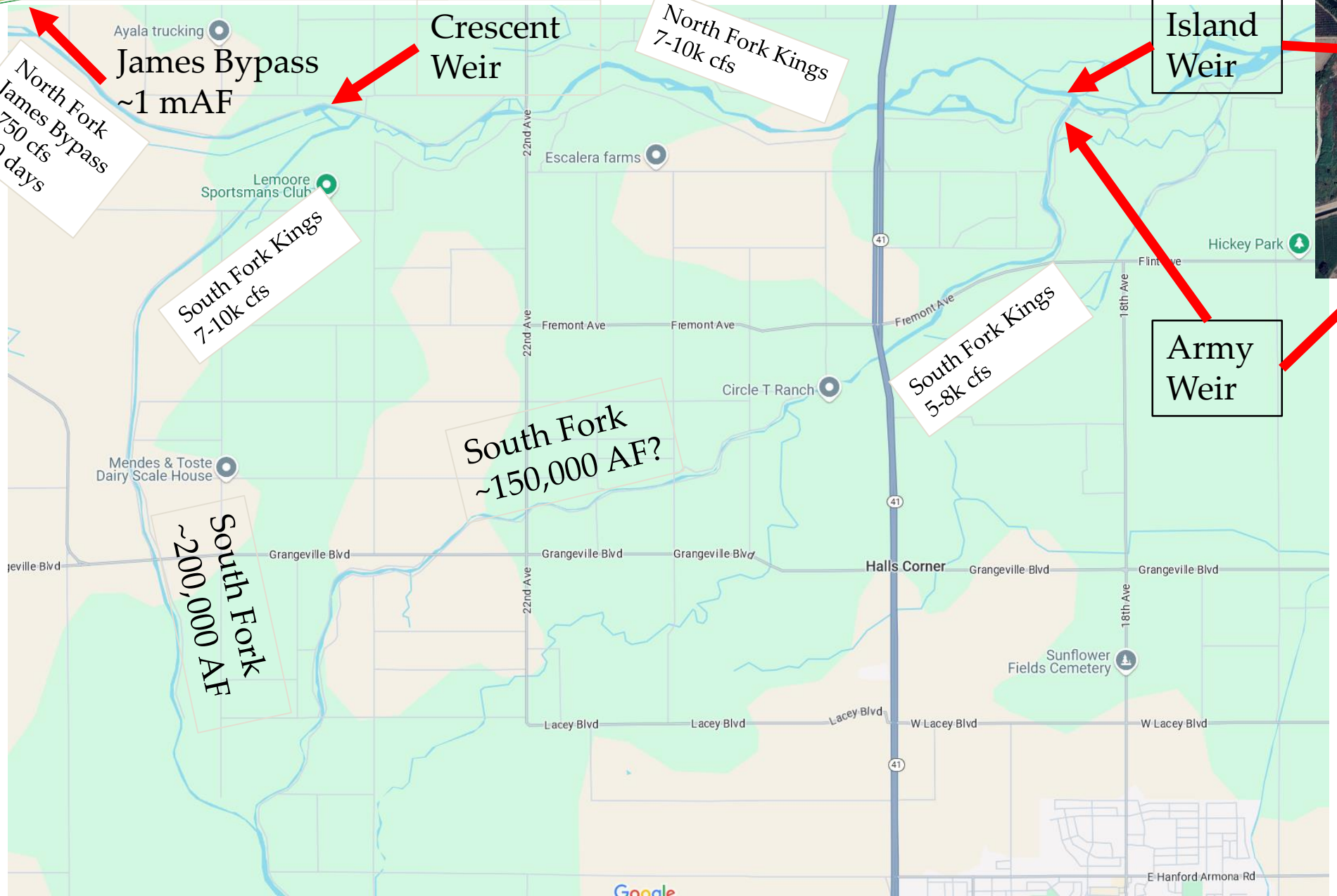
ELEVATION MAP
DRAWING E-1
SHEET 1

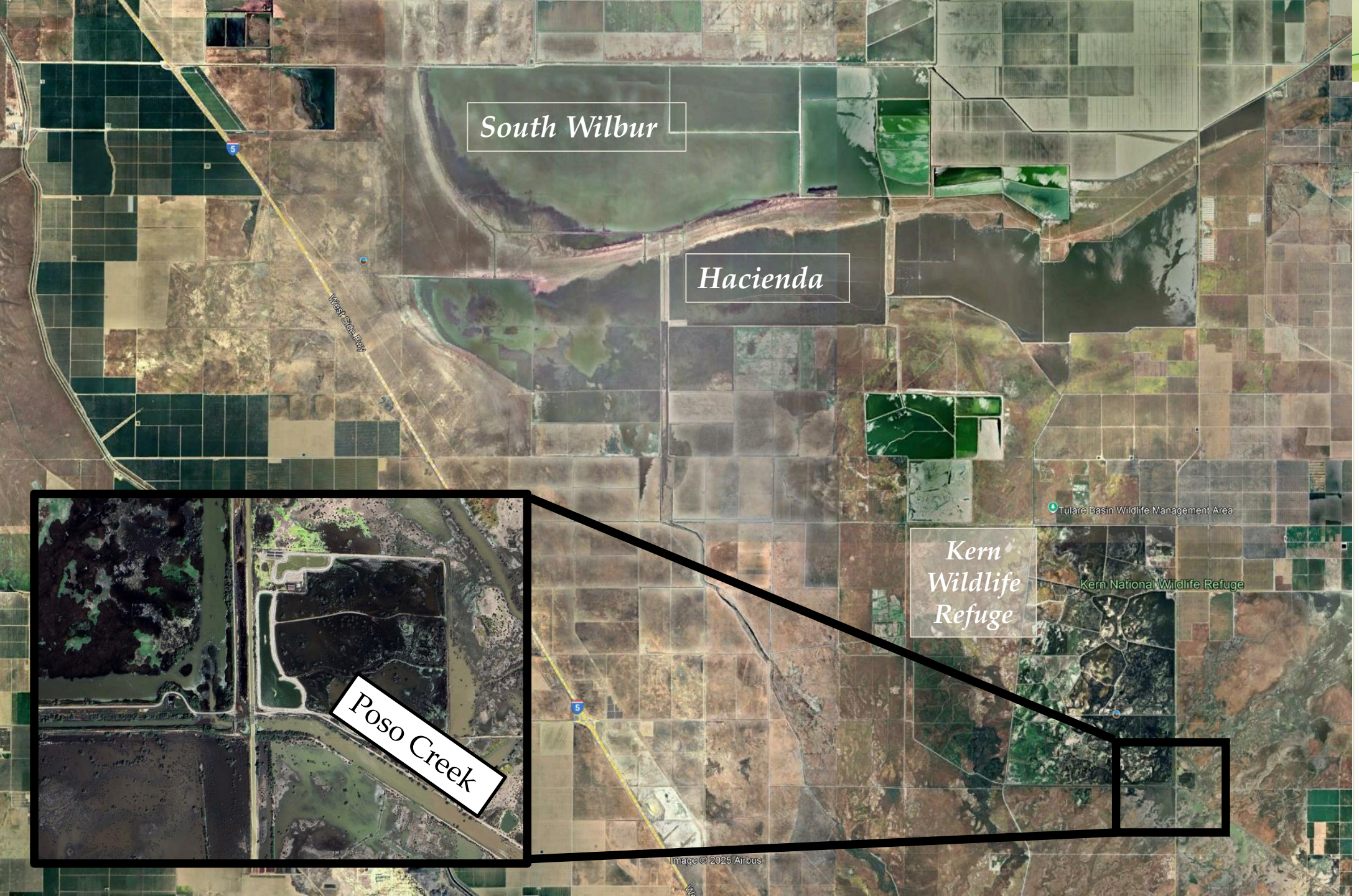
James Bypass
A Flood Diversion



Even with max diversions into the north fork of the Kings River, and diversions of other river tributaries, approx. 150,000 AF to 200,000 AF still ended up in Tulare Lake

Without the James Bypass, it is conceivable that an additional 1,000,000 AF would have ended up in Tulare Lake.

We want to remedy this



During the 2023 flood, the water in the South Wilbur and Hacienda flood areas were diverted from the Tule River through the Homeland Canal

Boswell also likely pumped a good amount of water out of Tulare Lake and into this zone to be used throughout the 2023 and 2024 growing seasons

Estimates of the 2023 Flood

- The Homeland Canal diverted about 200,000 acre-ft of Tule River flooding into the South Wilbur zone
- Boswell pumped roughly 100,000 acre-ft to 200,000 acre-feet into the Hacienda Zone.
- The total amount of water to reach Tulare Lake was likely 400,000 to 500,000 acre feet (or even more), but Boswell has a very well organized system of moving (and storing) water during flood years.
- Approximately 1,000,000 acre-ft of Kings River water was diverted into the James Bypass and away from its historical deposition into Tulare Lake
- Left undiverted, it is estimated Tulare Lake would have received roughly 2,000,000 acre-feet, or about 1/3 of its historical, maximum capacity

The Project

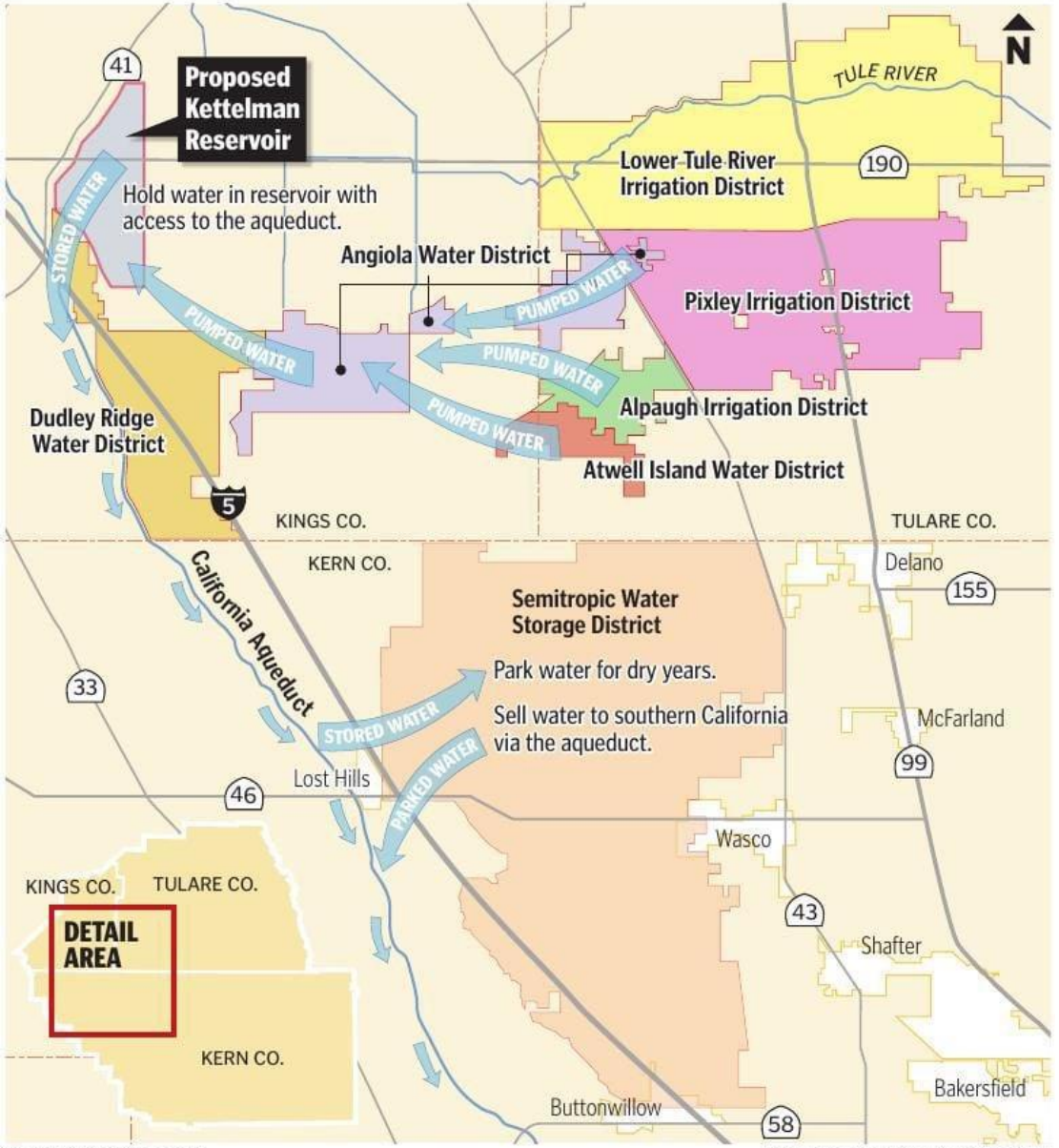
LOIS HENRY

Is John Vidovich planning to sell off the valley's lifeblood? Or is he just the newest water baron on the block?

Jul 1, 2017
Updated Jul 21, 2017

Will water be pumped, parked and sold?

A number of Tulare County farmers and water managers fear Angiola Water District, which is controlled by majority landowner John Vidovich, plans to pump massive amounts of groundwater out of Tulare into a proposed reservoir, then move it through the California Aqueduct to Semitropic Water District and eventually sell it to southern California in dry years.

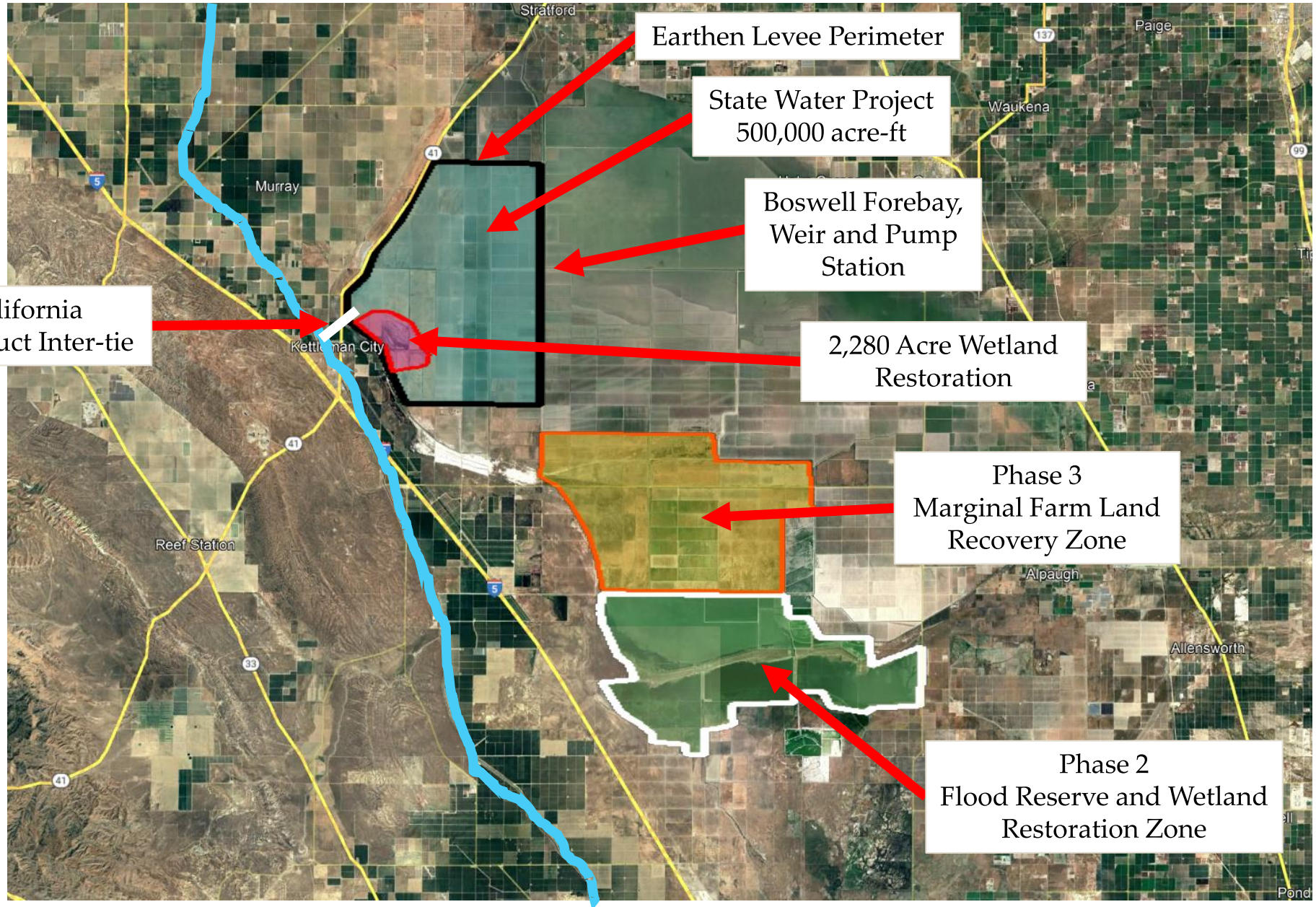


Source: Californian research

LOIS HENRY and KENT KUEHL / THE CALIFORNIAN

Tulare Lake

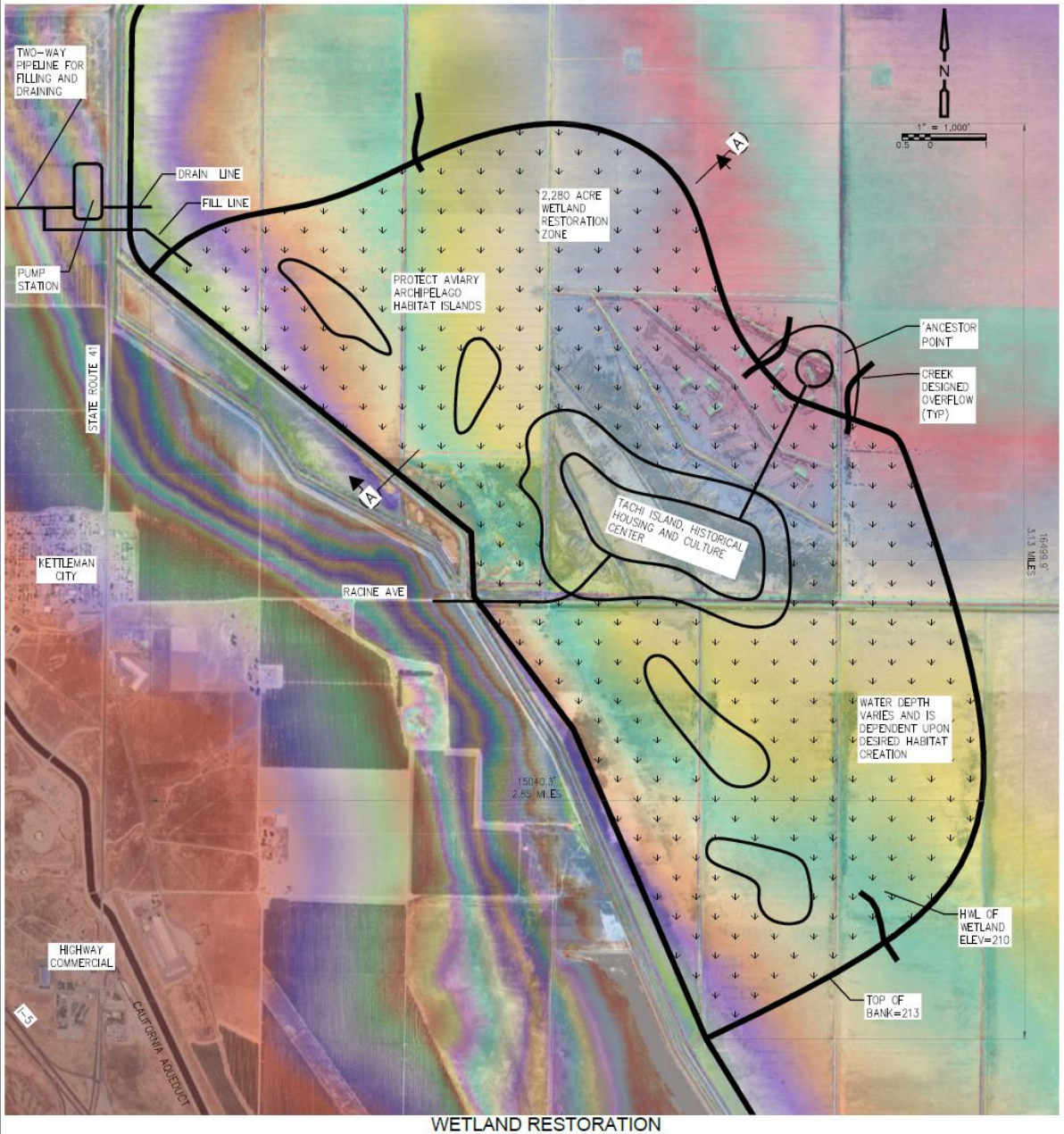
Restoration and Water Storage Project



Flood Protection and Restoration

Elements of the Project

- Boswell (Flood Prevention)
  - Build an 1,100 acre forebay and 6,000 cfs pump station at the intersection of the Tule River (749 Canal) and the Kings Rivers
  - This forebay is fed by the Tule River (749 Canal) and the Kings River (Stratford Weir)
  - In drought years, water from the State Water Project can drain into the forebay for crop irrigation
- Habitat Restoration
  - The interior lake and four undeveloped islands would serve as habitat for regional species and restoration of historic tule wetlands
  - Habitat for the Pacific Flyway
- Native American – Sacred Grounds
  - A primary island with a looped road will serve a sacred lands to those whose culture embraces a relationship with the land and their ancestors.
  - Ancestor Point is a significant feature in which Yokut people could gather during rising lake events



WETLAND RESTORATION

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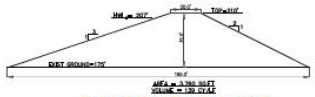
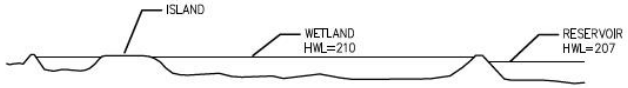


EAST SHORE DAM

WEST SHORE DAM



SECTION A-A

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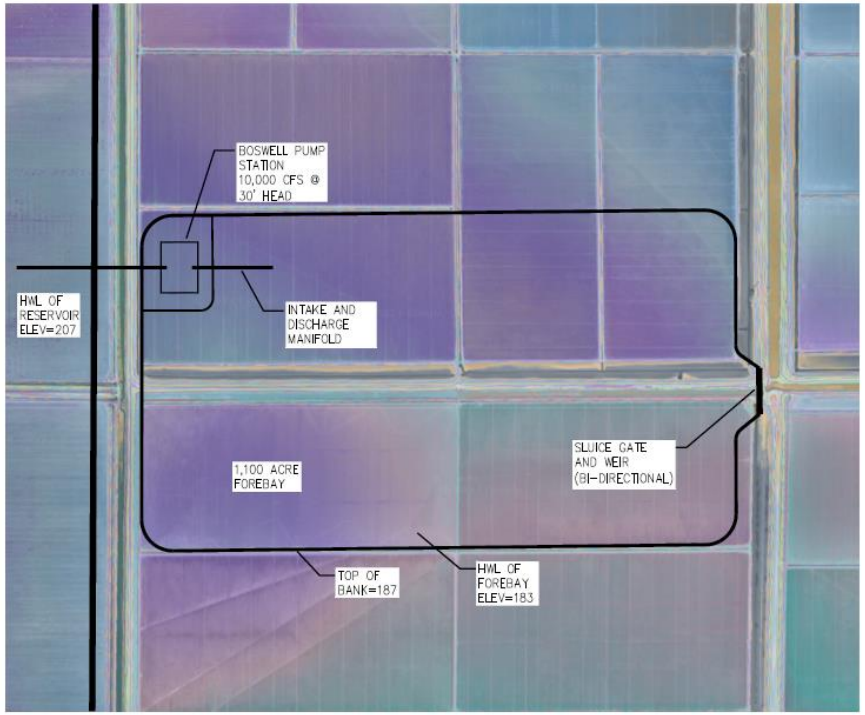

BOSWELL FOREBAY AND PUMP STATION

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California Aqueduct water always fills the wetland first, then water drains into the reservoir below the wetland

500,000 AF State Water Project

Elements of the Project

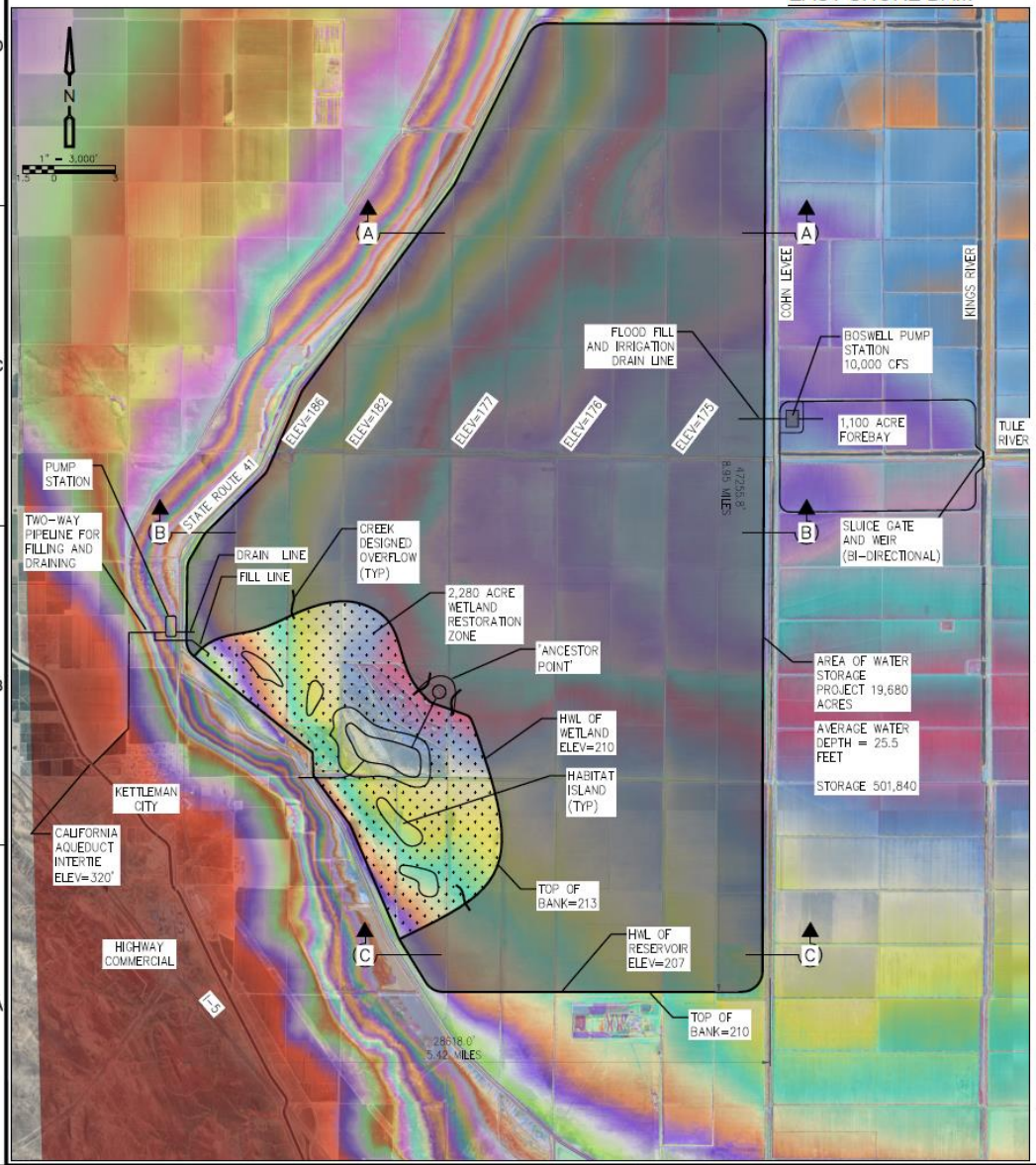
- State Water Project
  - As a new 500,000 acre-foot regulating reservoir, the lake would work in tandem with the San Luis Reservoir for storing and delivering water.
  - Additional water security and storage of the SWP… SOUTH of the Delta
- Groundwater Recharge
  - The size and scope of the facility water could help arrest the current overdraft condition by ensuring that some portion of the water worked its way into the groundwater aquifer, regardless of the Corcoran clay condition

WEST SHORE DAM

ESTIMATE EARTH MOVING FOR DAM CREATION IS APPROX. 16 MILLION CUBIC YARDS

ESTIMATE FOR ISLAND CREATION IS 7 MILLION CUBIC YARDS

EAST SHORE DAM



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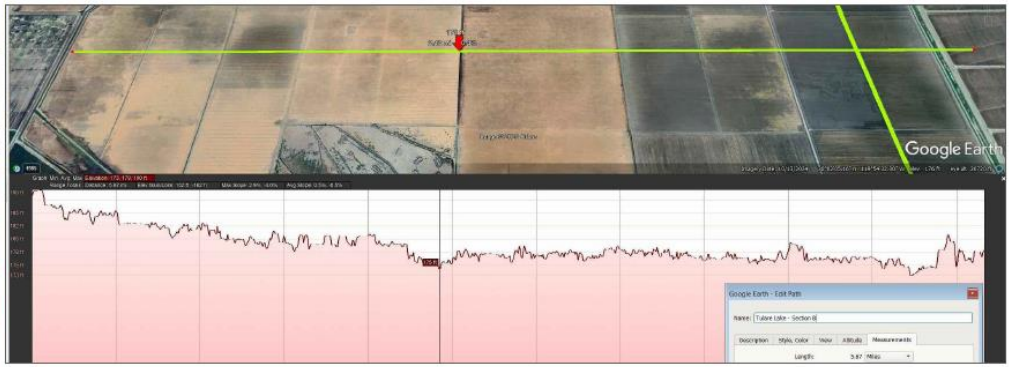

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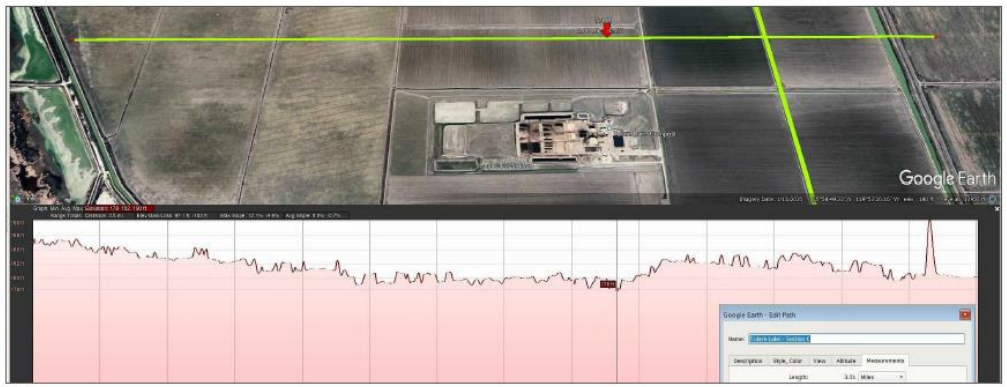

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TULARE LAKE
RESTORATION AND WATER STORAGE PROJECT

WATER STORAGE RESERVOIR

DRAWING WS-1

SHEET 1 OF 1 SHEET

State Water Project Storage
500,000 Ac-Ft.

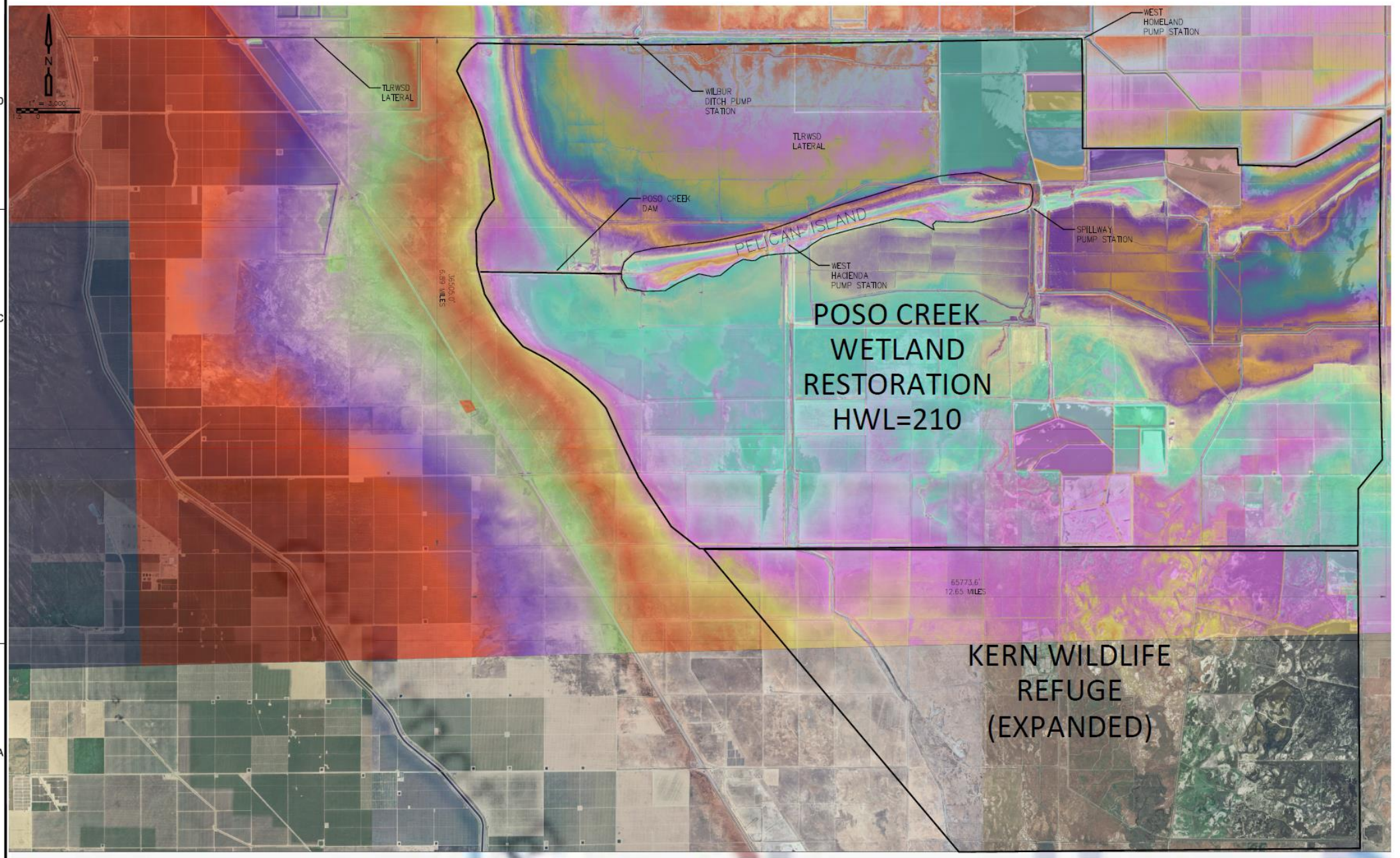
Tulare Lake Restoration, Habitat and Sacred Grounds
2,280 acres

California Aqueduct Intertie

Boswell & SWP Pump Stations

Project Expansion – Stage 2

- Water Storage and Flooding
  - In flood years, if the lake becomes full, without a reserve condition, water would need to be delivered into the California Aqueduct
    - However, this water could quickly be emptied back into the Stage 2 enhancement area through the TLRWSD Lateral
  - Also, the SWP Pump Facility can also be used to pump water into the Blakeley Canal which runs southerly into the southern zone of the ancient Tulare Lake
  - This water could also end up in the Stage 2 area through the South Central PS #3 and the Wilbur Ditch PS
- Expanded Kern Wildlife Refuge
  - The project would also expand Stage 2 of the Tulare Lake Wetland Creation and Enhancement Project



VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

DESIGNED BY JTE
DRAWN BY JTE
CHECKED BY –
DATE 2-10-25

PROJECT ENGINEER JOHN T. ENNIS
REG NUMBER C55519 EXP DATE –
PROJECT NUMBER –
CAD STANDARDS –

REGISTERED PROFESSIONAL ENGINEER JOHN T. ENNIS No. 55519 Civil STATE OF CALIFORNIA

ENNIS CONSULTING
735 W. Alluvial Ave., Ste. 104 * Fresno, CA 93711 * (559) 709-4888

Owner:
STATE OF CALIFORNIA

TULARE LAKE
RESTORATION AND WATER STORAGE PROJECT

STAGE 2 RESTORATION

DRAWING ST2-1

SHEET 1 OF 1 SHEET

During Flood Years and even during dry years, the Poso Creek Wetland could receive SWP water via the TLRWSD lateral for wetland enhancement and groundwater recharge

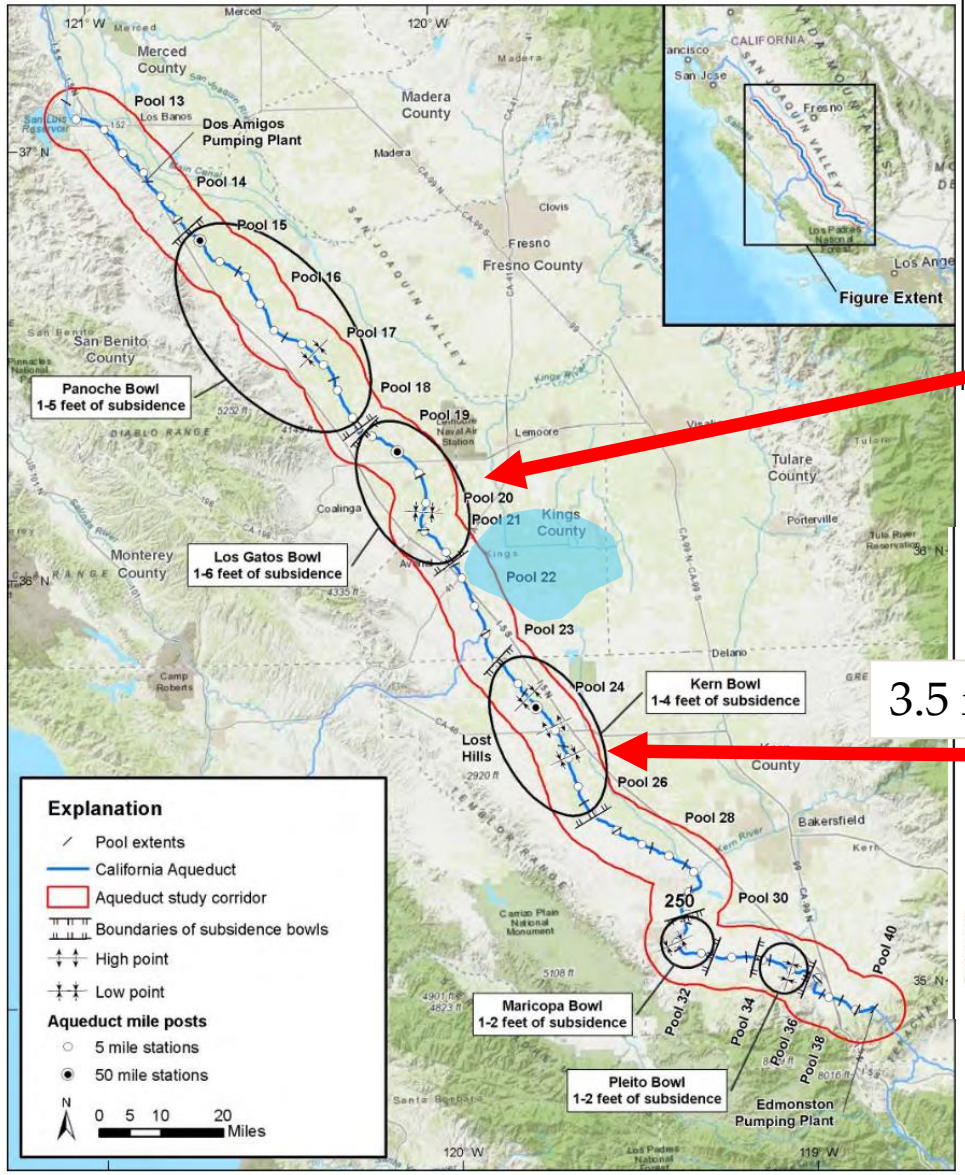
Finding the Water

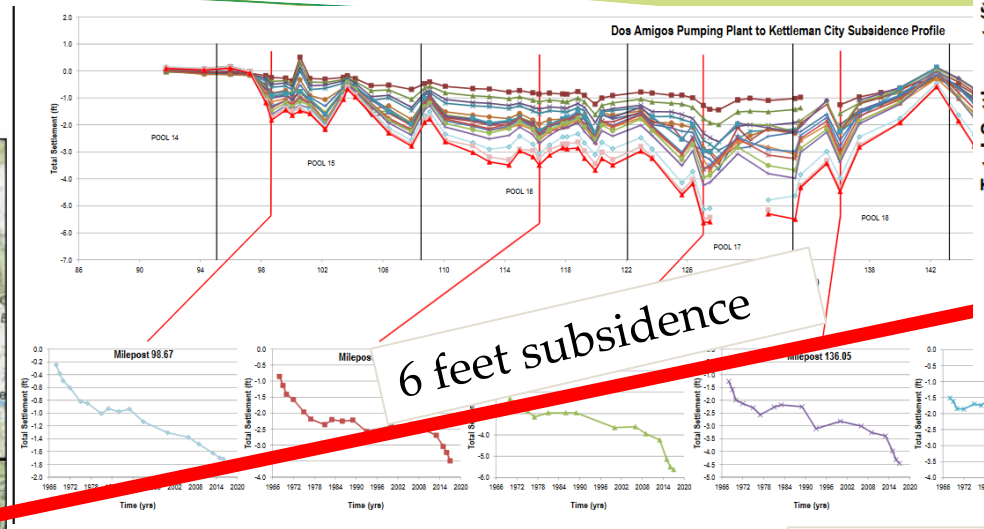
California Aquaduct - Stats

- 22,000,000 Acre-feet
  - The total, annual average volume of the Sacramento River at Rio Vista
    - (As comparison, the total Colorado River system at Lee's Ferry is 15 Maf and has fallen to 12.3 Maf due to the 2000-2021 western states drought)
- 3.0 Maf to 6.6 Maf
  - Annual range of the Harvey Banks Pump Station
- 17% to 30%
  - Annual allocation of the Sacramento River
- 13,100 cfs (9.4 Maf)
  - Flow capacity of the California Aqueduct (Harvey Banks to the San Luis Reservoir)

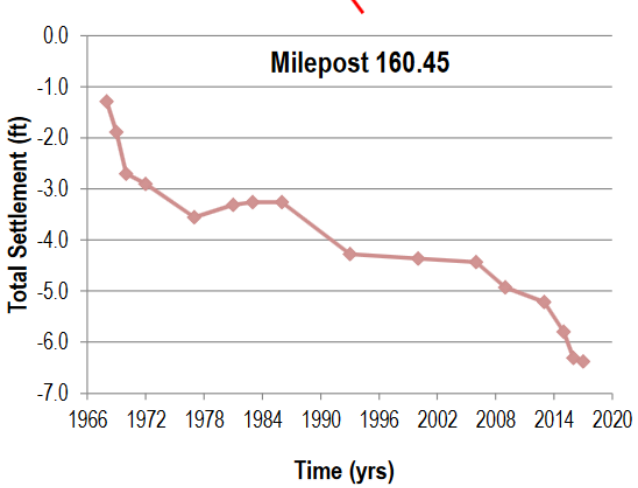
California Aqueduct
Charts of Subsidence

Figure 1-1 Land Use Study Corridor Along the California Aqueduct



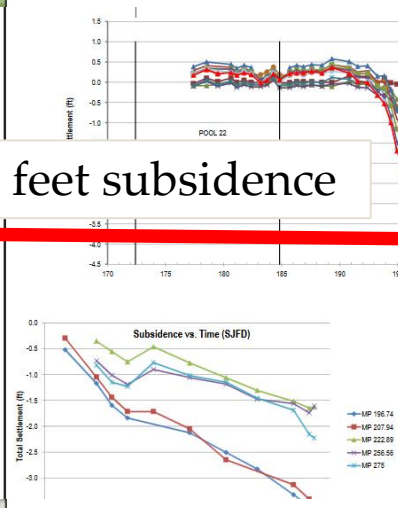


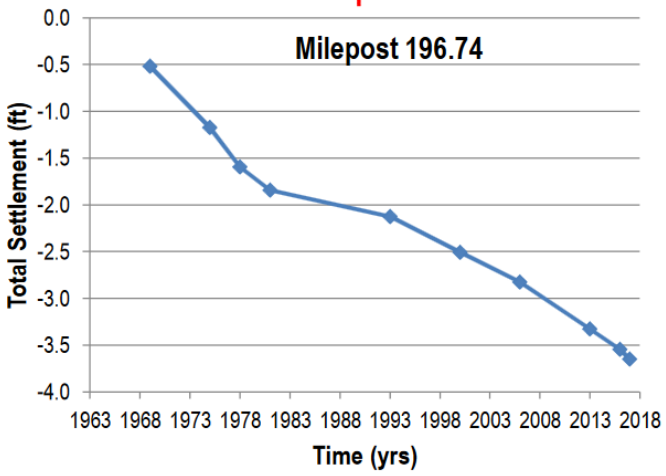
6 feet subsidence

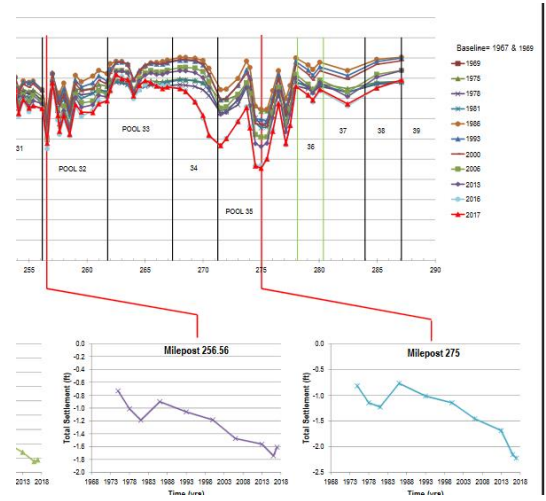


Pool 20

3.5 feet subsidence







Pool 24

California Aquaduct – Pool 20

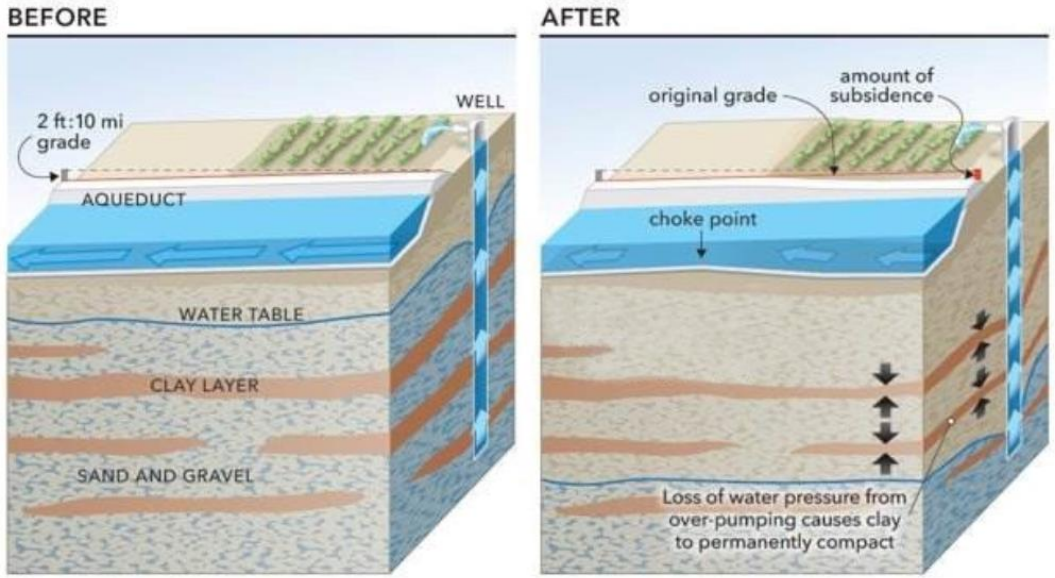
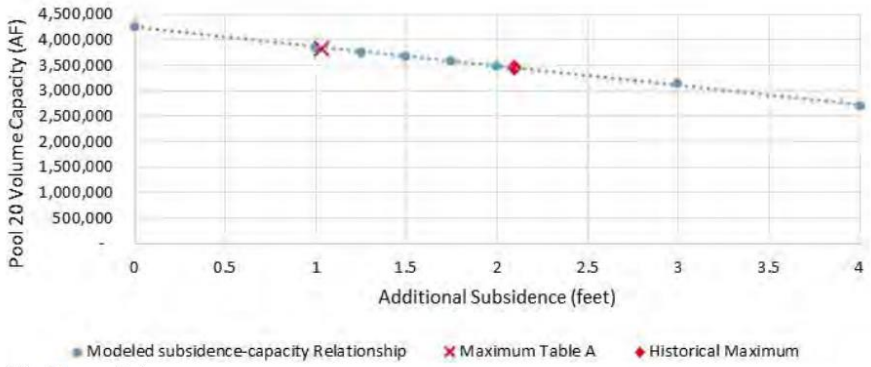


Figure 4-6 Volume Capacity vs. Subsidence Relationship for Pool 20



Note: AF = acre-feet

4.2.4.2 Delivery Impacts of Projected Subsidence Centered at Pool 20

To estimate the maximum subsidence the Aqueduct system can experience at Pool 20 before it affects allocations, the model was run at various increments of subsidence centered at Pool 20. The pool capacity was then recalculated at each increment. This process yielded a linear relationship between subsidence and a decrease in pool capacity. Assuming the system is operating 85 percent of the time year-round, it was estimated that approximately 4.2 million acre-feet could be conveyed across Pool 20 with 2017 conditions (running flat for the entire year). The system's capacity through Check 20 will be equal to the Maximum Table A volume of 3.8 million acre-feet after 1 foot of additional subsidence (beyond that measured in 2017). The historical maximum limit of 3.4 million acre-feet will be reached after

Table 4-4 Maximum Table A Volumes in Acre-Feet, South of Pool 20

San Joaquin Valley	
Oak Flat Water District	5,700
County of Kings	9,305
Dudley Ridge Water District	45,350
Empire West Side Irrigation District	3,000
Kern County Water Agency	982,730
Tulare Lake Basin Water Storage District	87,471
San Joaquin Valley Subtotal	**1,133,556**
Central Coast	
San Luis Obispo County Flood Control & Water Conservation District	25,000
Santa Barbara County Flood Control & Water Conservation District	45,486
Central Coast Subtotal	**70,486**
Southern California	
Antelope Valley-East Kern Water Agency	144,844
Castaic Lake Water Agency	95,200
Coachella Valley Water District	138,350
Crestline-Lake Arrowhead Water Agency	5,800
Desert Water Agency	55,750
Littlerock Creek Irrigation District	2,300
The Metropolitan Water District of Southern California	1,911,500
Mojave Water Agency	85,800
Palmdale Water District	21,300
San Bernardino Valley Municipal Water District	102,600
San Gabriel Valley Municipal Water District	28,800
San Gorgonio Pass Water Agency	17,300
Ventura County Watershed Protection District	20,000
Southern California Subtotal	**2,629,544**
Total	**3,833,586**

Source: California Water Data Library 2017

Existing Capacity 4.2 Maf

With 1-ft more of subsidence 3.8 MAf

California Aquaduct – Pool 24

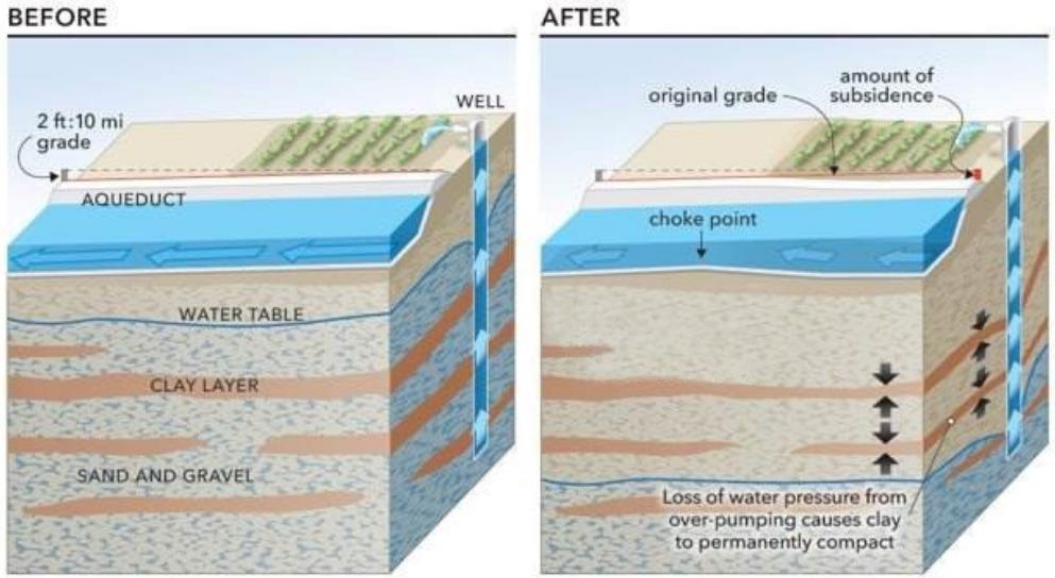
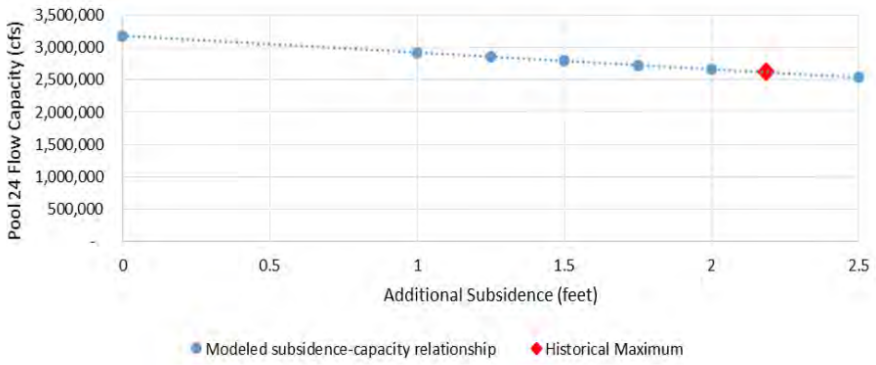


Figure 4-7 Volume Capacity vs. Subsidence Relationship for Pool 25



Note: cfs = cubic feet per second

4.2.4.3 Delivery Impacts of Projected Subsidence Centered at Pools 24 and 25

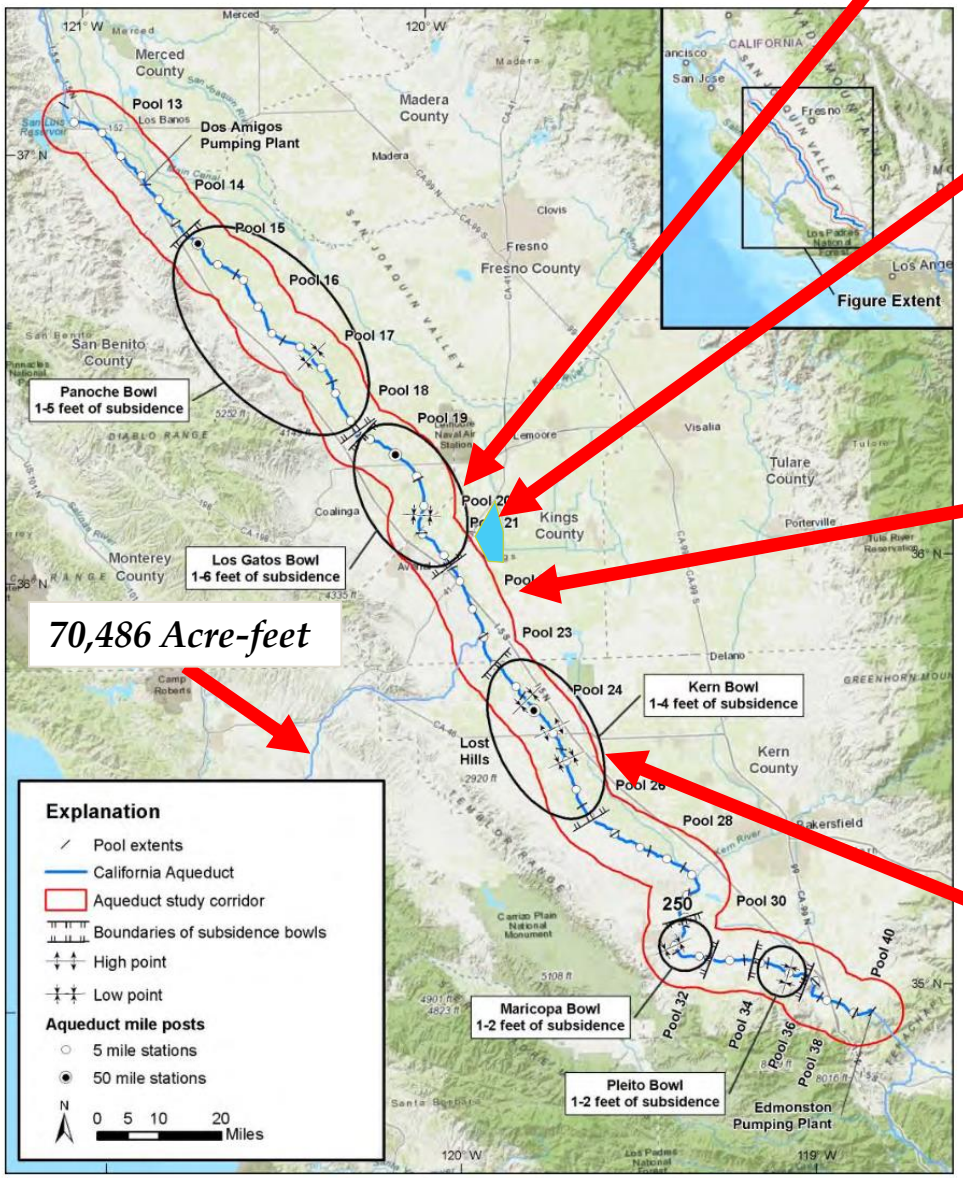
To estimate the maximum subsidence the Aqueduct system can experience at Pools 24 and 25 before it impacts water allocations, the model was run at various increments of subsidence centered at Pools 24 and 25. The pool capacity was then recalculated at each increment. Assuming that the system is operating 85 percent of the time year-round, it was estimated that just more than 3.1 million acre-feet could be conveyed across Pool 25 with 2017 conditions. This is less than estimated Maximum Table A volume of 3.6 million acre-feet (assumed to be equal to [Table 4-4 total] – [Central Coast Subtotal] – [Tulare Lake Basin + Dudley Ridge + County of Kings]). The historical maximum limit of 2.6 million acre-feet will be reached after approximately 2.2 feet of additional subsidence. Figure 4-7 shows the relationship between additional subsidence (relative to 2017 elevations) and maximum yearly volume capacity at Pool 25.

Existing Capacity 3.1 Maf

With 1-ft more of subsidence 2.9 MAf

California Aqueduct
Existing Delivery Capacity

Figure 1-1 Land Use Study Corridor Along the California Aqueduct



Los Gatos Bowl (Pool 20)
4,200,000 Acre-feet

Available to Tulare Lake
4,200,000 Acre-feet (Pool 20)
-3,100,000 Acre-feet (Pool 24)
-70,486 Acre-feet (Central Coast)
-150,826 Acre-feet (San Joaquin)
878,688 Acre-feet

150,826 Acre-feet (Less Kern County Water Agency)

70,486 Acre-feet

Kern Bowl (Pool 24)
3,100,000 Acre-feet

Table 4-4 Maximum Table A Volumes in Acre-Feet, South of Pool 20

San Joaquin Valley	
Oak Flat Water District	5,700
County of Kings	9,305
Dudley Ridge Water District	45,350
Empire West Side Irrigation District	3,000
Kern County Water Agency	982,730
Tulare Lake Basin Water Storage District	87,471
San Joaquin Valley Subtotal	**1,133,556**
Central Coast	
San Luis Obispo County Flood Control & Water Conservation District	25,000
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Coachella Valley Water District	138,350
Crestline-Lake Arrowhead Water Agency	5,800
Desert Water Agency	55,750
Littlerock Creek Irrigation District	2,300
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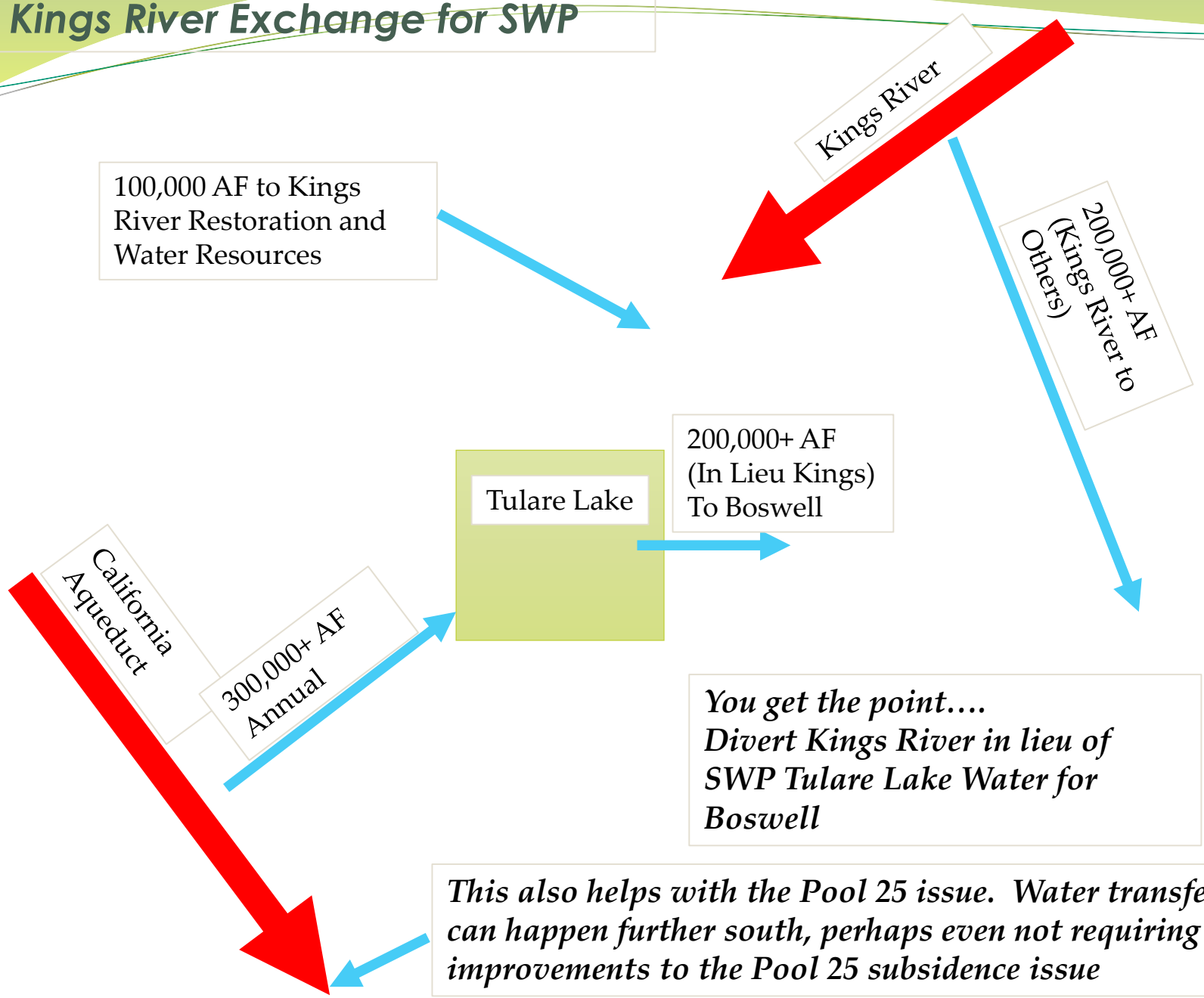
Mojave Water Agency	85,800
Palmdale Water District	21,300
San Bernardino Valley Municipal Water District	102,600
San Gabriel Valley Municipal Water District	28,800
San Gorgonio Pass Water Agency	17,300
Ventura County Watershed Protection District	20,000
Southern California Subtotal	**2,629,544**
Total	**3,833,586**

Source: California Water Data Library 2017

Boswell Farming
Kings River Exchange for SWP



You get the point….
Divert Kings River in lieu of SWP Tulare Lake Water for Boswell

This also helps with the Pool 25 issue. Water transfers can happen further south, perhaps even not requiring improvements to the Pool 25 subsidence issue

water across nearly 1 million acres of farmland. Here's a breakdown of the major water courses and rough estimates of water diversion during a typical irrigation season (March to October, assuming average conditions and a total release from Pine Flat of ~1.2 to 1.5 million acre-feet, based on historical averages):

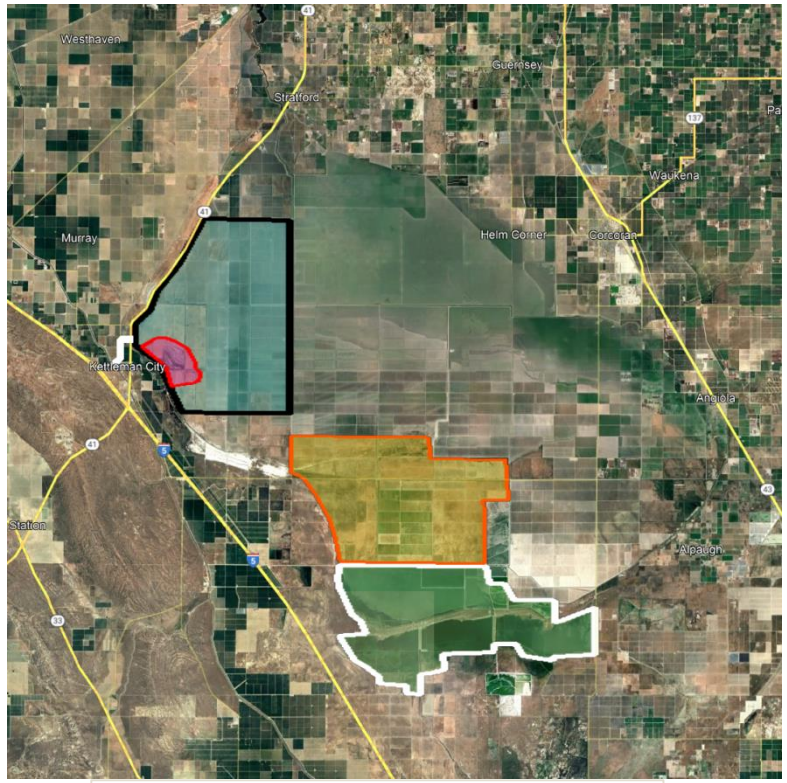
1. **Kings River Main Stem (below Pine Flat Dam to Army Weir/Island Weir)**
   - **Path**: Flows southwest through Fresno County, passing Piedra and Reedley.
   - **Diversions**: Initial flows are split at the Fresno Weir (near Fresno) and People's Weir (near Kingsburg), feeding canals like the Fresno Canal and Consolidated Canal.
   - **Estimate**: Of the 1.2–1.5 million acre-feet released, ~500,000–700,000 acre-feet are diverted here for irrigation across northern Fresno County. This is based on the Kings River Water Association (KRWA) managing 28 member units with entitlements averaging 2 acre-feet per acre annually across ~350,000 acres.
2. **North Fork (below Army Weir)**
   - **Path**: Splits at Army Weir (near Laton, ~36.65° N, 119.75° W), flows northwest via Fresno Slough into the James Bypass, eventually reaching the San Joaquin River.
   - **Diversions**: Primarily a flood control channel, but some water is diverted into smaller canals (e.g., James Irrigation District).
   - **Estimate**: In a typical irrigation season, ~200,000–400,000 acre-feet flow through here, with ~50,000–100,000 acre-feet diverted for local use; the rest is floodwater routed north in wetter periods.
3. **South Fork (below Army Weir to Stratford Weir and beyond)**
   - **Path**: Heads south from Army Weir through Lemoore and Stratford, reaching Stratford Weir (~36.19° N, 119.82° W), with some water continuing to Tulare Lake in high-flow years.
   - **Diversions**: Canals like the Lemoore Canal and Blakeley Canal pull water for Kings County farmland.
   - **Estimate**: ~300,000–500,000 acre-feet reach this fork, with ~200,000–300,000 acre-feet diverted before Stratford Weir. The weir itself might see 100,000–200,000 acre-feet in an average season, though this drops sharply in drought years.
4. **Major Canals (e.g., Fresno, Consolidated, Lemoore, Blakeley)**
   - **Path**: Radiate from the main stem and forks, serving specific irrigation districts (e.g., Fresno Irrigation District, Consolidated Irrigation District).
   - **Diversions**: These canals collectively distribute the bulk of irrigation water.
   - **Estimate**: Combined, they handle ~600,000–800,000 acre-feet, split across hundreds of miles of channels. For example, the Fresno Canal might take ~150,000 acre-feet, and the Consolidated Canal ~200,000 acre-feet, based on district acreage and water rights.
5. **Fresno Slough and James Bypass**
   - **Path**: Connects the North Fork to the San Joaquin River system northwest of Mendota.
   - **Diversions**: Minimal direct irrigation use; acts as a flood relief conduit.
   - **Estimate**: ~100,000–300,000 acre-feet pass through in an average season, mostly undiverted unless tapped by small local systems.

Conclusions – Win/Win

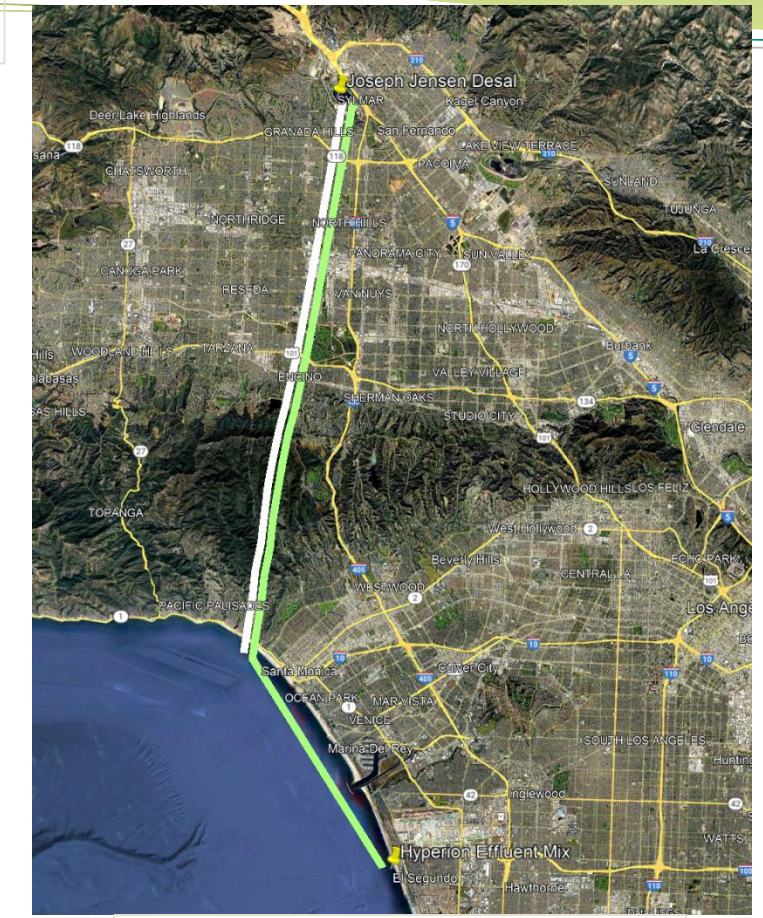
- Win #1
  - Flood Protection for Boswell Farming and the surrounding communities
- Win #2
  - Tulare Lake Restoration with Habitat
  - Return of Sacred Grounds
- Win #3
  - State Water Project gains a new 500,000 acre-foot facility
  - Additional storage along with the San Luis Reservoir
- Win #4
  - Water transfers assist and may even defer improvements to the California Aqueduct
  - California focuses on desalination south of Edmonston at the Sepulveda Basin

Questions and Discussion

California Dreamin'
A Bold New Era



Project #1:
Tulare Lake Water Storage and Restoration



Project #2:
Joseph Jensen Tunnels, Desal Plant and Hyperion Brine Mix

Project #3:
Salton Sea Tunnels, Desal Plant, Farm Creation and Restoration Project