

Insights from the Inland Sea

The Hydrology and Management of the Yolo Bypass Floodplain



Ted Sommer

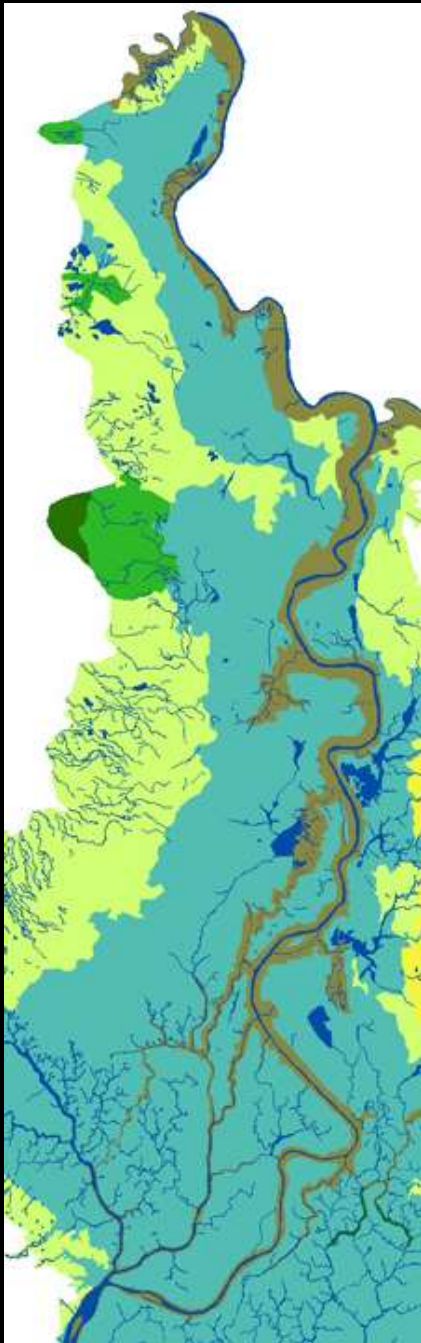
California Department of Water Resources

Yolo Bypass Myths

- Bypass was built on the lowest lands.
- Yolo Bypass is "operated".
- The landscape is homogenous.
- Hydrology = Sacramento River.
- Inundation requires lots of flow.
- Inundation occurs infrequently.
- Yolo Bypass isn't available to fish during drier periods.



The Historical Flood Basin



-  *Freshwater emergent wetland*
-  *Wet meadow/seasonal wetland*
-  *Valley foothill riparian*

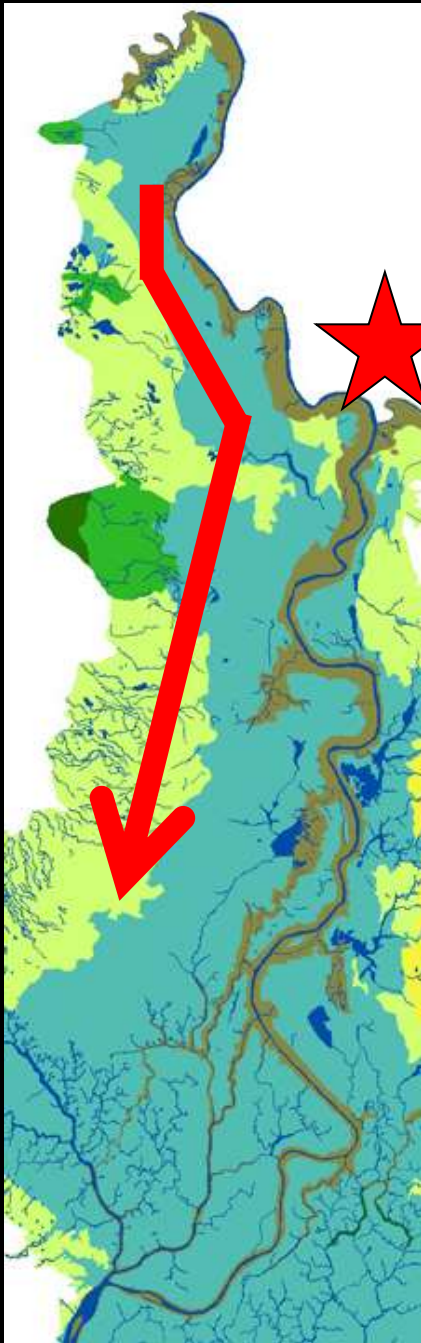
Whipple et al. 2012



K. STREET, FROM THE LEVEL.

**INUNDATION OF THE STATE CAPITOL,
City of Sacramento, 1862.**

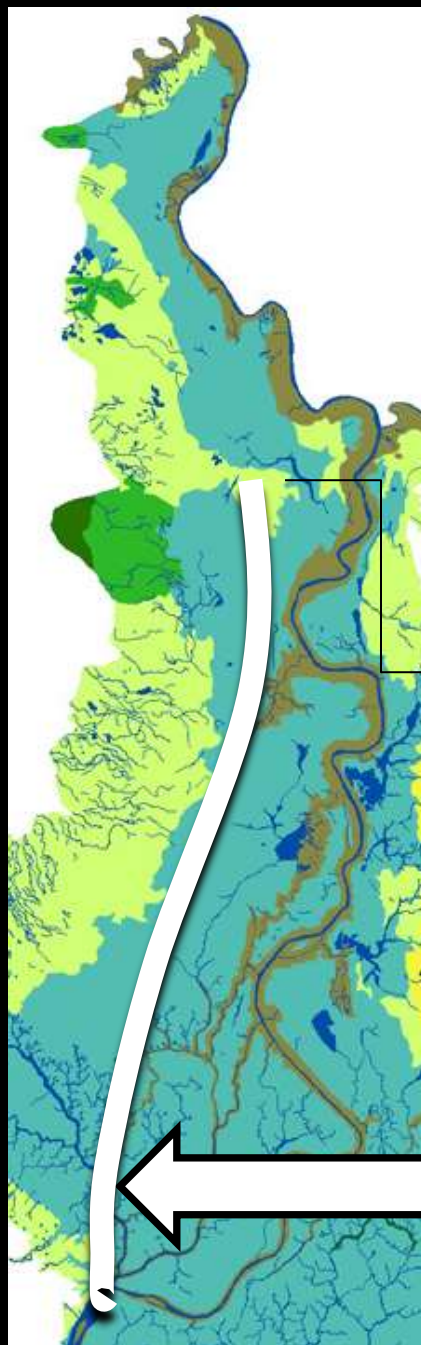
Published by A. HOWENFIELD, from Photographs.



Sacramento

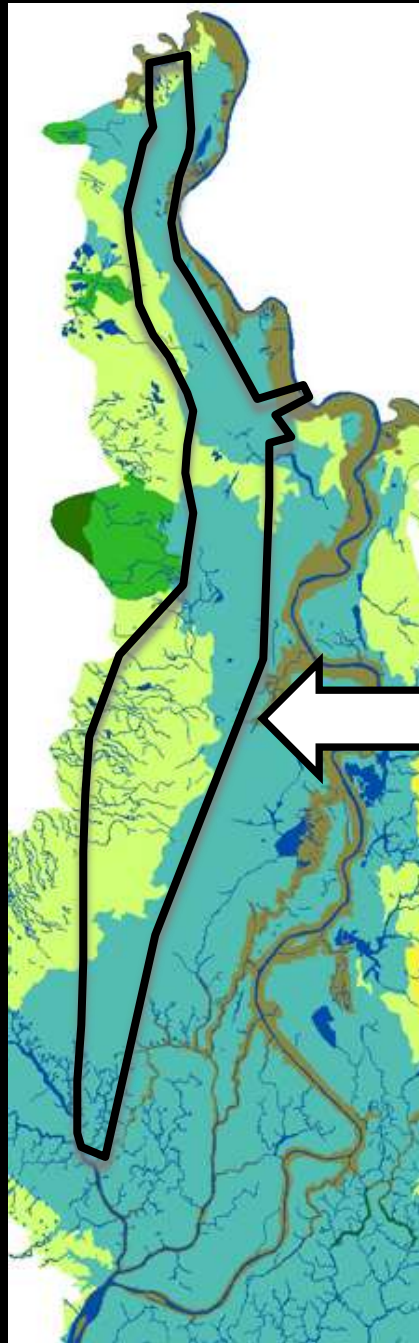
The Solution:
Guide Flood
Waters Away
From Valley
Communities

**Yolo Bypass
Features**



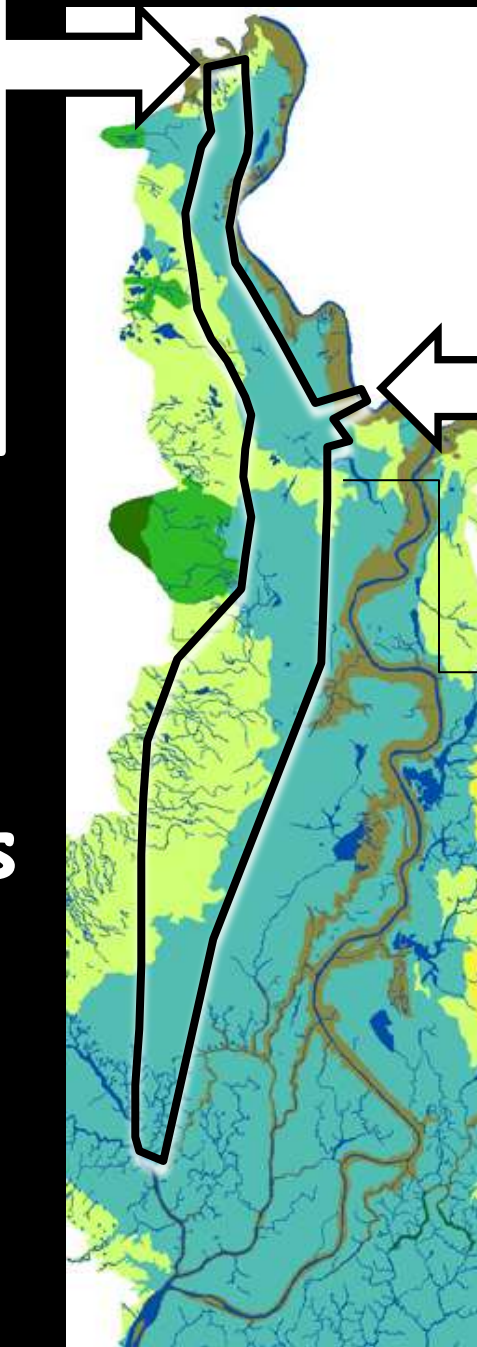
Channelization

**Yolo Bypass
Features**



Levees

Channelization



Weirs



Levees

Yolo Bypass
Features

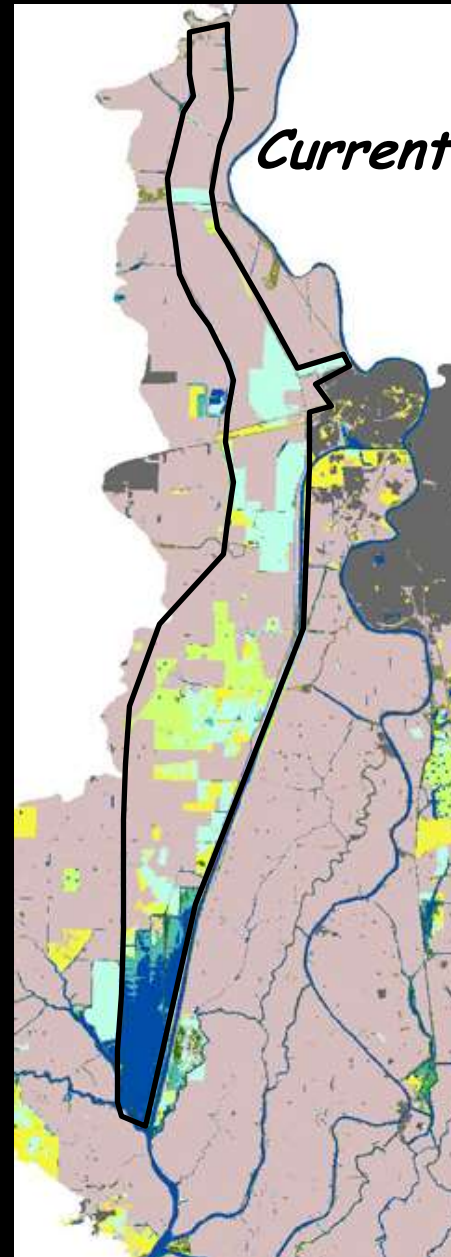
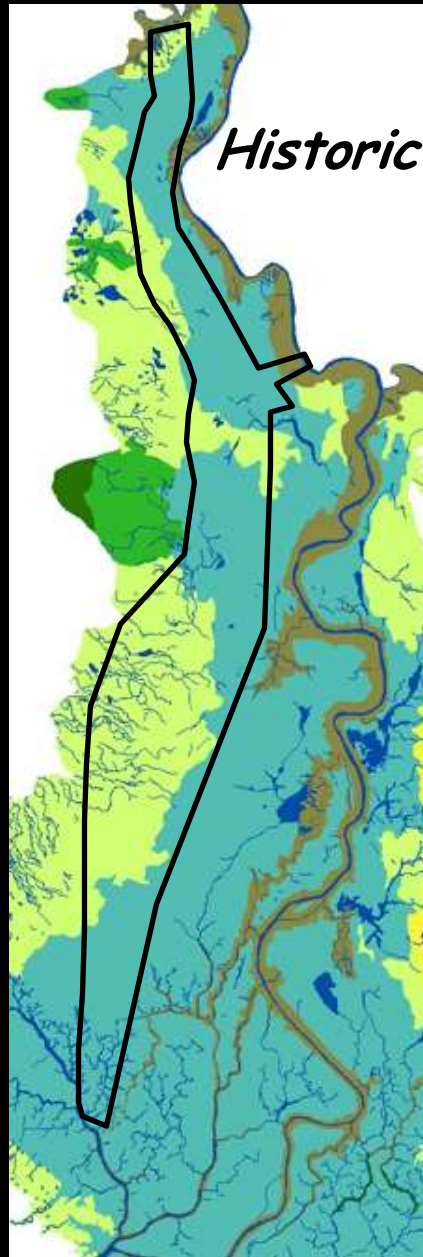
Channelization



Current Landscape



Mosaic of Habitat Types



- FW emergent wetland
- Seasonal wetland
- Riparian

- Agriculture/other
- Managed wetland
- Vernal pool complex
- Open water
- Grassland

*Adapted From
Whipple et al.
2012*

Perennial Water Sources



Tidal Channels



Ponds



Flooded Islands



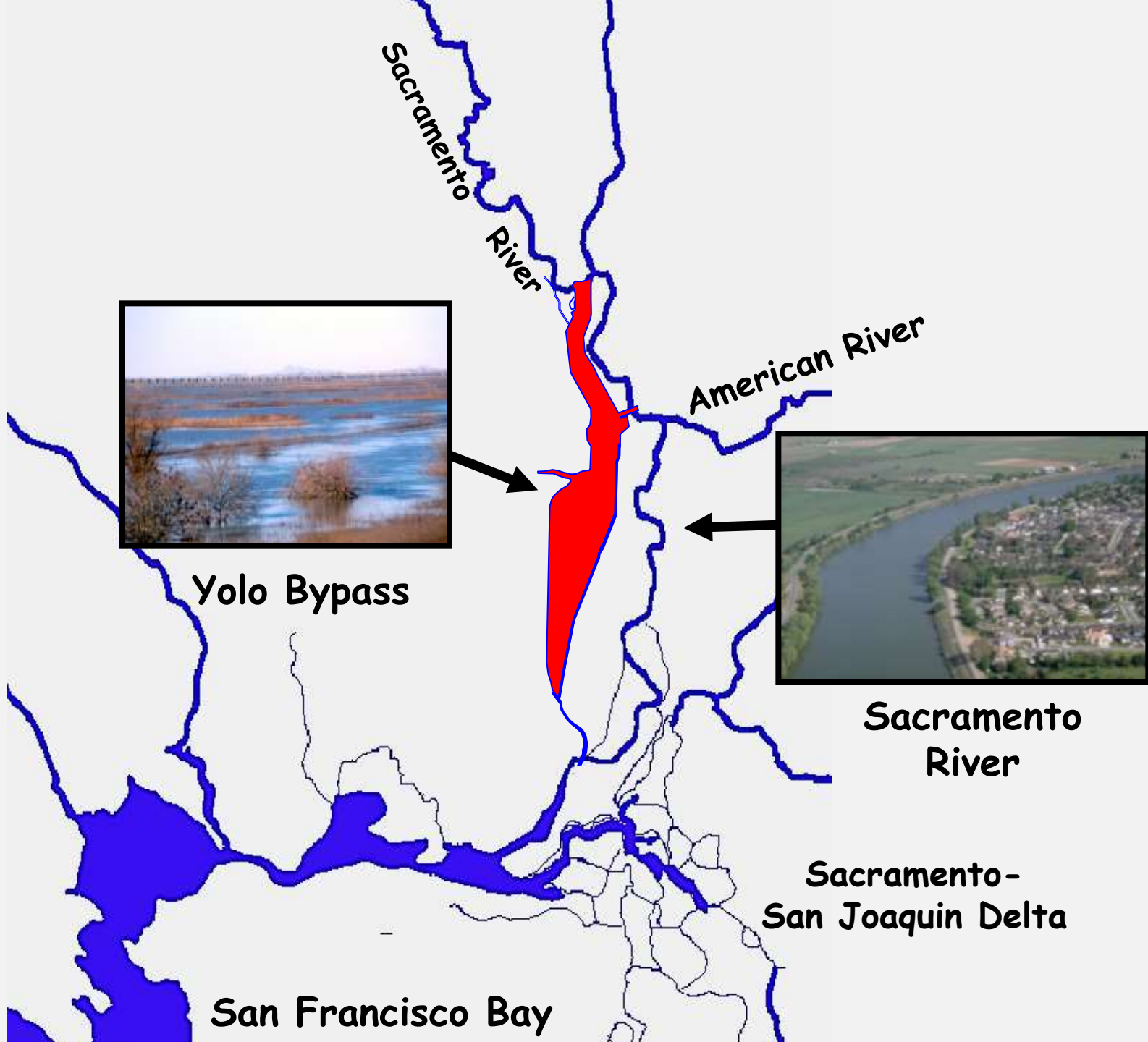
Grasslands



Managed wetlands



Vernal Pools



Sacramento River

American River



Yolo Bypass

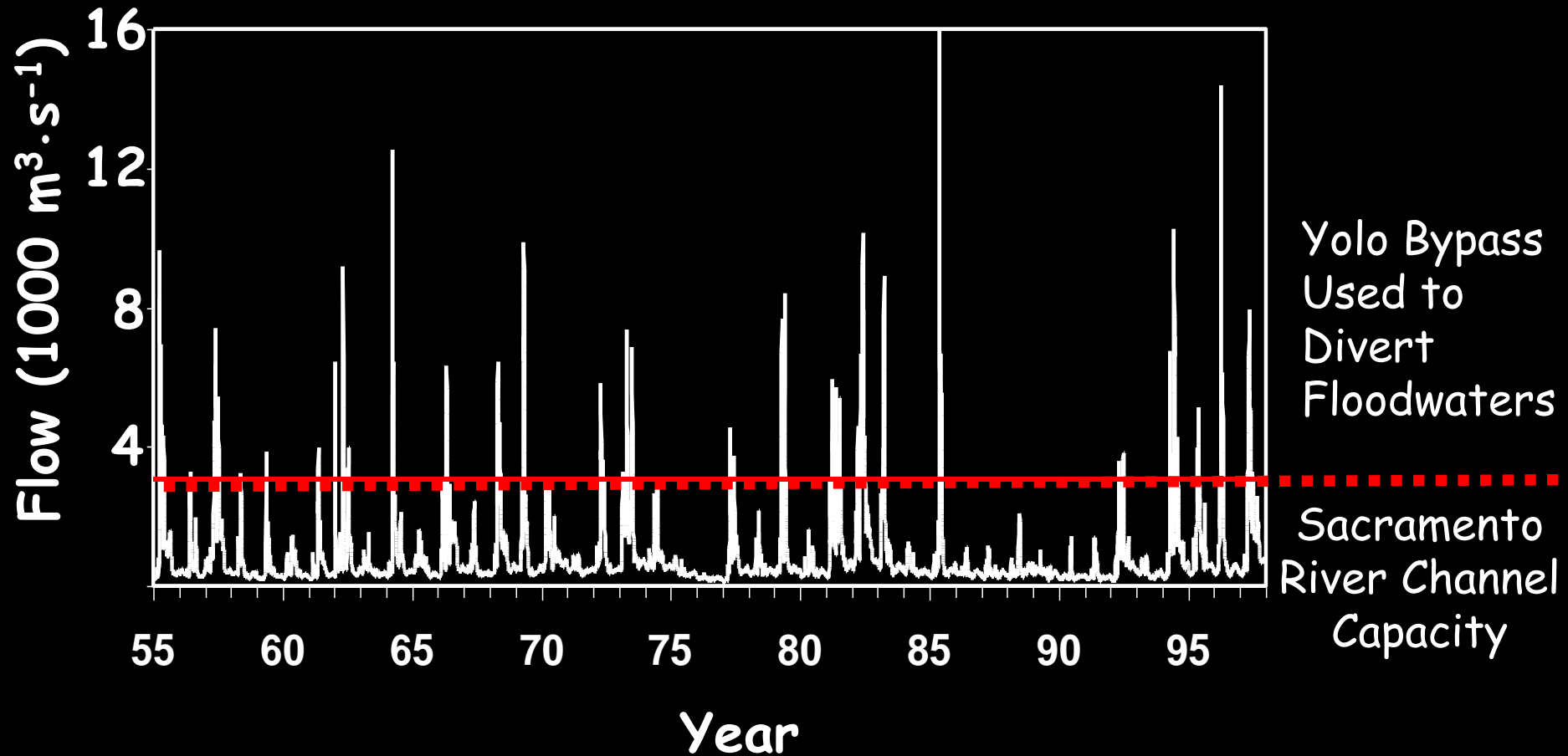


Sacramento River

Sacramento-San Joaquin Delta

San Francisco Bay

Flood Protection Benefits of Yolo Bypass



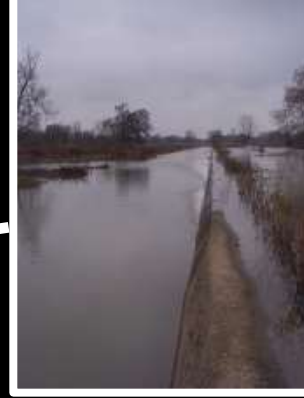
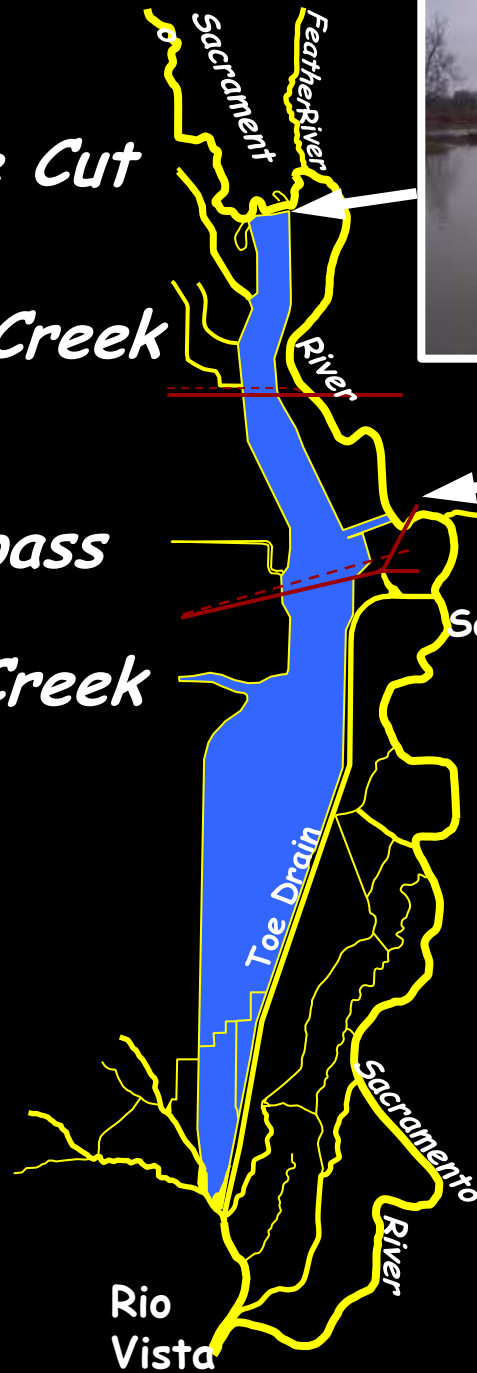
Knights Landing Ridge Cut

Cache Creek

Willow Slough Bypass

Putah Creek


*Yolo Bypass
Hydrologic
Inputs*



Fremont Weir



Sacramento Weir

An aerial photograph showing a wide river valley. The river is in the center, flanked by agricultural fields. A prominent ridge cut runs parallel to the river. The terrain is a mix of green and brown, indicating different types of vegetation and soil.

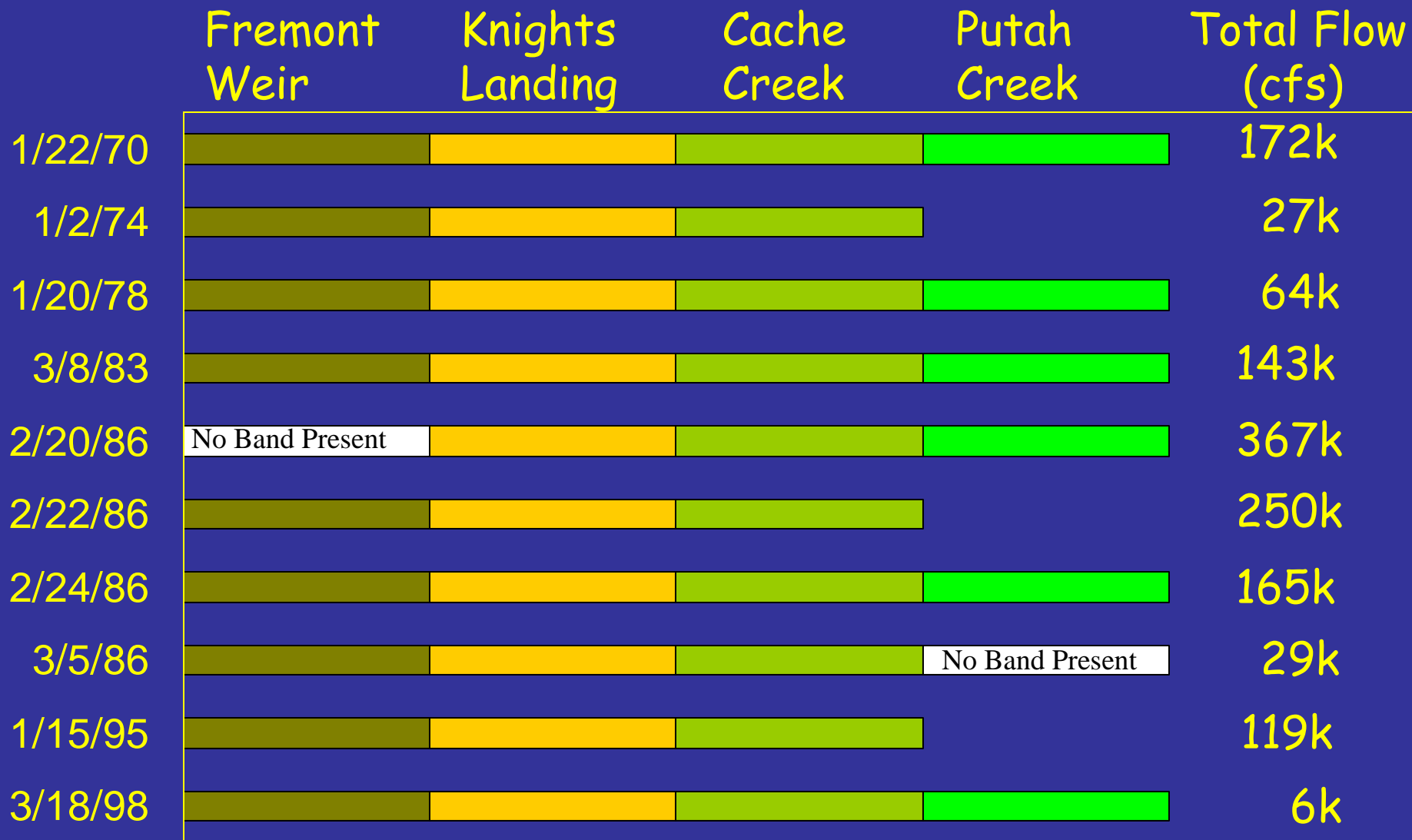
Putah Creek

Cache Creek

Knight's Landing Ridge Cut

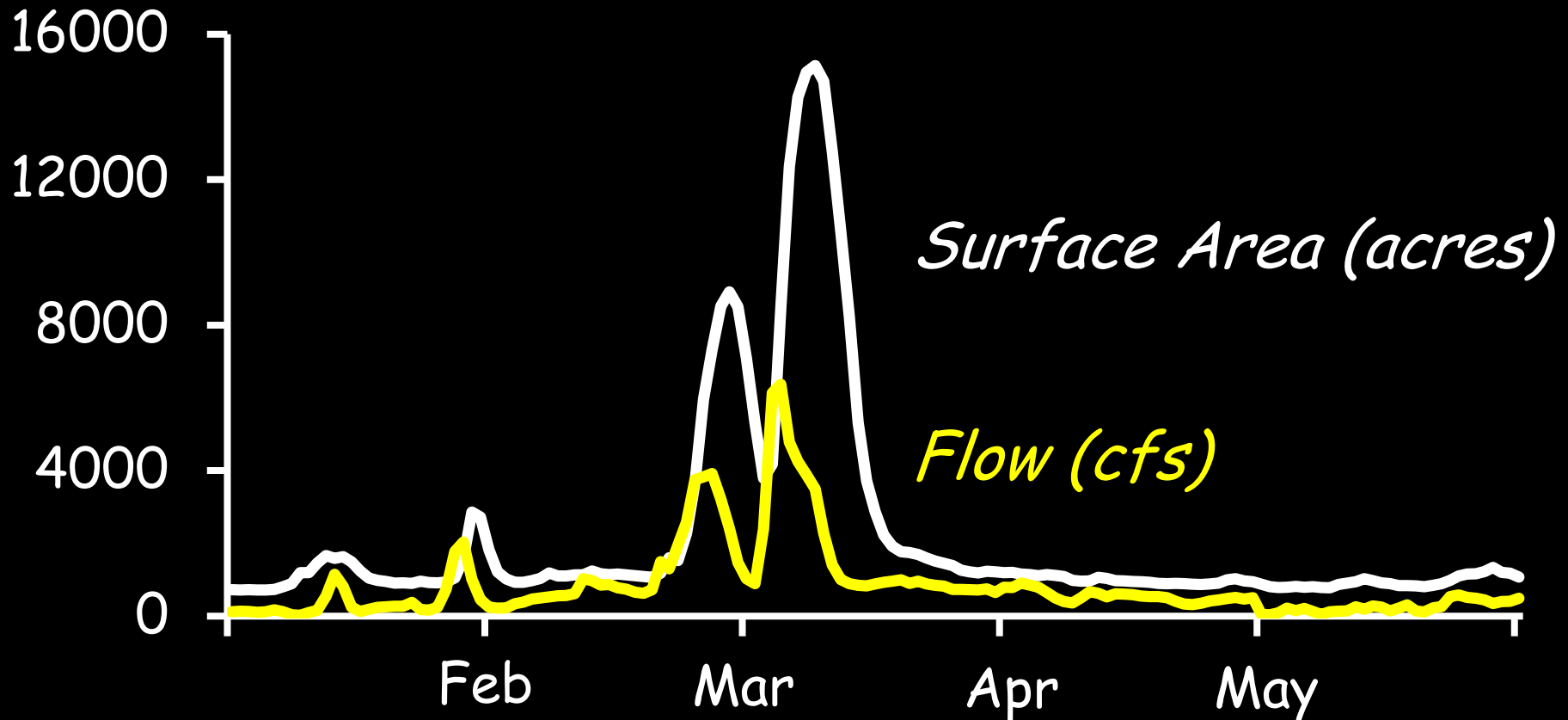
Sacramento River

Flow Bands Visible In The Yolo Bypass



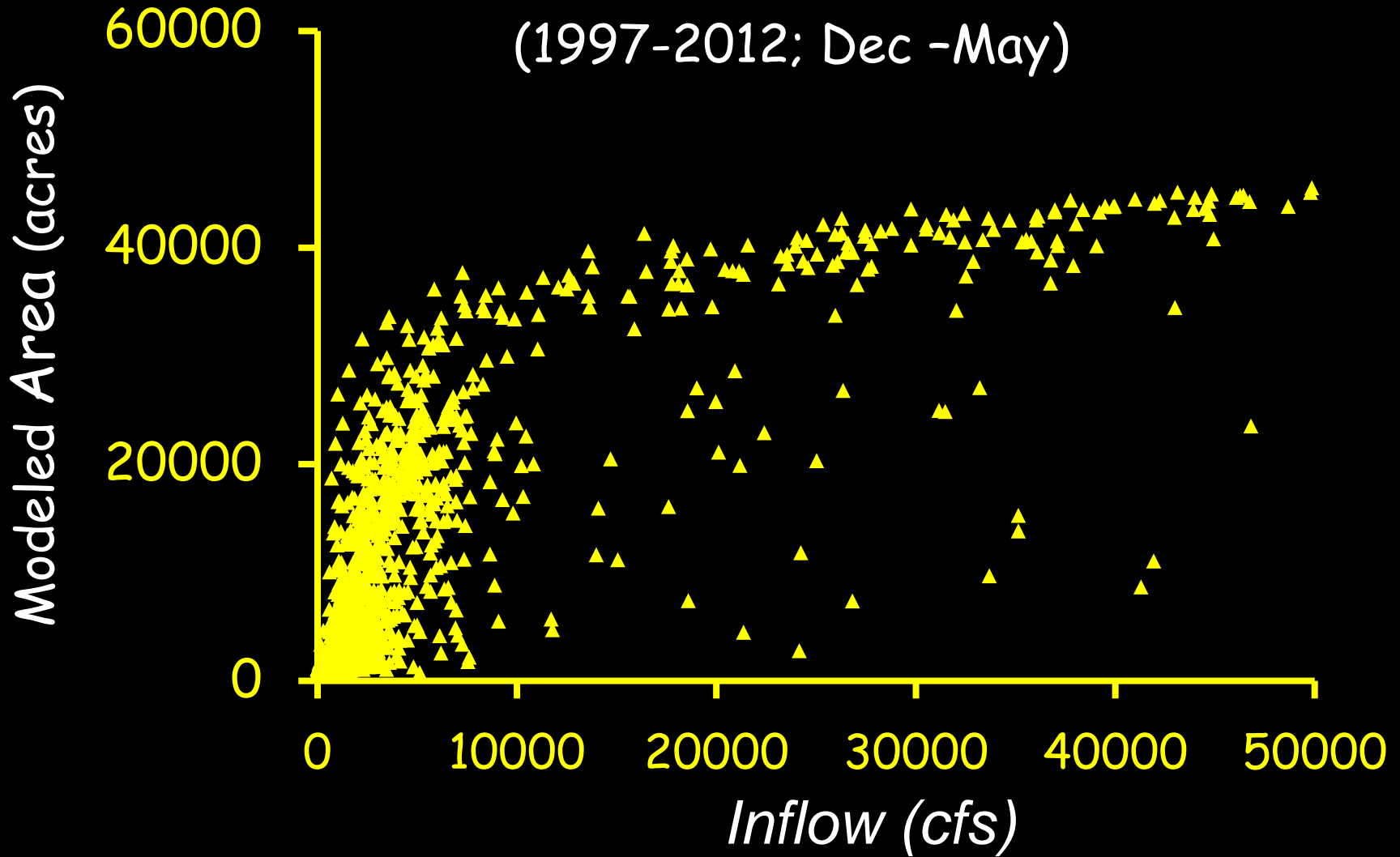
Tributaries Can Trigger Substantial Flooding

Example from 2001



Preliminary 2014 BiOP TUFLOW Hydraulic Modeling
Source: CBEC & HDR

Modest Flow = Large Scale Flooding



Preliminary 2014 BiOP TUFLOW Hydraulic Modeling
Source: CBEC & HDR

High Frequency of Inundation Flows

	Flow (cfs)	Percent of Years: 1+ Days	Percent of Years: 10+ Days
	1000	94	85
Some overbank <i>(N. Bypass)</i>	➔ 2000	89	79
	3000	83	71
Extensive overbank <i>(Much of Tule Canal & Toe Drain)</i>	➔ 4000	76	65
	5000	76	61
	6000	72	58
	10000	65	53
	20000	61	49
	30000	60	43

Source: USGS Yolo Gage (1940-2011)



Toe Drain

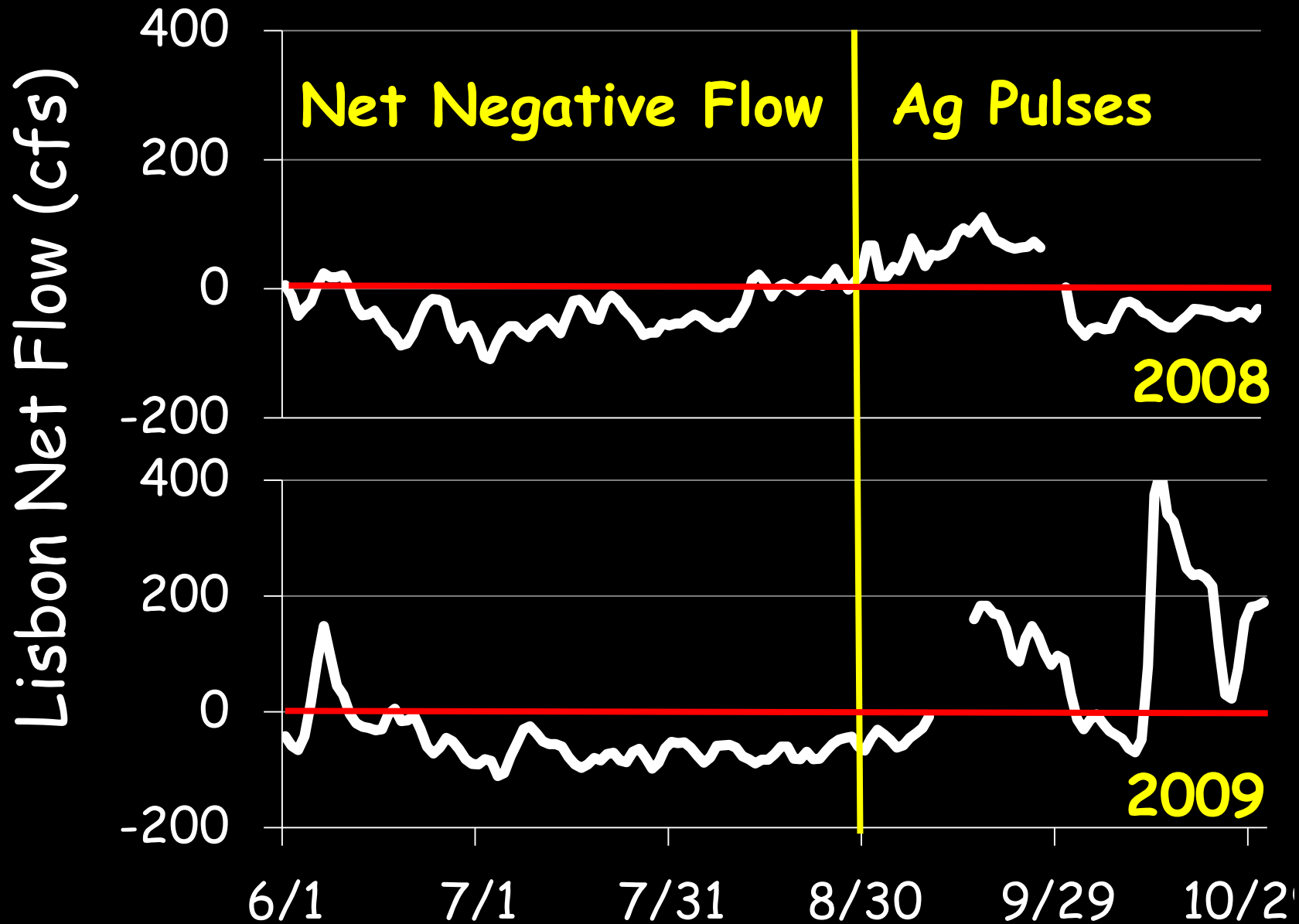


Lisbon Weir



Liberty Island

Dry Season Hydrology



Summary

- Bypass only partially built on lowlands.
- Yolo Bypass is a (mostly) passive system.
- The landscape isn't uniform.
- All tributaries are important to hydrology.
- A little bit of flow goes a long way.
- Frequent inundation.
- Tidal system during drier periods.

