Mountain Counties
WATER RESOURCES ASSOCIATION

THE CALIFORNIA WATER FIX

SUPPLY – CONVEYANCE – OPERATION

October 26, 2018

EDUCATION – ADVOCACY – LEADERSHIP

Presenter

Michael Patrick George

Delta Watermaster

State Water Resources Control Board

SUSTAINABILITY IN OUR HIGHLY ALTERED DELTA

A Presentation to the Mountain Counties Water Resources Association

Michael Patrick George
Delta Watermaster
State Water Resources Control Board

October 26, 2018

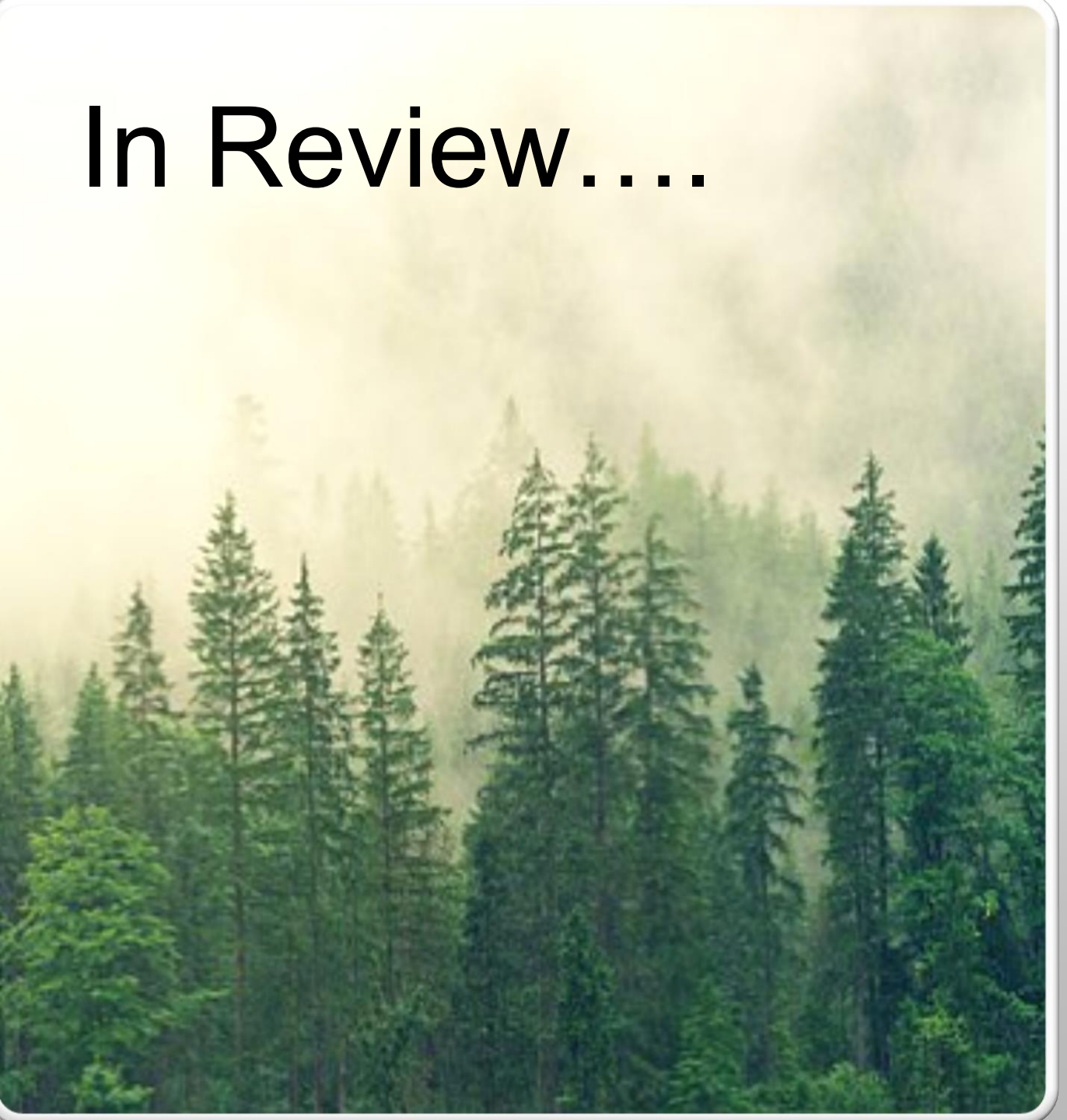
Disclaimer

- I am not speaking for the:
  - State Water Resources Control Board or
  - The Delta Stewardship Council

- I am not presenting State policy

- I am expressing personal observations and opinions *(except where specifically referenced to published materials)*

In Review….



- Watershed Health (starting in the mountains)
  - MCWRA's "Principles" (2014)
  - ACWA's Resiliency Framework (2015)
  - The Governor's Water Action Plan (2016)

EVEN THE PRESIDENT HAS NOTICED

We've Made Important Progress….

- We're all in this together!
  - "There is a need for coordinated action throughout the Delta watershed, from Timbers to Tides" (Randy Fiorni)
- Executive Order B-52-18 (May, 2018)
- SB 901 and AB 2551 (Sept. 2018)
- Application of the universal lubricants:
  - money, attention, accountability

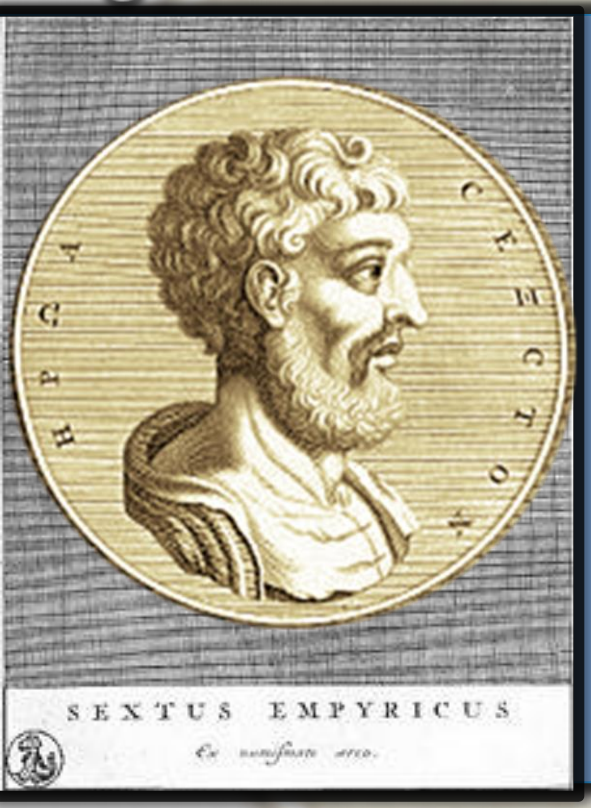
TODAY, I WANT TO FOCUS MY REMARKS MORE NARROWLY ON THE PHYSICAL DELTA

Three Interrelated Reasons….


SAVE THE SF BAY-DELTA
STOP THE TUNNELS
RESTORE THE DELTA
Fishable, Swimmable, Drinkable, Farmable
Visit our website at:
www.restorethedelta.org

Climate Change:

- Flashier System
- Warmer Water
- Sea Water Intrusion
- Infrastructure Failure
- Ecosystem Decline



“Though the mills of state grind slowly,
yet they grind exceeding small;
Though with patience we stand waiting,
with exactness grinds them all.”

With apologies to Sextus Empiricus c. 160 - c. 210 CE

Where the mills of state have been grinding

- The Delta Reform Act of 2009
- Waterfix and EcoRestore
- Bay/Delta Water Quality Control Plan
- Revision of Coordinated Operations Agreement
- State Water Project Contract Extension
- Re-consultation on Biological Opinions
- Revision of the Delta Plan

Some Observations…..

A Black Swan Event…

- **Flood**
- **Earthquake**
- **Political Crises**
- **Financial Crises**

When is Time to Take Positive Action?

Let's Not Blow It!

Questions ◈ Thank You

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Photo Credits: Department of Water Resources, Robert Waghorn, Pixabay

Presenter

Jennifer Pierre

General Manager

State Water Contractors

CAL WATERFIX:

WHAT IS IT, HOW DOES IT WORK, WHAT ARE WE DOING, AND HOW WILL WE PAY FOR IT?

JENNIFER PIERRE
GENERAL MANAGER, STATE WATER CONTRACTORS

ROGER PATTERSON
ASSISTANT GENERAL MANAGER, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

OCTOBER 26, 2018

Background on State Water Project and Contractors

State Water Project Contractors

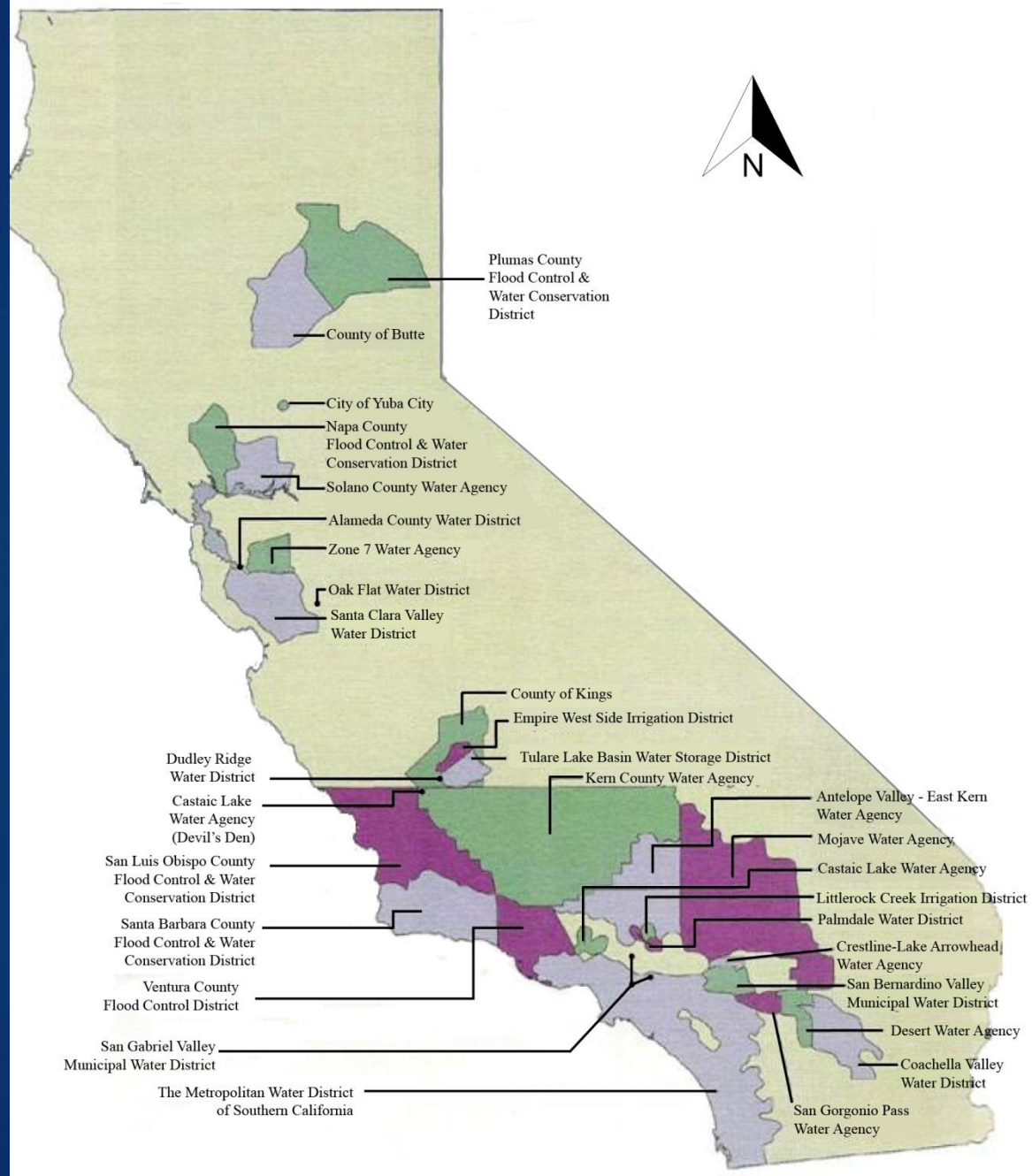
- DWR holds the water rights for the State Water Project ("Project") and operates and maintains the Project
- 29 public water agencies contract for water supply from the Project; These agencies extend from Plumas County to the Mexican Border
- DWR administers the contracts for the public's benefit
- SWP contractors pay the capital and O&M costs of the Project

Water Delivery

- 26 million people
- 750,000 acres of farmland
- Silicon Valley
- San Joaquin Valley
- Southern California
- Napa, Solano, Yuba City

State Water Project Contractors

- Upper Feather River
- North Bay Area
- South Bay Area
- San Joaquin Valley
- Central Coast
- Southern California

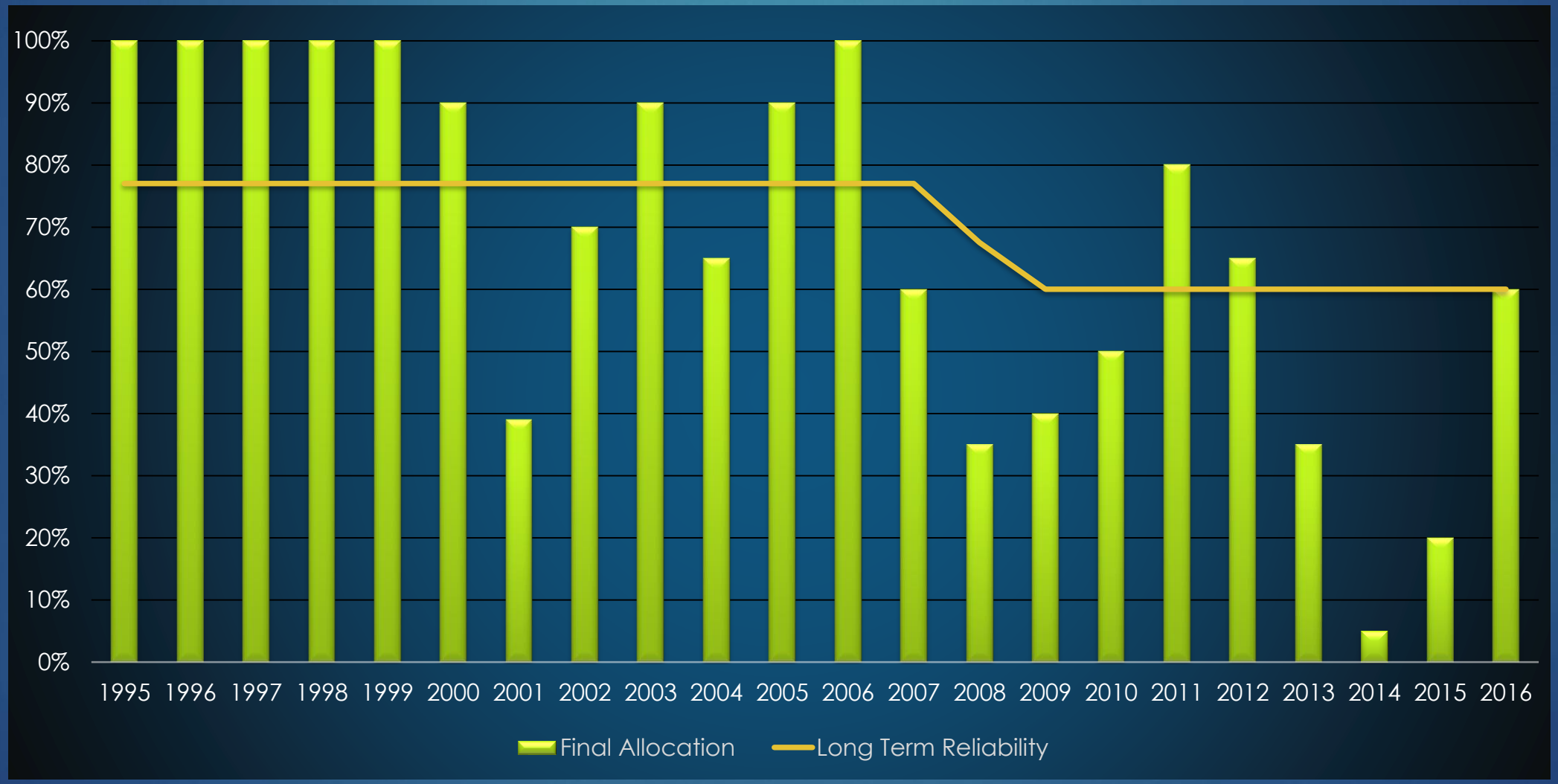


Current Status of Delta Environment

- The regulatory environment in the Delta is always changing
- SWP reliability[1] has dropped from 76% to 61% over the last 20 years
  - Trends suggest further declines are likely (assumed at 48%)[2]
- Climate change impacts are uncertain
- WaterFix is predicted to restore reliability

[1] DWR Capability reports 2001- 2015 future condition
[2] Based on preliminary draft modeling analysis

Decreasing Trend in SWP Allocations



Important Implications

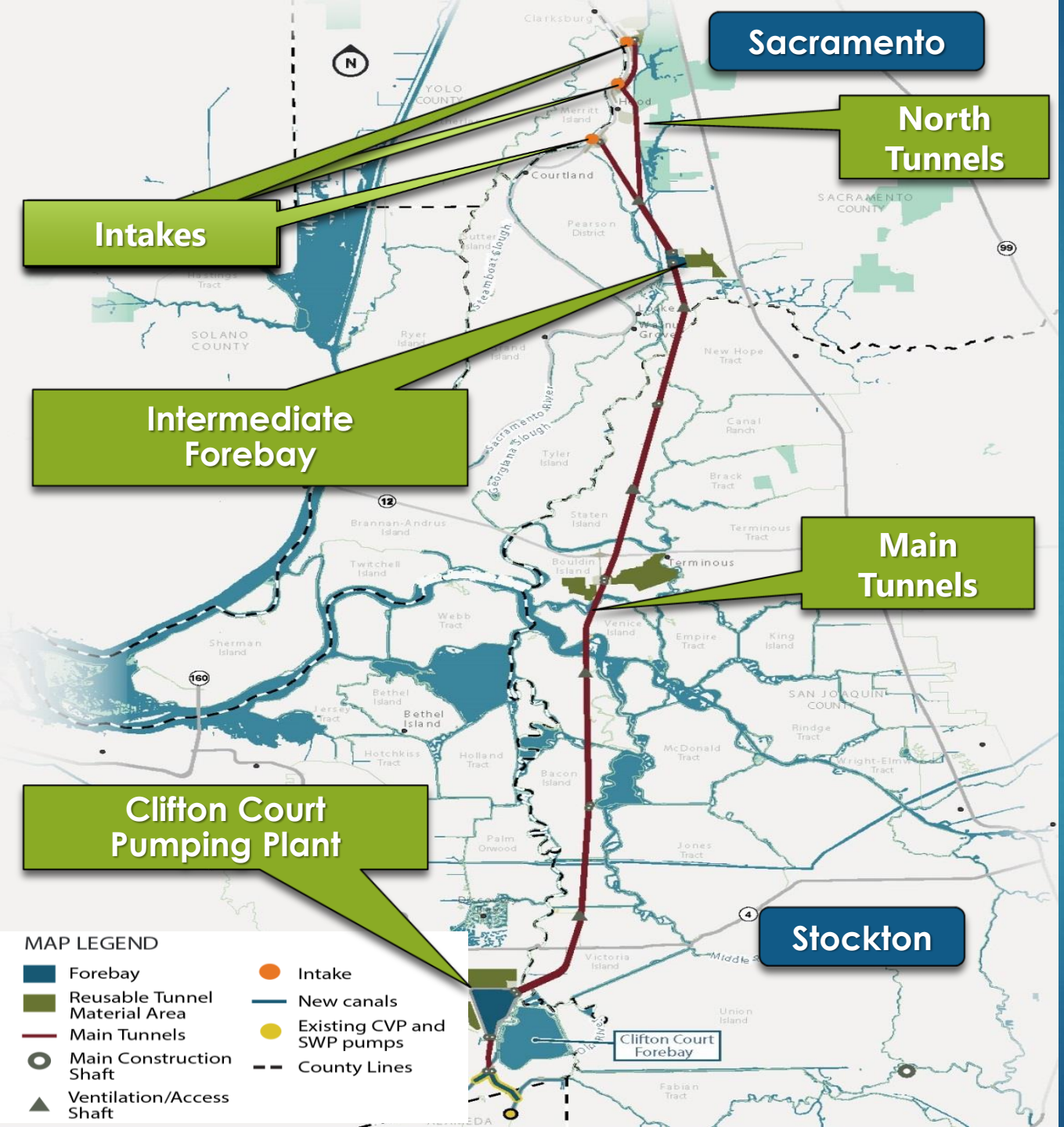
- As the regulatory environment changes, yields are likely to decrease and unit costs would go up
- Table A unit costs increase as reliability decreases
- Climate change will lead to a higher risk with potential for variability in water reliability and costs

What is California WaterFix?

California WaterFix

9000 CFS
Dual Tunnel System Configuration

10

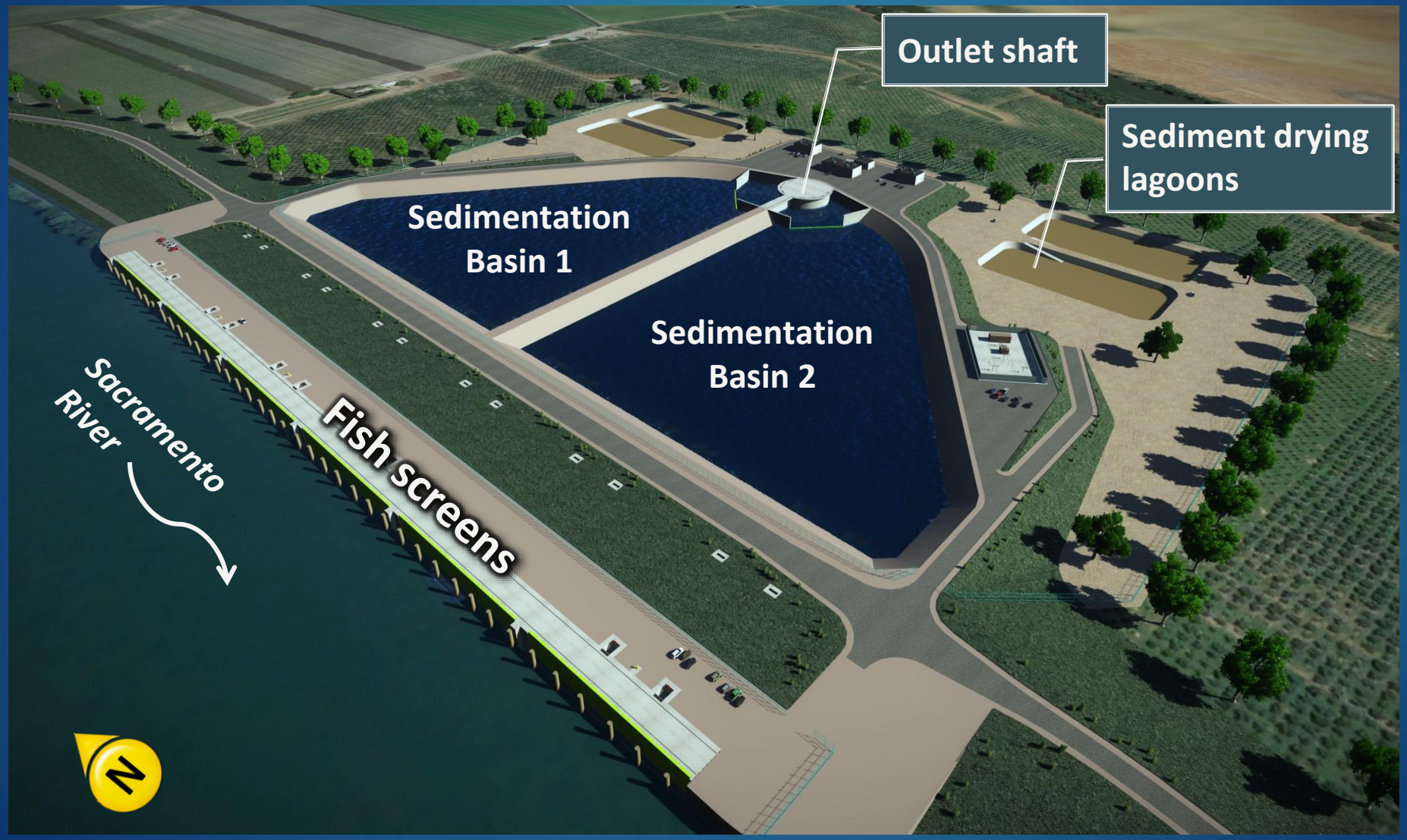


- North Delta
  - North Delta Intakes
  - North Tunnels
  - Intermediate Forebay
- Main Tunnels
- South Delta
  - Clifton Court Pumping Plant
  - Clifton Court Forebay Modifications
  - Head of Old River Gate

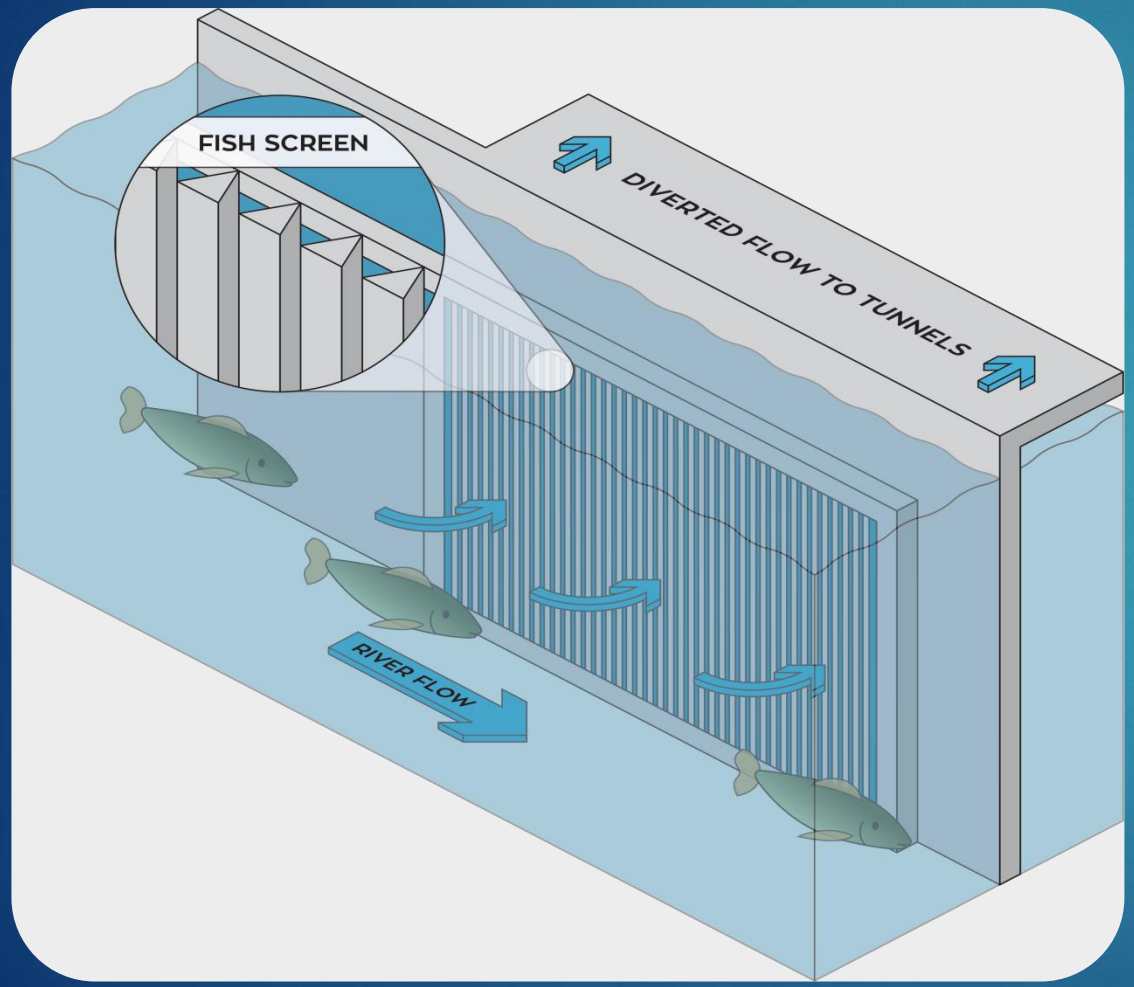
How does California WaterFix work?

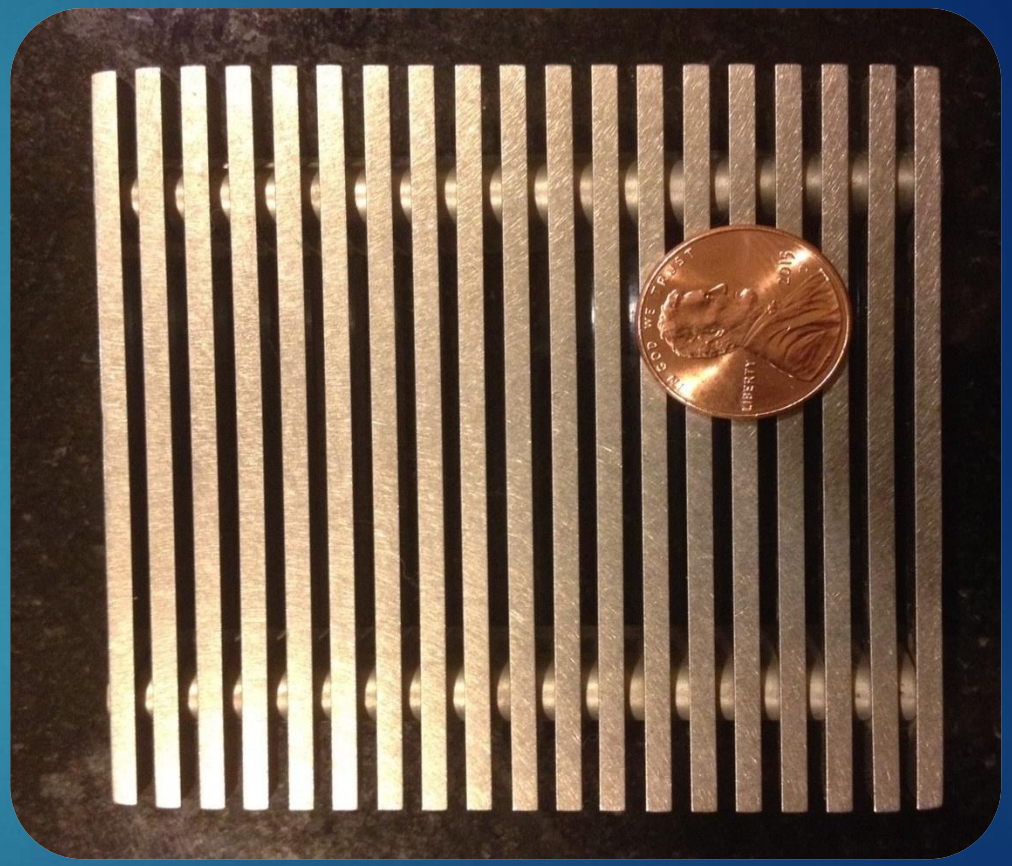
River Intake Locations

River Intakes



Designed to Protect Fish

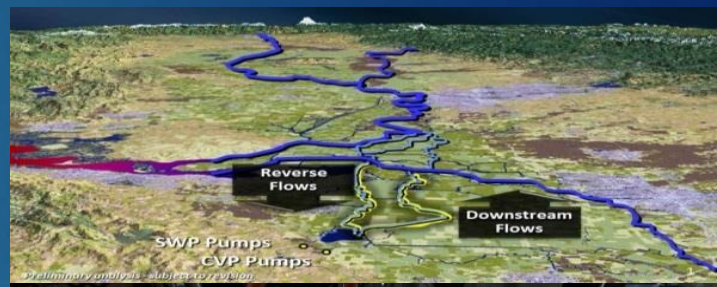


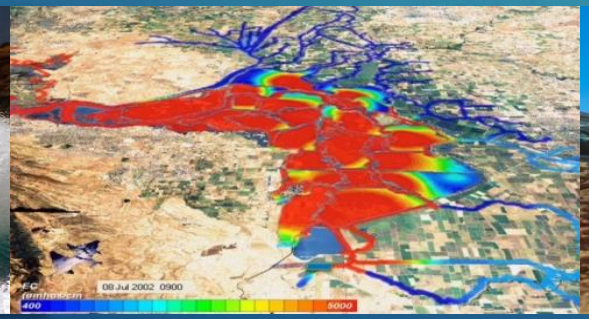


Screen spacing – 1.75mm
Flow approach velocity = 0.2 ft/sec

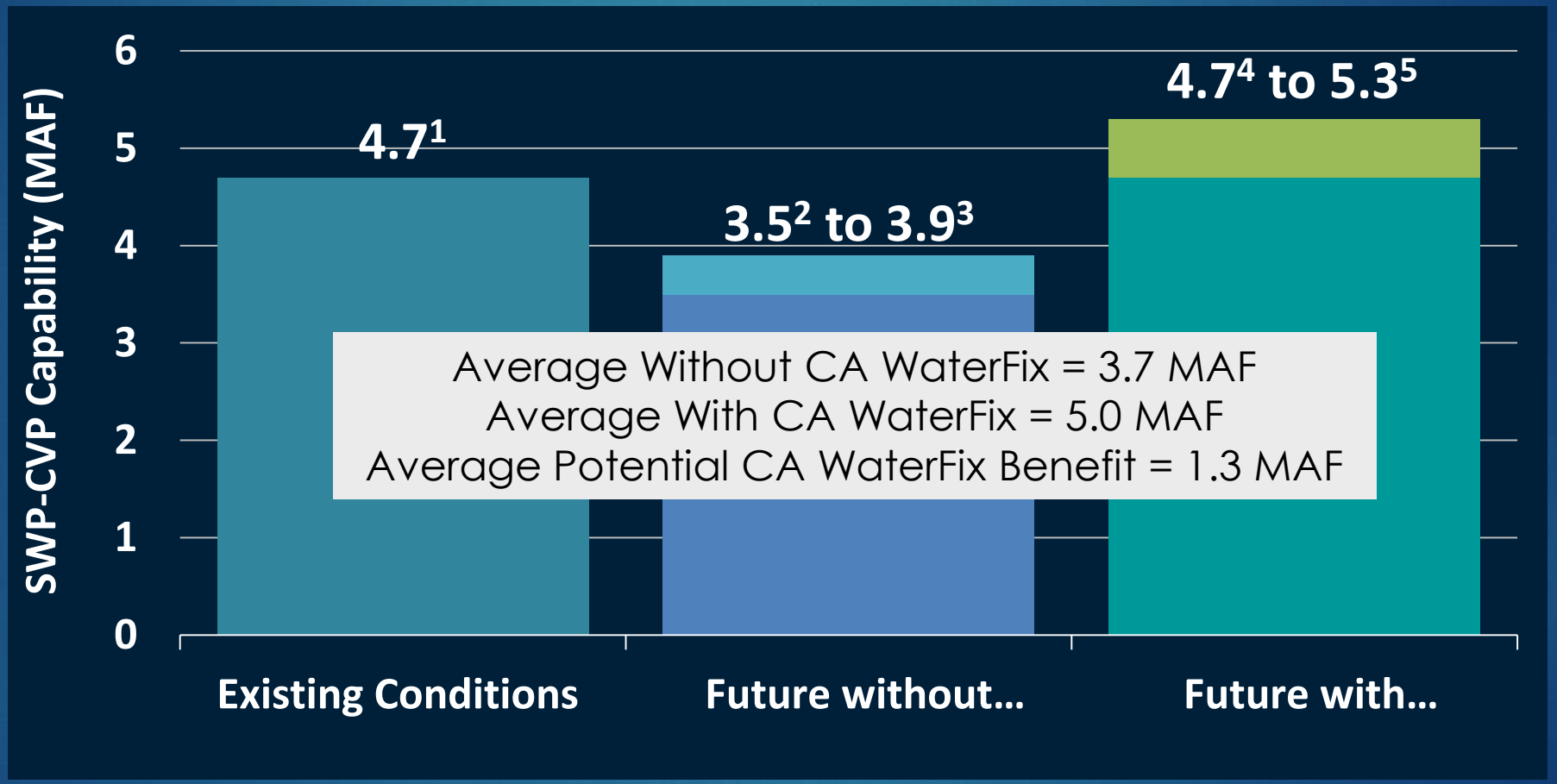
Benefits of WaterFix Implementation

- Environmental and water supply reliability benefits
- Improve delivery reliability of SWP supplies
- Reverse flow reduction
- Flexible operations
- Seismic resiliency
- Climate change adaptation
- Water quality
- Cost effective





California WaterFix Water Supply Analysis



1 California WaterFix EIR/EIS No Action Alternative, existing conditions with 2025 climate change impacts
2 2015 Delivery Capability Report Existing Conveyance High Outflow scenario
3 2015 Delivery Capability Report Existing Conveyance Low Outflow scenario
4 California WaterFix EIR/EIS Alternative 4A-H4, initial operating criteria lower range
5 California WaterFix EIR/EIS Alternative 4A-H3, initial operating criteria upper range

CA WaterFix Water Supply Analysis[1]

- Approximately 67% of the capacity of California WaterFix is subscribed by mostly California State Water Project contractors and the approximately 33% CVP capacity is unsubscribed but committed to be paid for by MWD
- SWP Contractors would benefit from the 67% (approximately 6,000 cfs) available to convey SWP supplies (protects approximately 0.7 MAF)
- This equates to a supply reliability improvement for SWP Contractors of approximately 13% for Table A or 18% in SWP Exports including Table A and Article 21 Water

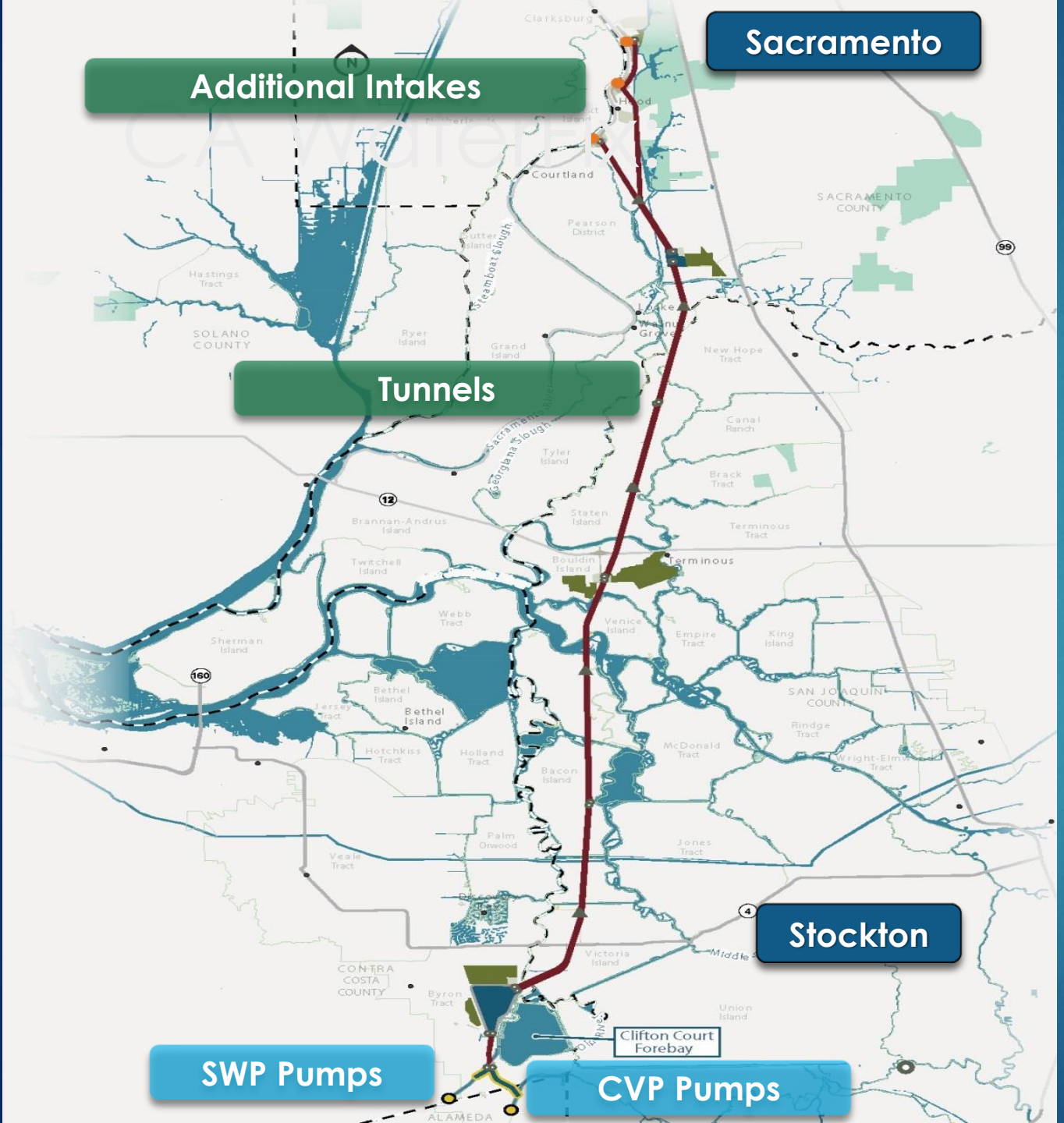
Enhance Ecosystem Fishery Habitat Throughout Delta

- Improved flow patterns
- Reduced risk of entrainment
- Physical habitat actions


Photo by Morgan Bond


Photo by Jacob Katz


Photo by Joel Williams



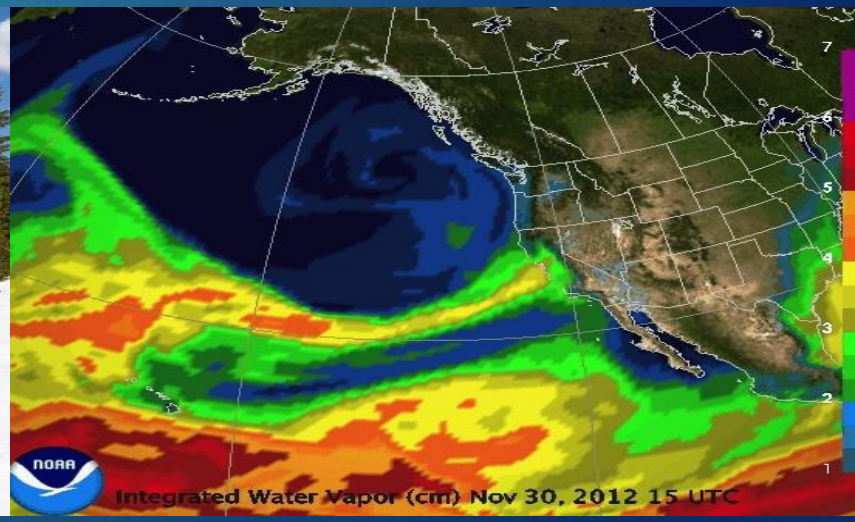
- North Delta
  - Modern intake screens allow fish to bypass without salvage
  - Flexibility to divert excess flood flows & reduce fish impacts during low flow periods
- South Delta
  - Reduces reverse flows in river
  - Less fish salvage at pumps

Climate Change Adaptation

- Sea-Level Rise: Project Design
  - 55" increase estimated at Golden Gate by 2100
  - 200-year flood frequency
  - Diversion moved upstream to increase elevation
    - Additional 3 feet of freeboard
    - Reduces impacts of salt water intrusion

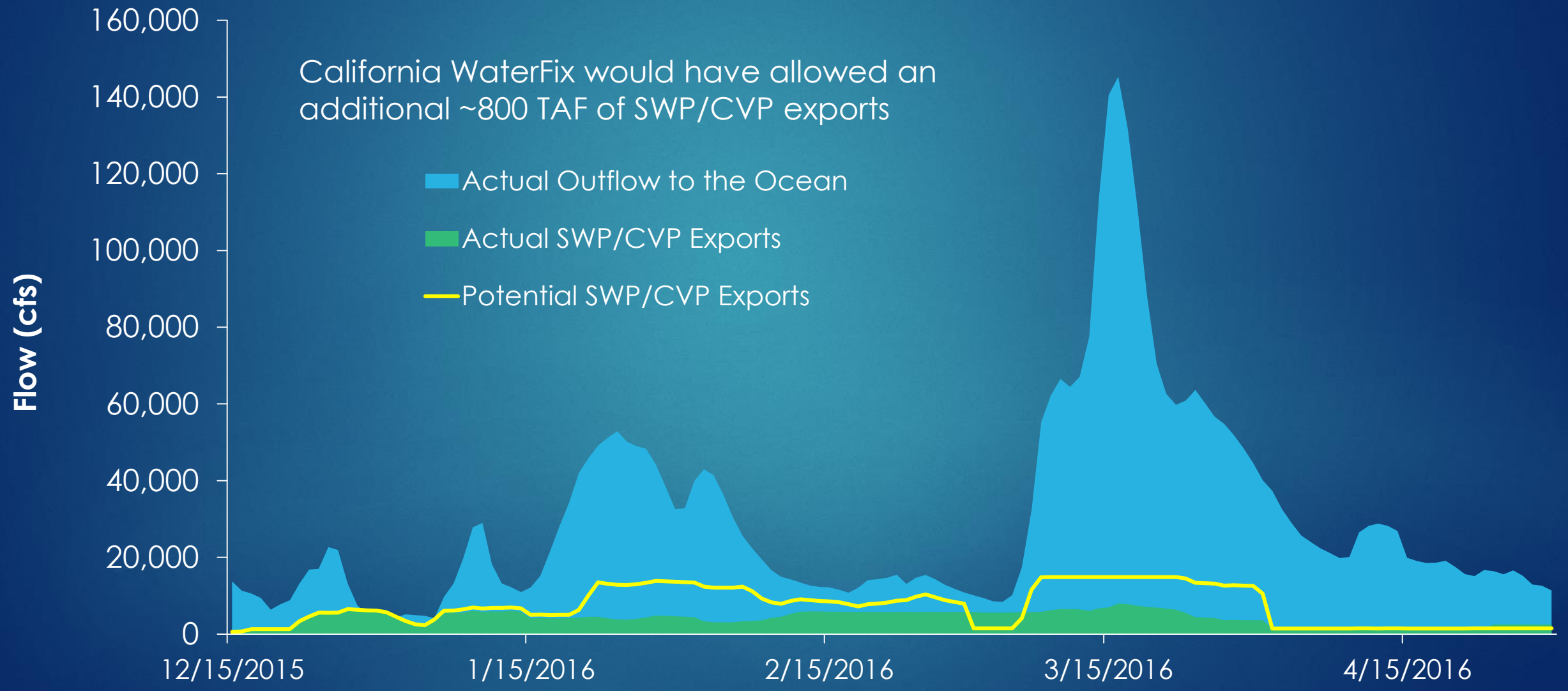
Climate Change Adaptation

- Future temperature increases will cause reduced snowpack
- Overall precipitation will remain similar but higher peak storm flows during winter
- Reduced window to capture supply requires larger conveyance facilities



California WaterFix

Export Operations for Water Year 2016



California WaterFix Costs (2017 $s)

	9000 CFS ($ in billions)
Capital Costs	
Water Facility:	
Construction	10,380
Contingency (36%)	3,692
Program Management, Engineering and Construction Management	2,098
Land Acquisition	160
Sub-Total Water Facilities	$16,330 B
Mitigation (Capital)	401
Total Capital Costs	$16,731 B
Annual Operations and Maintenance Costs	
Water Facility O&M, Power, and Replacement	44.1
Mitigation (Operations)	20.3
Total Annual O&M Costs	$64.4 M/Year

What are we doing now?

CWF Support

- 5 north of Delta Contractors won't benefit and won't pay
- All south of Delta Contractors will participate in CWF
- 12 contractors adopted support resolutions in Fall 2017
- 8 contractors have voted to join the Delta Conveyance Design and Construction Authority JPA
- 6 contractors have voted to join the CWF Finance JPA
- By the end of the year, additional contractors will join one or both of the JPAs

Delta Conveyance Design and Construction Authority

- Formed in May 2018
- Purpose is to complete design and construction of the CWF
- Sunsets once construction is complete
- Coordinates with DWR's Delta Conveyance Office
- 4 of 5 Board members have been appointed
- Several RFQs are in process such as Geotechnical, Engineer Design Manager; others are in process such as Program Manager, Executive Director, and General Counsel
- Will be business-ready by the end of 2018

CWF Finance JPA

- Formed in July 2018
- Purpose is to issue bonds for CWF until DWR validation action is resolved
- 4 of 5 Board members appointed
- Submitted a WIFIA Letter of Intent
- December 3 deadline for membership

How are we going to pay for it?

Conceptual CA WaterFix Cost Allocation Framework

CA WaterFix Total Cost (100%) ($16.7B)*

Central Valley Project Unsubscribed
33% of Total Costs ($5.6B)*

MWD
Up to 33% Unsubscribed

State Water Project
67% of Total Costs ($11.1B)*

MWD
31.6%
(47.1% of SWP)

Other SWP Contractors
35.4%
(52.9% of SWP)

* 2017 Dollars

SWP Water Transfer Agreements

SWP Water Transfer Agreements

- Framework
  - All south of Delta contractors pay their proportional share of CA WaterFix cost
  - SWP Contractors selling incremental CA WaterFix water reliability benefits
  - Buyer pays 85% of seller's CA WaterFix cost
  - Costs align with benefits
  - Individual agreements may vary

- Potential Participants

Sellers
- Kern County
- Dudley Ridge
- Tulare Lake Basin
- County of Kings
- Oak Flat
- Empire West Side

Buyers
- Santa Clara
- San Gorgonio Pass
- Metropolitan
- Others

SWP Water Transfer Agreements
Agreement Template/Key Terms

- Reliability improvement from CA WaterFix
  - Buyer receives Table A (~81% of improvement)
  - Seller retains Article 21 (~19% of improvement)
- Table A supplies can be scheduled unlike Article 21
- Buyer receives additional transfer benefits should an emergency occur longer than 12 months

SWP Water Transfer Agreements
Agreement Template/Key Terms

- Seller
  - Pays all SWP costs including CA WaterFix costs to DWR
    - Receives 85% reimbursement from buyer, effectively paying 15% of CA WaterFix costs
  - Retains access to Article 21 supplies
  - Retains conveyance capacity for non-project transfers
  - Retains 12 months emergency conveyance for base supply

SWP Water Transfer Agreements

Agreement Template/Key Terms

- Buyer
  - Receives reliability improvement in Table A supplies from CA WaterFix
  - Transfer amount linked to SWP allocation and determined in advance
  - In the event of an emergency lasting longer than 12 months, Buyer receives additional transfer supplies
  - Pays Seller 85% of Seller's CA WaterFix cost

SWP Water Transfer Agreements

Agreement Template/Key Terms

- Example for water transfer of 100,000 AF Base Table A

SWP Allocation	Transfer Water (AF) *
0 to 10%	-
11 to 20%	200
21 to 30%	3,000
31 to 40%	6,000
41 to 50%	7,000
51 to 60%	7,000
61 to 70%	13,000
71 to 80%	22,000
81 to 90%	25,000
91 to 100%	26,000

* Initial analysis, amounts modeled every five years at a minimum

Jennifer Pierre
General Manager, State Water Contractors

Presenter

Jim Watson

General Manager

Sites Project Authority

SITES PROJECT
JOINT POWERS AUTHORITY

Sites Project: Increasing Dry Year Supplies

Mountain Counties Water Resources Association

Symposium

October 26, 2018

Overview

Premise: All water in the river provides some measure of ecologic value

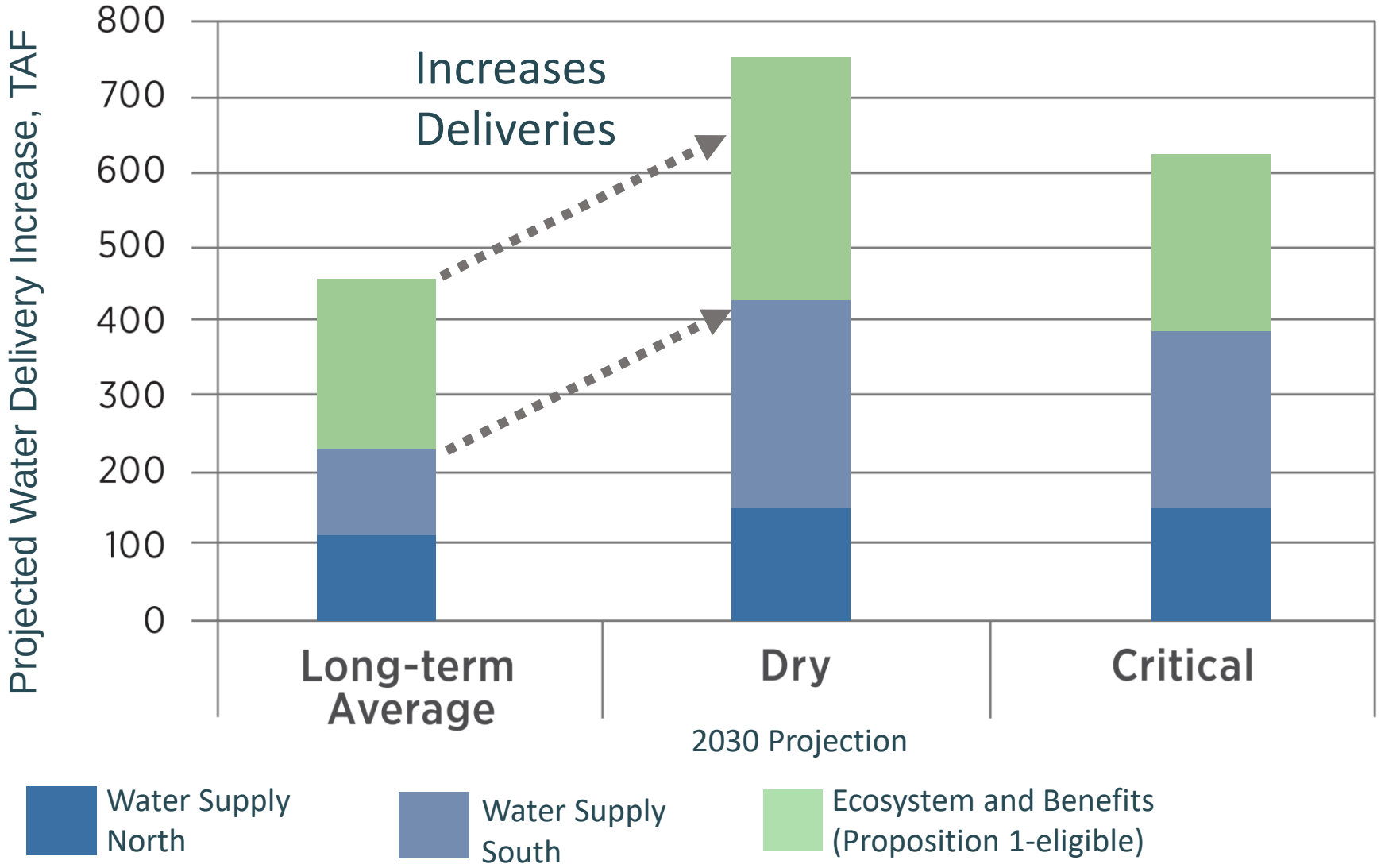
During dry years and in later summer/fall, water is becoming a scarce resource

Sites: To divert water from the Sacramento River when the impacts to these ecologic values are minimal

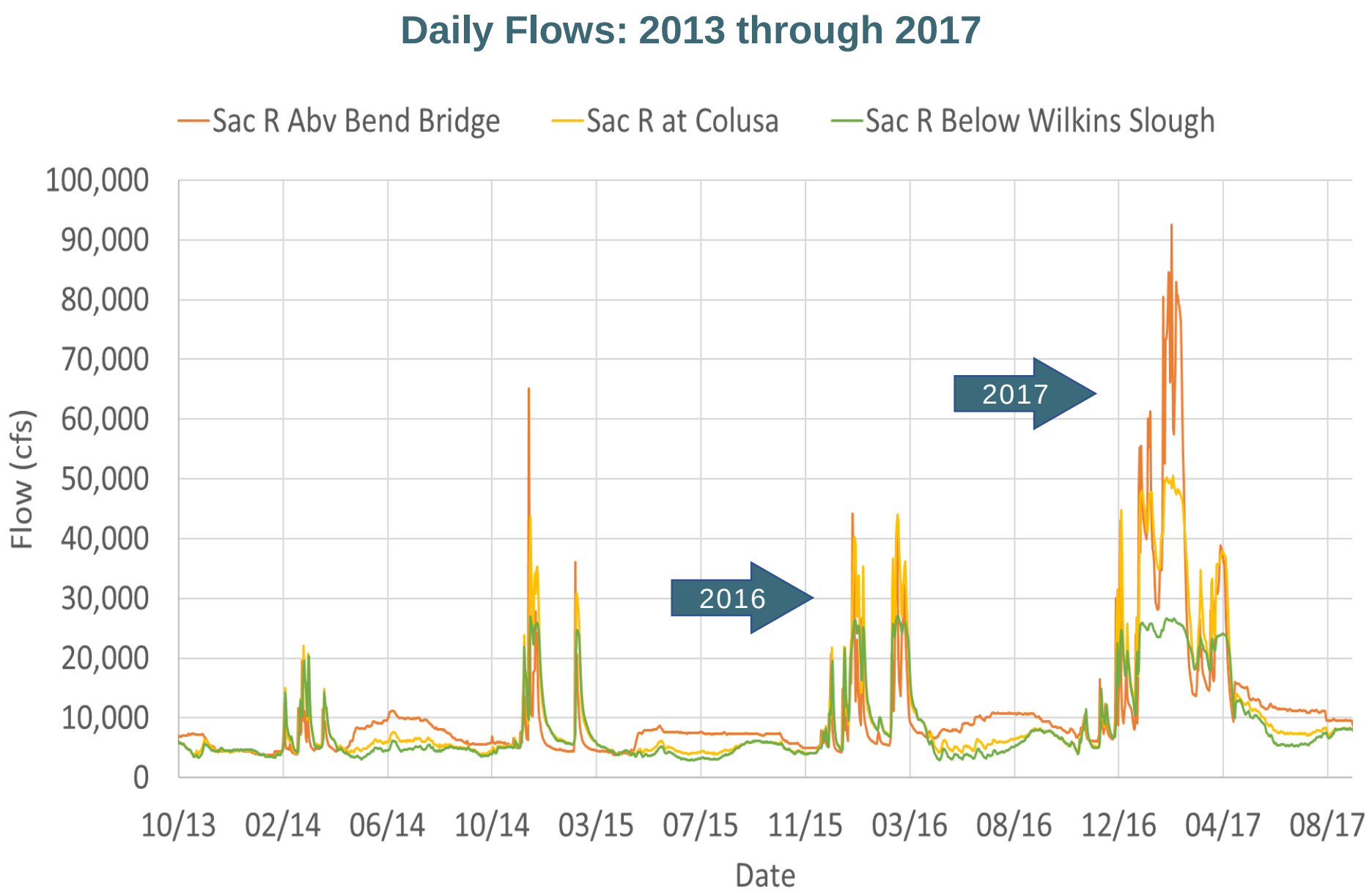
To then release water when and where it can provide the greatest ecologic and water supply benefits,

And, to create a water asset to be managed for the benefit of the environment

Provide More Water in Drier Years

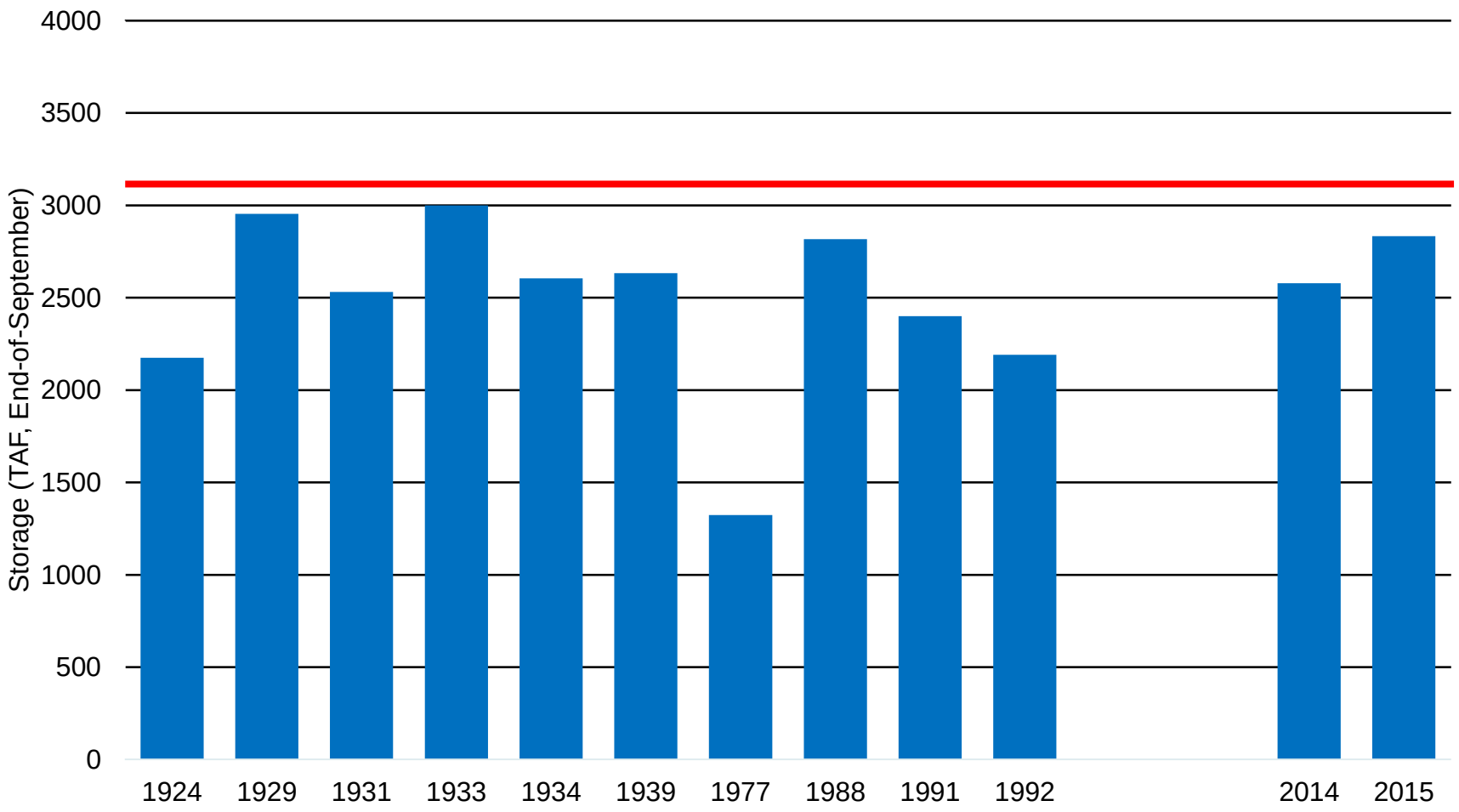


Variability of Sacramento River Flows



Combined Storage During Extremely Dry Conditions

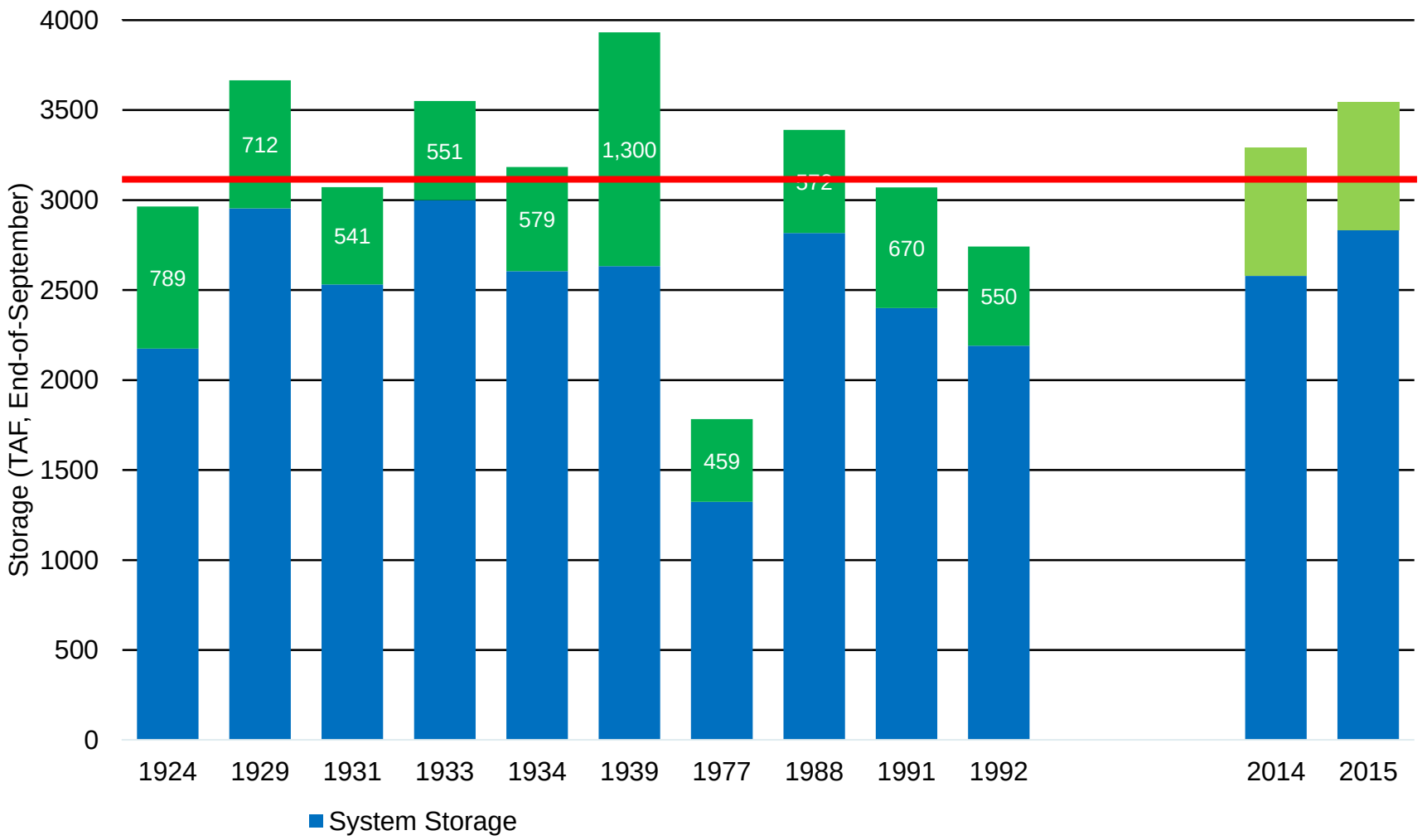
(Shasta, Oroville, Folsom)



Level at which DWR and Reclamation submitted a Temporary Urgency Change Petition on January 29, 2014

Combined Storage During Extremely Dry Conditions

(Shasta, Oroville, Folsom, & Sites)



Level at which DWR and Reclamation submitted a Temporary Urgency Change Petition on January 29, 2014

2012-2016 Drought Management Tools & Results

Tools Used:	Effectiveness:
1. Curtailed lower-value uses	Limited (hardened system)
2. Voluntary actions & agreements	Funding could improve results
3. Curtailed junior water right holders first	Significant acre-feet
4. Waivers were negotiated (TUCP)	"Closed the gap"

Results (Sacramento River):

source: PPIC

- "High-temperature releases from Shasta Dam, leading to ***two consecutive brood year collapses*** of winter-run Chinook salmon"
- "Water deliveries to the refuges were reduced to as little as ***48% of the CVPIA targets***"

Lessons Learned from 2012-2016 Drought

PPIC's Perspective (page 16)

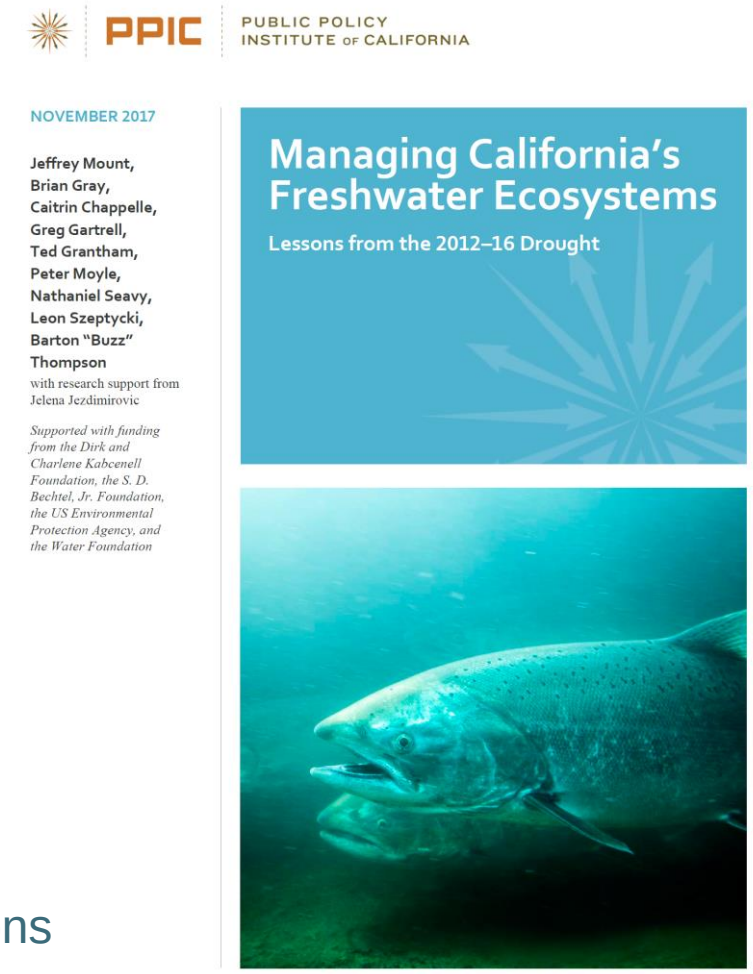
1. Better accounting of water for the environment

2. Develop environmental drought management plans

3. **Create flexibly managed ecosystem water budgets**

   - "rigid environmental flow rules and complex approval systems inhibited adaptation."

   - "management functioned best where there were well defined water allocations for ecosystems"


PPIC PUBLIC POLICY INSTITUTE OF CALIFORNIA

NOVEMBER 2017

Jeffrey Mount, Brian Gray, Caitrin Chappelle, Greg Gartrell, Ted Grantham, Peter Moyle, Nathaniel Seavy, Leon Szeptycki, Barton "Buzz" Thompson
with research support from Jelena Jezdimirovic

Supported with funding from the Dirk and Charlene Kabcenell Foundation, the S. D. Bechtel, Jr. Foundation, the US Environmental Protection Agency, and the Water Foundation

Managing California's Freshwater Ecosystems

Lessons from the 2012–16 Drought

Link: http://www.ppic.org/wp-content/uploads/r_1117jmr.pdf

Environmental Water Budget – (WSIP Application)

Prop 1: A project is eligible for funding if it "will advance the long-term objectives of *restoring ecological health* and improving water management for beneficial uses *of the Delta*"

Eligible Benefits	Long-term Average	Drier-Years
✓ Refuges (Level 4)	33,000	19,000
✓ Delta smelt	39,000	29,000
✓ Chinook salmon	125,000	190,000
Measureable Improvement:	**197,000**	**238,000**

Ecologic improvements will create indirect benefits

Proposed Environmental Water Budget:

Winter-run chinook:

- Increases cold water pool in Shasta
- Decreases summer/fall water temperature

Spring-run chinook:

- Decreases summer/fall water temperature

Fall-run and Late Fall-run chinook:

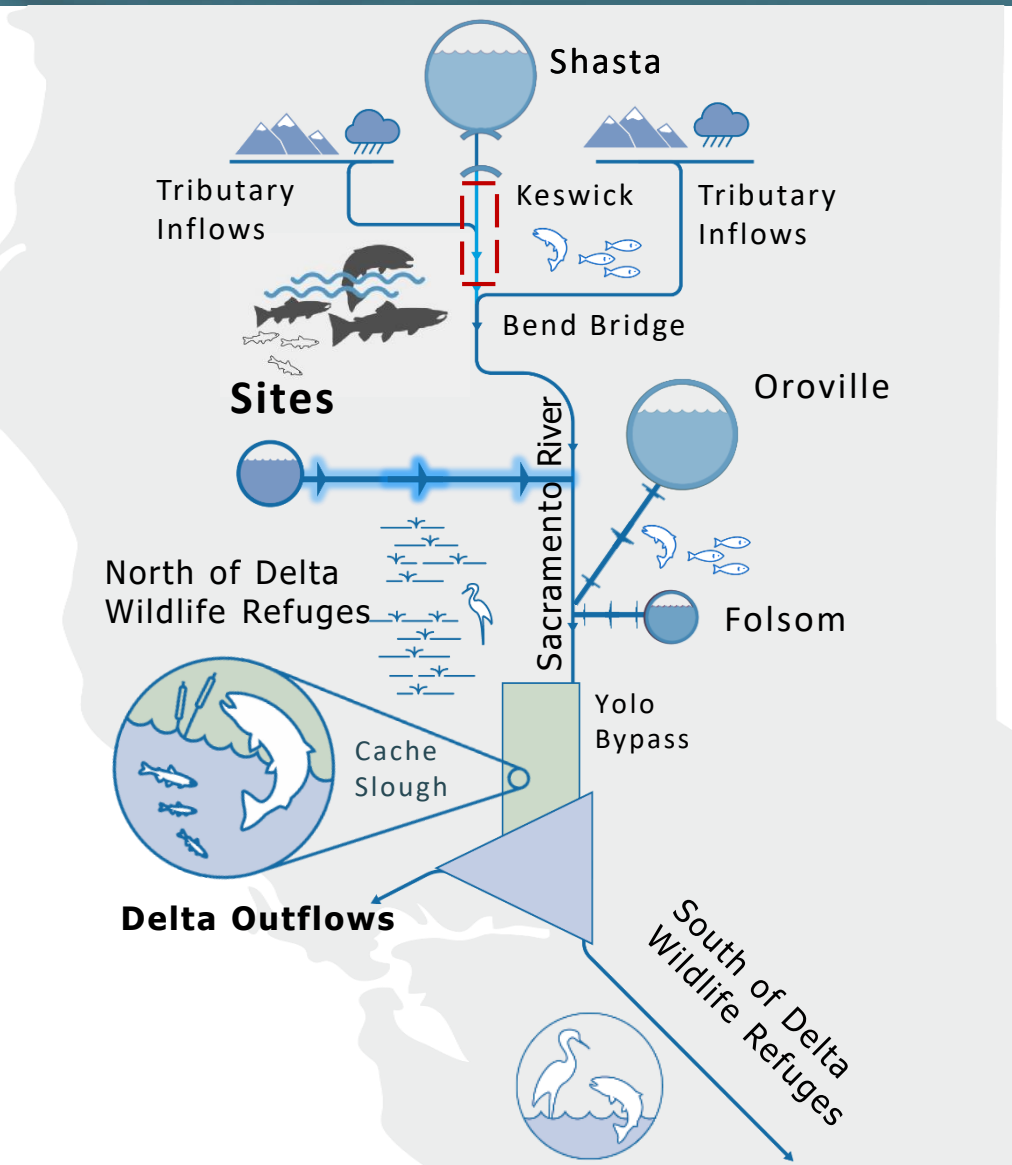
- Improves fall flow stability

Delta smelt:

- Food-rich summer-fall pulse flow

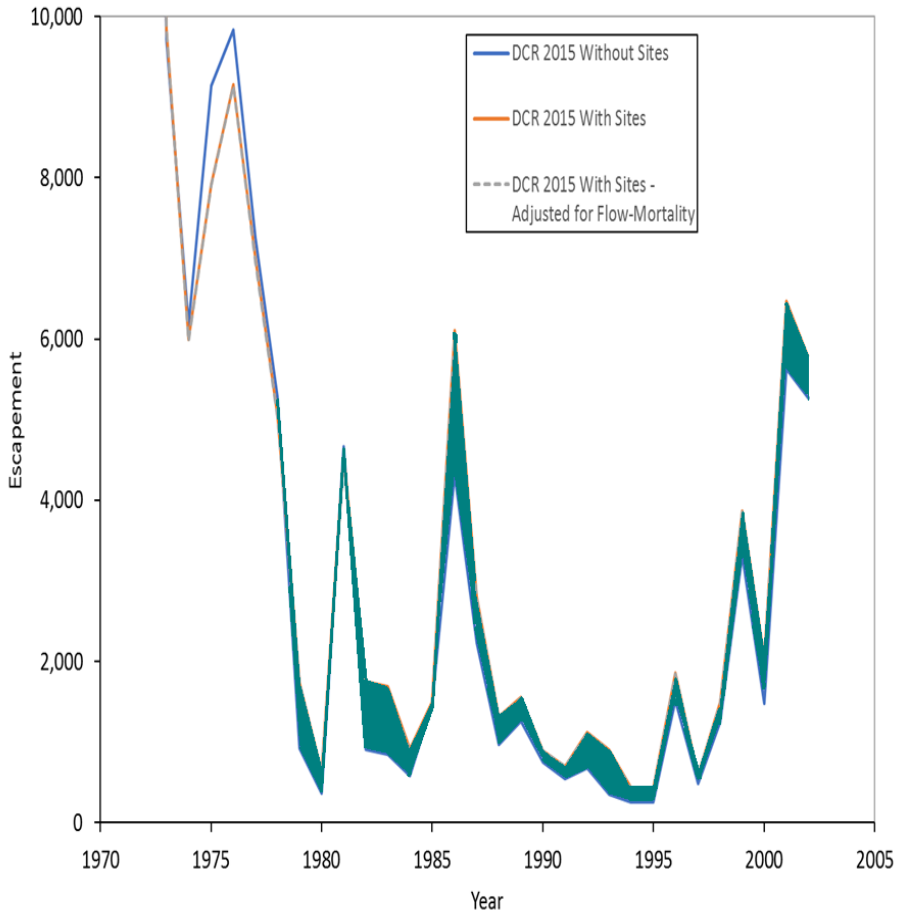
Waterfowl:

- Augment incremental Level 4 water supply

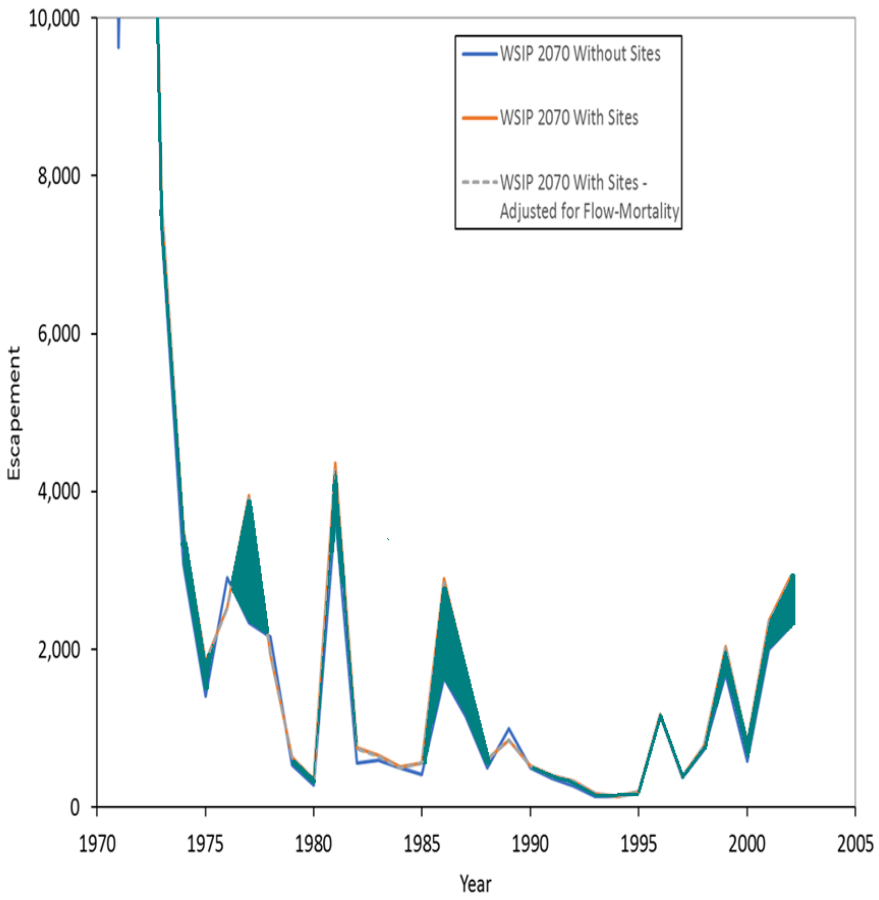


Winter-run Lifecycle Results

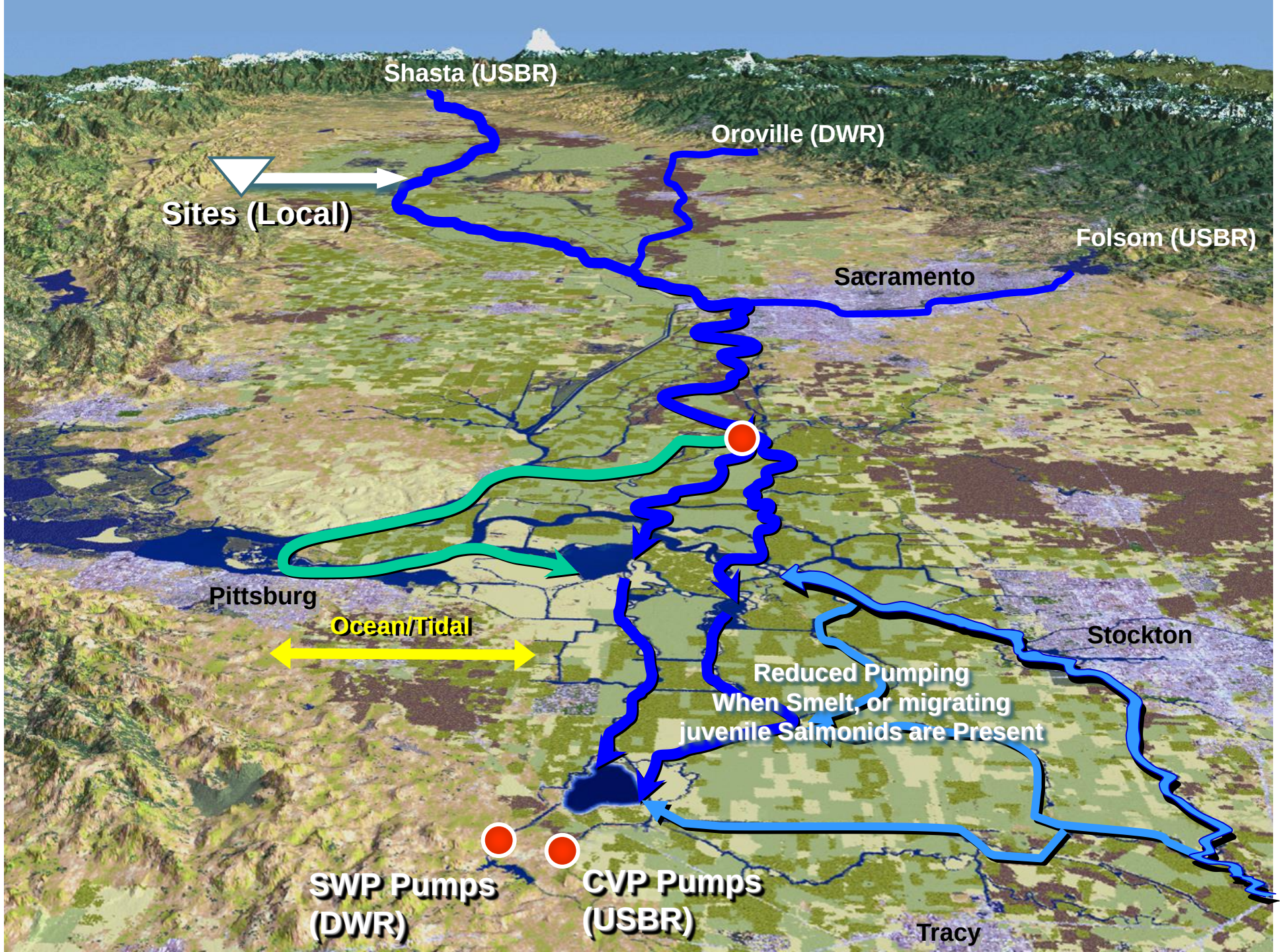
Current (2015)



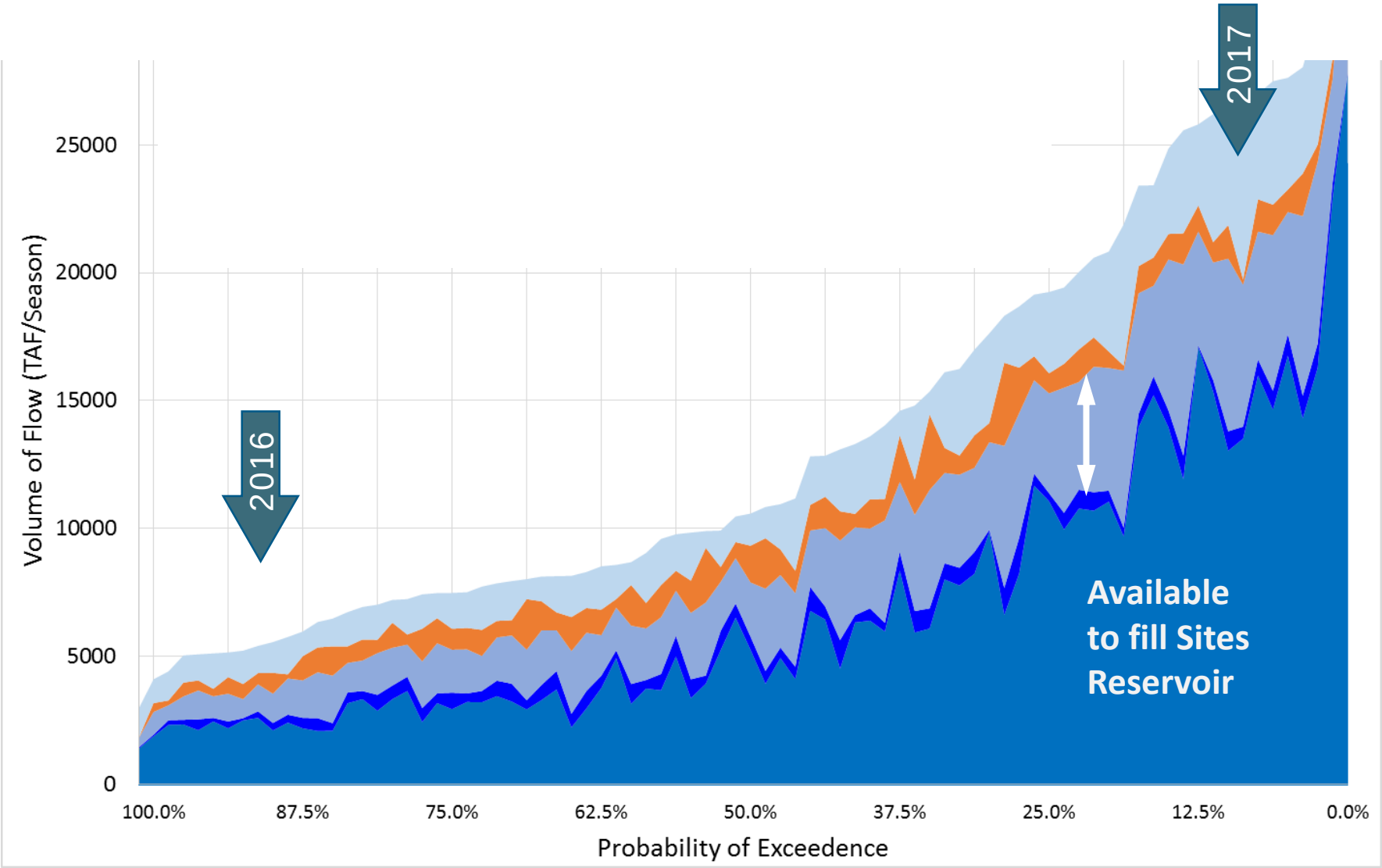
2070 with climate change



Median Annual Escapement of Winter-Run Chinook Salmon


Shasta (USBR)
Oroville (DWR)
Sites (Local)
Folsom (USBR)
Sacramento
Pittsburg
Ocean/Tidal
Stockton
Reduced Pumping
When Smelt, or migrating
juvenile Salmonids are Present
SWP Pumps
(DWR)
CVP Pumps
(USBR)
Tracy

Sacramento River Flows (with Climate Change)



Sacramento River Tributaries below Keswick

Operations

Diversions to Fill:

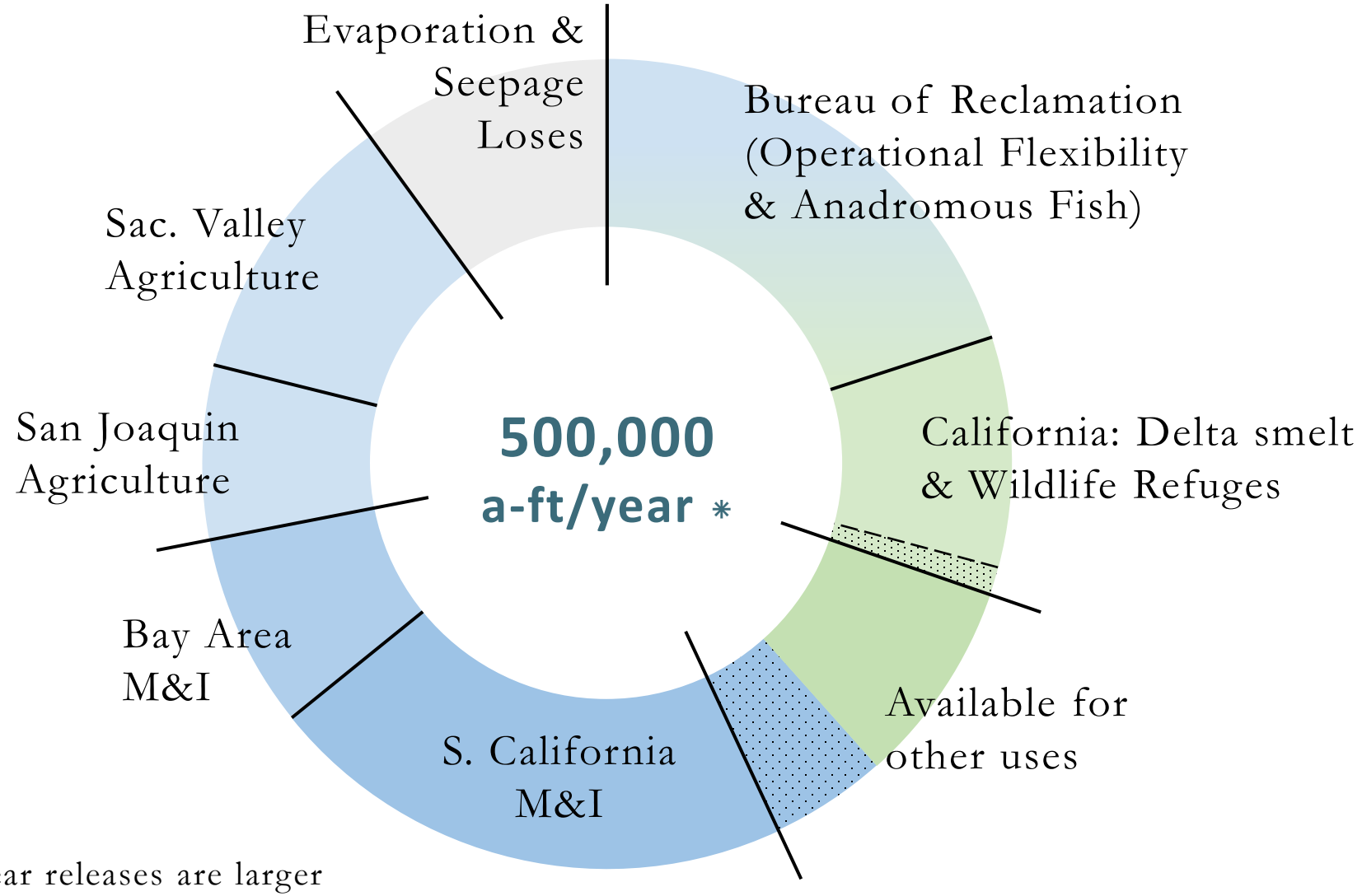
1. During & immediately after storm events
   - Delta is in excess conditions
   - Flows downstream of Keswick
2. After all regulatory requirements have been met
3. After all senior water rights holders' demands have been met

Operations

Releases:

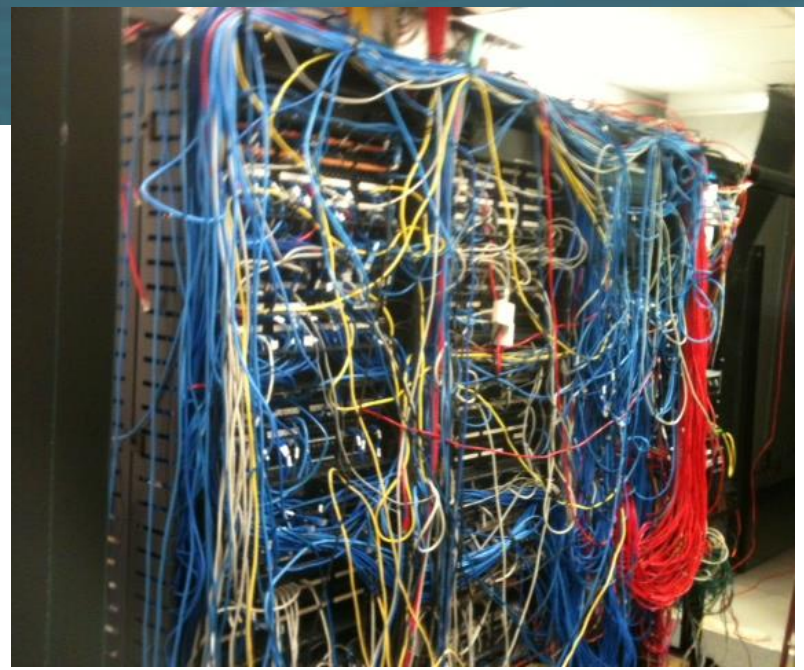
1. Tehama-Colusa canal and GCID Main Canal
2. Sacramento River
3. Colusa Basin Drain
   - Sacramento River
   - Yolo Bypass
4. Indirect via Exchanges:
   - ✓ Shasta
   - ✓ Folsom
   - ✓ Oroville

Participation



* Drier year releases are larger
Water Supply is FOB Holthouse

Challenge: Simplifying Complexity



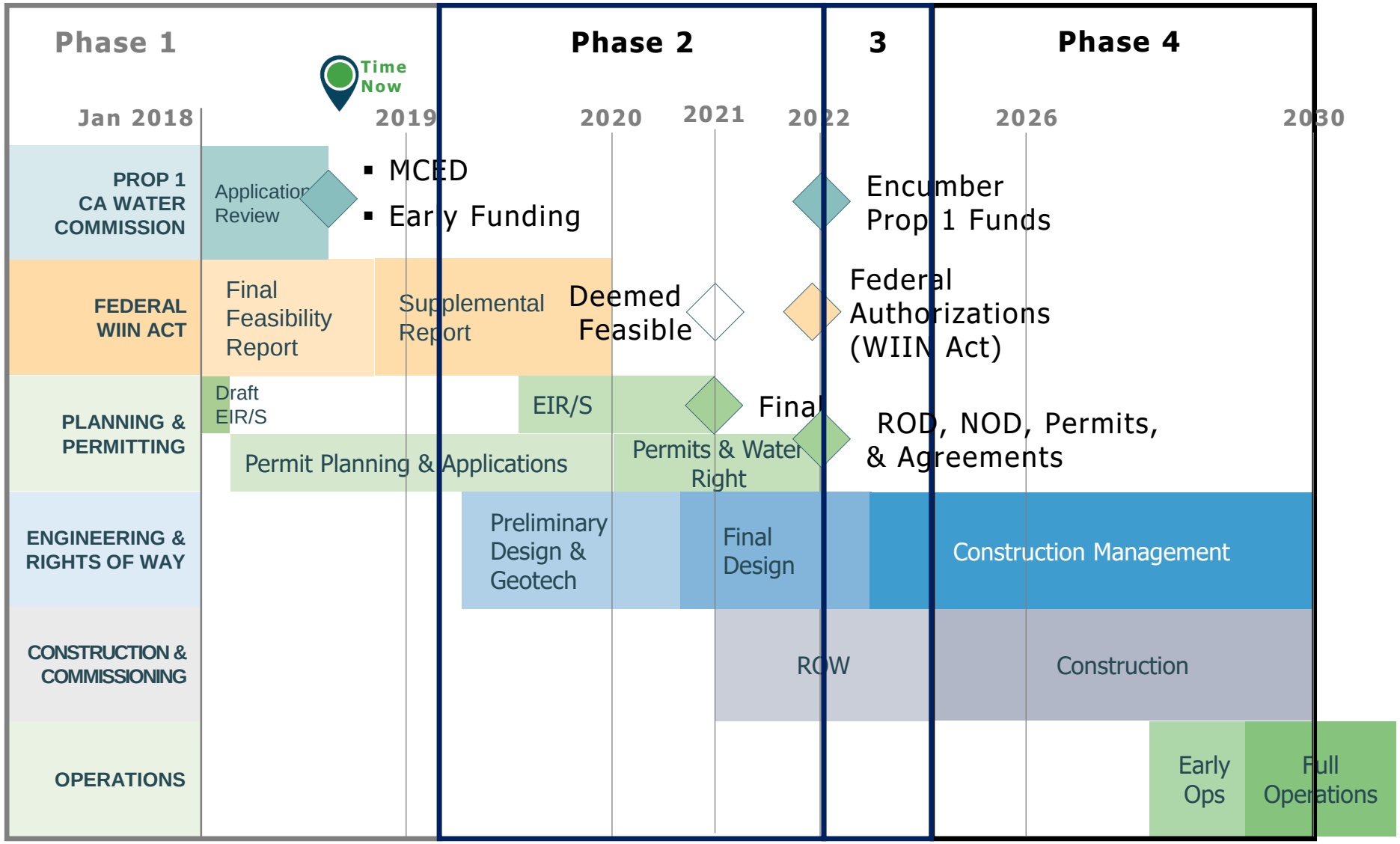
Layers of Complexity:

- State's Water System
- Climate Change & hydrology
- Biological systems
- Human (built environment)
- Political & policy
- Regulatory (multi jurisdiction & complex regulations)
- Others…

Challenge: Managing a Megaproject

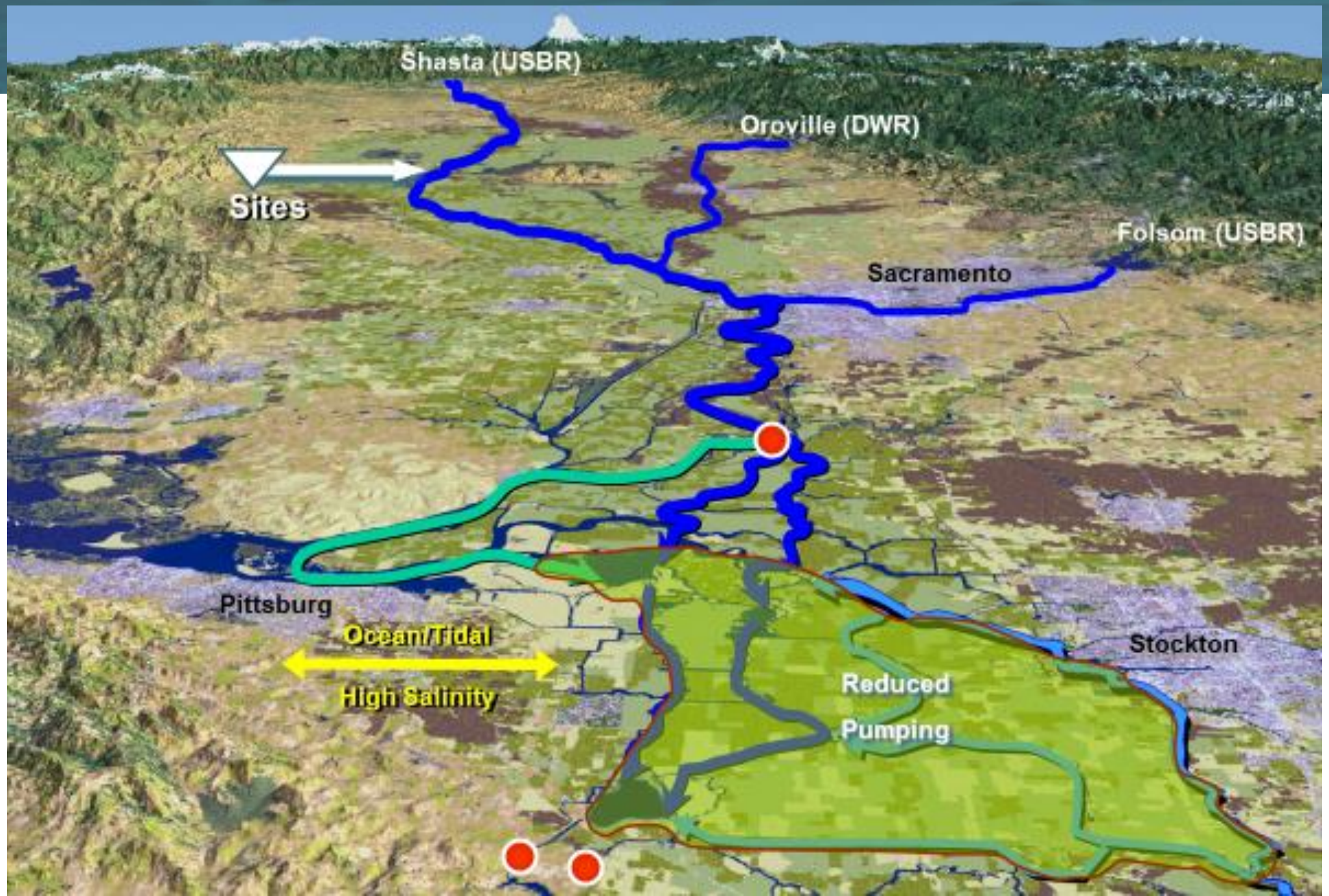
Challenge: Preventing Optimism Bias

Challenge: The Schedule



Sites

Challenge: Future Conditions



Sites Reservoir Project

Questions?