



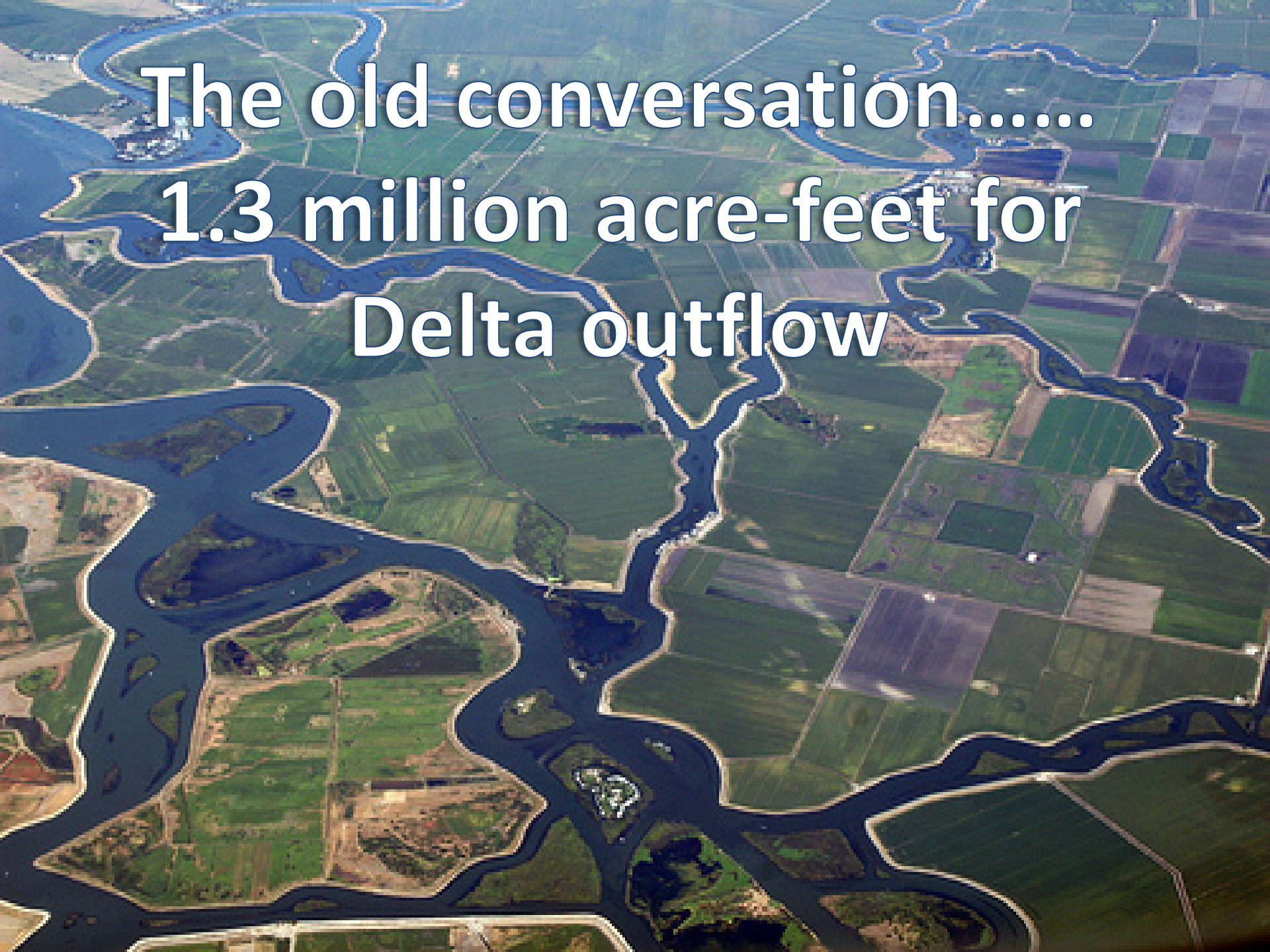


# NCWA

Northern California Water Association

**California Grain and Feed Association**  
**April 27, 2017**





The old conversation.....  
1.3 million acre-feet for  
Delta outflow



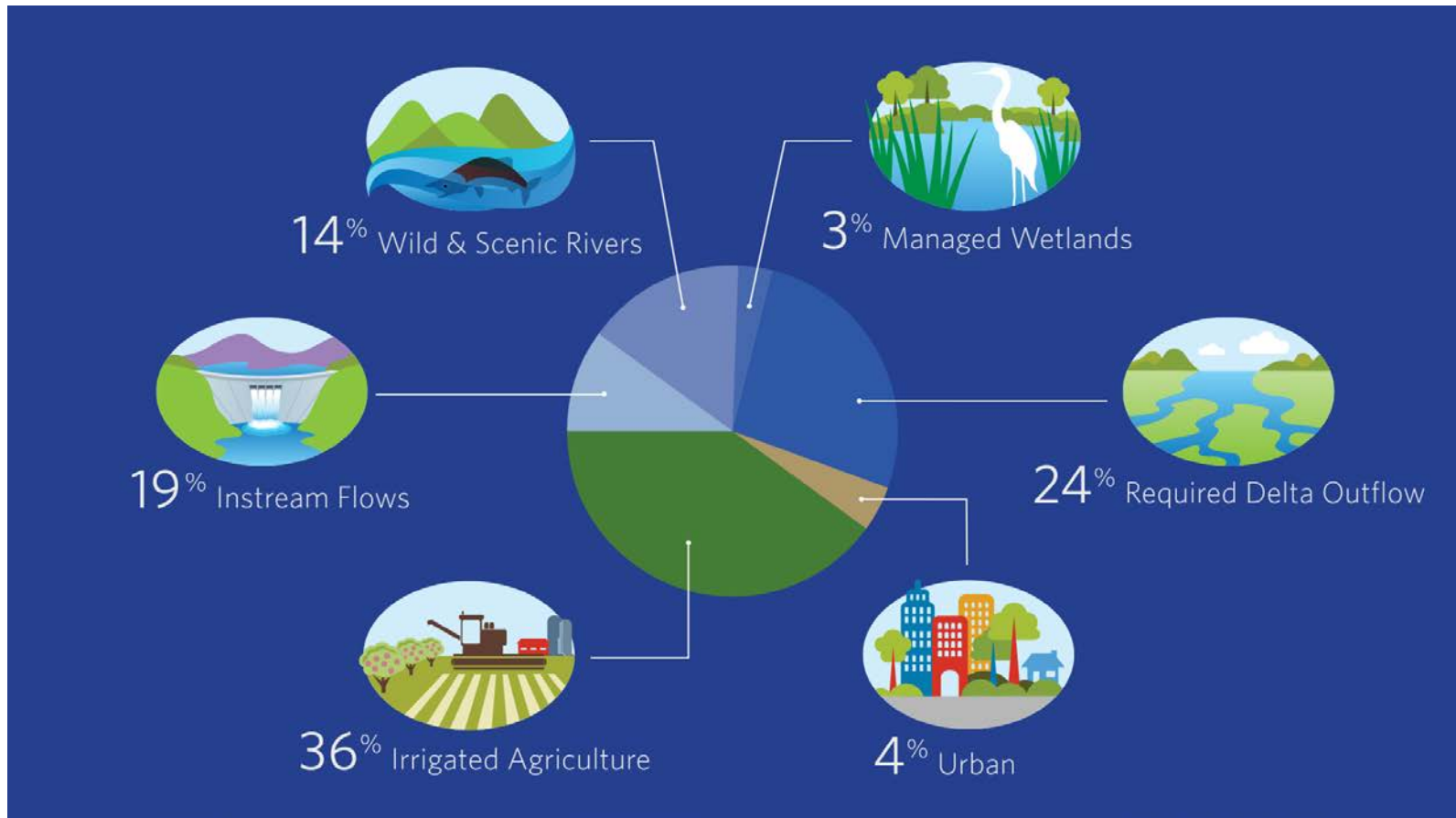
## The New Conversation





- A flow-through system
- Funnel to the Delta

# *Sacramento Valley Water Use*



# CALIFORNIA CONSTITUTION

## ARTICLE X, §2

It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.

An aerial photograph showing a complex river delta system. The river channels are dark blue and winding, branching out across a landscape of green agricultural fields. The fields are divided into rectangular plots by thin white lines, likely roads or irrigation canals. The overall scene depicts a significant area of land used for agriculture, with the river system playing a central role in the landscape.

Why do we care about  
the Bay-Delta?



# The SWRCB

## Efforts to Redirect Water Rights.....

- 1992 – SWRCB Draft D-1630
- 1994 – Bay- Delta Accord
- 1995 – SWRCB Adopts Bay-Delta Water Quality Control Plan
- 1998 – SWRCB Initiates Phase 8 Proceedings
- 2000 – CALFED Record of Decision
- 2001 – Negotiated Sacramento Valley Water Management Agreement



# Water Quality Control Plan for Bay-Delta

- The Water Quality Control Plan (WQCP) is a blueprint for water quality control—akin to a County General Plan
- An inventory of beneficial uses and the water quality objectives to ensure the reasonable protection of beneficial uses.
- Water Code § 13241, 13242, 13170.



# SWRCB's Proposed Schedule for Next Phases of WQCP Update

- Phase 1– Update to San Joaquin River objectives and program of implementation (complete Summer/Fall 2017)
- Phase 2– Other updates not addressed in Phase 1, including Delta outflows, Sacramento River flows, etc. (complete in mid-2018)
- Phase 3– Water rights proceedings to implement changes from Phases 1 and 2





# Phase I (San Joaquin) - SWRCB Substitute Environmental Document (SED)

40 percent of unimpaired  
flow is the preferred  
alternative.



# Phase II (Sacramento/Delta) - SWRCB Working Draft Scientific Basis Report (October 2016)

“The Report recommends improving habitat and providing flows that support native species and not non-native fish. That includes more natural timing, distribution and variability of flows. A range of tributary inflows of from 35 percent to 75 percent of unimpaired flow is analyzed in the Report.”



# Biological Opinions (BiOps)

- Fish and Wildlife Service – Smelt
- National Marine Fisheries Service – Salmon
- Govern operations of CVP/SWP
- Section 7 of ESA
- Re-consultation/  
Adjust RPAs







# NCWA Perspective

Northern California Water Association

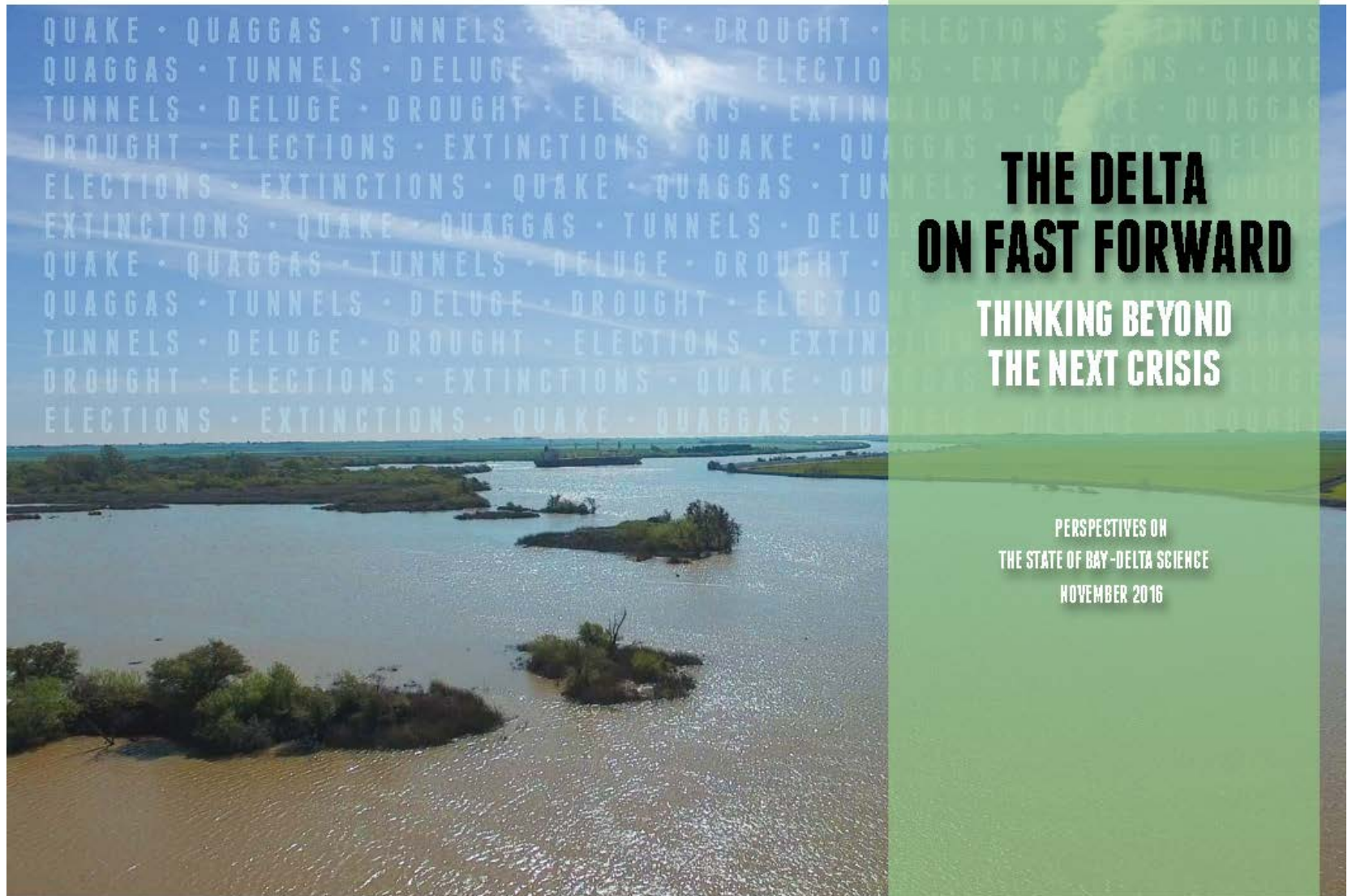
- The “percent of unimpaired flow” approach would not work for 21st century California
- The “functional flow” approach is the preferred alternative for the Sacramento Valley

# 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 (1 million af)
- This is a complex system, and there are many tradeoffs between different operations goals

# Delta Science





# 2016 Perspectives

## 2016 PERSPECTIVES

### State of Bay Delta Science 2016

1	<b>Nutrients</b> are important. Whereas in the past we considered nutrients to be relatively unimportant in Delta productivity, we now understand that the absolute and relative concentrations of different nutrients in the Delta can be drivers of Delta ecology, including inhibition of phytoplankton growth by ammonium and promotion of the expansion of invasive <i>Microcystis</i> and waterweeds.
2	Delta waters are contaminated. The complex <b>cocktail of contaminants</b> that enters the Delta from agriculture, urban, and industrial discharges has the potential to cause serious damage to the ecosystem and human health.
3	Aquatic food webs no longer sustain native species. <b>Food webs</b> in the Delta now bear little resemblance to those that supported communities of native organisms prior to European colonization. Driven by physical and chemical changes in the Delta and invasions by alien species, the aquatic ecosystem has gone through a regime shift that probably cannot be reversed. The present food web appears stable but is much less able to support native fishes than in the past.
4	Species declines are a result of <b>multiple stressors</b> acting together. There are few instances in which a single stressor can be identified as the primary cause of any species' decline. Effective conservation of aquatic species requires a holistic approach to improve habitat quantity and quality.
5	Future water management will be driven more by extreme events (of all types) than by long-term averages, even as those averages change. As California's climate changes due to global greenhouse gas emissions, more frequent and more <b>extreme storms and droughts</b> will occur. Management will have to restructure to respond to these changes.
6	Delta habitats work together as a landscape scale mosaic. The success of local restoration is dependent on what happens in adjacent habitats and vice versa. Any habitat restoration, therefore, has cascading effects that propagate far beyond the restored habitat. <b>Landscape ecology</b> provides a set of tools and concepts for identifying and taking account of these cascading effects.
7	The <b>situation for native species is dire</b> . The ecological regime shift coupled with the emerging effects of climate change in the Delta are creating conditions that will likely accelerate the current downward spiral of native species. This situation makes it urgent that the scientific foundations for new management responses be developed.

# Delta Renewed

## A DELTA RENEWED

*A Guide to Science-Based  
Ecological Restoration*

IN THE SACRAMENTO-SAN JOAQUIN DELTA



SAN FRANCISCO ESTUARY INSTITUTE **SFEI**  
AQUATIC SCIENCE CENTER **AASC**



Salmon and steelhead  
rearing and spawning



# *Multiple Beneficial Uses Are Supported by Functional Flows*

Peak Hydropower  
Generation



Agricultural and M&I  
water supplies



Pacific Flyway migratory  
bird habitat and refuge



Recreation



Source: Anthony Dunn Photography



# Re-managing the Flows in the Sacramento Valley

## 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.



**Trinity and Shasta Lakes** are important sources of cold water storage. Timing the release of this cold water into the rivers is vital if spawning fish are to thrive.

**Clear Creek**  
In May and June, water is pulsed into Clear Creek to attract Spring-run salmon from the Sacramento River. From June through October, water released from Whiskeytown Reservoir keeps water temperatures cool.

**Sacramento River below Keswick Dam**  
In 1960, flow objectives were established for the protection of fish and wildlife. In 1990 and 1991 this policy was modified requiring more cold water when warmer temperatures would be harmful to fish.

**Sacramento River at Wilkins Slough**  
The Rivers and Harbors Act of 1935 mandated a specific flow rate at Wilkins Slough be maintained. The primary goals at that time were navigation and flood control. In 1992, Congress made protection of fish and wildlife a secondary goal and this requirement was updated in 2009.

**Sacramento River Tributaries**  
Various flow agreements benefit spring run salmon.

**Feather River**  
A water quality certification adopted in 2010 provides for specific flow and temperature requirements to accommodate spawning salmon and steelhead.

**Yuba River**  
In 2008, the Yuba River Accord increased the streamflow requirements over previous levels, which benefits fish while insuring sufficient water supplies for irrigation and municipal uses.

**American River below Nimbus Dam**  
In 2000, the Flow Management Standard was developed, which established minimum flow standards to improve the conditions for fall-run Chinook salmon and steelhead. Additionally, releases are adjusted to maintain sufficiently low water temperatures for steelhead rearing in summer and Chinook spawning in the fall.



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

# Fish Screen Projects

## Protecting Fish

More than two decades ago, implementation of the Central Valley Project Improvement Act (CVPIA) began, bringing about a new era of fish passage improvement. Under the CVPIA, the Anadromous Fish Screen Program (AFSP) was created, which authorized federal funding for fish passage and fish screen projects. These contributions to the fish screen projects were matched with local and state funding.

**Fish protected through this program include:**



*Chinook Salmon*



*Steelhead Trout*

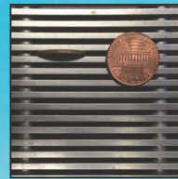


*Green Sturgeon*



*White Sturgeon*

A **fish screen** creates a barrier between the fish in the river and the pumps used to divert water.



**Screens** are constructed with gaps small enough (not much larger than the thickness of a penny) that not even the egg of an endangered or threatened species of fish could make it through.

In addition to fish screens, other projects have been constructed in the Sacramento Valley to improve safe fish migration. This includes siphons to convey water and sophisticated barriers (such as the Knights Landing Outfall Gates and Wallace Weir projects) to keep adult salmon in the river as they migrate upstream.

### Size

The recently constructed Natomas Mutual Water Company screen is **158 feet long**. The Glenn-Colusa Irrigation District fish screen is **1,100 feet long**, or almost a quarter mile in length.



**NCWA**  
Northern California Water Association

[www.norcalwater.org](http://www.norcalwater.org)

water pumps

intake

**The LARGER the pumps, the LARGER the fish screen.**

This ensures that water moving through a screen does so no faster than **one foot every three seconds**, thereby creating no chance that even the smallest juvenile salmon would be impinged on a screen or even have its equilibrium disturbed if it is swimming by a diversion that is pumping at maximum capacity.

**Birds Benefit, Too.**

Fish screens also allow water management entities to divert water year-round, allowing diversions in the fall and winter months to provide habitat for the waterfowl, shorebirds, raptors and other species that utilize the Pacific Flyway.



### Coverage

Since 1990, **every high priority diversion has been screened.**

The last two could be completed by 2018.

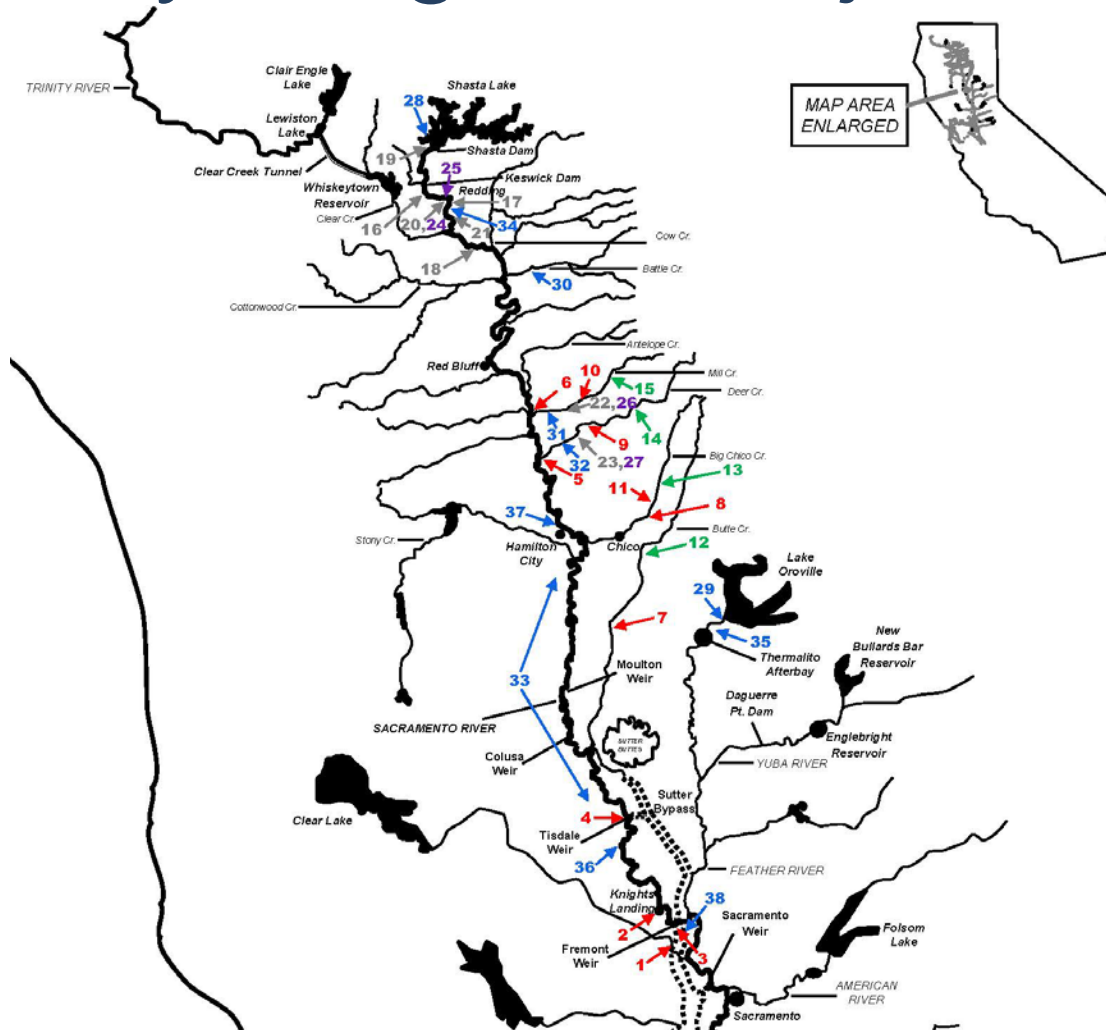
At this point, **over 90%** of the water diverted from the Sacramento River goes through state-of-the-art fish screens.

● existing fish screens





# Sacramento Valley Salmon Recovery Program Projects





# Delta Smelt Food Production

## Delta Smelt Food Web Flow Action Summer 2016



# Sacramento Valley & Waterfowl

## The 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.\*

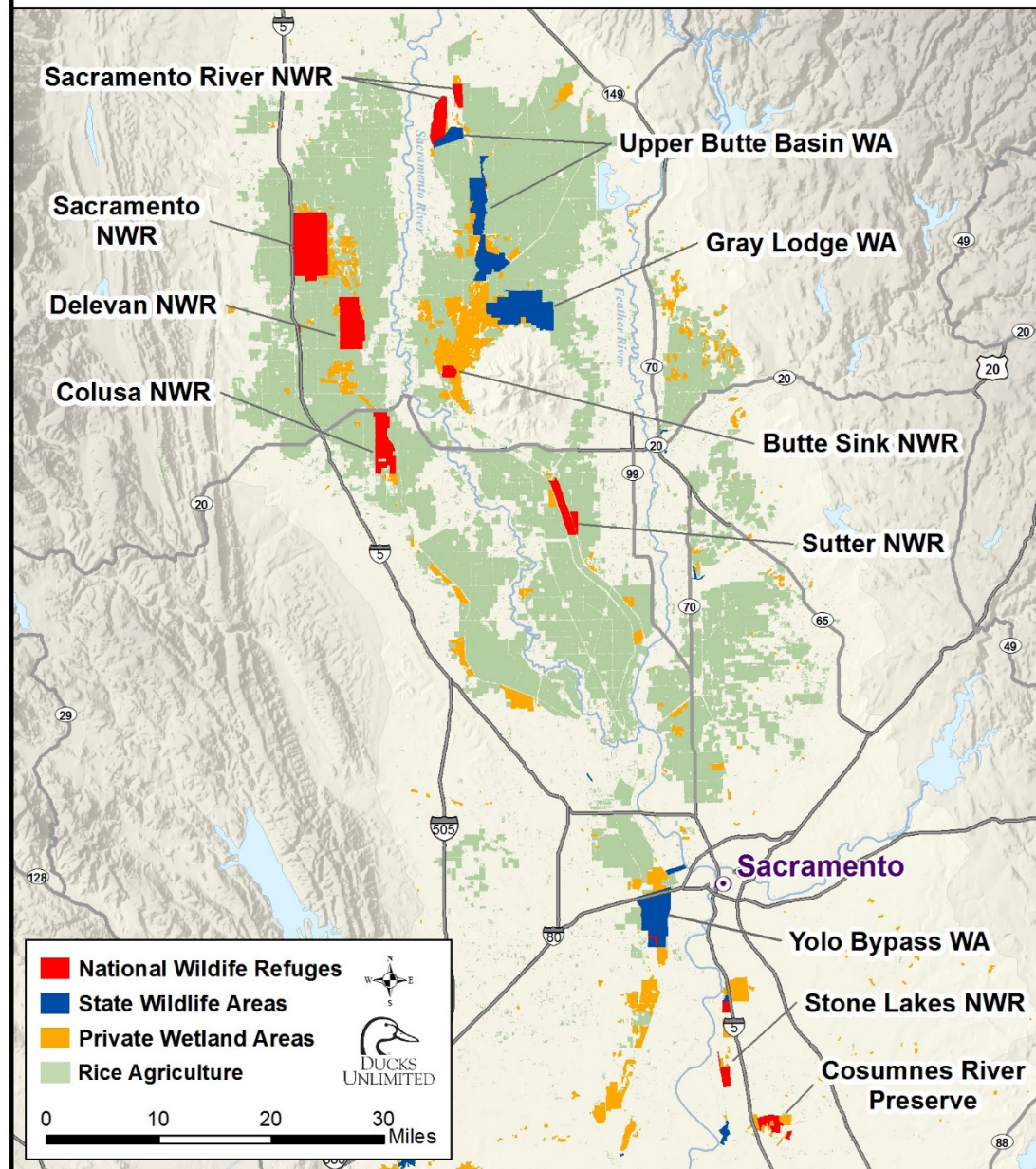
Currently, the region is experiencing a tenuous balance, providing just enough food for the waterfowl and other birds traveling to the Sacramento Valley in the winter months. Redirecting water to other areas would result in less acres of habitat by shifting the balance, leaving the birds without adequate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

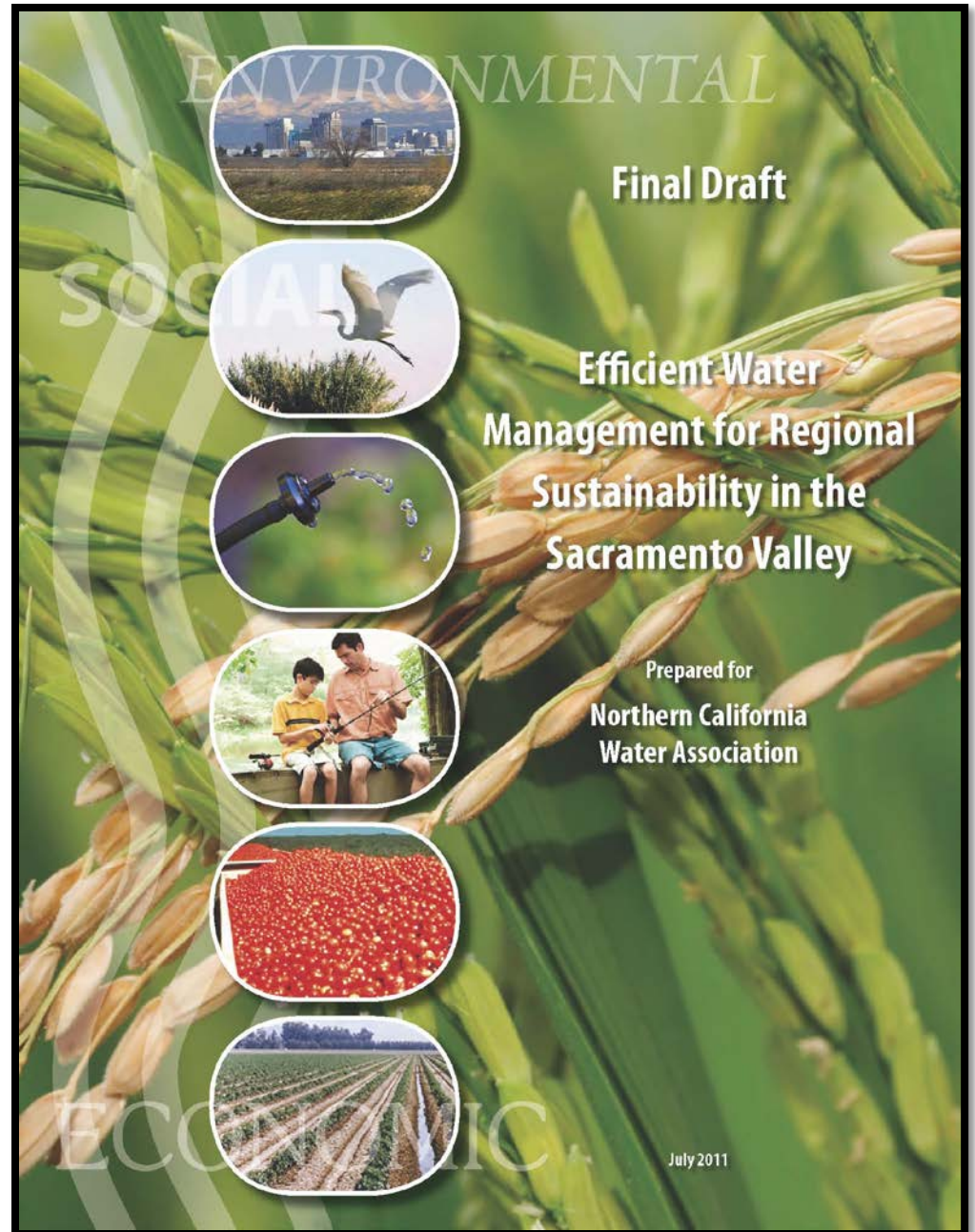


## Wetland Areas and Rice Fields in the Sacramento Valley of California

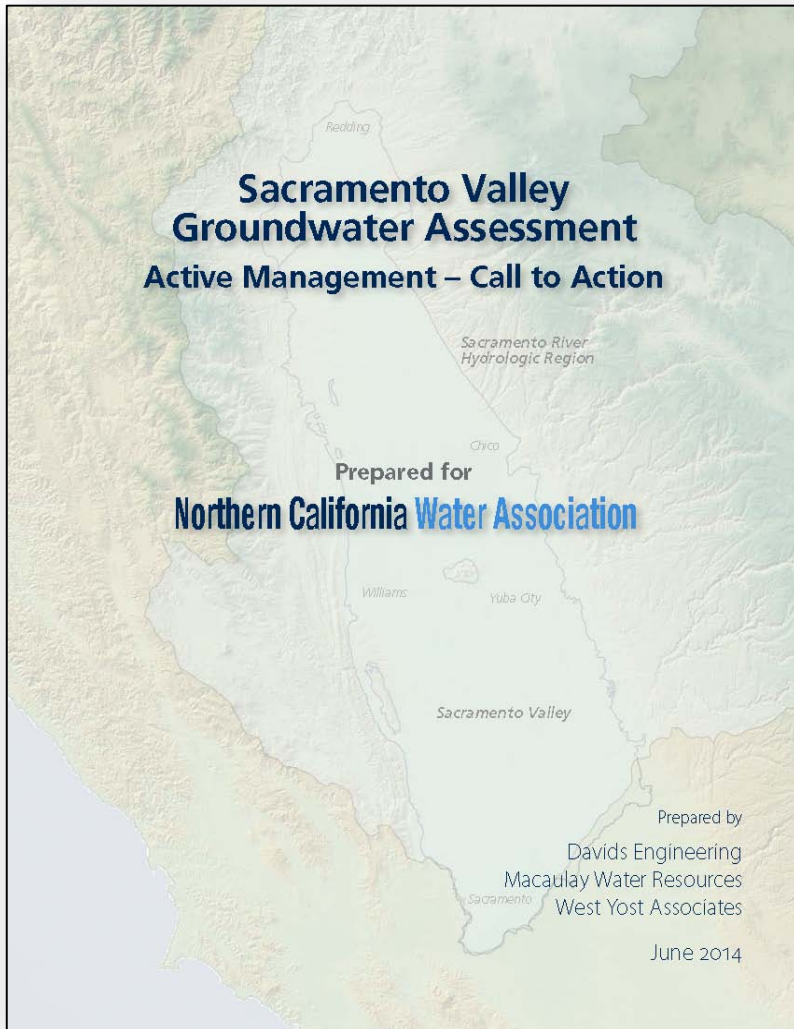




# Water Management Strategies

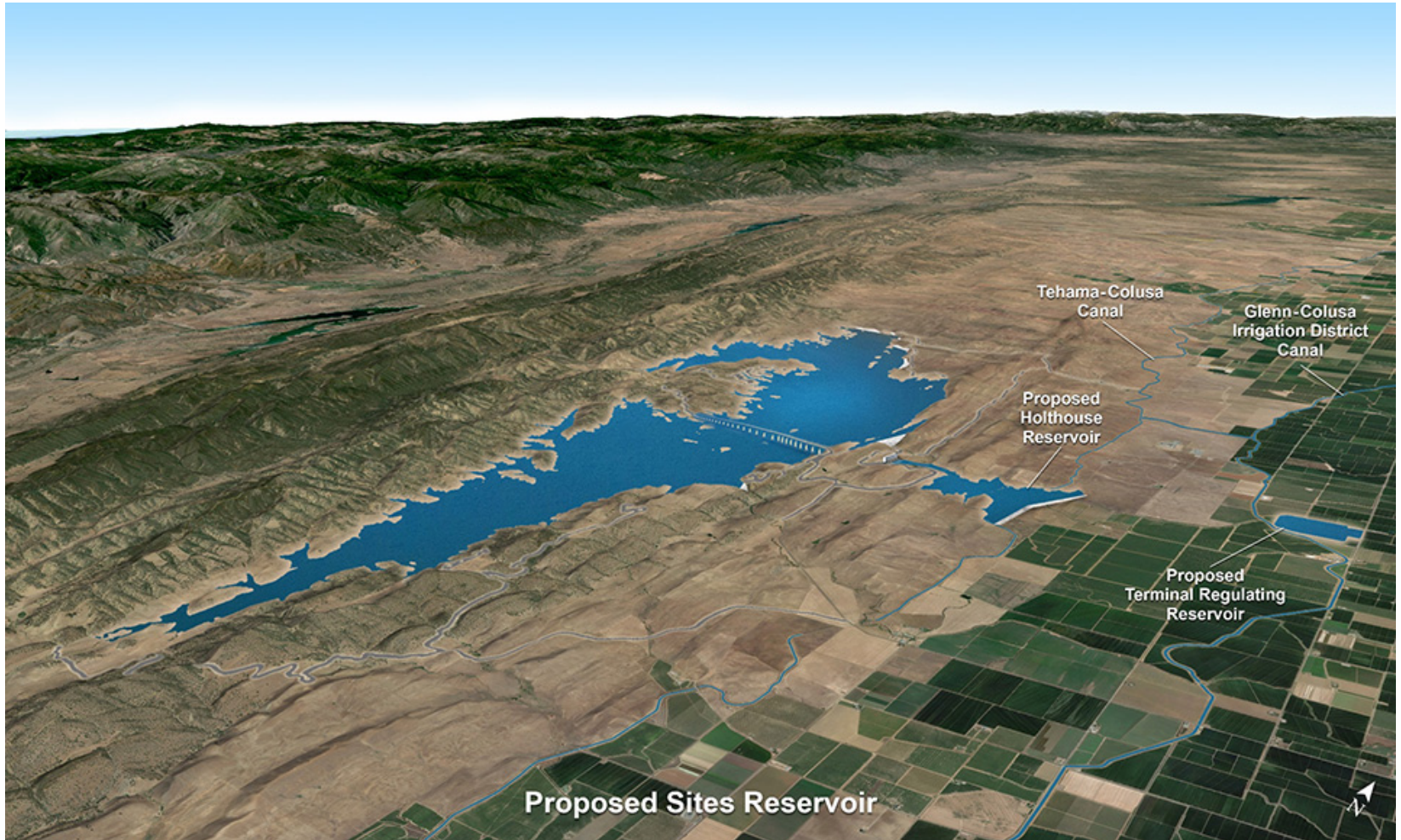


# Sustainable Groundwater Management





# Sites Reservoir





# Sites Reservoir



# Public Benefits of Sites Reservoir



## Restores Operational Flexibility to California's Primary Water System

- Captures and stores runoff supplies for use in dry and critical years
- Allows other reservoirs to hold more water later into the summer months
- Increases flood management opportunities
- Supports groundwater recharge

## Mitigates the Effects of Climate Change

- Guards against salinity intrusion in the Sacramento-San Joaquin Delta (Delta) due to sea level rise
- Ideally located to maximize the capture and storage of rain
- Contributes to the state's renewable energy goals
- Mitigates the negative economic and environmental impacts of historic drought conditions

## Provides up to 50% of water to environmental flows, creating a net benefit in:

  
Water quality improvements

  
Reduced salinity levels in the Delta

  
Improved Pacific Flyway habitat for migratory birds and other native species

  
More reliable cold water for the benefit of salmon in the Sacramento Valley river systems

 **Meets the Coequal Goals**  
identified in the 2009 Delta Reform Act

Balances human and environmental needs





# California Needs Sites Reservoir

## Saving Water for the Future: California NEEDS Sites Reservoir

California needs long-term solutions that help save water for California's future. The Sites Reservoir—a modern off-stream reservoir in Northern California—captures and stores runoff supplies for use in dry and critical years, allows other reservoirs to hold more water into the summer months, provides water for fish, birds, farms and cities, increases flood management opportunities and supports groundwater recharge. As shown below, Sites Reservoir will work well in all year types.

### 2017

#### WET YEAR - SIGNIFICANT SNOWPACK AND RAINFALL

With the Sacramento Valley in flood stage early in the year, the California Department of Water Resources has estimated that as of mid-February Sites Reservoir could have stored over **1 million acre-feet** of water, or over **325 billion gallons**.

### 2016

#### AVERAGE SNOWPACK AND RAINFALL

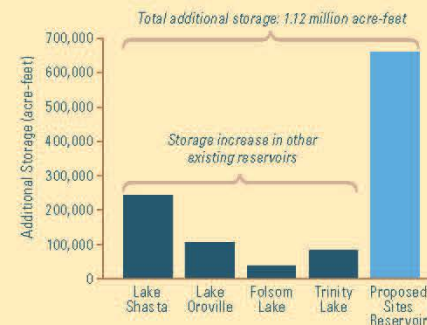
This year saw average snowpack and rainfall in Northern California that filled existing reservoirs. If Sites Reservoir were online, the California Department of Water Resources estimated that it could have stored an additional **1 million acre-feet** of water, or over **325 billion gallons**.

### 2015

#### CRITICAL YEAR - LOWEST SNOWPACK AND RAINFALL

In one of the driest years **ever** in Northern California, Sites Reservoir could have captured **660,000 acre-feet** of precious water from two storm events.

More importantly, water available from Sites Reservoir could ease the necessary releases from other reservoirs effectively increasing the total storage in Northern California to more than **1.12 million acre-feet**, or about **365 billion gallons**, with Sites Reservoir in place.



Source: California Department of Water Resources





# What's at Stake?

The importance of protecting  
water resources in the Sacramento  
Valley

