BIG STORAGE

Putting new storage projects in perspective
Looking at the dams

Southern California Water Dialog
MWD, July 27, 2016

Presented by Friends of the River

SOME BASICS

Statewide water use:

40/42 million acre-feet per year

Demand profile:

80% agricultural, 20% urban

Source:

Roughly 50% groundwater, 50% surface water swinging with surface water availability

MORE BASICS

Central Valley Project:

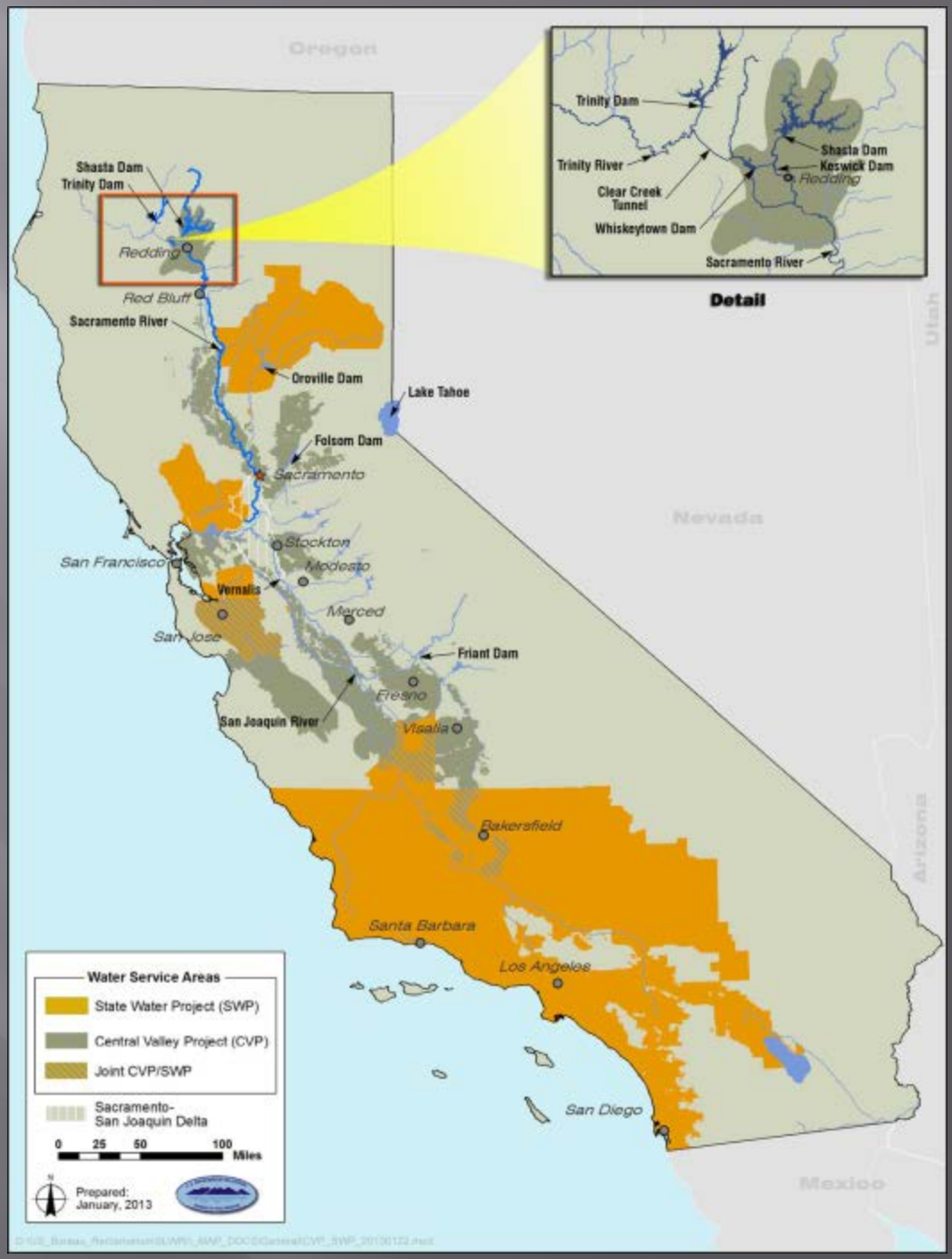
- 7 million acre-feet per year deliveries
- 9 million acre-feet per year control
- Unpaid CVP reimbursable costs approximately $1.3 billion
- Today Reclamation (USBR) wants up-front cost-sharing

State Water Project:

- Average deliveries more than 2 million acre-feet/year

Average Groundwater Overdraft

- 1 to 2 million acre-feet per year
- (mostly San Joaquin Valley)


Oregon
Nevada
Utah
Arizona
Mexico
Shasta Dam
Trinity Dam
Redding
Red Bluff
Sacramento River
Oroville Dam
Lake Tahoe
Folsom Dam
Sacramento
Stockton
Modesto
San Francisco
Vernalis
Merced
San Jose
Friant Dam
Fresno
San Joaquin River
Visalia
Bakersfield
Santa Barbara
Los Angeles
San Diego
Trinity River
Clear Creek Tunnel
Whiskeytown Dam
Keswick Dam
Sacramento River
Detail
Water Service Areas
State Water Project (SWP)
Central Valley Project (CVP)
Joint CVP/SWP
Sacramento-San Joaquin Delta
0 25 50 100 Miles
Prepared: January, 2013

STATEWIDE STORAGE FACTLETS

Statewide Surface Storage:

42 million acre-feet

Central Valley Groundwater:

683 million acre-feet

(1975 California Water Atlas)

Urban Southern California (San Gabriel, San Fernando, Santa Anna, San Jacinto river and mountain watersheds):

109 million acre-feet

(1975 California Water Atlas)

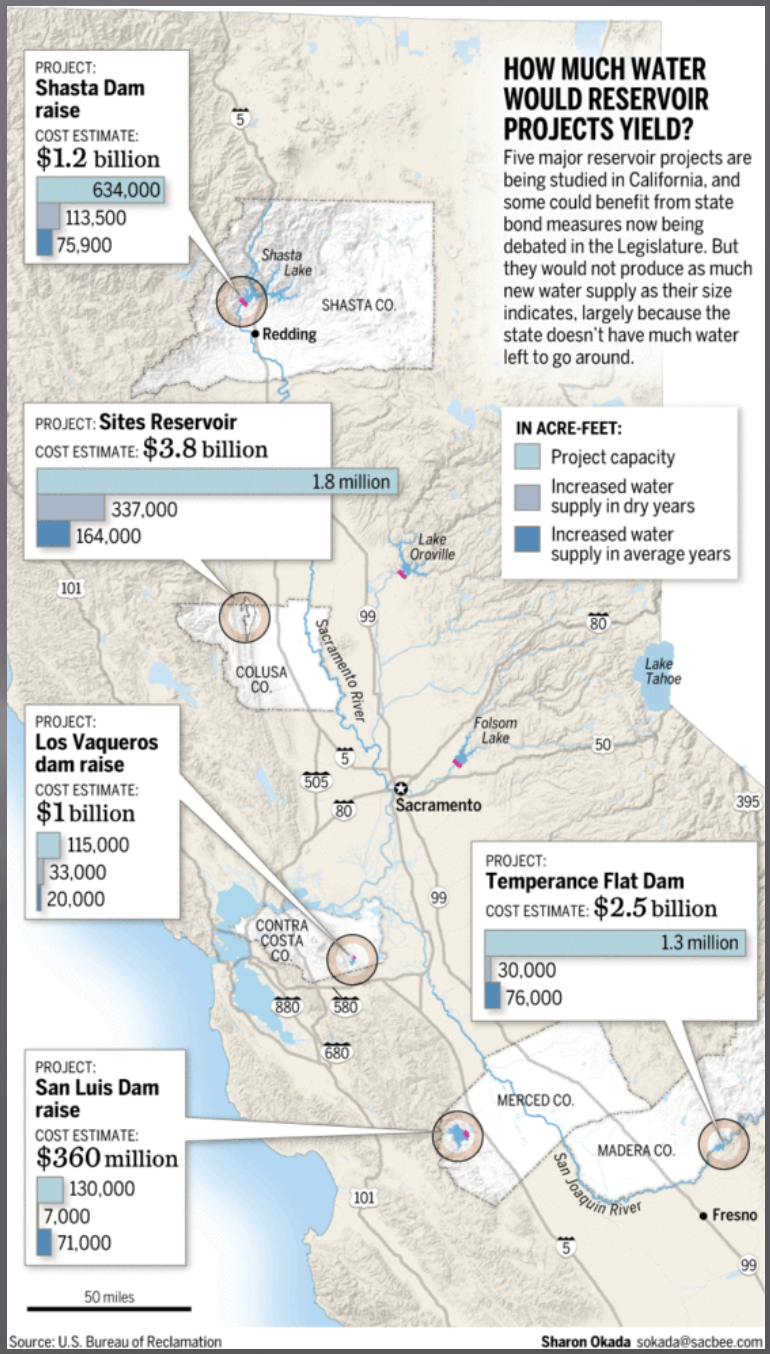
Post-1990 Storage Project	Size *(acre-feet)*	Description
Kern	2,500,000	Groundwater aquifer developed jointly by Kern County Water Agency, Kern Water Bank and the City of Bakersfield. Most of these supplies are used locally, but some of this water has been sold to other regions.
Semitropic	1,650,000	Groundwater storage, developed by Semitropic Water Storage District, serving as a water bank for a variety of agencies in northern and southern California. Additional capacity is available for new partners.
Diamond Valley (Domenigoni)	800,000	Surface reservoir built and paid for by Metropolitan Water District of Southern California (MWDSC) to improve dry-year reliability.
Yuba	200,000	Additional groundwater storage developed by the Yuba County Water Agency.
Arvin-Edison	350,000	Groundwater storage, developed by Arvin-Edison Water Storage District, serving as a water bank for MWDSC.
Los Vaqueros	160,000	Now 160,000 acre-foot surface reservoir to store delta diversions accomplished in two phases (so far) for Contra Costa Water District water quality.
Urban Southern California Groundwater	212,000	Local Groundwater Storage (Long Beach, Chino, Orange County, Compton etc.) Projects managed by Metropolitan Water District of Southern California.
Daly City	60,000	Groundwater banking agreement developed in cooperation with San Francisco Public Utilities Commission.
San Vincente Dam Expansion	152,000	Now 242,000 acre-foot surface reservoir expanded by San Diego County Water Authority for Colorado River water.
Olivenhain Dam	24,000	San Diego County Water Authority surface reservoir for Colorado River water. Connection to Lake Hodges also allows storage of 20,000 acre-feet for emergency use.
Total	6,108,000	Surface storage total: 1,136,000 acre-feet Groundwater storage total: 4,972,000 acre-feet

Cal Fed-like Dams

Storage: Approximately 4 million acre-feet

Yield: Approximately 400 thousand acre feet average annual. (Sacramento Bee numbers here. Other estimates might nearly double this assessment.)
Cost $8.9 billion (Sac Bee numbers)

Representing an increase in statewide storage of 10% and increasing average annual water supply of 1% (or 2%).



Map courtesy of the Sacramento Bee

STATUS OF PROJECTS

Shasta Dam Raise (USBR):

- Final Feasibility Report – July 2015
- Final EIS – Dec. 2015
- No Recommended alternative

Temperance Flat Dam (USBR)

- Draft Feasibility Report – Jan. 2014
- Draft EIS – Aug. 2014
- Final EIS – Aug. 2016
- No FEIS recommended alternative expected
- EIR NOP from SJVWIA expected shortly

STATUS OF PROJECTS

Third Los Vaqueros Dam raise (USBR/DWR/CCWD):

- Supplemental Feasibility Report/EIS – 2017
- Probably will be a recommended alternative

Sites Reservoir (DWR then Sites Project JPA to take over):

- No Feasibility Report
- Administrative Draft EIR – December 2013
- Likely to have an EIR preferred alternative

San Luis Dam raise: (USBR)

- Appraisal Report – December 2013

STATUS OF OTHER DAM PROJECTS

Centennial Dam (Parker Dam on Bear River)

(Nevada Irrigation District)

CEQA NOP – 2016

SOFAR (El Dorado Irrigation District)

CWC Concept paper

New Exchequer Dam (Merced Irrigation District)

Dam raise (Congressional testimony to de-designate National Wild & Scenic River)

Invasion of Corps of Engineers-required flood pool (Merced ID paper)

SHASTA DAM RAISE

Estimated Cost: $1.3 billion

Additional Capacity: 634,000 acre feet

Average Annual Water Delivery Yield: 51,300 acre feet

Water Beneficiaries: Not known

Key issue: Illegal under California law

PURPORTED ENVIRONMENTAL BENEFITS

Bureau: 49% of the dam raise benefits are allocated to providing cold water for endangered salmon downstream.

USFWS: The dam raise will provide only "minimal" benefit to salmon –

90% of the time there will be no benefit to salmon.

OUTSTANDING CONSIDERATIONS

- No cost-sharing partners
- No water rights to serve SWP
- Illegal to construct, illegal to receive bond subsidies
- No support from resources agencies
- Native American cultural resources

SIGNIFICANT UNAVOIDABLE IMPACTS

- Flooding of the state-protected McCloud River
- Flooding of more than 5,000 acres of the Shasta-Trinity National Recreation Area
- Losses in nearly ½ of known populations of the newly discovered Shasta snow-wreath
- Major impacts on Shasta salamander, purple martin, other species
- Possible significant impact on Sacramento River fish and wildlife habitat downstream
- Permanent loss of Winnemem Wintu Tribe cultural sites

AGENCY COMMENTS

USFWS & CDFW:

- Minimal benefits for salmon
- More salmon benefits from non-dam raise restoration actions
- Possible significant impact on Sacramento River downstream
- Significant impacts on wildlife and botanical species
- Possible pollution issue from old mines

USFWS Conclusion: "*The Service is unable to support the adoption of any of the proposed action alternatives.*"

SITES RESERVOIR

Cost: $4.1 billion

$4.2 billion CWC, $6.3 Fed estimate according to LA Times

Capacity: 1.2-1.8 million acre feet

Average Annual Water Supply Delivery Increase (M&I, Ag, environmental/WQ):

184 to 368 thousand acre feet

NODOS PDEIR Appendix A, p. A-74

Water Beneficiaries: Area farmers, SWP & CVP urban water contractors, delta outflow

Key issues: 1) Environmental protections for Sacramento River not established,

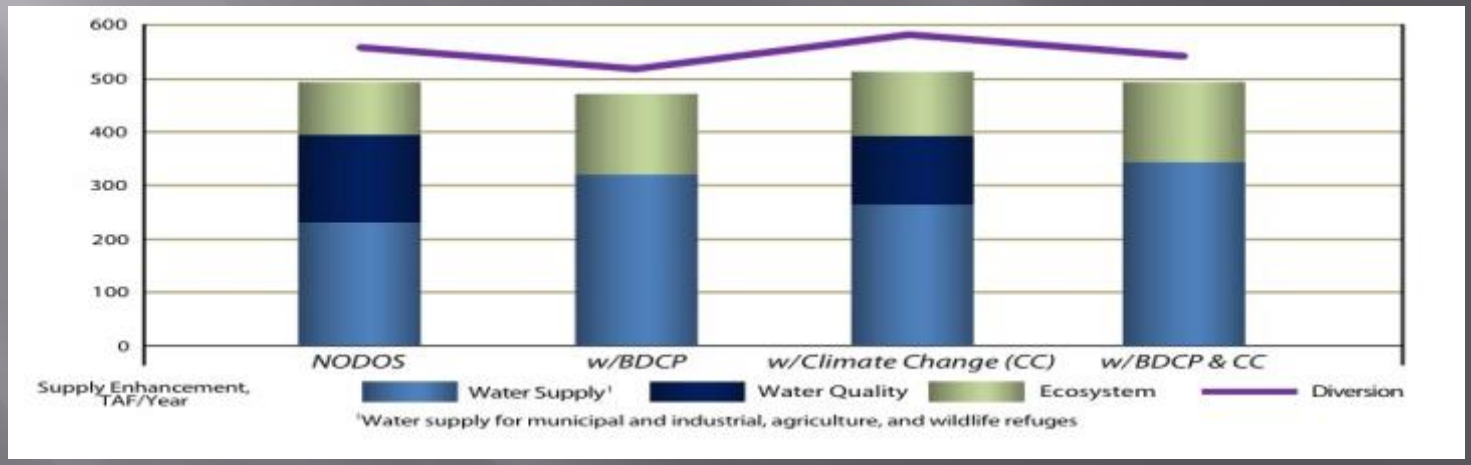
2) Cost and beneficiaries and cost-sharing partners

PURPORTED ENVIRONMENTAL BENEFITS

- Delta water quality (largely water supply benefit)
- Improved salmon production (primarily from coordinated operation with reservoirs on other rivers)
- Low to medium reservoir-based recreation benefits
- Flood damage reduction benefits for 8,625 acres

WATER QUALITY BENEFITS

- Sites only provides Delta water quality benefits if the Delta Tunnels (now CA Water Fix, formerly BDCP) ARE NOT built.
- Water originally allocated to maintain Delta water quality and paid for by Prop. 1 apparently will be sold to water contractors if the Delta Tunnels are built.



SIGNIFICANT UNAVOIDABLE IMPACTS

- Loss of nearly 15,000 acres of wildlife habitat and agricultural fields
- Potential significant impact on Sacramento River ecosystem from reduced flows
- Potential significant impact on botanical resources
- Significant loss of historical/cultural sites, some eligible for the National Register
- Potential temperature and water quality impacts on the Sacramento River
- Potential reservoir-induced seismicity issues
- Reduces water storage in San Luis Reservoir

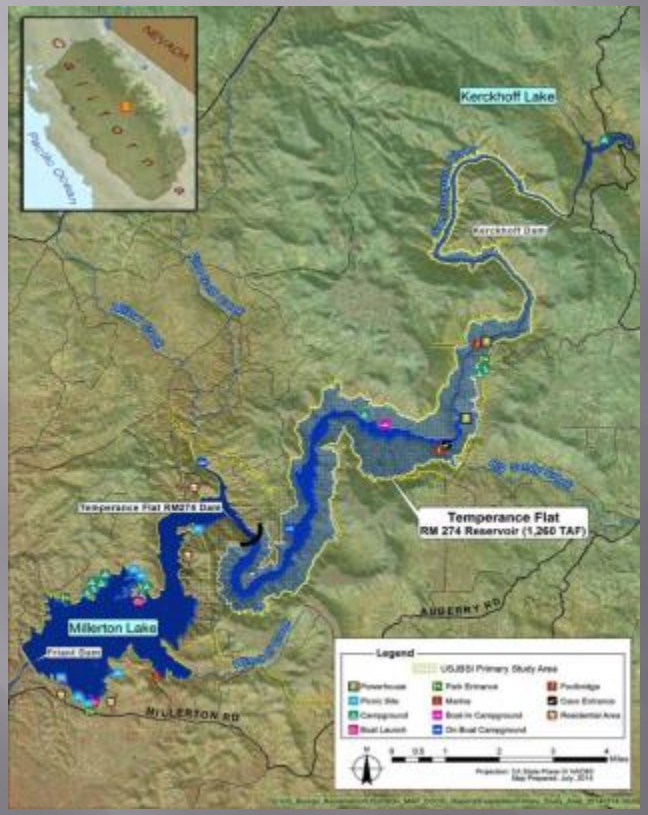
SACRAMENTO RIVER FLOW IMPACTS

- Up to 5,900 cubic feet per second of diversions to fill the reservoir
- Water diverted from 2 existing facilities and one additional new diversion facility
- Current minimum flow standard for the Sacramento River is insufficient and not ecosystem based
- Potential impacts on the Sacramento River National Wildlife Refuge

LIMITED PUBLIC DISCUSSION TO DATE

- No draft EIR available for public and agency review and formal comment
- No draft Feasibility Report available to determine actual beneficiaries and how the project would be operated
- Authority is presently looking for new members and customers. MWD's Jeff Kightlinger says MWD is not a customer without the tunnels

TEMPERANCE FLAT DAM



Cost: $2.6 billion

Capacity: Up to 1.3 million acre feet

Average Annual Yield:
61-94 thousand acre feet

Water Beneficiaries:
30% agriculture, 40% municipal

Key issue: River is fully appropriated, no water rights are available for legal operations by the Temperance Flat Dam

PURPORTED SALMON BENEFITS

Depending on the action alternative and the range of high and low estimates:

- 2.8% to 18.3% increase in spring Chinook salmon abundance in the lower San Joaquin River
- .6% to 13.1% decrease spring Chinook salmon abundance in the lower San Joaquin River

SALMON BENEFITS OVERSTATED

- An independent economic analysis found that the Bureau "extremely exaggerated" alleged ecosystem benefits and concluded that the dam "…is not economically justified."
- TFD's salmon benefits are dramatically overstated and fail to consider adverse ecosystem impacts.

SIGNIFICANT UNAVOIDABLE IMPACTS

- Loss of public recreation lands and scenic quality
- Loss of cultural/historical resources
- Substantial impact on raptors
- Loss of riparian habitat
- Adverse impacts on aquatic habitat
- Adverse temperature conditions for migration salmon and steelhead

SIGNIFICANT UNAVOIDABLE IMPACTS

- Adverse effects on Delta fish habitat
- Loss of existing hydropower generation
- Increase in noise/traffic
- Conflicts with local, state, federal land use plans
- Cumulative impacts on air quality, fish, wildlife, cultural resources, geology, soils, etc.

RIVER GORGE IMPACTS

The Temperance Flat Dam will flood:

- 8 miles of the San Joaquin River Gorge – a river recommended by the BLM for National Wild & Scenic River protection.
- A BLM recreation area visited by 84,000 people annually
- Three campgrounds, an outdoor education center and natural history museum
- Segments of San Joaquin River National Recreation Trail and two other National Trails

RIVER GORGE IMPACTS

The Temperance Flat Dam will also flood:

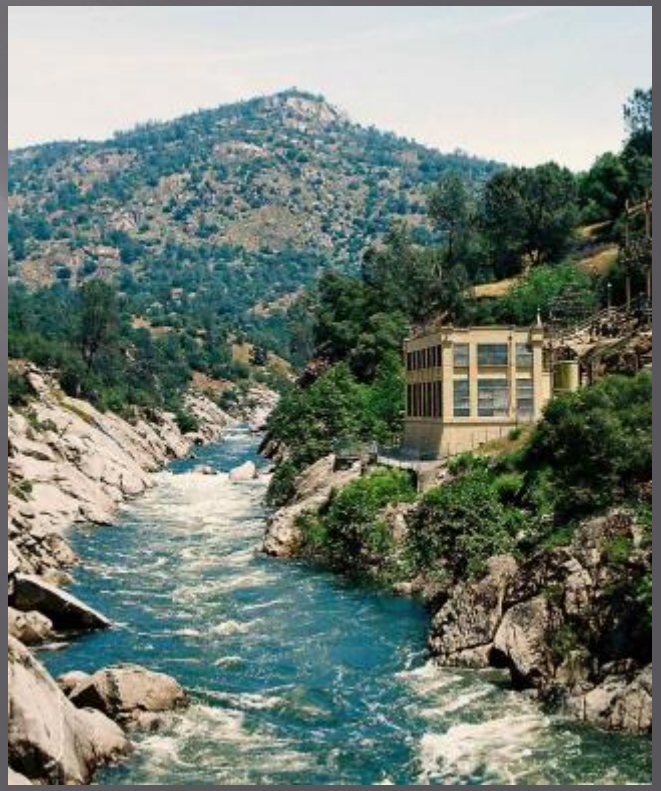
- The unique Millerton Caves system
- A class III-V whitewater kayak run
- Habitat for many special status wildlife and plant species
- Many historical and cultural sites, some eligible for the National Register

AGENCY COMMENTS

- EPA: DEIS does not identify or discuss sufficient mitigation for impacts on 9 miles of river habitat and 5,756 acres of oak woodlands
- CDFW: DEIS fails to adequately consider the ecosystem benefits of flood releases to the lower San Joaquin River.
- SWRCB: The San Joaquin is a fully appropriated stream.

UNRESOLVED ISSUES

- Decide on beneficiaries
- Water rights (river system fully allocated)
- Native American cultural resources
- Environmental impacts and mitigation requirements
- Special designations (BLM's Wild & Scenic River recommendation)
- Hydropower mitigation (loss of PG&E powerhouses)



OTHER PROJECTS

San Luis Dam Raise: No obvious project owner eligible for water bond funding

Exchequer Dam: Raising dam violates the National Wild & Scenic Rivers Act and is therefore ineligible for bond funding. Invading flood reservation needs Corps of Engineers approval (at minimum). No formal applications have been made.

Centennial Dam: $300 to $500 million dollar project whose principal feature is to legally capture water currently held by another water-right and dam owner. They are on an aggressive schedule to complete EIR and EIS for needed permits.

CALIFORNIA WATER COMMISSION

- Responsible for allocating Prop. 1 funds for the environmental, water quality, and other public benefits from new water surface or groundwater storage
- $2.7 billion is likely to be awarded on the basis of comparative value, not whether the public benefit is worth the expenditure at all
- Likely to rely on EIRs from project proponents

CALIFORNIA WATER COMMISSION

- Currently completing regulations for water storage investments
- Sites Reservoir, Temperance Flat Dam, and Los Vaqueros proposals all expect water bond funding, even though their public benefits are questionable. Project feasibility without bond funds are questionable

CURRENT FEDERAL LEGISLATION

- *S.2553 (Feinstein)* – Authorizes the Interior Secretary to spend $600 million for Reclamation storage projects, 25% for projects by others, and establishes a Reclamation bank for water project loans

- *HR 1060 (LaMalfa, Garamendi)* – Pre-authorizes the Sites Reservoir pending Interior Secretary approval.

- *HR2898 (Valadao)* – Increases federal/state water deliveries, weakens protection of endangered fish, repeals San Joaquin River Restoration Act.

- Provisions of all of these bills may find their way into the Energy or Public Land bills or appropriations bills.

THIS YEAR'S STATE LEGISLATION

- AB 1649 (Salas) – Declares that Sites and Temperance Flat provide the most public benefits.
- AB 1647 (Waldron) – Creates CEQA exemption to expand reservoirs by 25%.
- AB 1242 (Gray) – Diverts GGRF to water storage with a goal of increasing statewide storage capacity by 25%.
- AB 2551 (Gallagher) – Authorizes a design-build method for CalFed projects.
- Prospects are poor for passage for most.

THOUGHTS FOR THE DAY

"…the problem isn't that we don't have enough reservoirs, the problem is that there isn't enough water in them."

John Holdren, White House Science Advisor

"It's hard to dam your way to Paradise in California anymore."

Ronald Stork, Friends of the River

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For referenced fact sheets and other information on proposed dams, visit,
www.friendsoftheriver.org

Citations: Shasta Raise (SLWRI)

Pg. 11 – Shasta Dam Summary

Cost: SLWRI Final Feasibility Report (July 2015), Table ES-6 - pg. ES-35

Capacity: SLWRI FEIS (Dec. 2014), Table S-2 - pg. S-31

Average Annual Water Yield: SLWRI Final Feasibility Report (July 2015), pgs. 4-50

Water Beneficiaries: SLWRI FEIS (Dec. 2014), Table S-2 - pg. S-31

Pg. 12 – Purported Environmental Benefits

SLWRI Final Feasibility Report (July 2015), Table ES-8 - pg. ES-35, pgs. 177-178

USFWS: USFWS SLWRI Coordination Act Report (Nov. 2015), pgs. viii, xiii

For Risks & Uncertainty (not shown in slides here) see

SLWRI Final Feasibility Report (July 2015), pgs. ES-36 to 38

Pg. 13 – Outstanding Considerations

SLWRI Final Feasibility Report (July 2015), pgs. ES-44 to 45

Pg. 14 – Significant Impacts

See SLWRI FEIS Executive Summary table S-3

Pg. 15 – Agency Comments

USFWS SLWRI Coordination Act Report (Nov. 2015)

CDFW SWLRI DEIS Comments (Aug. 2013)

Citations: Sites Reservoir (NODOS)

Pg. 16 – Sites Reservoir Summary

Cost: NODOS Investigation Highlights (May 2014), Table 1 – pg. 9

Capacity, Total Releases, Water Beneficiaries: NODOS ADEIR Executive Summary Table ES-5 – pg. ES-23,

NODOS Progress Report (Dec. 2013) Table S-7 – pg. 7-2, NODOS ADEIR Table G-16 – pg. G-54

Pg. 17 – Purported Environmental Benefits

NODOS Progress Report (Dec. 2013), pgs. ES-4 to 6

Pg. 18 – Water Quality Benefits

NODOS Investigation Highlights (May 2014) Figure 6 – pg. 8

Pg. 19 – Environmental Impacts

NODOS ADEIR Executive Summary (Dec. 2013) Table ES-5 – pgs. 1-51

Pg. 20 – Sacramento River Flow Impacts

Friends of the River NODOS Scoping Comments (Jan. 2002)

By extrapolation: USFWS SLWRI Coordination Act Report (Nov. 2015)

Citations: Temperance Flat Dam (USJRBSI)

Pg. 22 – TFD Summary
Cost: USJRBSI Draft Feasibility Report (Jan. 2014) pg. ES-15
Capacity: USJRBSI Draft Feasibility Report (Jan. 2014) Table ES-1, pg. ES-16
Average Annual Yield: USJRBSI DEIS (Aug. 2014) Table ES-2, pg. ES-29
Water Beneficiaries: Extrapolation of figures in USJRBSI DEIS (Aug. 2014) Table ES-2, pg. ES-29
Pg. 21 – Purported Salmon Benefits
USJRBSI DEIS (Aug. 2014) Table ES-2, pg. ES-29
Pg. 22 – Salmon Benefits Overstated
Review of Economic Benefits and Cost in the January 2014 Draft USJRBSI Feasibility Report by Dr. Jeffrey Michael
NRDC et al comments on the USJRBSI Draft Feasibility Report, April 2014.
Pgs. 25-26 – Significant Unavoidable Impacts
USJRBSI DEIS (Aug. 2014) Table ES-3, pgs. ES-235 to 104
USJRBSI DEIS (Aug. 2014) Table ES-4, pgs. ES-105 to 106
Pg. 27-28 – River Gorge Impacts
FOR et al comments on the USJRBSI DEIS, Oct. 2014
FOR comments on the USJRBSI Draft Feasibility Report, April 2014
Pg. 29 – Agency Comments
EPA & CDFW comments on USJRBSI DEIS, Oct. 2014
SWRCB comments on USBR Permits 11885-87, Aug. 2014
For Risk & Uncertainty not shown here, see,
USJRBSI Draft Feasibility Report (Jan. 2014) pg. ES-30
Pg. 30 – Unresolved Issues
USJRBSI Draft Feasibility Report (Jan. 2014) pg. ES-32
Friends of the River Unresolved Issues memo (on FOR website)