

# Sacramento Valley Water Users

State Water Resources Control Board

December 7, 2016



# *Topics*

- Overview
- Hydrology, operations, and modeling
- Biological issues
- Current Sacramento Valley environmental enhancement projects
- Conclusions

# *Overview*

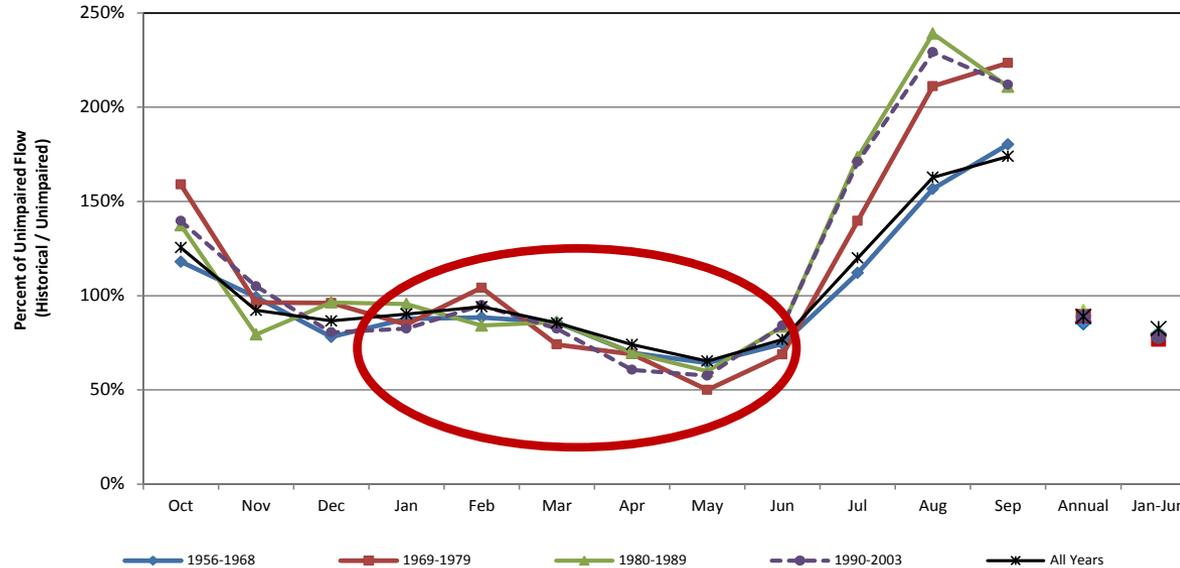
- The “percent of unimpaired flow” approach would not work for 21st century California
- The “functional flow” approach is the preferred alternative for the Sacramento Valley

# *Review of Hydrology, Operations and Modeling by MBK Engineers*

- Percentages of Sacramento River Basin outflows have not changed substantially since late 1950s
- Increase of 300 TAF Delta outflow with D-1641
- Additional 1 MAF Delta outflow requirements were imposed in 2008 with BiOps
- 50% of unimpaired flow requirements would have extreme adverse impacts
- This is a complex system, and there are many tradeoffs between different operations goals

# Percent of Jan.-June Unimpaired Sacramento River Basin Outflow has not changed significantly since late 1950s

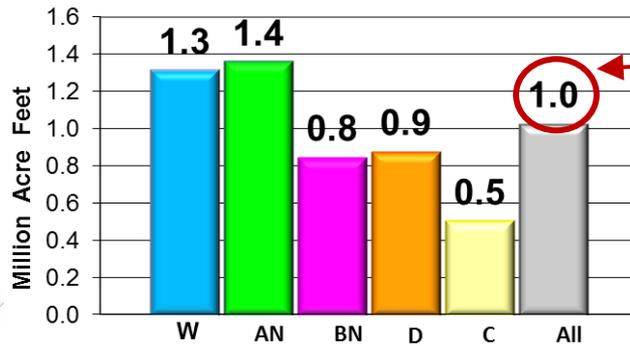
Presented during September 6, 2012 SWRCB workshop



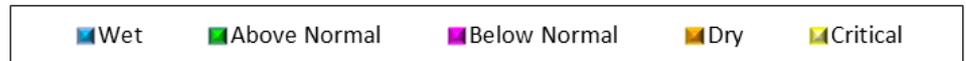
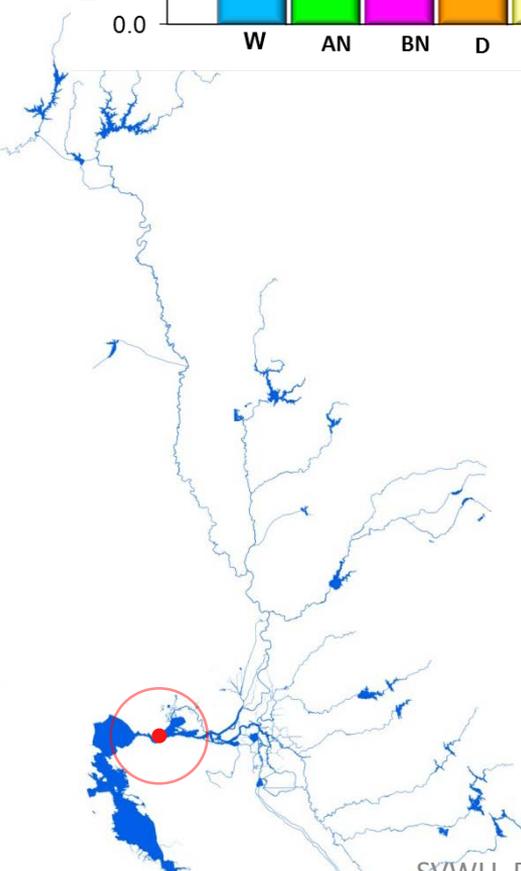
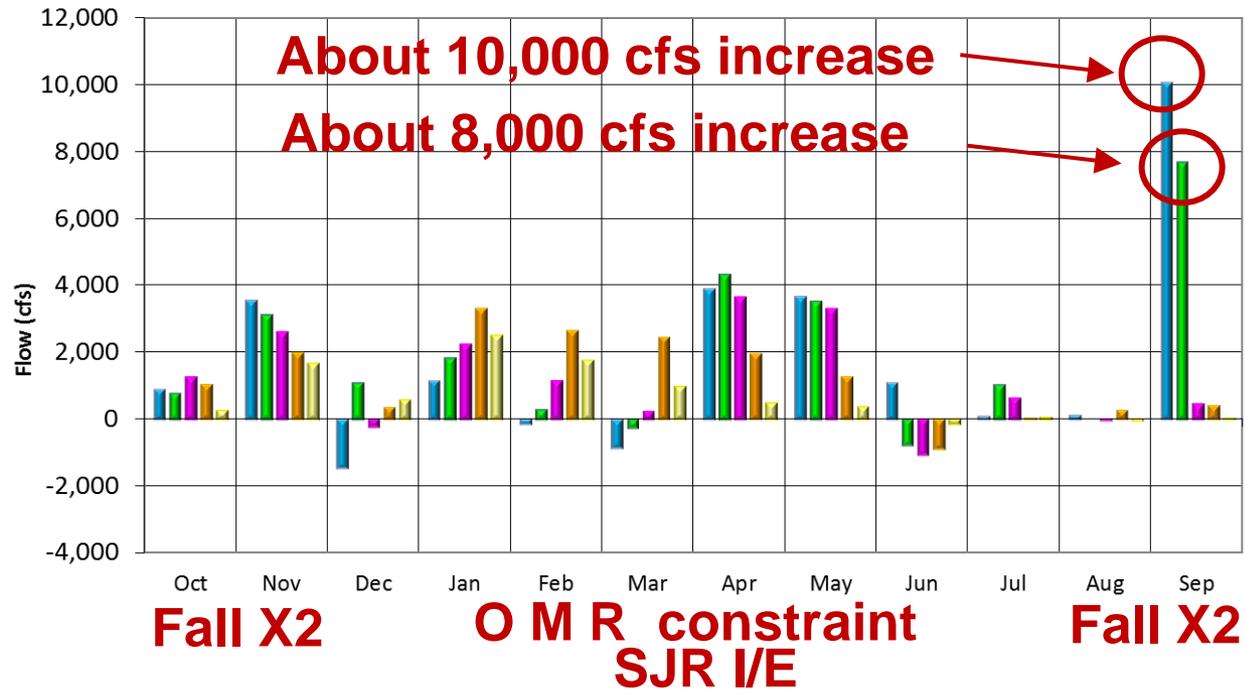
- Hydrology is variable, but the percentage of January-June unimpaired flow that flows from the Sacramento River basin to the Delta has not changed significantly since the late 1950s

# Delta Outflow Changes Since 2006 - Effect of BiOps

Presented during November 14, 2012 SWRCB workshop



**Delta outflow is increased about 1,000,000 acre feet per year**





Folsom - 1991

## *CVP/SWP Operational Changes with BiOps*



Oroville - 1991

- **Without BiOps** : CVP/SWP relied on exporting surplus flows and used storage for dry year reliability
- **With BiOps** : Ability to divert surplus is limited, therefore the CVP/SWP rely on storage releases to meet demands and flow requirements

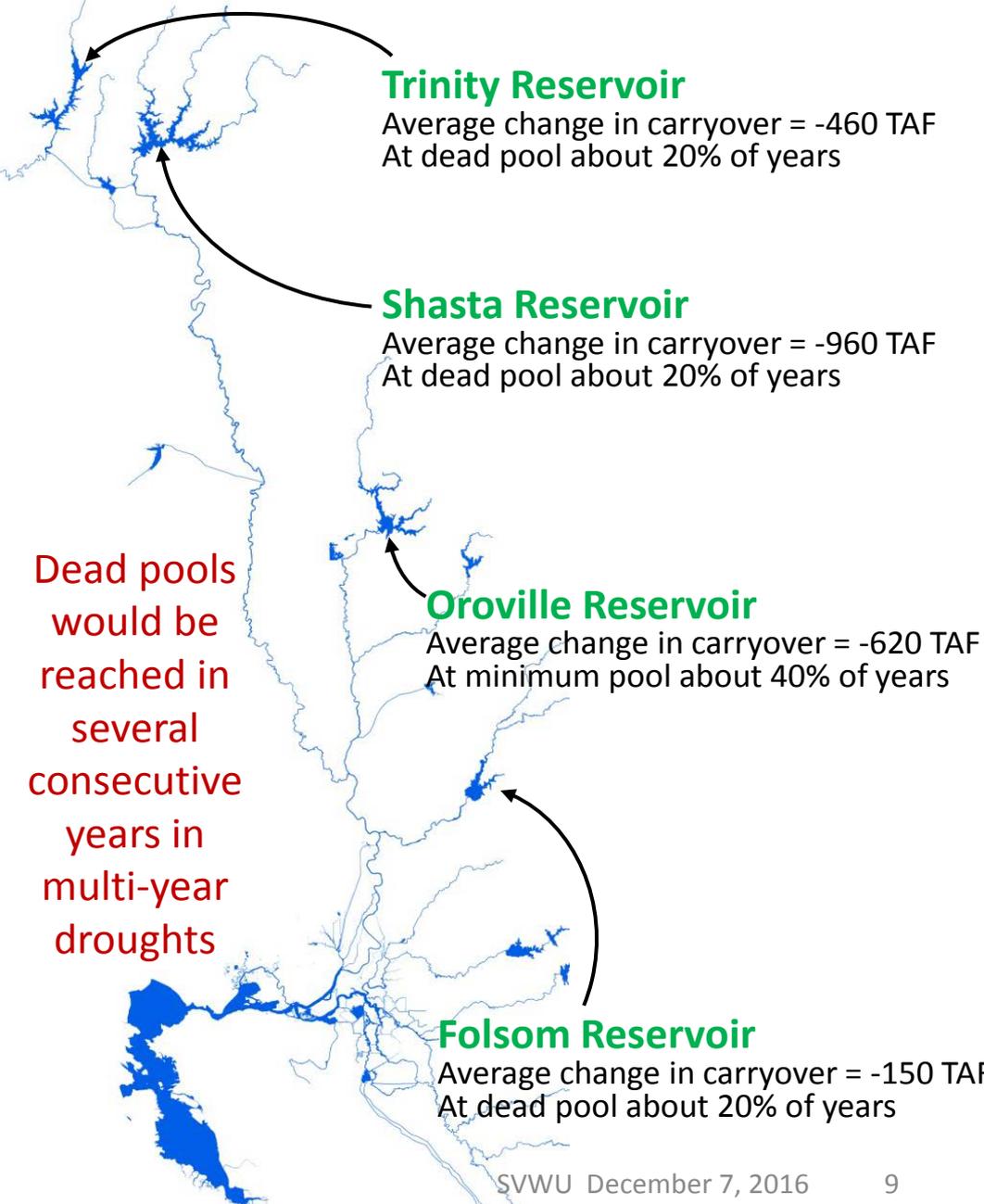
**The BiOps have substantially decreased water supply reliability for many beneficial uses**

# *Hydrologic Impacts of Delta Flow Requirements Based On Unimpaired Flows*

- “Percent of unimpaired flow” requirements would likely affect cold water pools and instream temperature in all but the wettest of years
  - The Draft Scientific Basis Report addressed this with a brief narrative objective to be “further evaluated”. This narrative objective does not define what actions would be taken or how cold water pool management would be accomplished for most years.
  - With “percent of unimpaired flow” requirements, actions would be needed to balance beneficial uses of water all the time. Using functional flows, or a mechanistic type of approach, instead is preferable

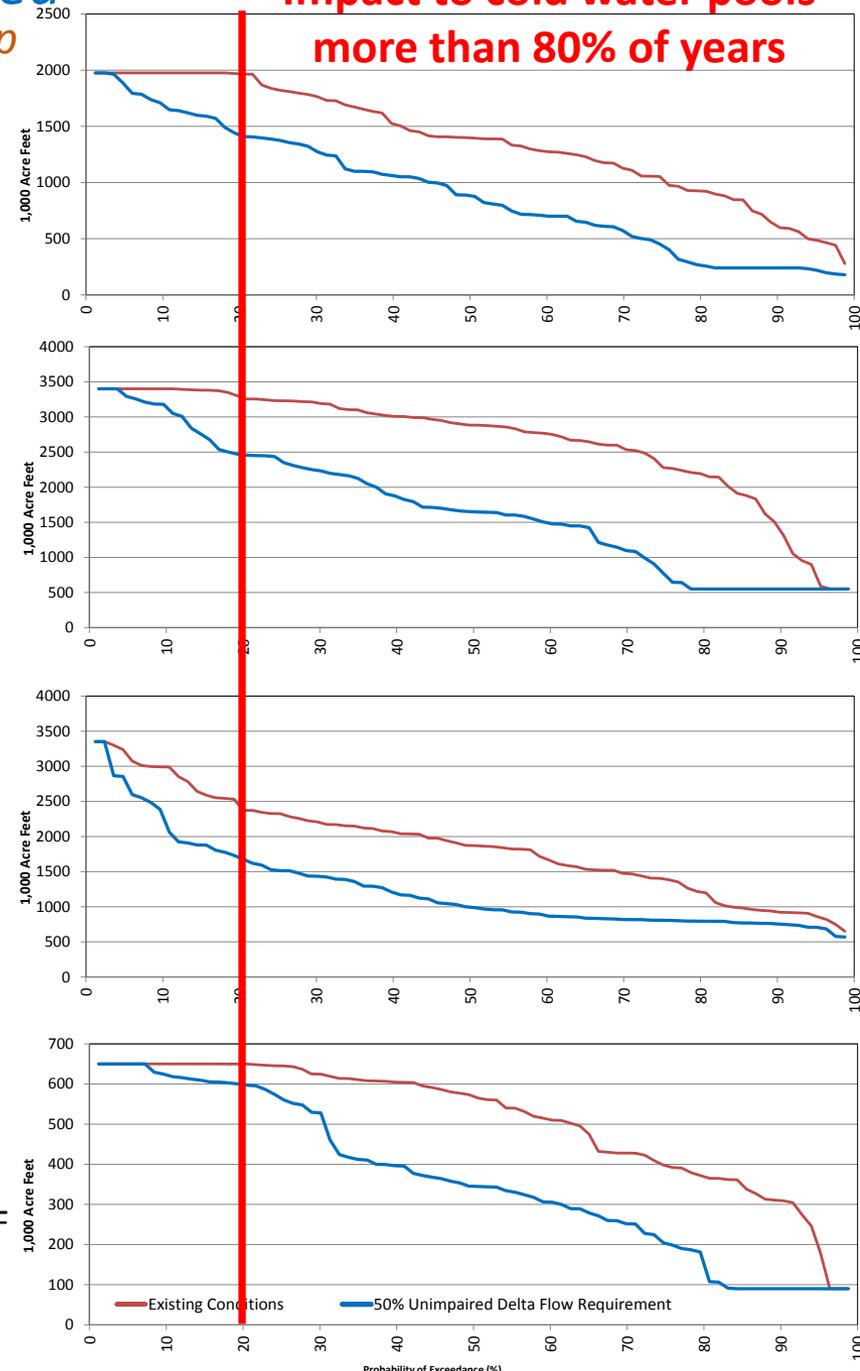
# Project Reservoirs with 50% of Unimpaired

Presented during September 6, 2012 SWRCB workshop



## Impact to cold water pools

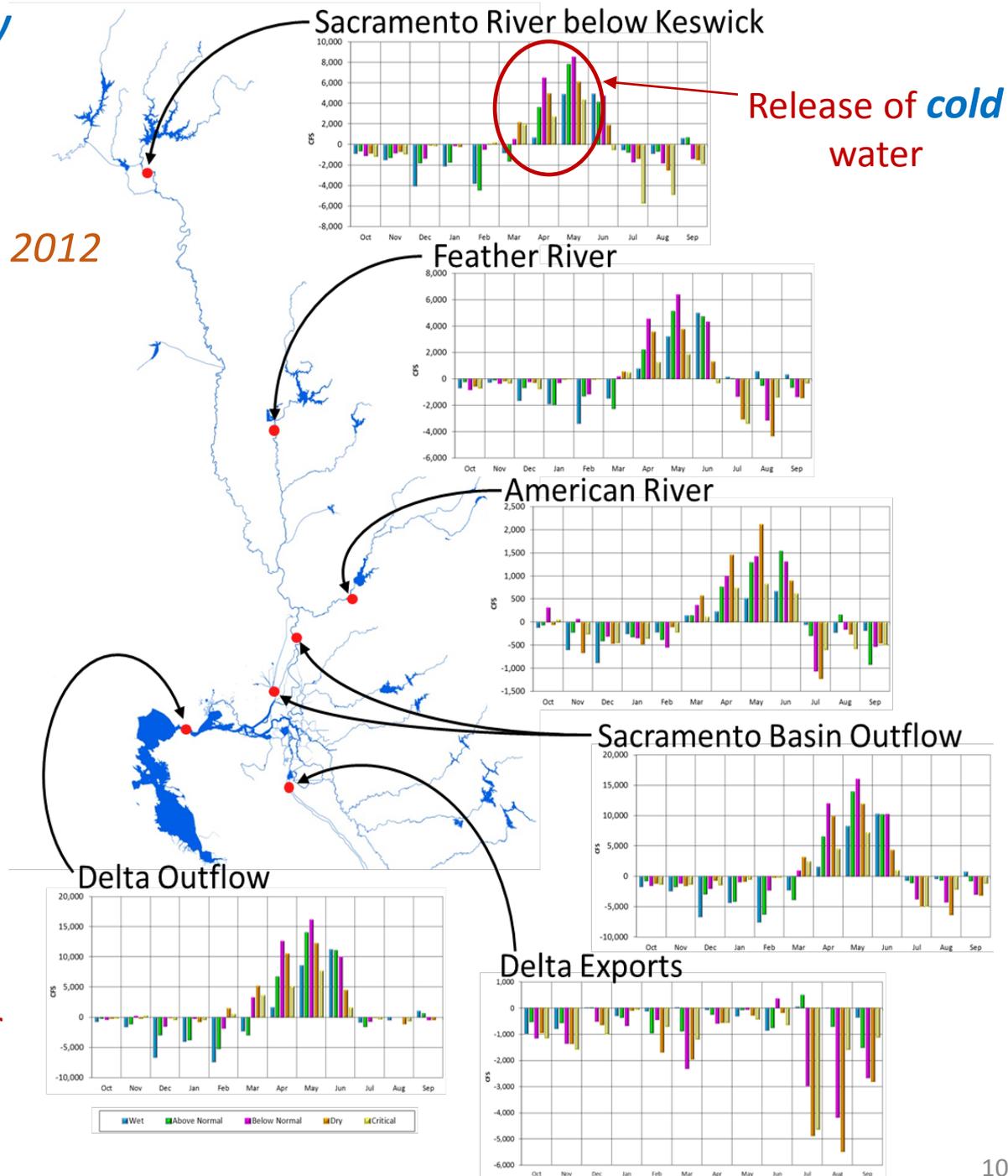
more than 80% of years



# Average Monthly Flow Changes at 50% Unimpaired Flow

Presented during September 6, 2012 SWRCB workshop

- Significant shifts of flow from summer and fall to spring
- Unable to build cold water storage in spring months
- Impacts on flows for salmon and steelhead rearing and spawning habitat
- Impacts on hydropower generation during peak-demand periods
- **Can not simply reduce summer releases to recover lost cold water**



# *Summary of Dave Vogel's Conclusions and Recommendations on the Working Draft Scientific Basis Report (SBR) Pertaining to Anadromous Salmonids*

- The SVWU parties will submit Dave Vogel's written report by the comment deadline. These slides provide a brief summary of some of the key findings:
- The best available science concerning anadromous salmonids was not used in preparing the SBR -- relevant science on anadromous salmonids, previously provided for the 2012 SWRCB Workshops, was overlooked or ignored.
- Information re: Sacramento River basin anadromous salmonids presented in the SBR is incomplete and largely out-of-date.
- Many statements in the SBR re: anadromous salmonids are unsubstantiated with no supporting scientific basis.
- The SBR does not address major scientific uncertainties and highly complex variables affecting salmonids.

# *Summary of Dave Vogel's Conclusions and Recommendations (Cont'd)*

- There are numerous conflicting and confusing statements concerning unimpaired flows and natural flows.
- The SBR frequently recommends “mimicking the natural hydrograph” for purported benefits to anadromous salmonids, but recommends artificially “sculpting” flows that would not reflect natural hydrologic conditions.
- The SBR lacks descriptions of alleged flow-related problems in the Sacramento River and its tributaries on a specific spatial and temporal basis.
- The SBR is severely deficient in not providing any meaningful details on non-flow measures that could be implemented to benefit salmonids.

# *Summary of Dave Vogel's Conclusions and Recommendations (Cont'd)*

- The SBR does not adequately describe the specific biological mechanisms that would result from the flow recommendations, and does not quantify how those mechanisms would benefit anadromous salmonids.
- The SBR provides no meaningful understanding of redirected impacts on other species and life stages resulting from the flow recommendations – e.g., major reductions in water storage in the large reservoirs (Shasta, Oroville, Folsom).
- The document is severely deficient in the section concerning other stressors on anadromous salmonids, and additional management actions which could be implemented to benefit salmonids.

# *Summary points for pelagic fishes*

## *by Robert J. Latour*

- Analytical framework needs significant improvement
  - Analyses of flow-abundance relationships are based on survey indices rather than fish population dynamics models that explicitly incorporate vital rates (e.g., survival, growth, movement, etc.)
  - Conclusions rest on correlations rather than analyses of causative mechanisms
  - Statistical methods used to estimate Fall Midwater Trawl indices are flawed (see Newman 2008, Latour 2016)

Newman, K. 2008. Sample design-based methodology for estimating delta smelt abundance. *San Francisco Estuary & Watershed Science* 6(3).

Latour, R.J. 2016. Explaining patterns of pelagic fish abundance in the Sacramento-San Joaquin Delta. *Estuaries and Coasts* 39:233-247.

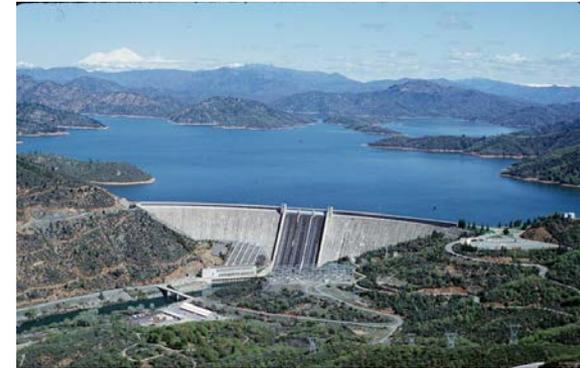
- Current strict reliance on indices, rather than survey data, results in tremendous loss of information that relates fish presence and abundance to environmental factors. A significant analytical shift is necessary.
  - Relate raw catch-per-unit-effort (CPUE) data to environmental variables of interest (e.g., Latour 2016)
- Conclusions do not account for scientific uncertainty which is known to be substantial for survey data

# *Multiple Beneficial Uses Are Supported by Sacramento Basin Water Supply*

Salmon and steelhead rearing and spawning



Peak Hydropower Generation



Agricultural and M&I water supplies



Pacific Flyway migratory bird habitat and refuge deliveries



Recreation



Source: Anthony Dunn Photography

# Re-managing the Flow

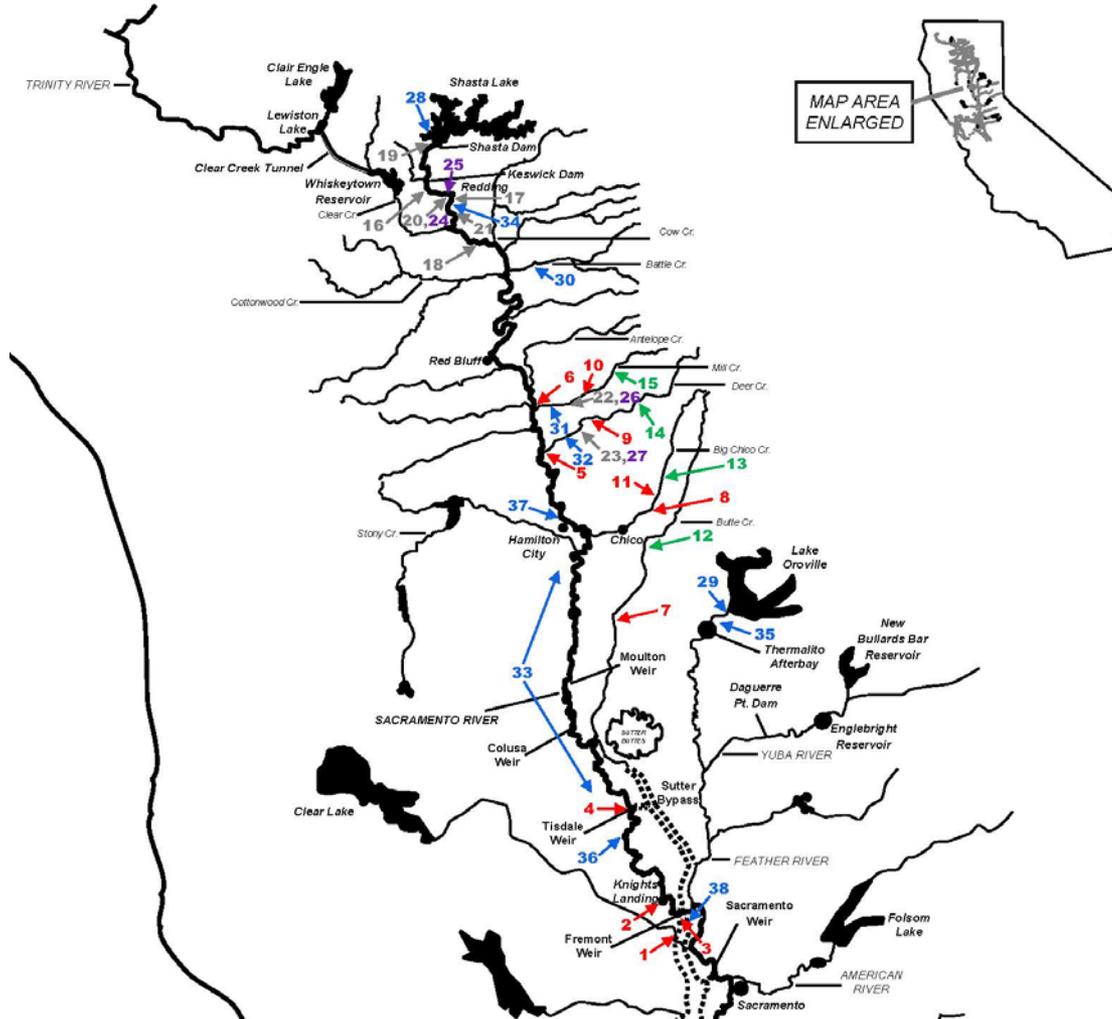
## Re-managing the Flow

The major rivers and streams of the Sacramento Valley provide essential pathways for spawning salmon and steelhead. Flow agreements to benefit these fish are on every major watercourse in the Sacramento Valley.



For more details visit [www.norcalwater.org/efficient-water-management/instream-flows/](http://www.norcalwater.org/efficient-water-management/instream-flows/)

# Sacramento Valley Salmon Recovery Program Projects



# Delta Smelt Food Web Flow Action

## Delta Smelt Food Web Flow Action Summer 2016



Base map courtesy of NOAA Fisheries

# Sacramento Valley & Waterfowl



California's Sacramento Valley is the single most important wintering area for waterfowl along the Pacific Flyway with 4.5 million waterfowl migrating to the region every fall from as far away as Alaska, Canada, and Siberia. The Sacramento Valley's world-renowned mosaic of natural resources, including farms, wildlife refuges and managed wetlands, cities and rural communities, and meandering rivers work together in concert to support and feed waterfowl, shorebirds, raptors and other species.

As the map on the reverse side shows, diverse land types such as refuges, rice-lands, private wetlands, and other farms sustain birds with food and shelter through winter and into spring, acting as surrogate wetlands to defray the loss of 95% of the historic wetland areas in the state.

Each year, between 500,000 and 600,000 acres of rice are planted in the Sacramento Valley, providing habitat for more than 230 species, including many birds. In a typical fall and winter, around 350,000 acres of this rice land is flooded, providing the greatest amount of Pacific Flyway habitat. In addition, more than 40,000 acres of privately managed wetlands and 27,000 acres within the National Wildlife Refuges and State Wildlife Areas also make substantial contributions to the Pacific Flyway habitat in the region.

All of this habitat is reliant upon the ability of Sacramento Valley water districts and companies to divert and deliver surface water resources year-round in accordance with their contracts and water rights. According to the Central Valley Joint Venture (CVJV), the combined winter water needs of flooded rice and wetlands in the Sacramento Valley is almost 1.1 million acre feet per year.\*

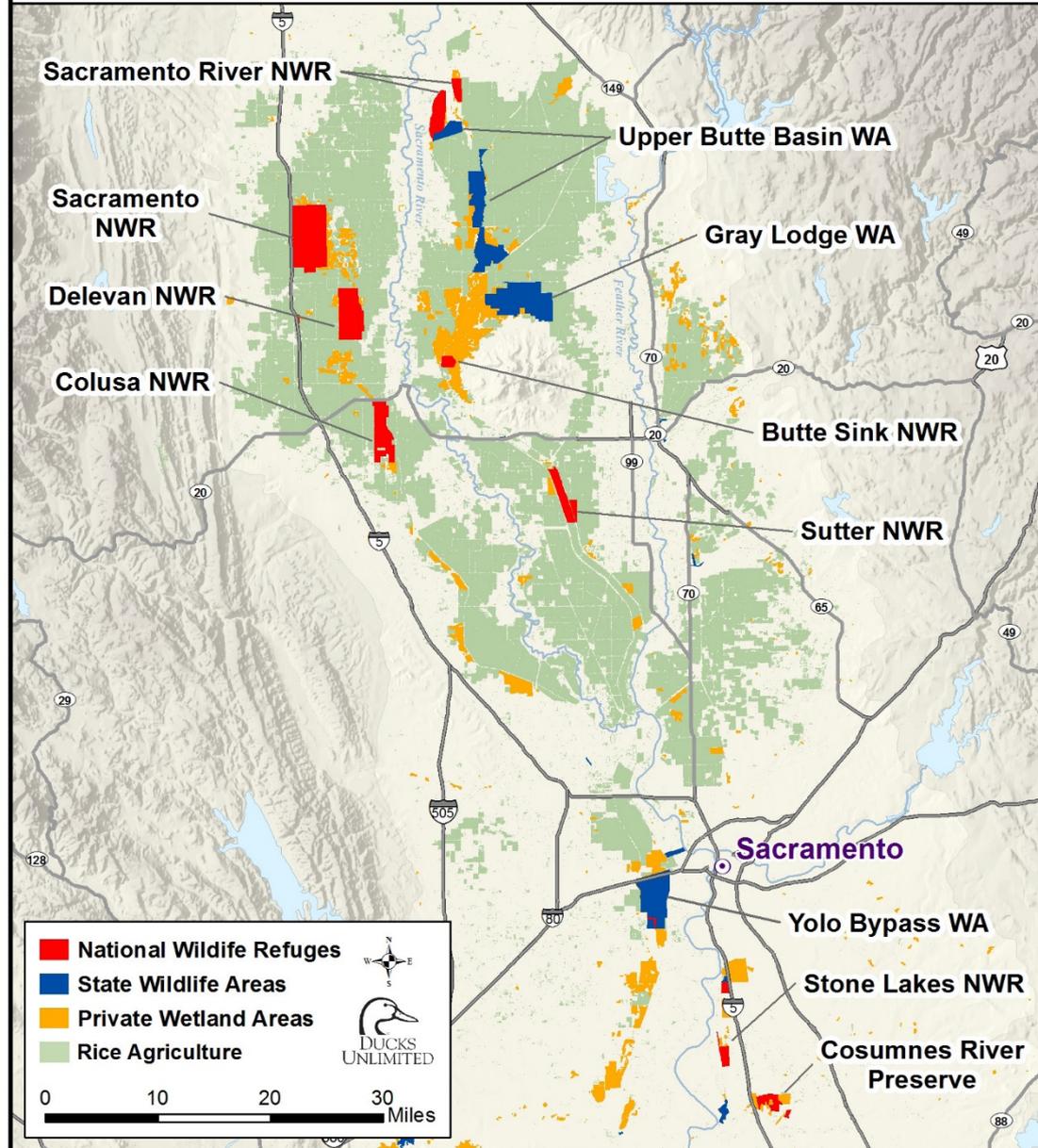
Currently, the region is experiencing a tenuous balance, providing just enough food for the waterfowl and other birds traveling to the Sacramento Valley in the winter months. Redirecting water to other areas would result in less acres of habitat by shifting the balance, leaving the birds without adequate food.

Thanks to the sum of its parts, the Sacramento Valley is an ecological success story where the mosaic of land uses limited water resources to create a modern habitat combination that works for both humans and birds.

*\*This includes more than 250,000 acre-feet in additional water needed to reach CVJV water supply goals for refuges and privately managed wetlands.*



## Wetland Areas and Rice Fields in the Sacramento Valley of California



# *SVWU Conclusions*

- Sacramento Valley consumptive use of water has been essentially stable since the late 1950s
- Required Delta outflows have increased substantially since 1994, while Delta pelagic fish have continued to decline
- Delta flow requirements based on 50% or 40% of unimpaired flow would have significant adverse impacts on Sacramento Valley water resources, including significant reductions in reservoir storage
- Sacramento Valley water systems already are subject to comprehensive regulatory requirements

# *SVWU Conclusions (continued)*

- Rather than pursue the “percent of unimpaired flow” approach, SWRCB should embrace and implement the “functional flow” approach for the Sacramento Valley
- Our recommendations are consistent with the following key points discussed by DISB on November 18, which include a stronger discussion of alternative approaches to the “percent of unimpaired flow” approach, such as functional flows