Next Steps

Joe Grindstaff

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CALFED BAY-DELTA PROGRAM

Acknowledgements

- Department of Water Resources
- Department of Fish and Game
- USGS
- Mike Dettinger
- Ray Seed
- Metropolitan Water District of Southern California
- Other Implementing Agencies

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Why are we here?

- Stage 1 of the 30 year CALFED Program will be completed 12/07
- We agreed in the ROD to assess progress, make decisions and move forward

CALFED BAY-DELTA PROGRAM

Today's Presentation will Discuss:

- Importance of the Delta
- End of Stage 1 assessment and decision process
- Future conditions and how they may influence Stage 2 implementation
- Program assessment – by objective

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Importance of the Delta

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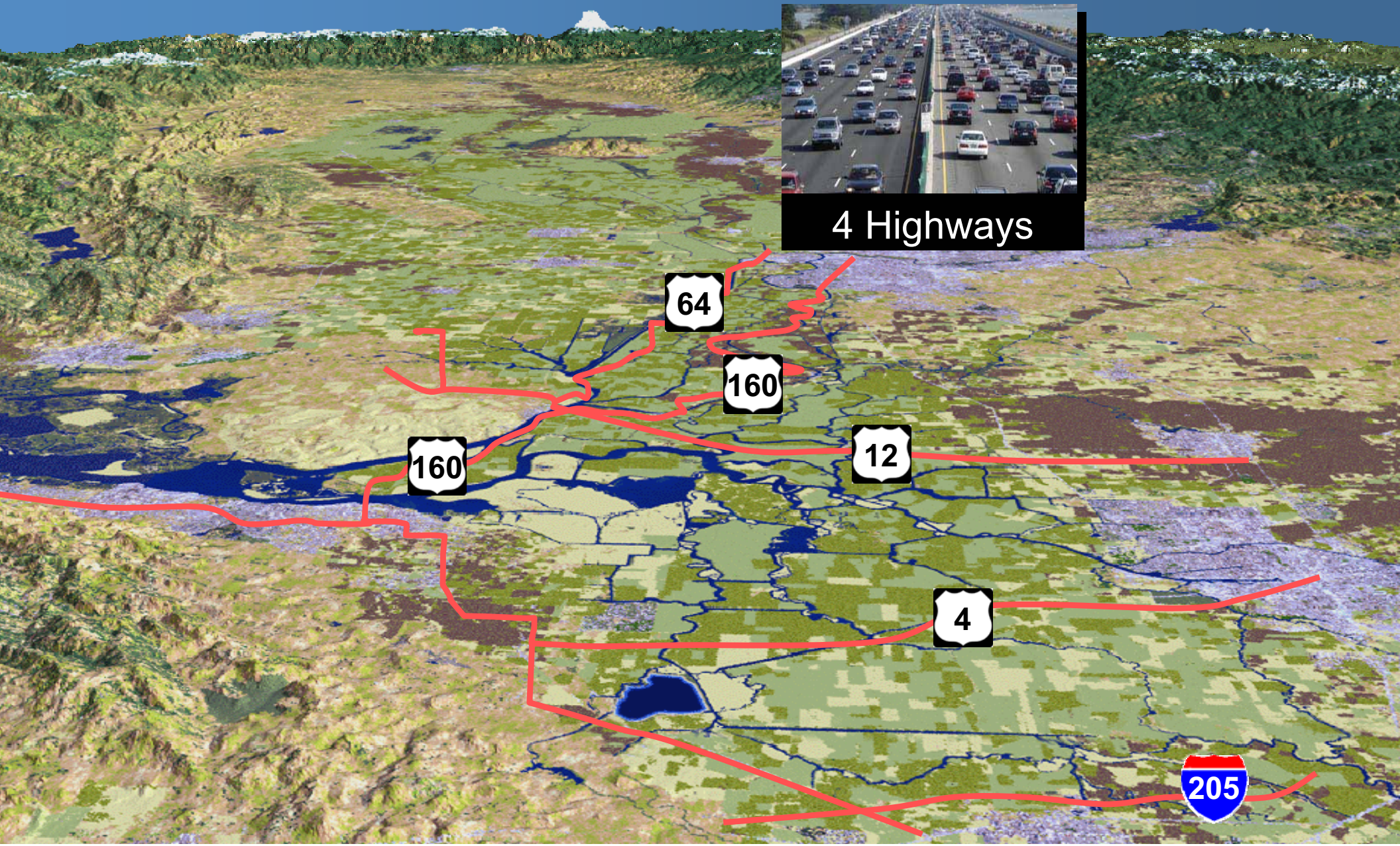
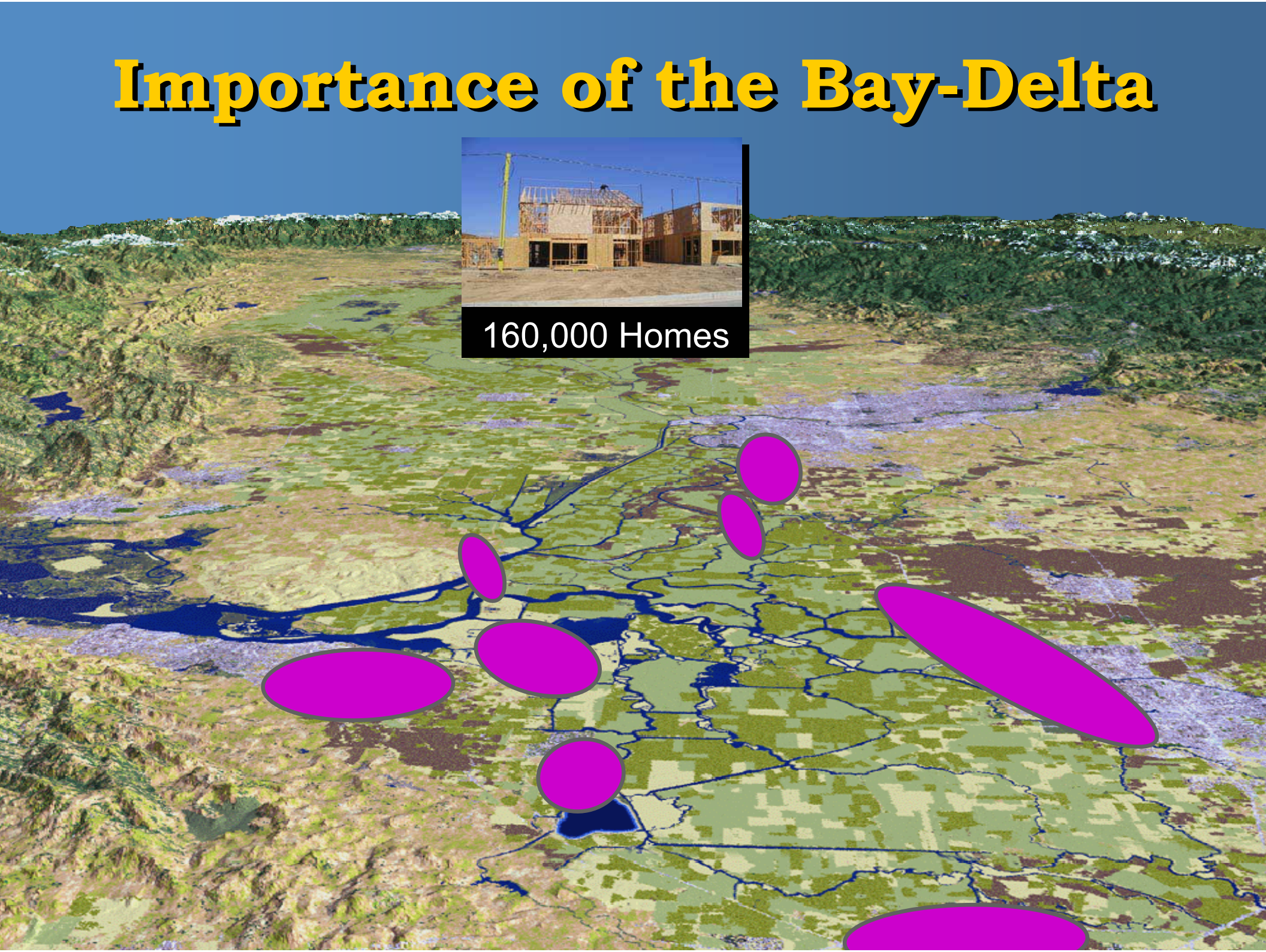
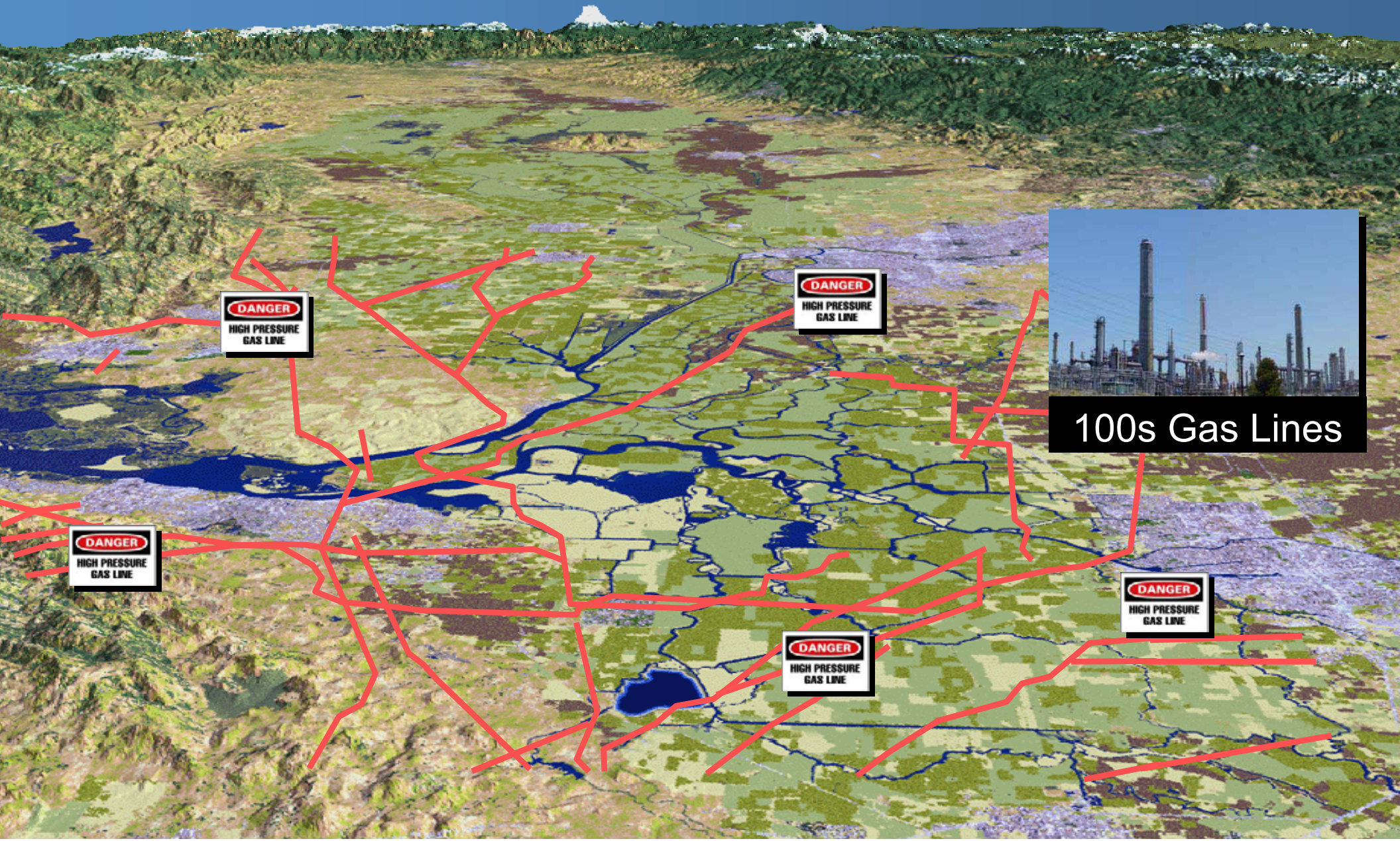
Importance of the Bay-Delta



Importance of the Bay-Delta



Importance of the Bay-Delta



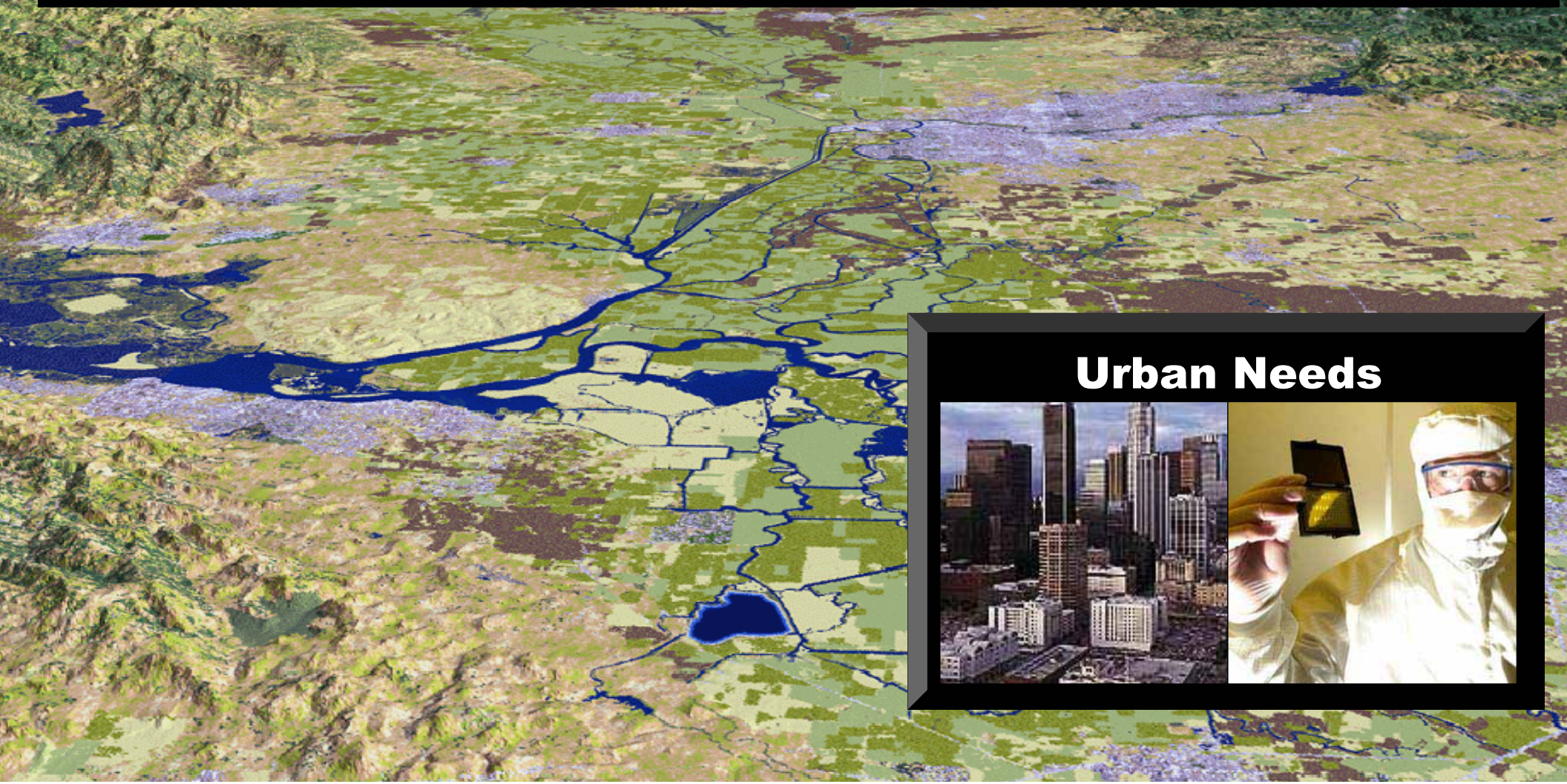
Importance of the Bay-Delta

- 80% of the state's commercial salmon fishery is dependent on the Bay-Delta system
- Habitat for 700 native species

Importance of the Bay-Delta

Importance of the Bay-Delta

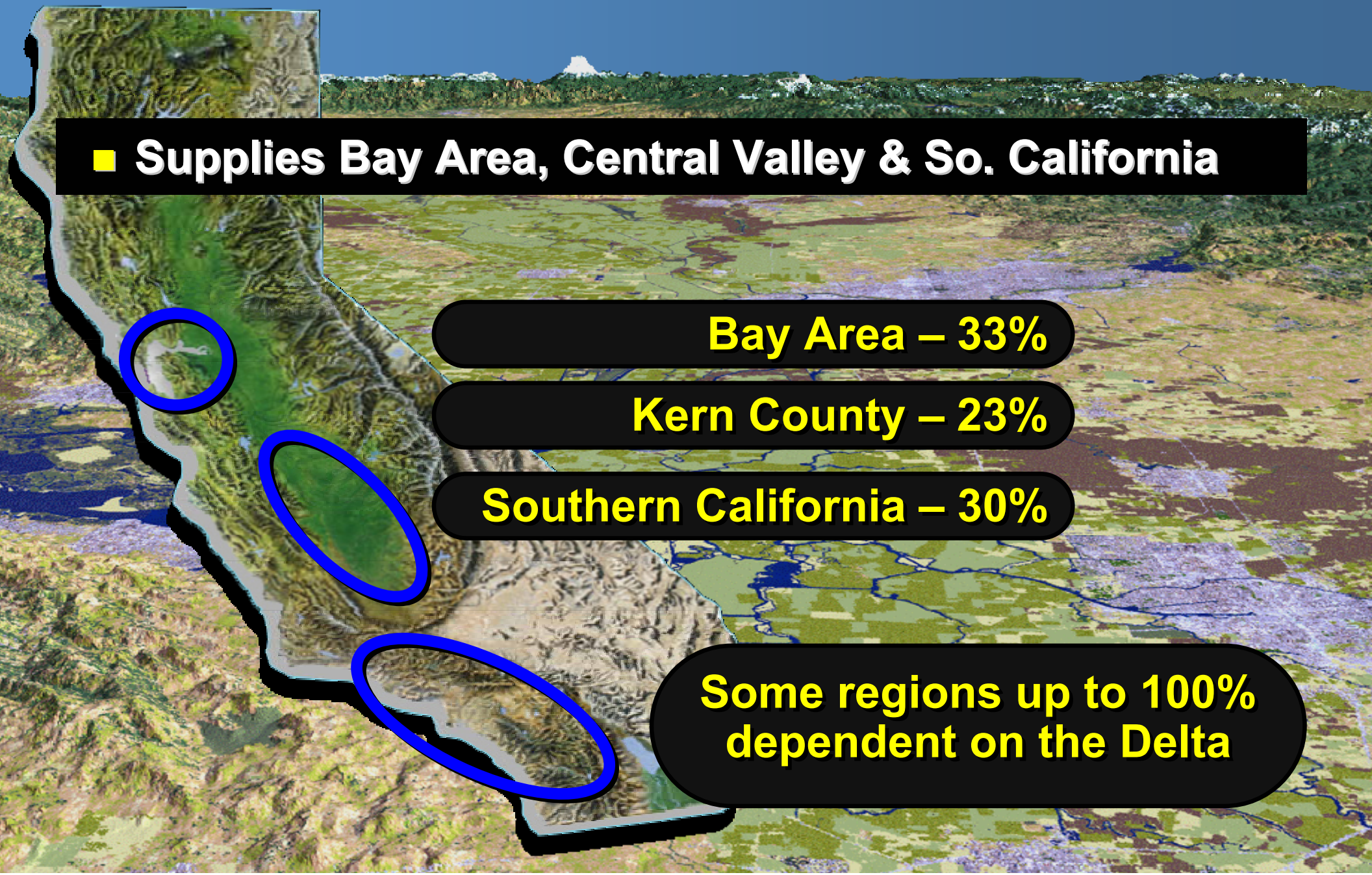
- 2/3 of California (24 million residents) rely on Delta water



Urban Needs

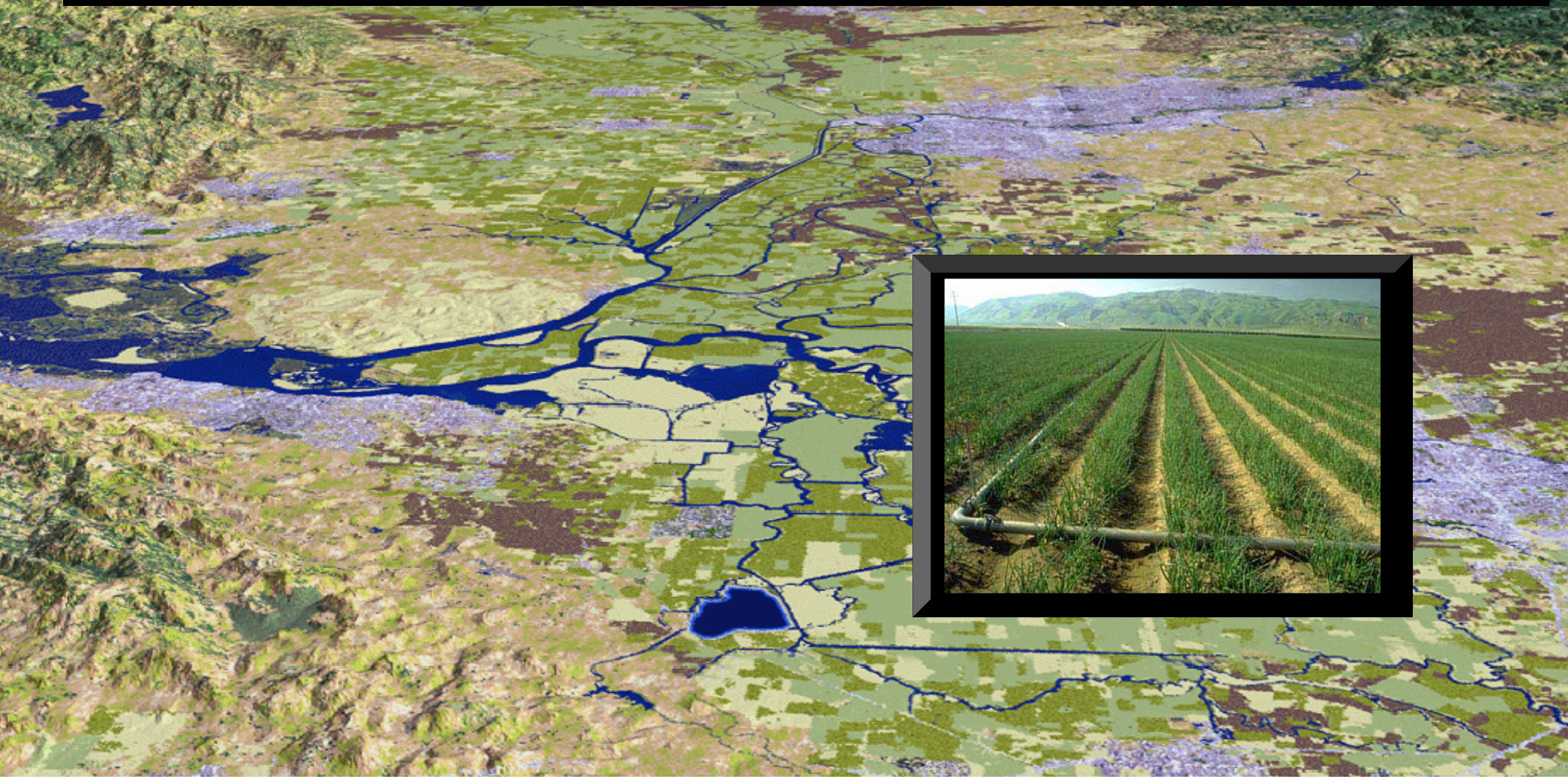
Importance of the Bay-Delta

- Supplies Bay Area, Central Valley & So. California

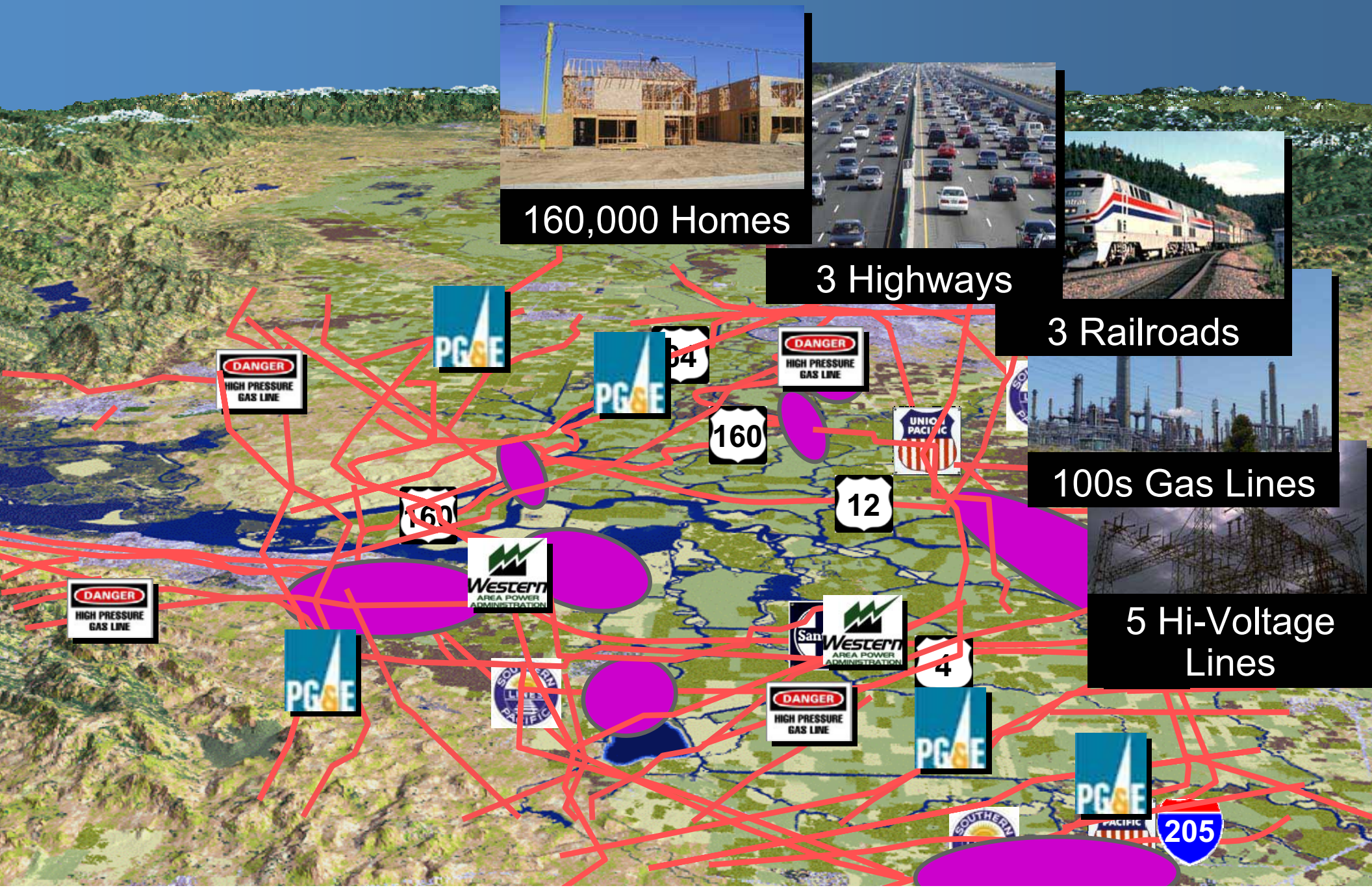


Importance of the Bay-Delta

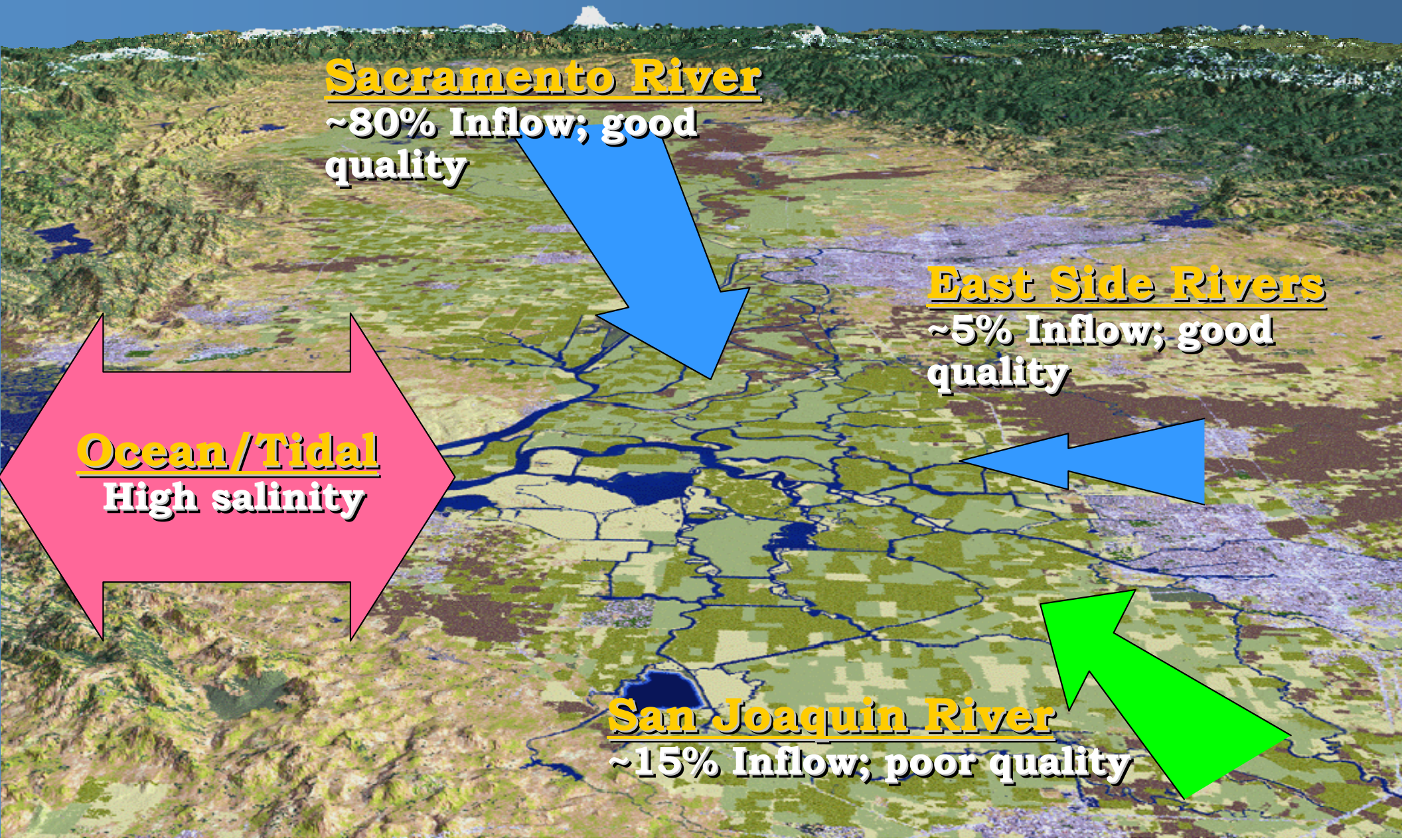
- Irrigates 45% of the fruits & vegetables produced in US



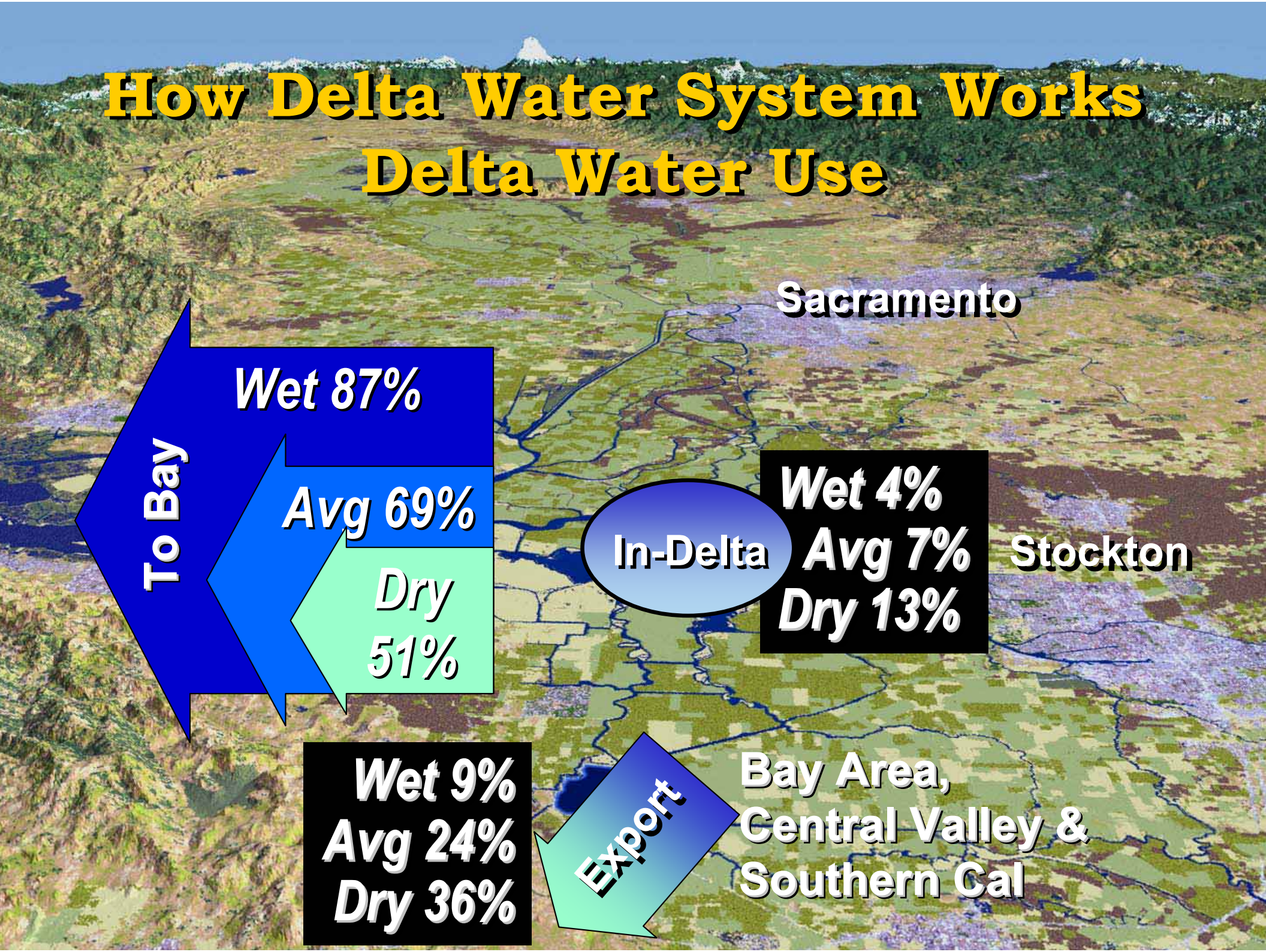
Importance of the Bay-Delta



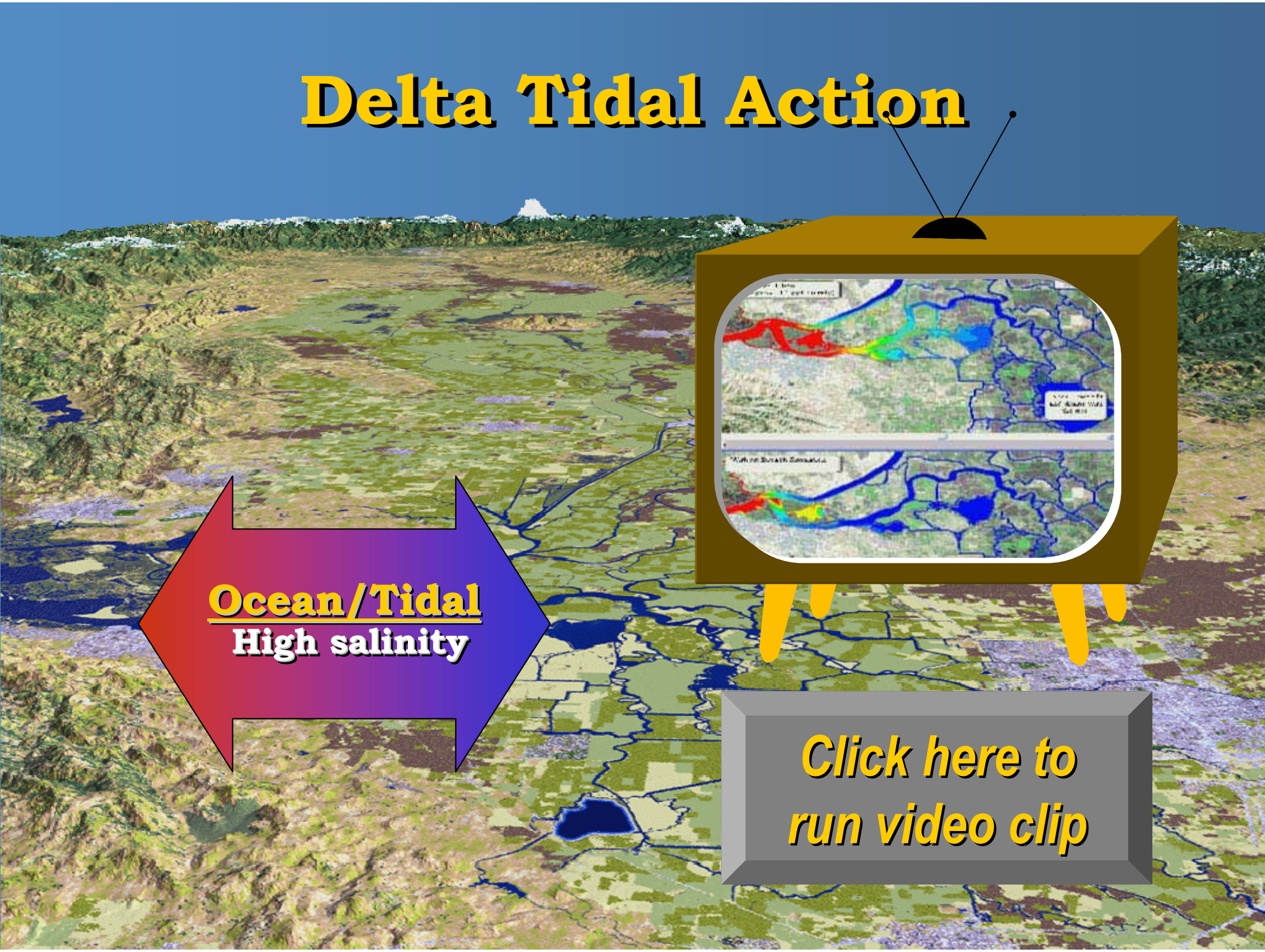
How Delta Water System Works
Delta Inflow



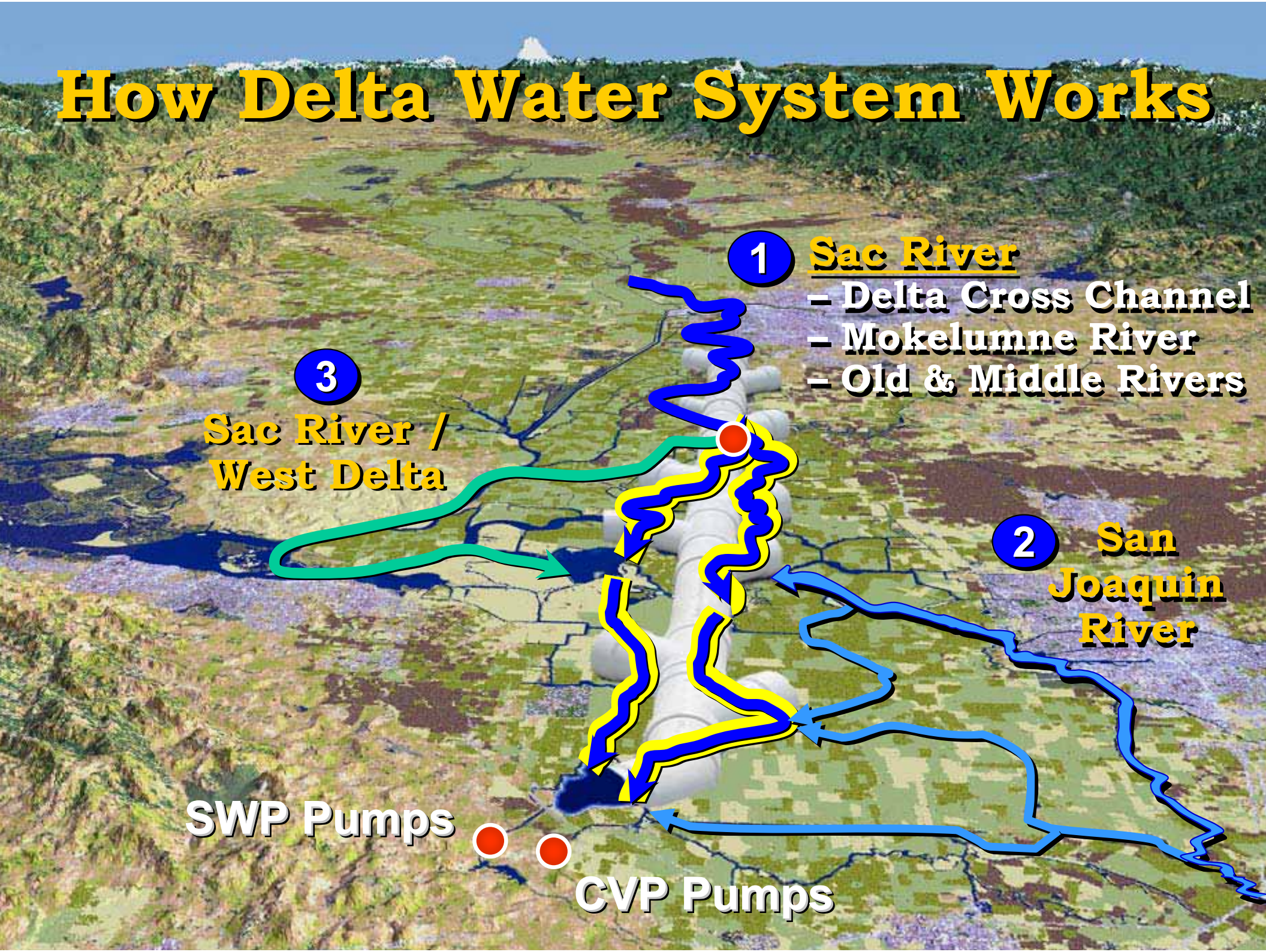
How Delta Water System Works
Delta Water Use



Delta Tidal Action



How Delta Water System Works



Importance of the Delta

- The Delta represents unique ecological resources
- The quality of life of all Californians is linked to the Delta
- We have an opportunity to make the Delta an even MORE special place

End of Stage 1 Decisions and Stage 2 Planning

The Assessment and Decision Process

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CALFED Record of Decision

- Anticipated challenges and decisions
- Divided the 30 year CALFED Program into Stages
- Established review and decision points consistent with adaptive management – End of Stage 1
- Recognized that through Delta conveyance might not work and called for reconsideration at the end of Stage 1

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CALFED Record of Decision Process for Considering Alternative Conveyance

"The Preferred Program Alternative includes a process for determining the conditions under which any future additional conveyance facilities or water management actions would be taken. The process would include:

- An evaluation of how water suppliers can best provide a level of public health protection equivalent to Delta source water quality of 50 parts per billion (ppb) bromide and 3 parts per million (ppm) total organic carbon.
- An evaluation based on two independent expert panels' reports -- one on the Program's progress toward these measurable water quality goals and the second on CALFED's progress toward ecosystem restoration objectives, with particular emphasis on fisheries recovery."

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Language from the ROD on Conveyance

- "The dual-Delta conveyance approach with an isolated facility appeared to provide greater technical performance than the other alternatives."
- "Some of the preliminary scientific and engineering evidence suggests that a dual-Delta conveyance configuration may improve export water quality and achieve fish recovery most effectively."
- "Relative to the Preferred Program Alternative, Alternative 3 would improve export water quality and improve Delta flow patterns for fish migration, including reduced incidence of reverse flow and entrainment in the south Delta pumps."
- "If the Program purposes cannot be fully achieved with the actions proposed in the Preferred Program Alternative, additional actions including an isolated conveyance facility will need to be considered in the future."

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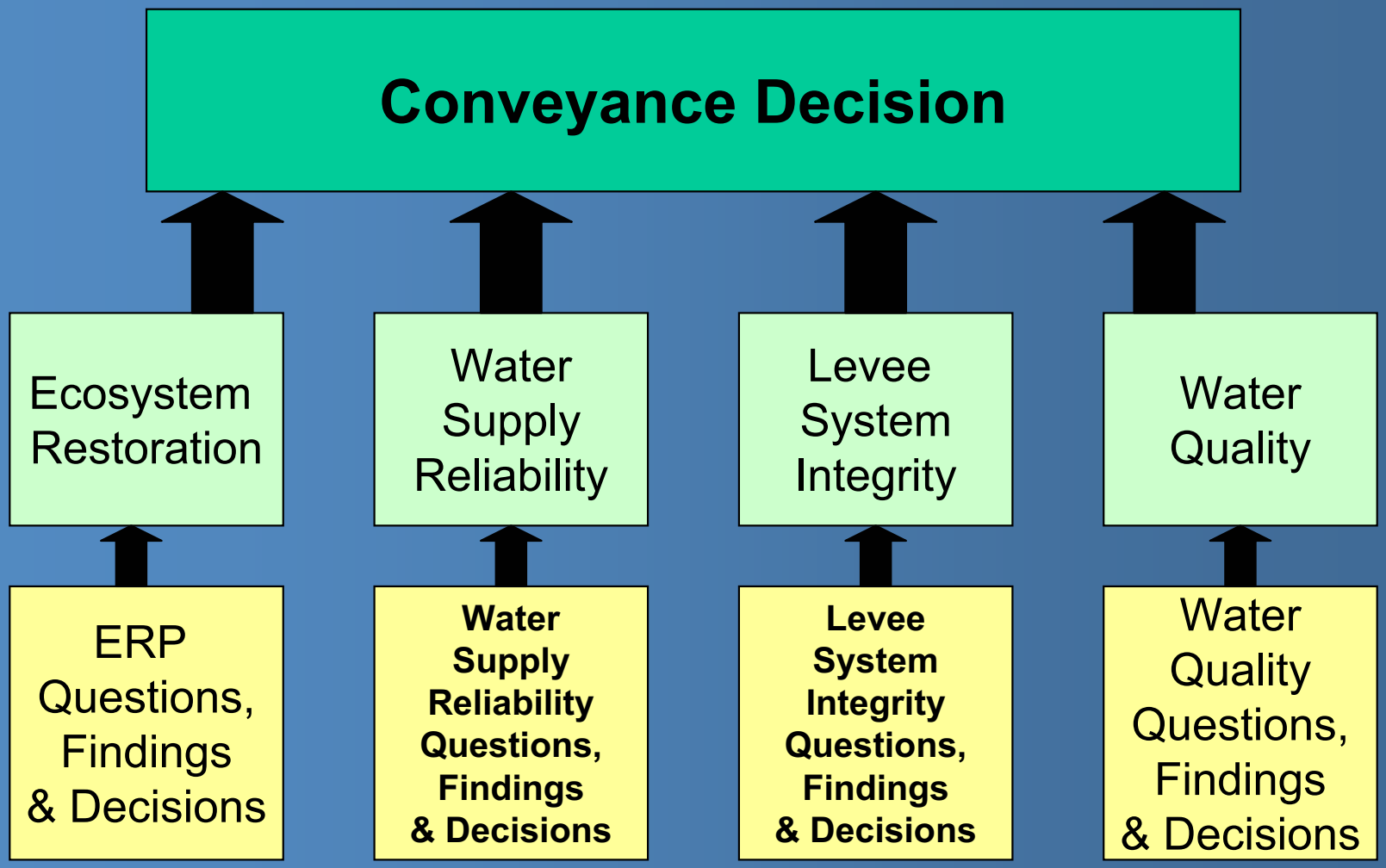
CALFED Conveyance Decision



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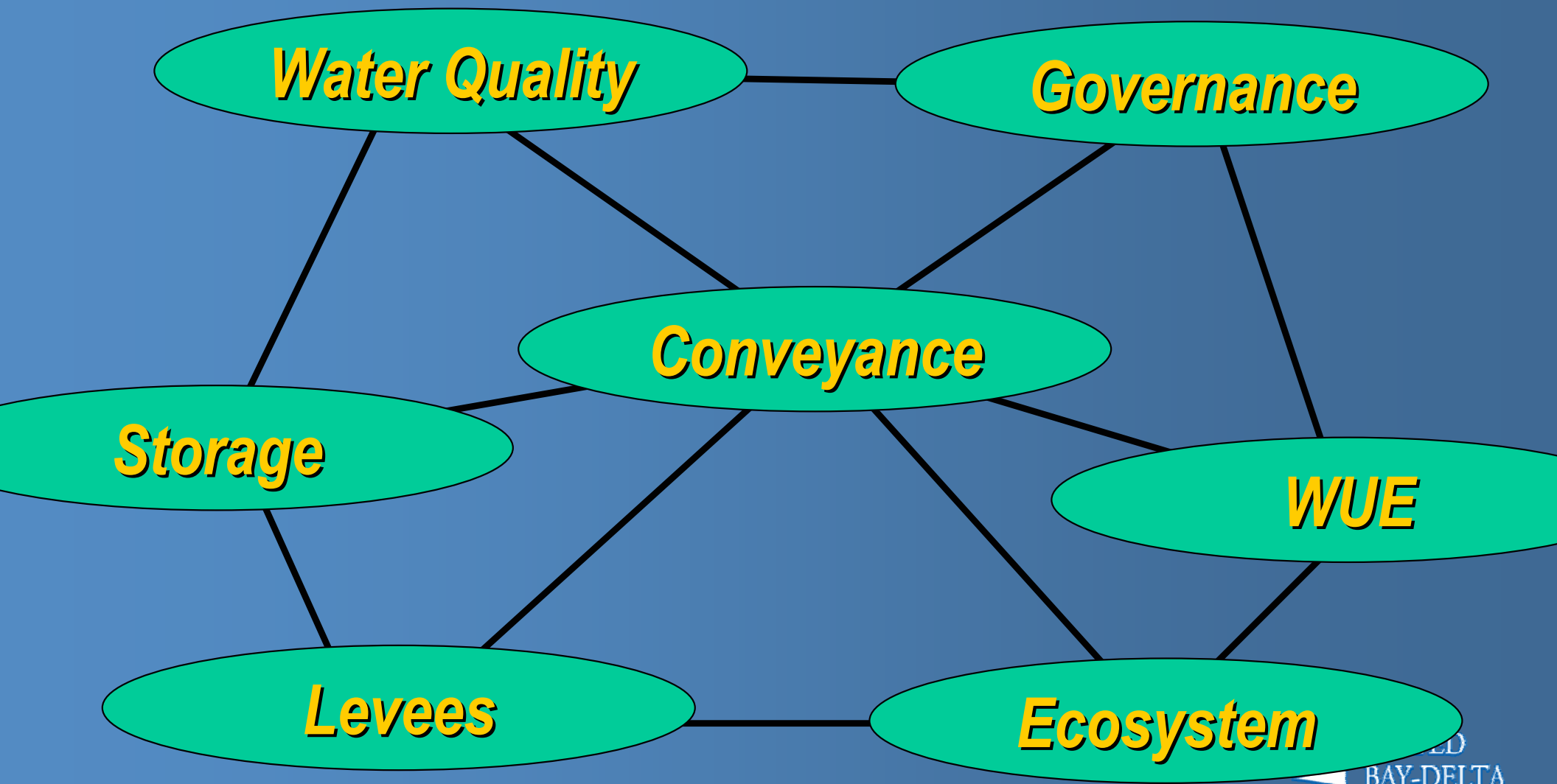
Decisions are Interrelated



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Decisions are Interrelated

This is a complex system that requires system-wide approaches:

- *Water Management*
- *Ecosystem Restoration*

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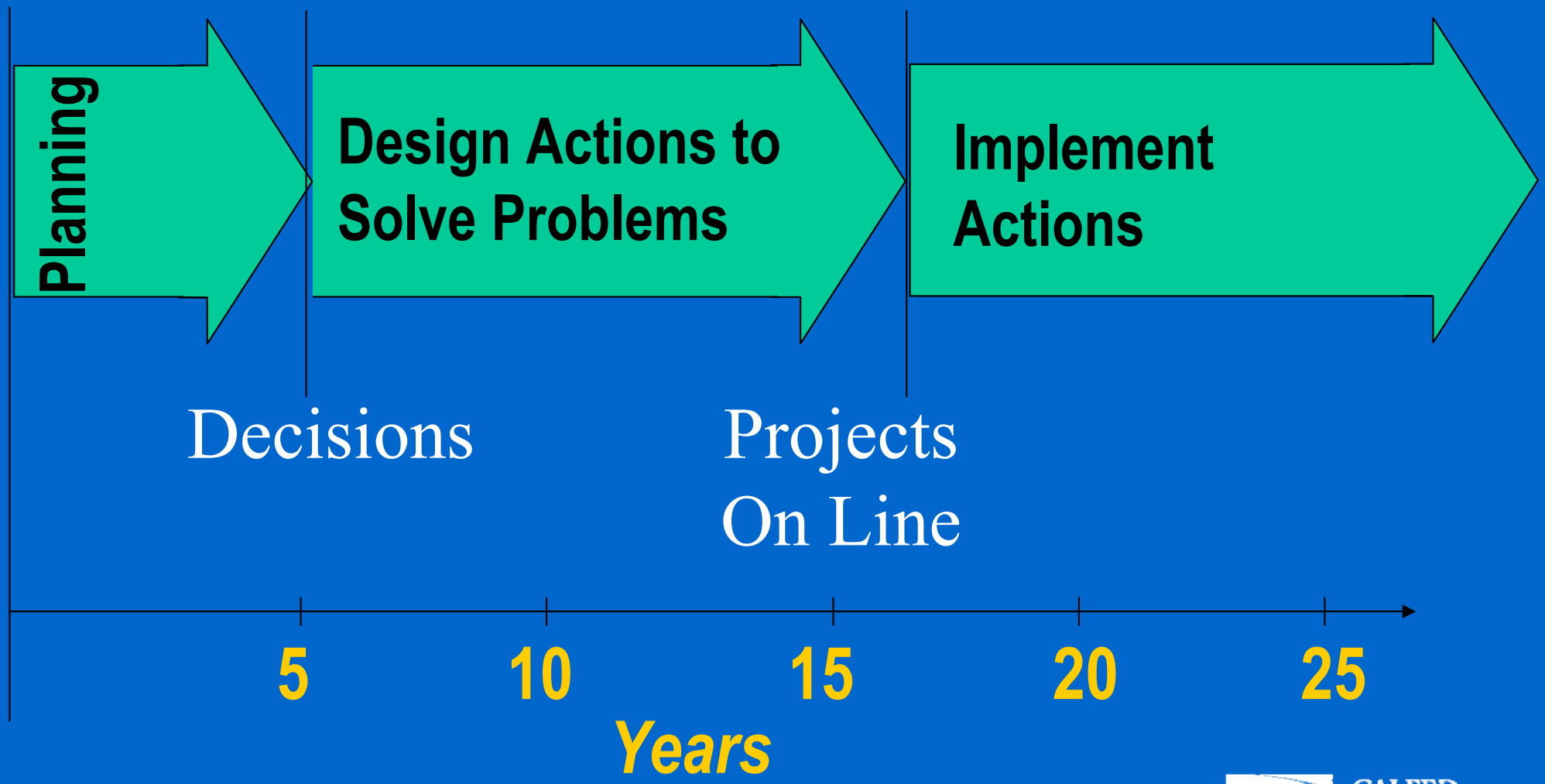
Delayed Decisions Lead to Delayed Solutions



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Approach to Decision-Making

- Decisions will be made using the best information available at the time
- We can't delay decisions while waiting for "perfect" data

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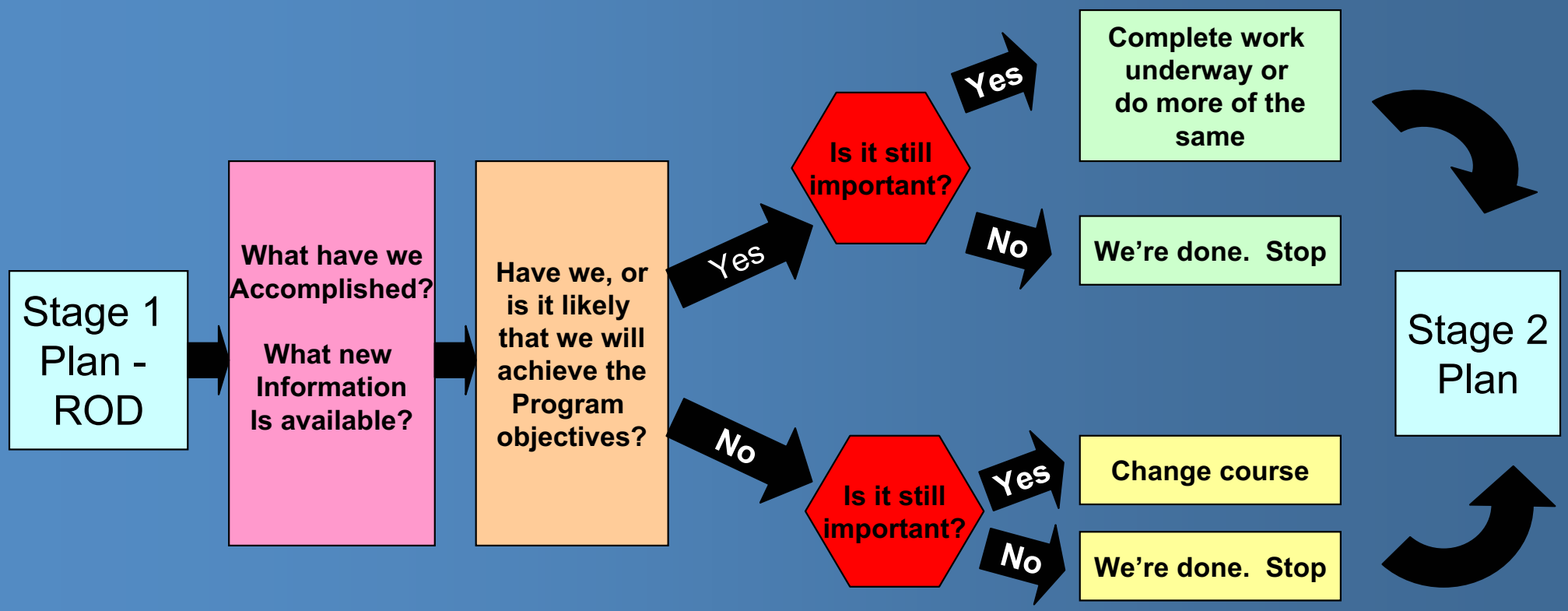
CALFED End of Stage 1 Assessment and Stage 2 Planning



Accomplishments → Information → Questions → Decisions

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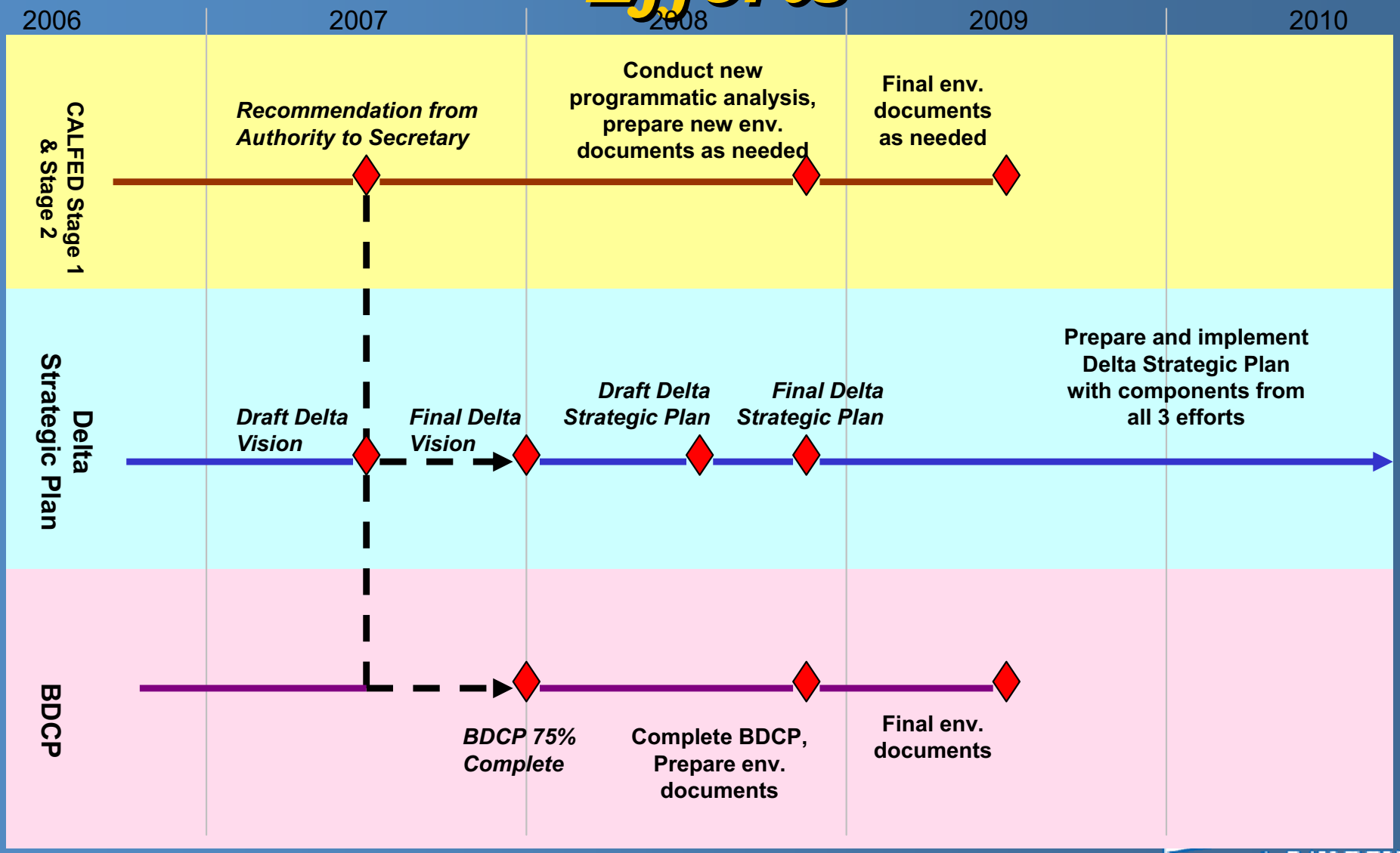
Integration of 3 Major Delta Efforts



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Potential Future Conditions can and will Affect Future Actions

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Climate Change Uncertainty

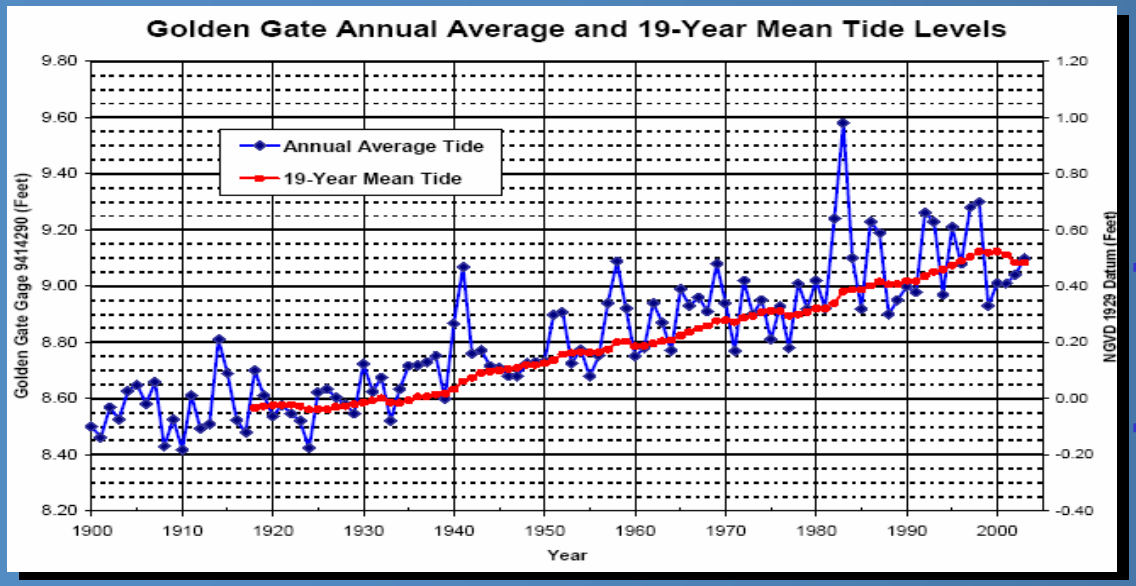
By 2100

+ 1.4 – 5.8 ºC degrees

By 2050

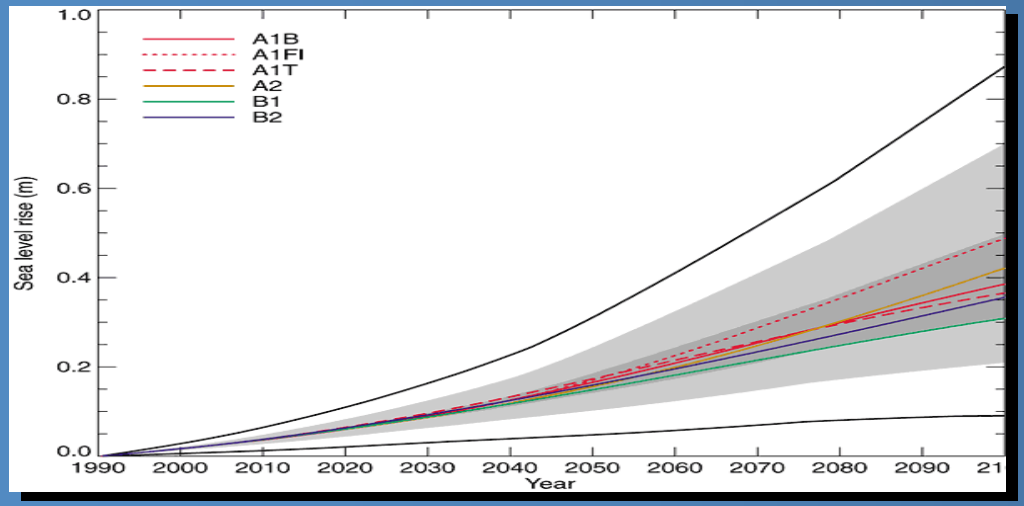
1/3 loss of snowpack

Climate Change Uncertainty



Past (1900 – 2000)

+ ½ ft sea level rise



Future (2000 – 2100)

½ to 3 ft sea level rise

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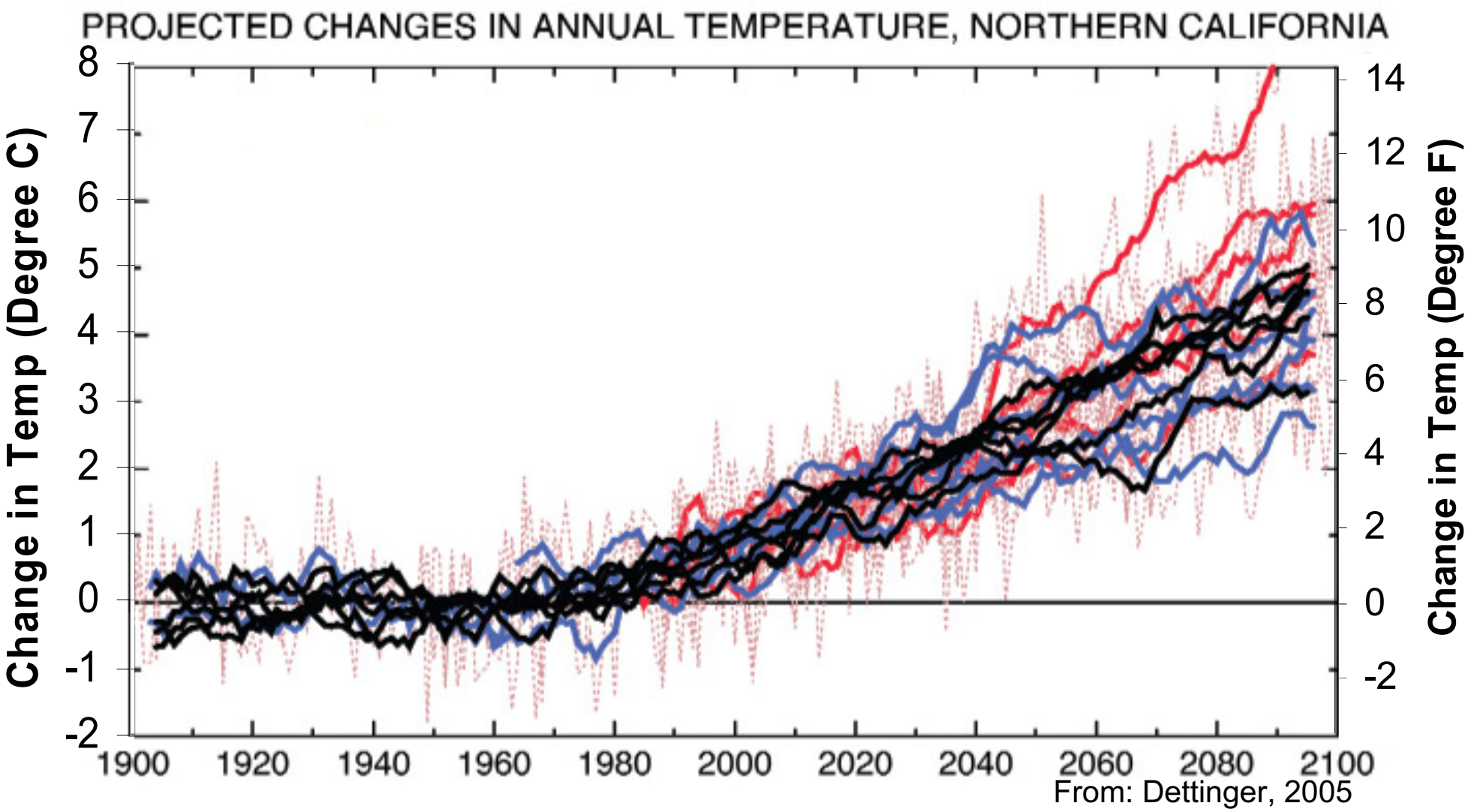
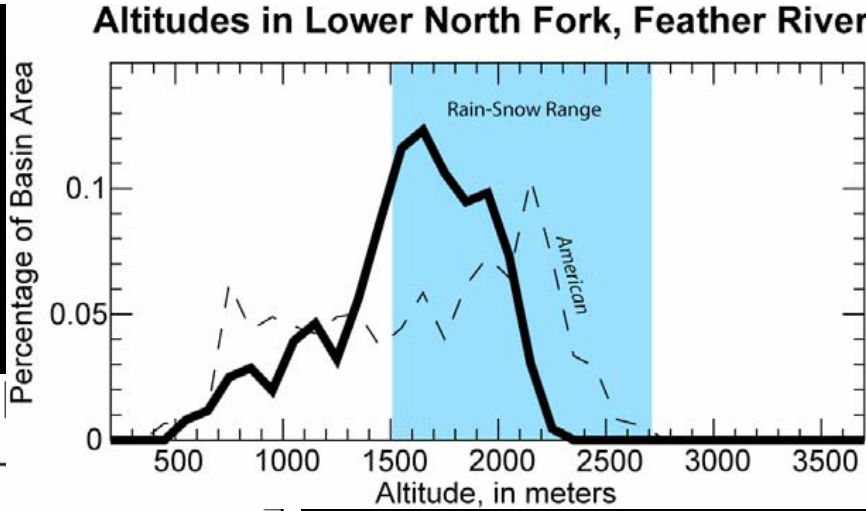
Climate Change Uncertainty - Rising Temperatures -

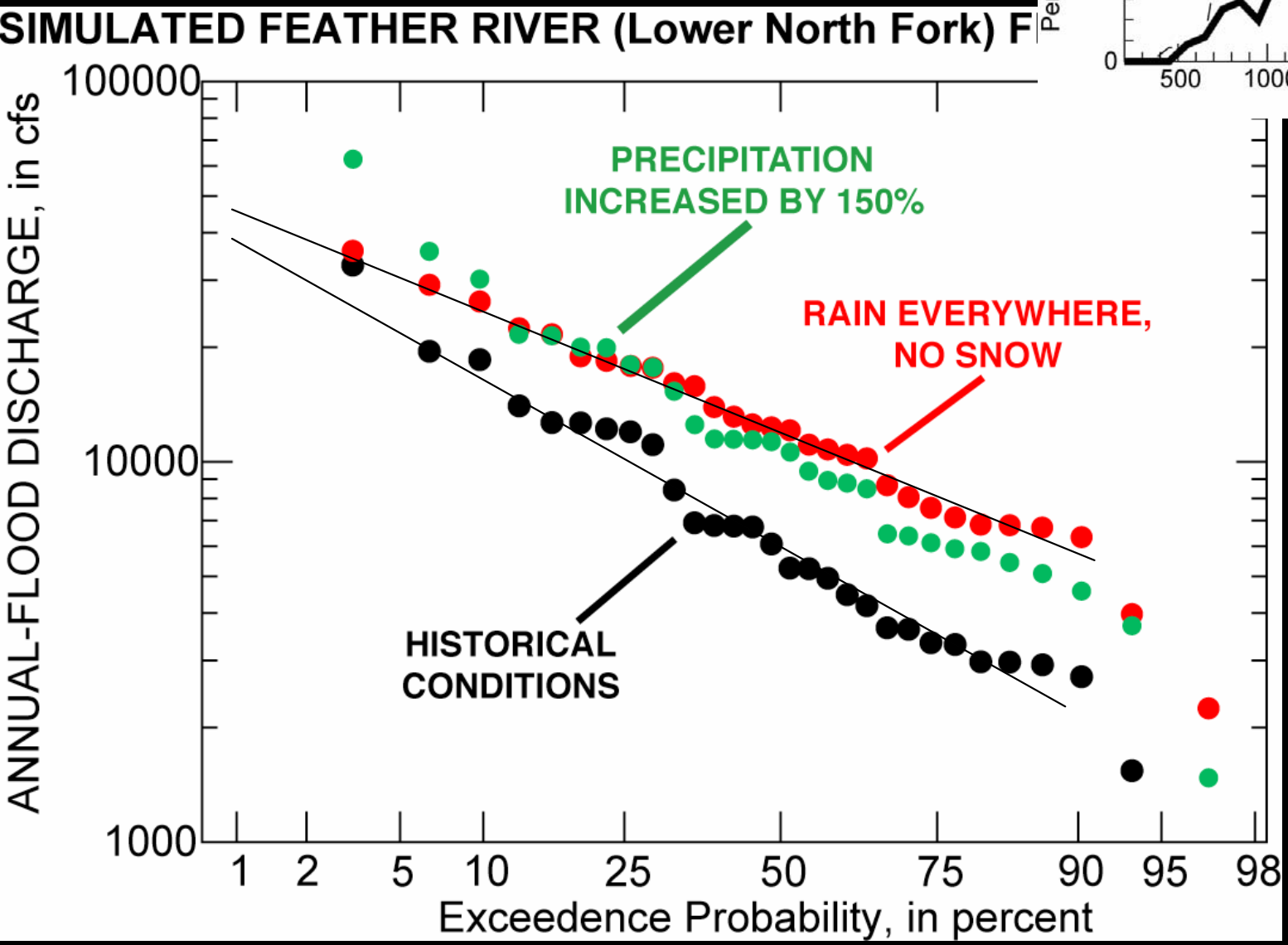
Projections



From: Dettinger, 2005

Making ALL precipitation = rain in PRMS simulation model of Lower North Fk Feather River (abv Oroville)





Concentration of altitudes in historical snow-rain transition range yields notable max-flood changes with snow-rain change:

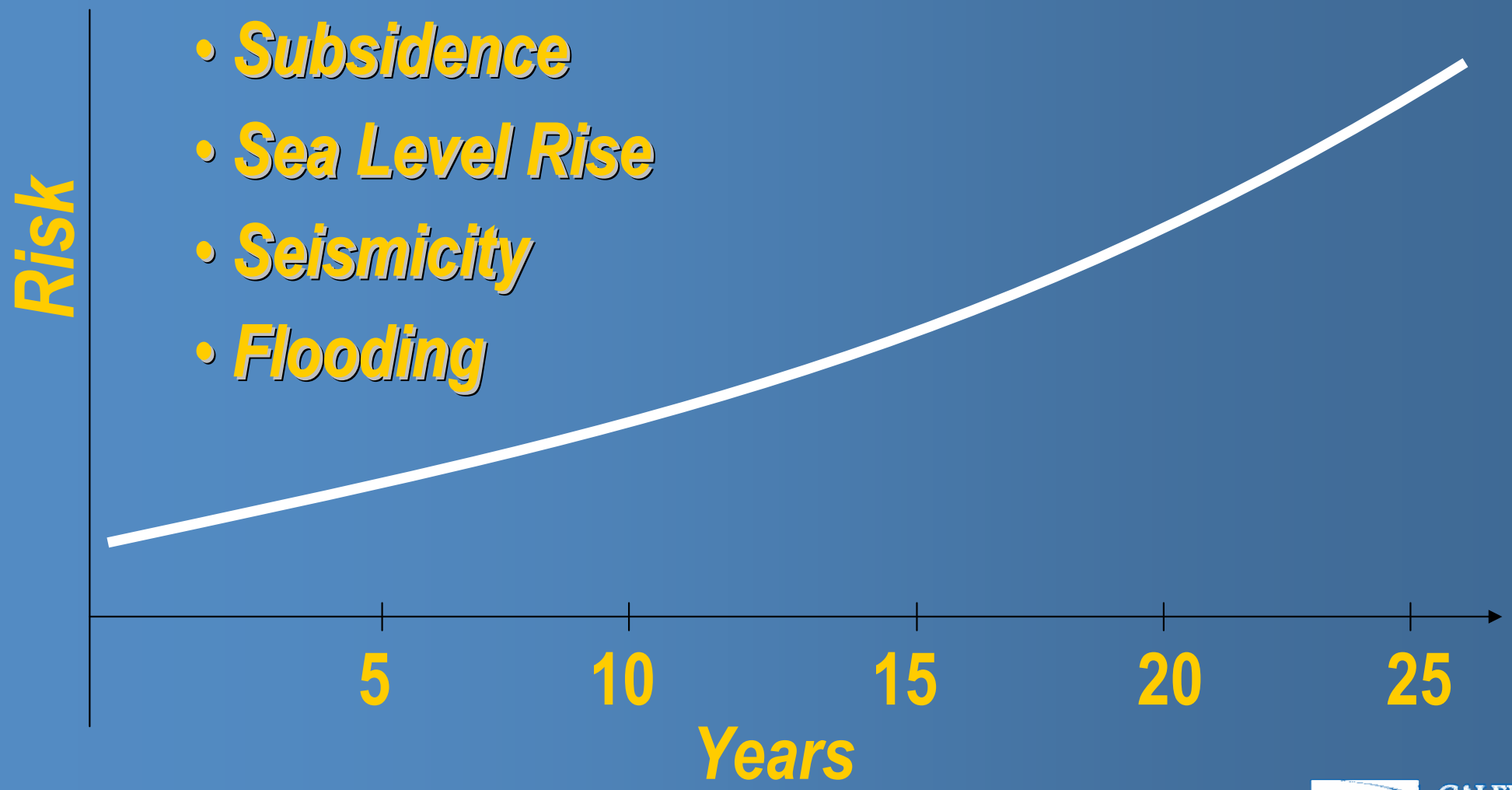
8-yr flood --> 2-yr

(Model described by Koczot et al, 2005, USGS SRIR 2004-5202)

Climate Change will Reduce California's Snow Pack

- 14 MAF ~ Average annual Central Valley snow pack
- DWR projects that a temperature rise of 3 degree Celsius rise in temperatures will reduce this storage by 4 to 5 MAF

Delayed Solutions Can Lead to Catastrophic Failure



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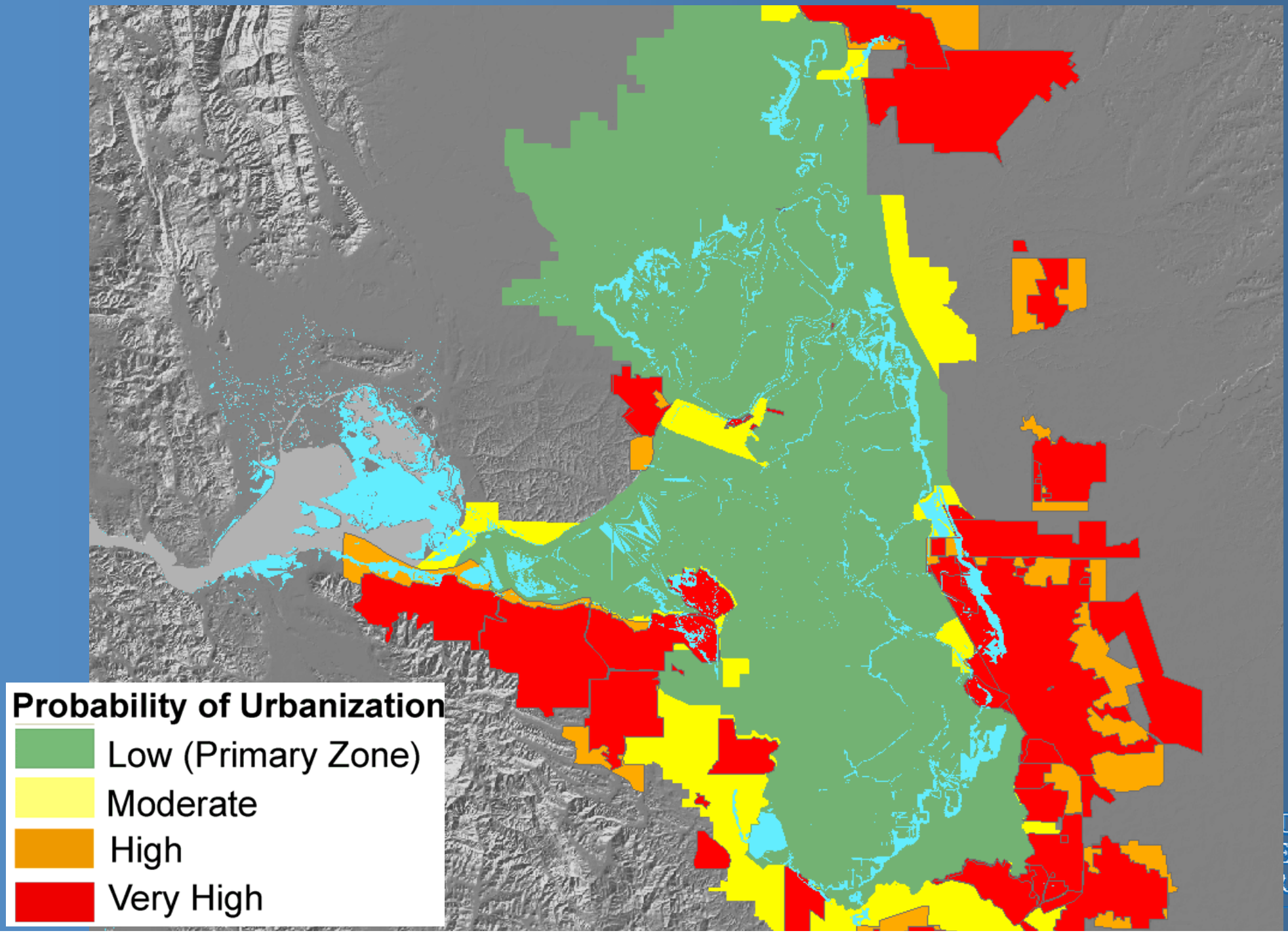
Urbanization

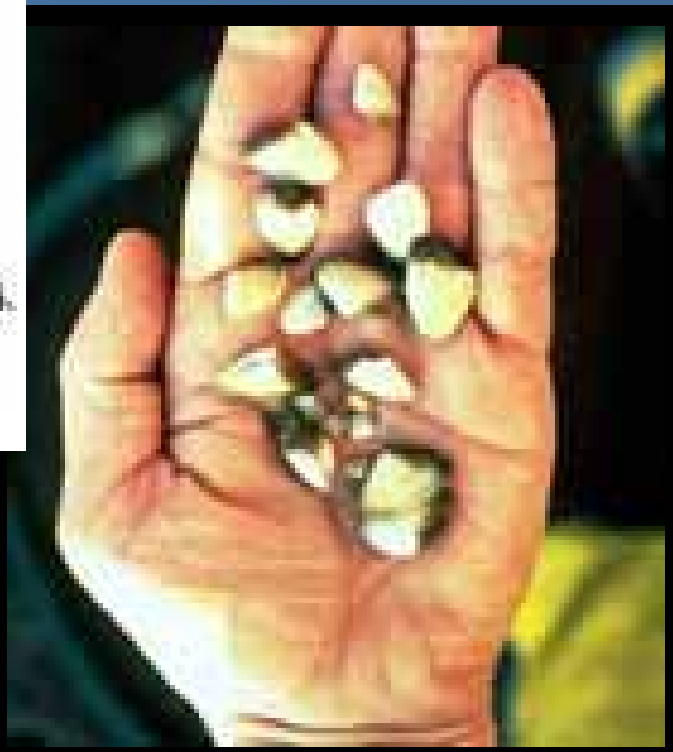
Probability of Urbanization (U.C. Berkeley)



Invasive Species

Zebra Mussels

Hydrilla



Asian Clam

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Assessment by Objective

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Accomplishments

- Significant habitat restoration upstream from the Delta
- Significant scientific research & understanding

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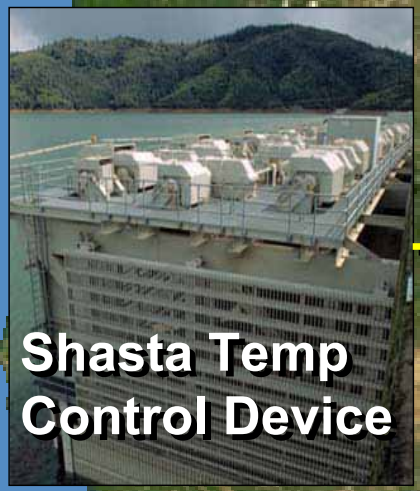
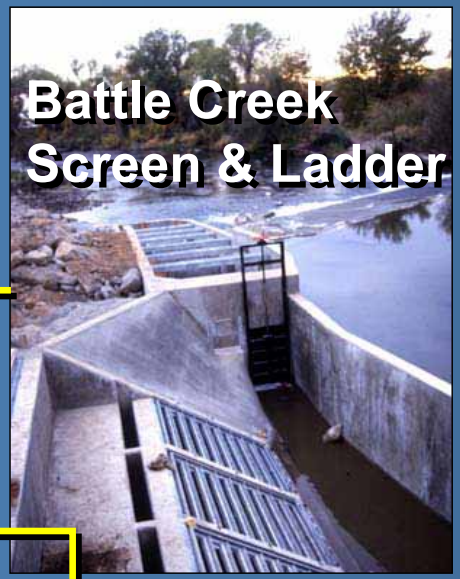
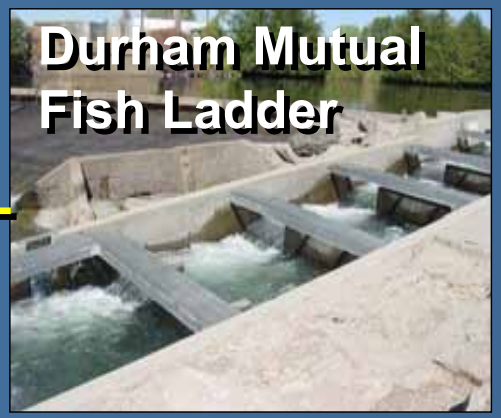
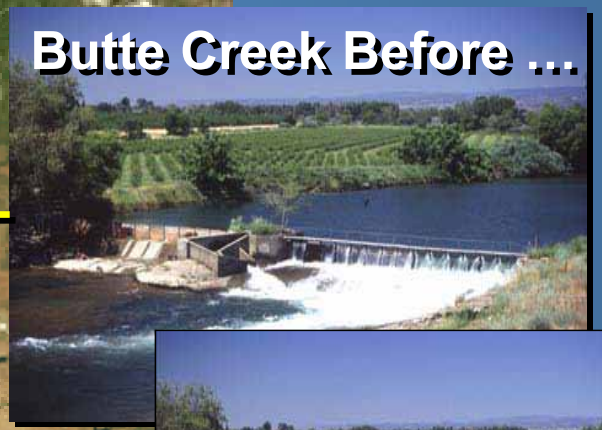
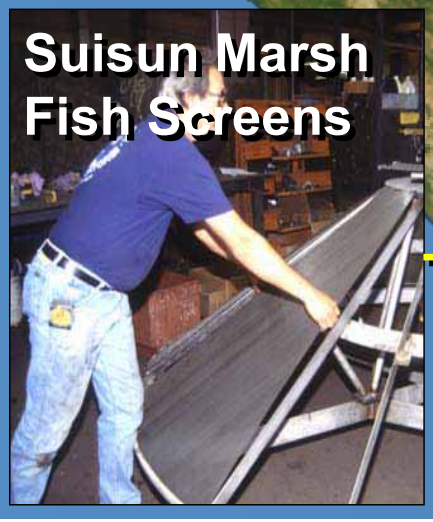
Eco Improvements - Above Delta











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Information

- Pelagic organisms at all time low
- Some salmon runs improved
- Entrainment at the pumps is a significant factor for Delta species
- A variable salt regime would likely benefit native species in the Delta
- Invasive species play a significant role in the Delta
- Delta is a tidal ecosystem not a riverine system

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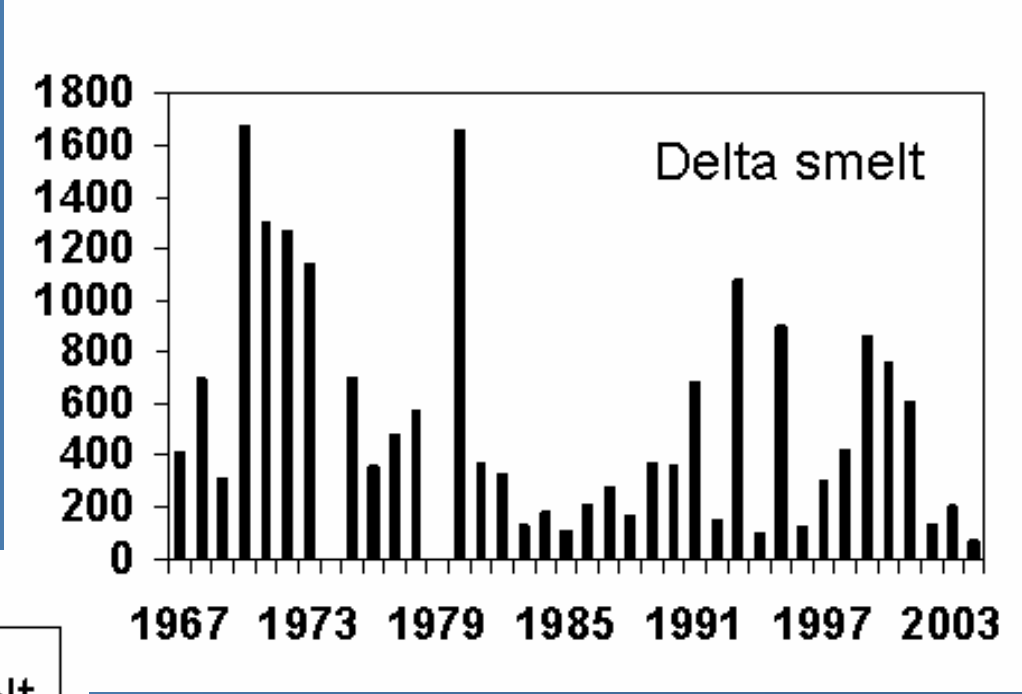
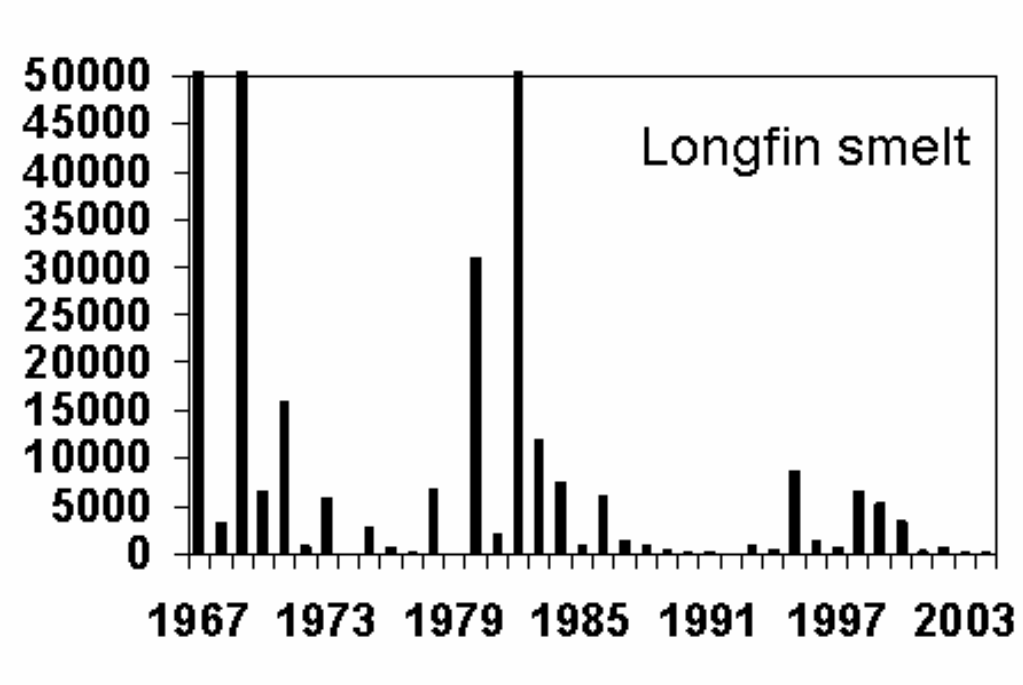
Regulatory Uncertainty
- Pelagic Fish Decline -

Species have declined to record low levels





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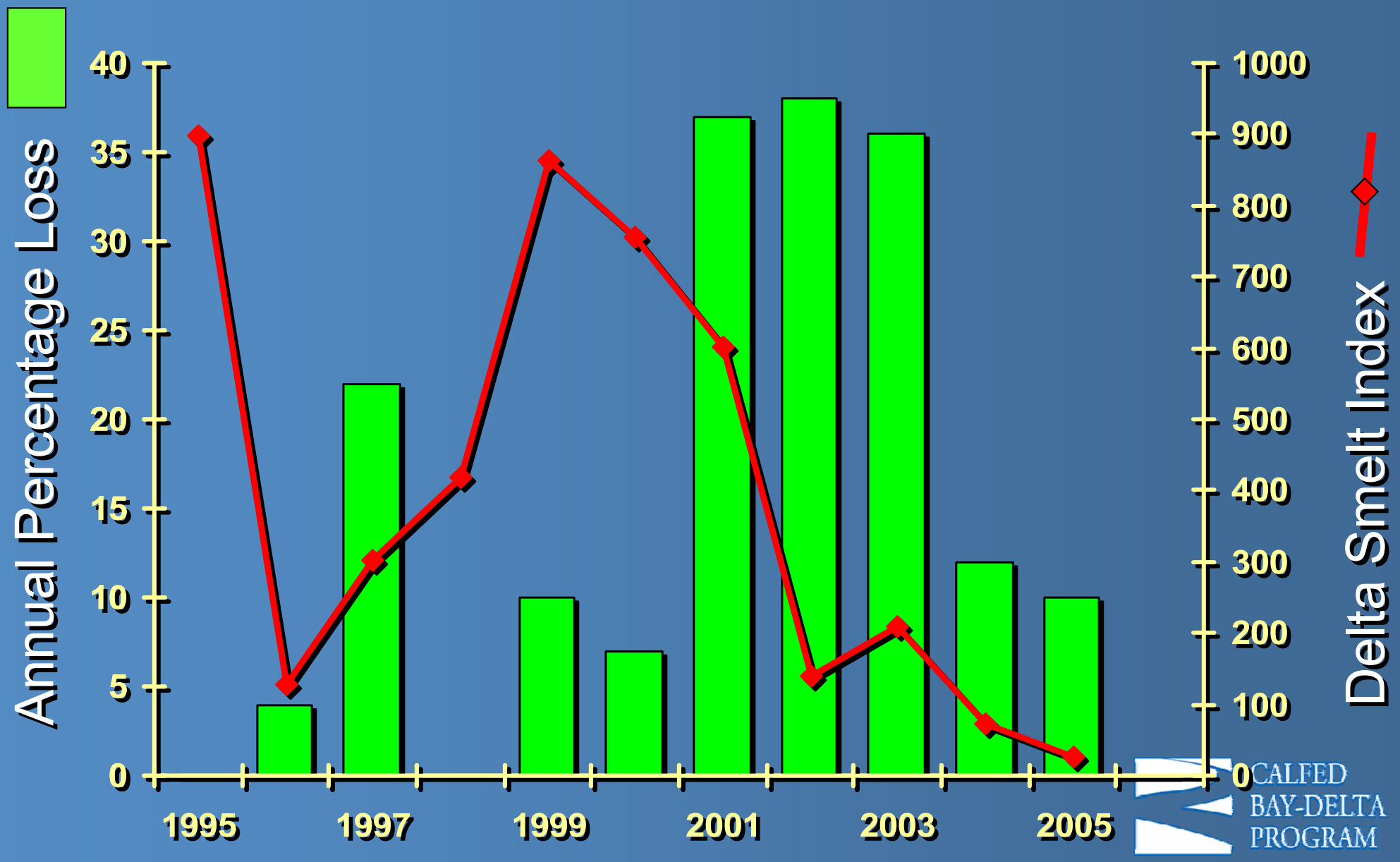
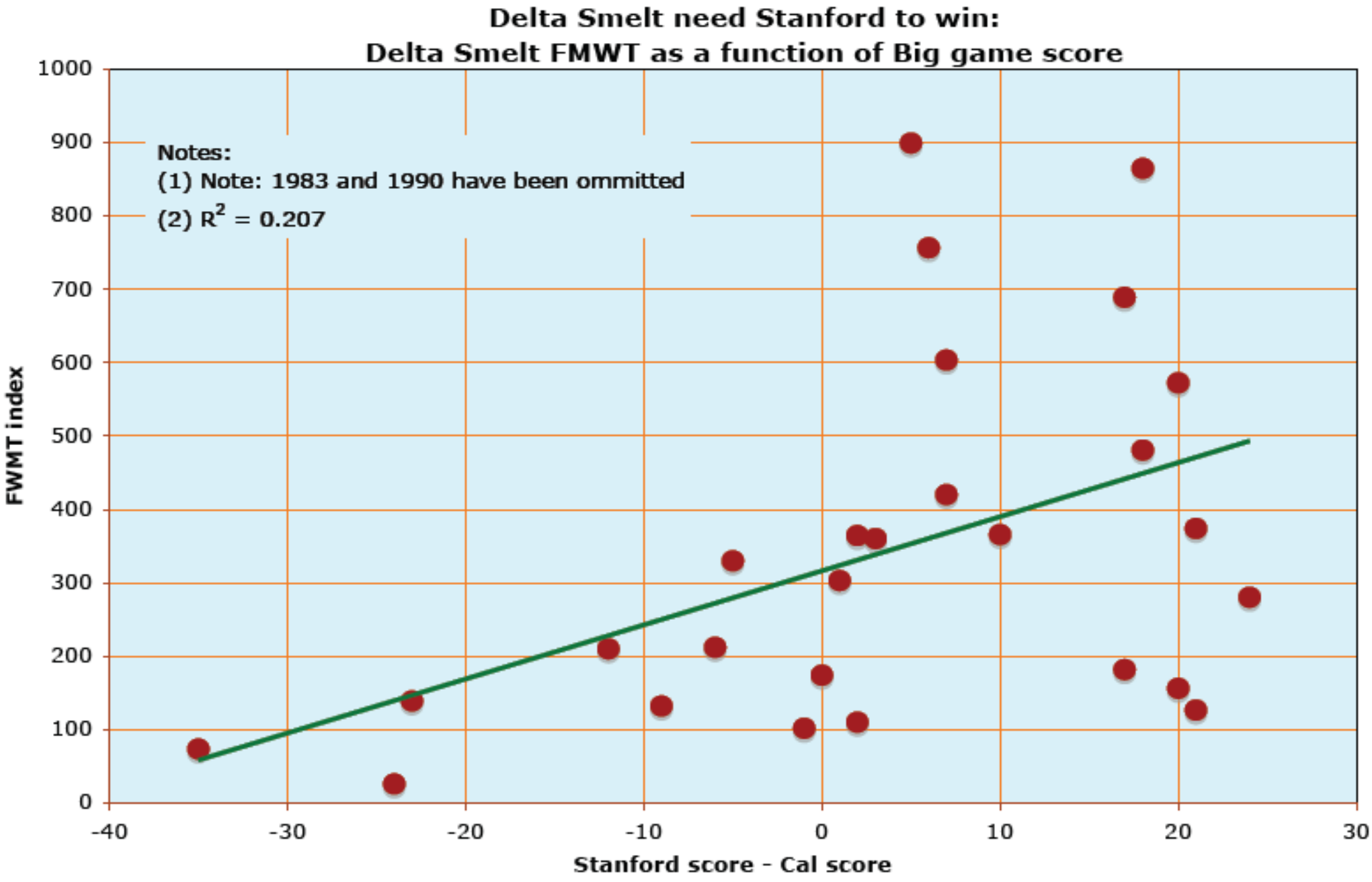
Kimmerer & Brown (USGS)

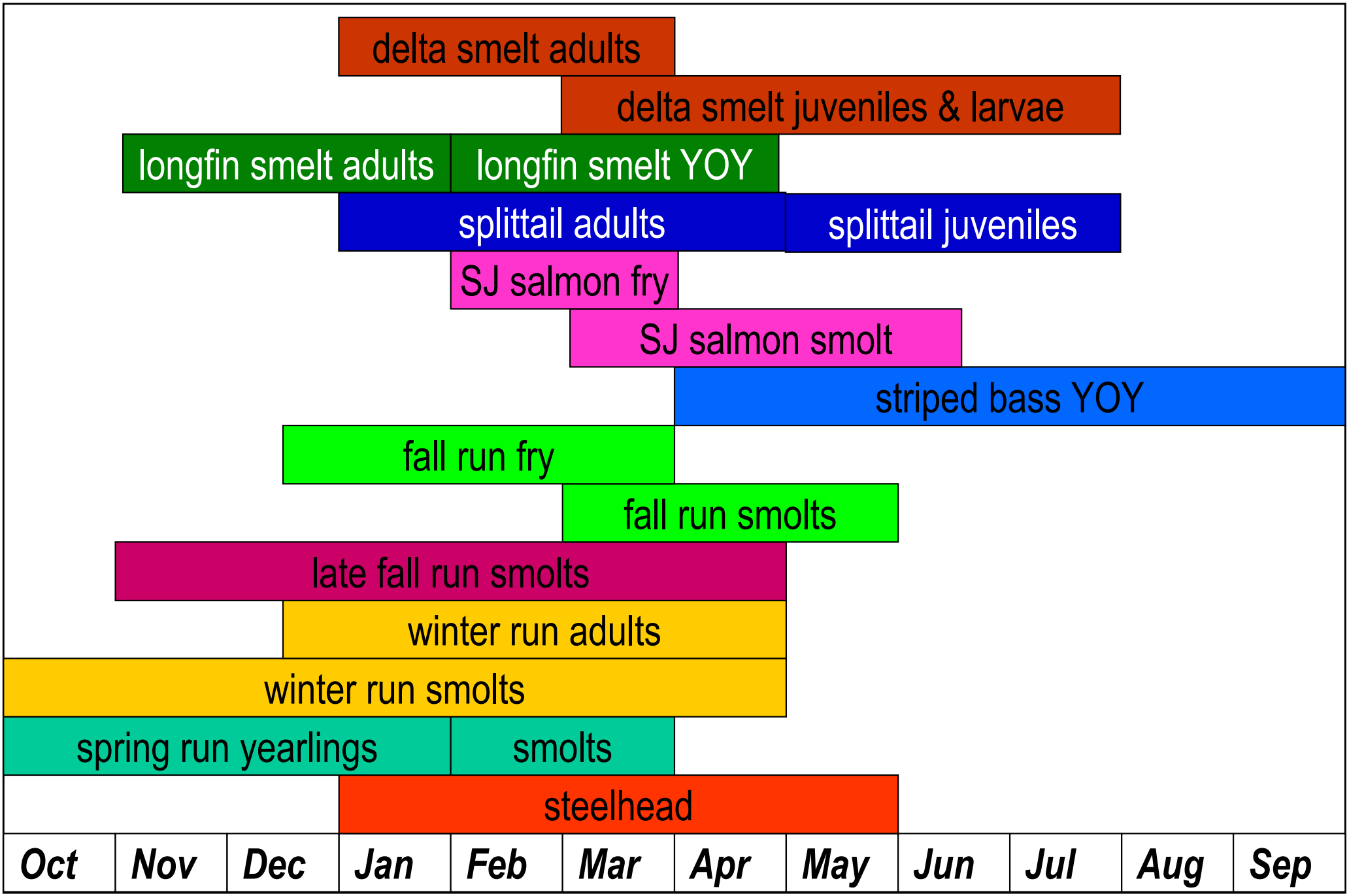
Estimates of Pumping Impacts on Delta Smelt



Interpreting Correlations



Fish Presence in the Delta



Questions

- Achieved sustainable ecosystems that support native species? On the right track?
- Through Delta Conveyance compatible with Ecosystem Restoration?
- Variable salinity & flow a requirement?
- Continue EWA? How large?
- What should the Delta environment look like in 50 years?

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Decisions To Be Made

- Ecosystem Restoration – how best to proceed. Use new science information
- Regulatory Commitments – scope and extent
- Conveyance Structure – compatible with ecosystem objectives
- Governance and funding
- Use of the Environmental Water Account

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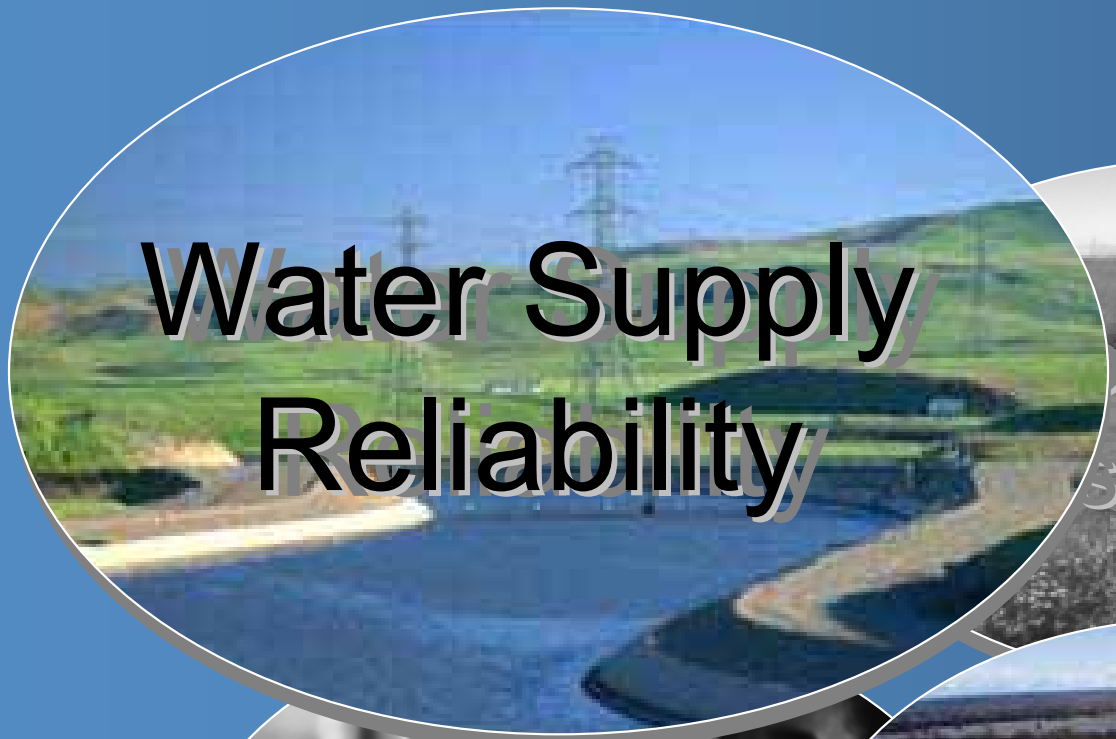

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Accomplishments

- Groundwater storage
- Ag & Urban water conservation
- Recycling
- Water transfers
- EWA Actions
- Surface Storage first stage studies completed
- Final EIS/EIR for South Delta Improvements Program completed

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Information

- Understand hydrodynamics much better
- More water has been delivered
- High risk of pump curtailment (lower reliability)
- Projects to allow greater export flexibility delayed
- Risk of catastrophic failure
- Climate change

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Questions

- Can we support ALL beneficial uses reliably with a thru-Delta system? With expected changes?
- Can we reduce / mitigate
  - regulatory risk?
  - catastrophic failure risk?
  - climate change risk?

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Decisions To Be Made

- Conveyance Facility – same or different
- Water Deliveries – expand, reduce or maintain
- Water Supply Reliability – how best to achieve
- Support for additional regional self sufficiency improvements
- Surface Storage
- Governance and funding

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Accomplishments

- Significant reductions in San Joaquin River salt loads
- Significant progress towards solving Stockton ship channel DO problem
- Successful demonstration of advanced drinking water treatment technologies
- Expanded monitoring and modeling capabilities

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Information

- Though native Delta species benefit from water quality variability, variability complicates drinking water treatment
- Drinking water quality standards will become more strict in the future
- Treatment technology is improving
- Not meeting ELPH objective
- Improved understanding of Delta water quality (from improved models)

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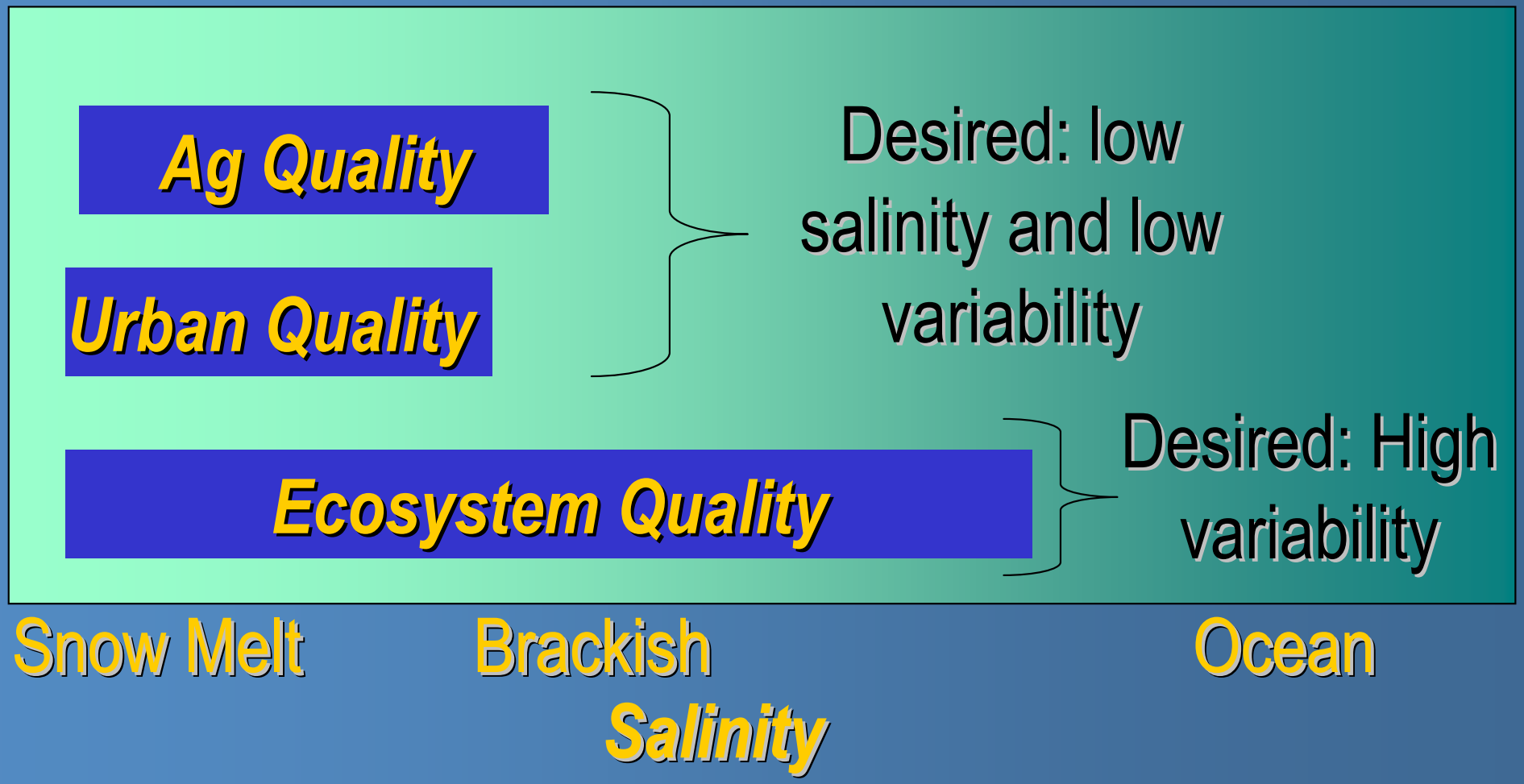
Example of Conflicting Delta Needs – Water Salinity*



*Note – Salinity is one of many important water quality factors

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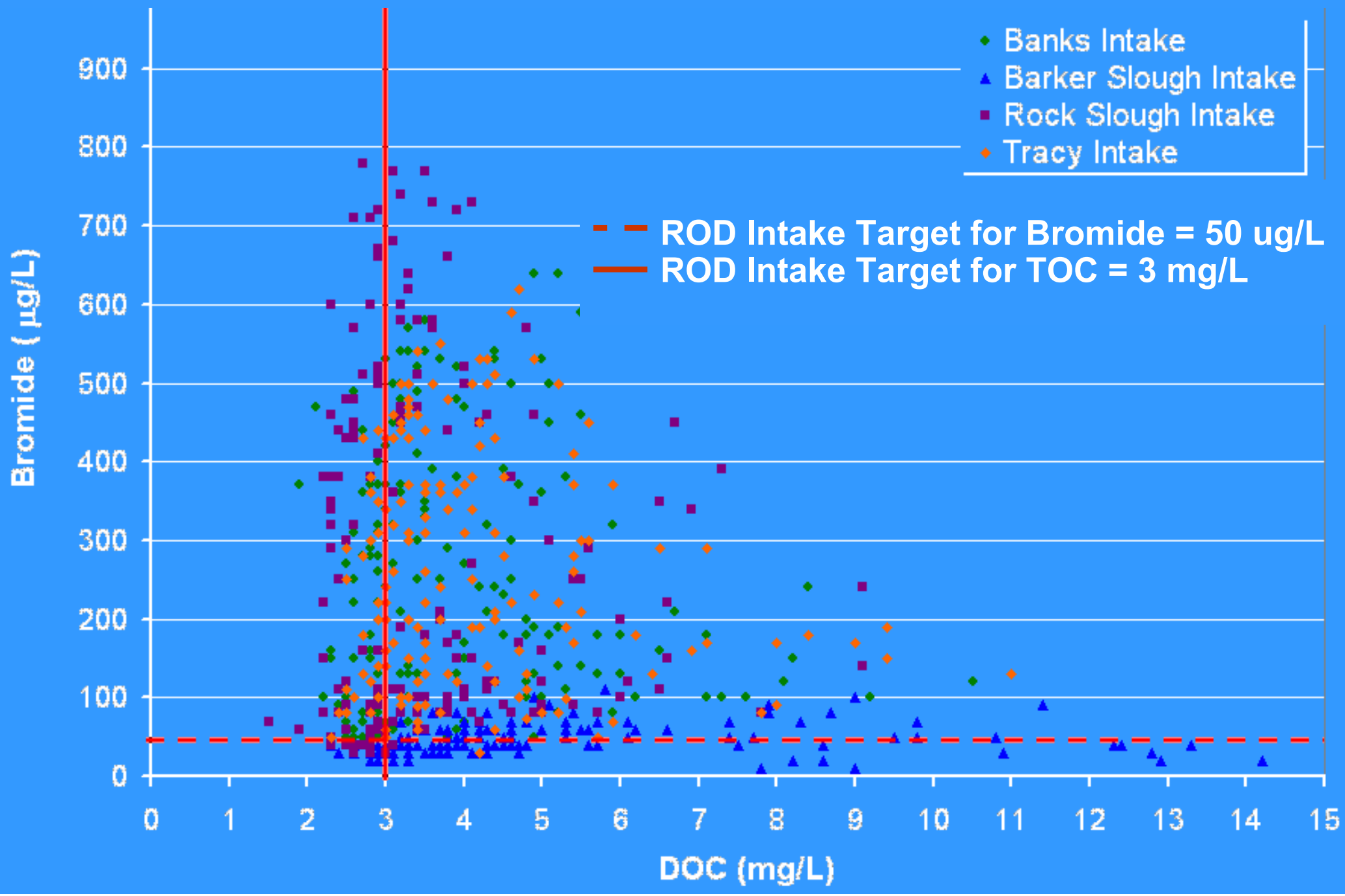
Drinking Water Quality



Questions

- Have we met drinking water quality objectives (Bromide? TOC?)?
- Can we meet these objectives w/ ELPH?
- Can the Delta continue to be used as a source of drinking water? At what cost?
- How will future conditions affect water quality?

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Decisions To Be Made

- Conveyance Facility - same or different
- Other facilities / programs needed to meet CALFED ROD "Equivalent Level of Public Health" (ELPH) drinking water quality target
- Ecosystem water quality requirements
- Governance and funding

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Accomplishments

- Ongoing maintenance of Delta levees
- Improvements on a few Delta levees
- Improved emergency preparedness
- New Bonds provide needed financial resource

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Information

- Delta levees are unstable
- Stabilizing Delta levees is very difficult and costly
- Sea level rise may overwhelm Delta levees
- Regional climate change will result in more frequent severe flood events in the Delta
- 2 in 3 chance of catastrophic levee failures in 50 years
- Delta levee maintenance requires significant continuous expenditure

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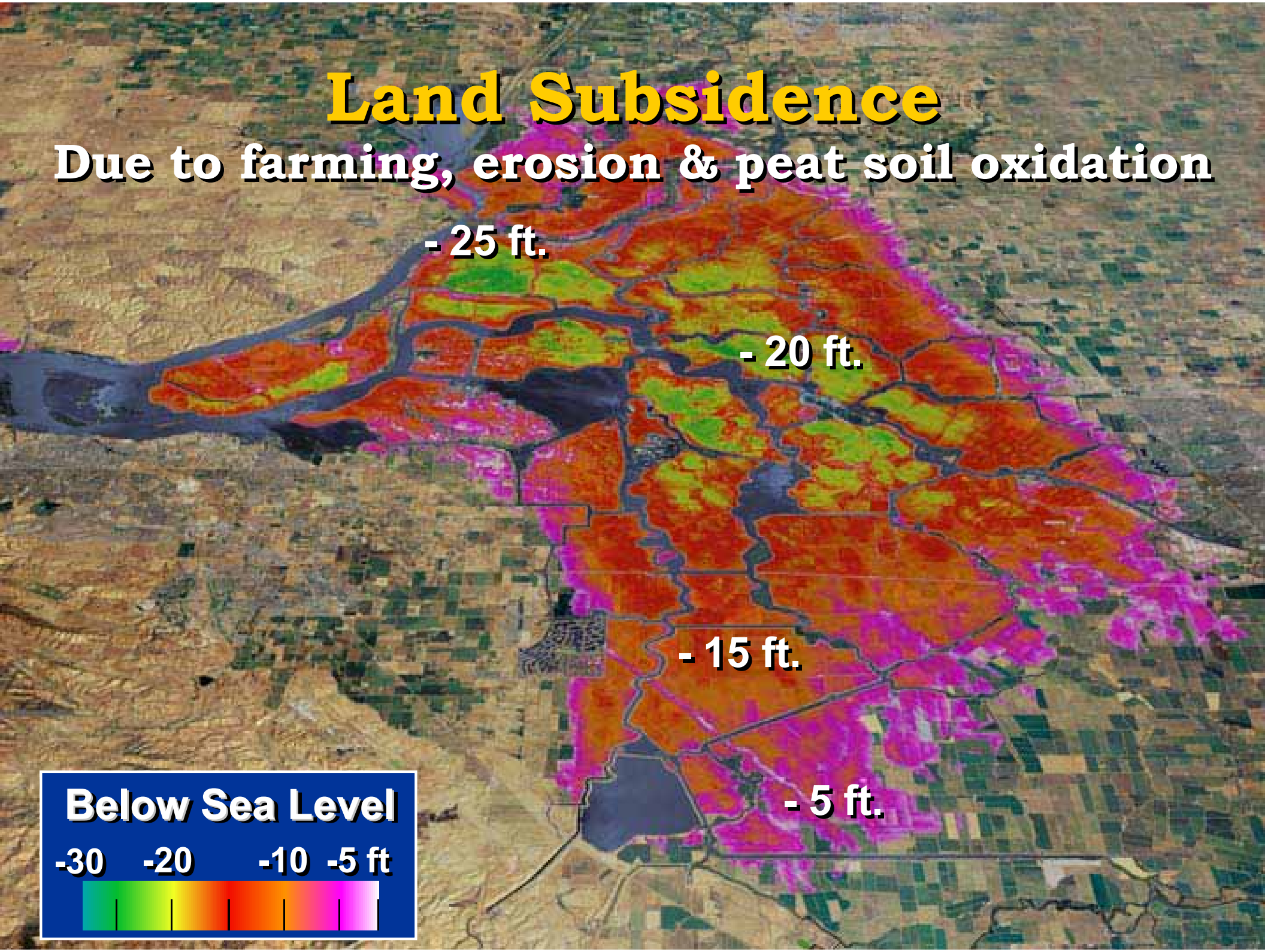
Twitchell Island (2006)

Click here to run video clip

Land Subsidence

Due to farming, erosion & peat soil oxidation



Seismic Vulnerability

Two-in-three chance of catastrophic flooding by 2050 from earthquakes or 100-year flood events

Bay Delta Region Major Faults

New Orleans Levee Failure

Displacement of wall and part of levee

17th Street Canal

17th Street Canal: Sheared Layer within Marsh near the Main Section of the Displaced Levee Embankment

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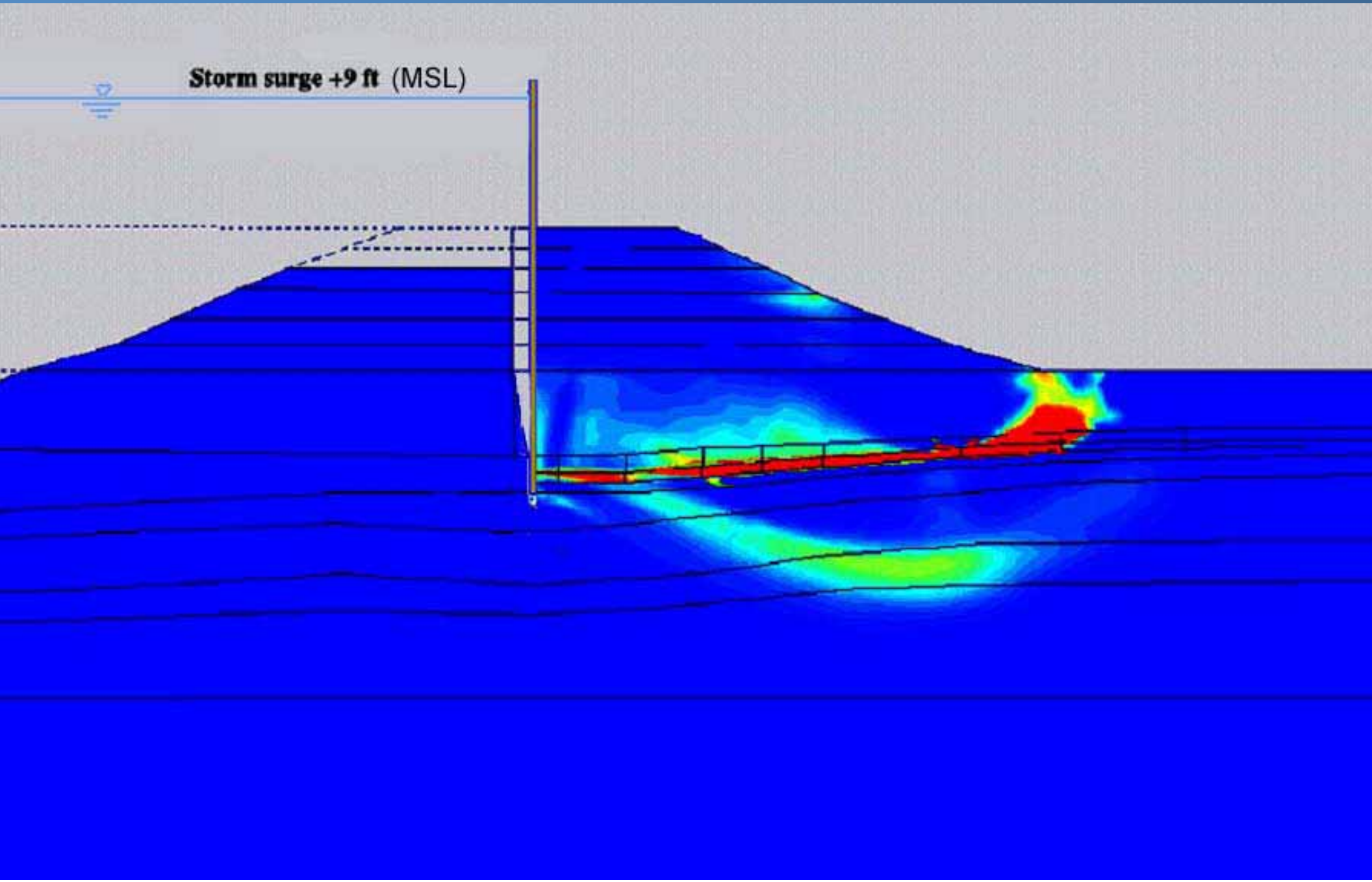
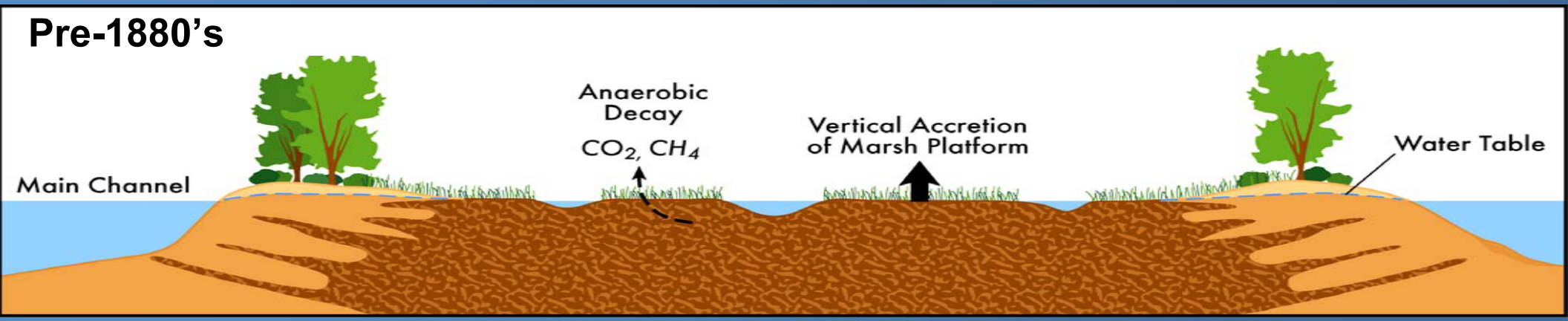
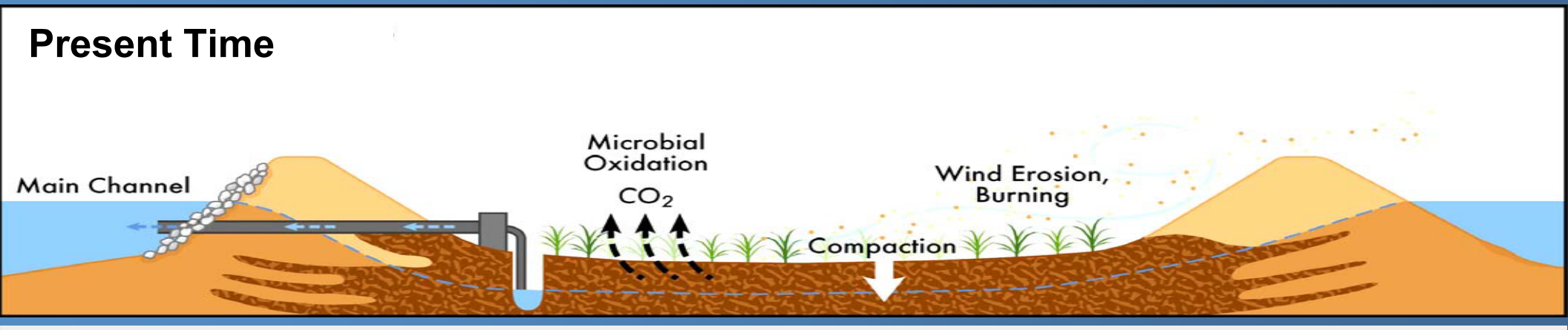
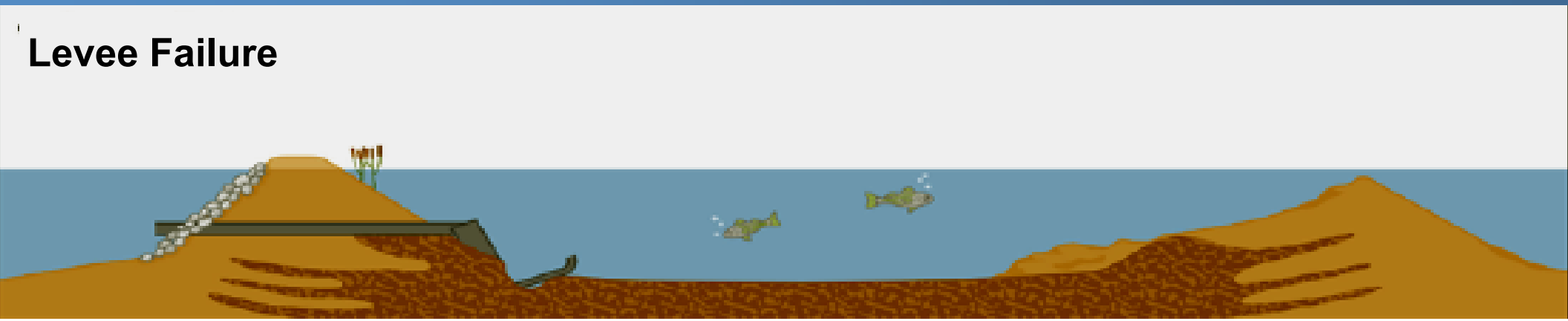
17th Street Canal: Gap Fully Developed at Storm Surge Elev. + 9 ft (MSL)



Bay-Delta Land Subsidence -- Islands or Holes?







Questions

- Can the Delta as we know it be sustained?
- Is the technology available to protect levees from the catastrophic failures that may occur in the future? If so, at what cost?
- How do we prioritize the work to be done on Delta levees?
- How will future conditions affect Delta levees?

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Decisions To Be Made

- Protect islands / levees
- Protect infrastructure
- Protect agricultural values
- Protect urban areas
- Integrate levee & conveyance decisions
- Governance and funding

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Conclusions

- Despite some progress, the Delta is still broken - difficult **decisions** required
- Stakes are high - **irreplaceable** ecosystem, water supply, public health
- **Future Changes** will magnify challenges (climate change, sea level rise, etc.)
- **Action** is imperative

End of Stage 1 Report 2007 Schedule & Role for BDPAC and Authority

- March BDPAC/ April Authority – discuss Stage 1 report progress
- May/June – technical panels on WQ and fish; transmit draft Stage 1 assessment and findings to BDPAC/Authority
- September – BDPAC/Authority review draft End of Stage 1 Report and make recommendations to Secretary

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