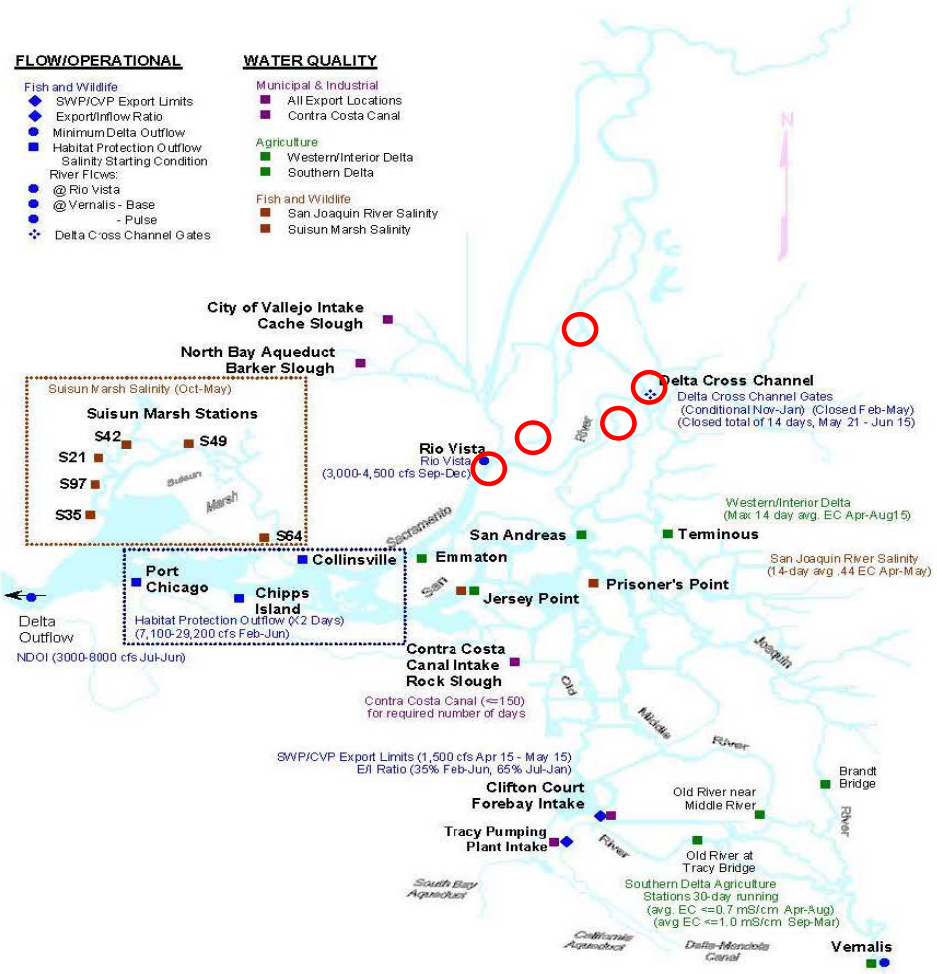
IMPACTS TO RECREATION FROM LOW FRESHWATER FLOW

Figure 2 - D-1641 Bay Delta Standards Locations

SHR-2-245

D-1641 BAY-DELTA STANDARDS STATIONS



Operations Compliance
and Studies Section

Revised 5/7/2002

Preliminary: Subject to Revision

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STATE OF THE ESTUARY REPORT 2015

ACCESSING THE REPORT

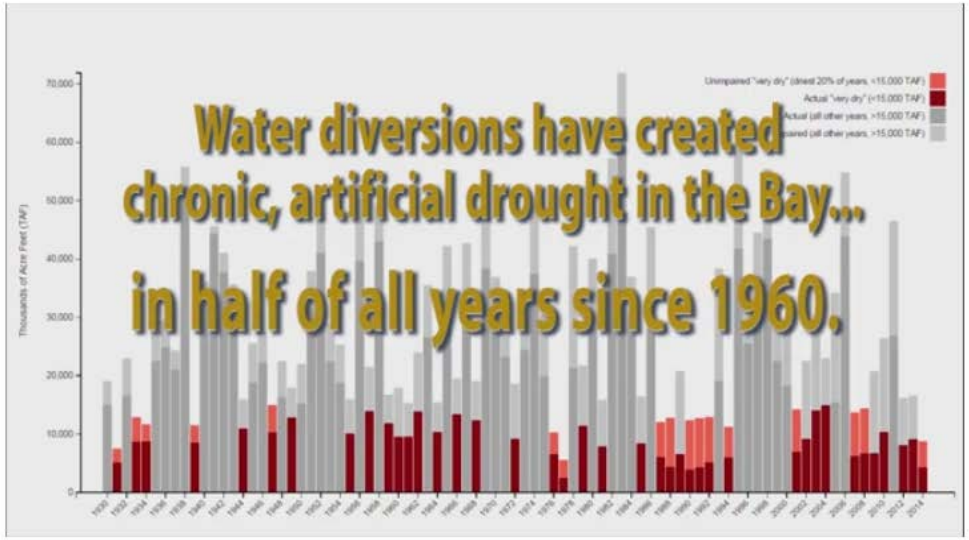
The Report as a Flipbook
The flipbook integrates features such as text searching, bookmarking, and new enhancements, such as interactive charts and data stories.

The Report as a PDF

The Executive Summary as a PDF
If you wish to take the report "to go," then a PDF offers the best form for printing and emailing.

THE REPORT IN MOTION

A Video Summary



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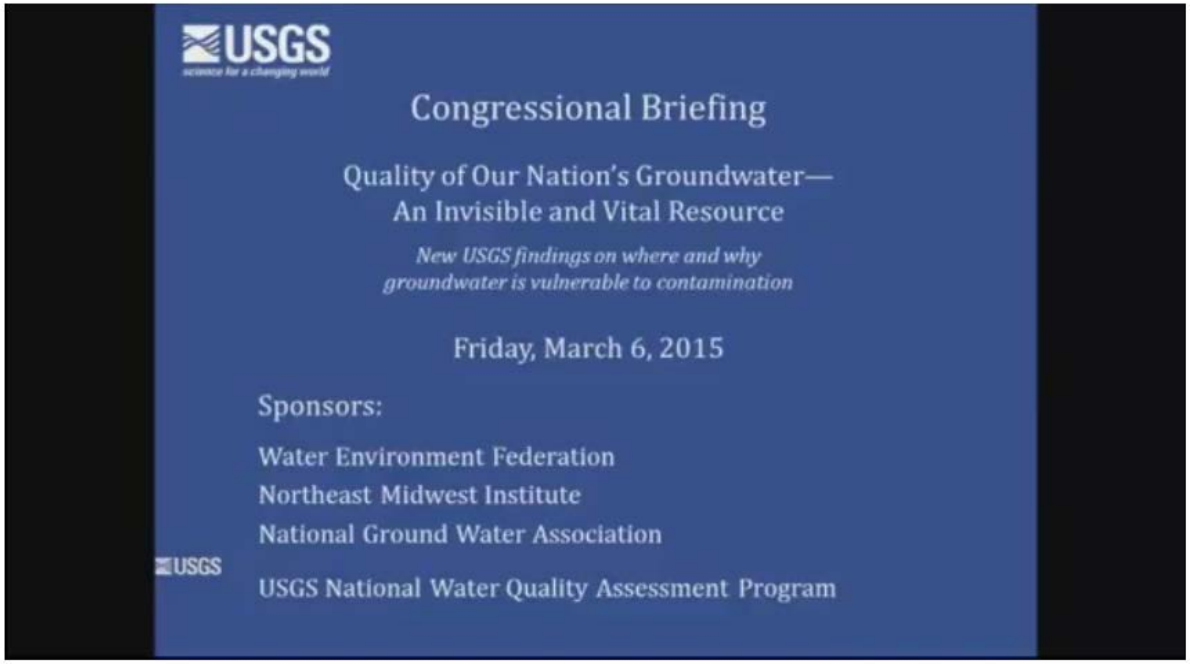

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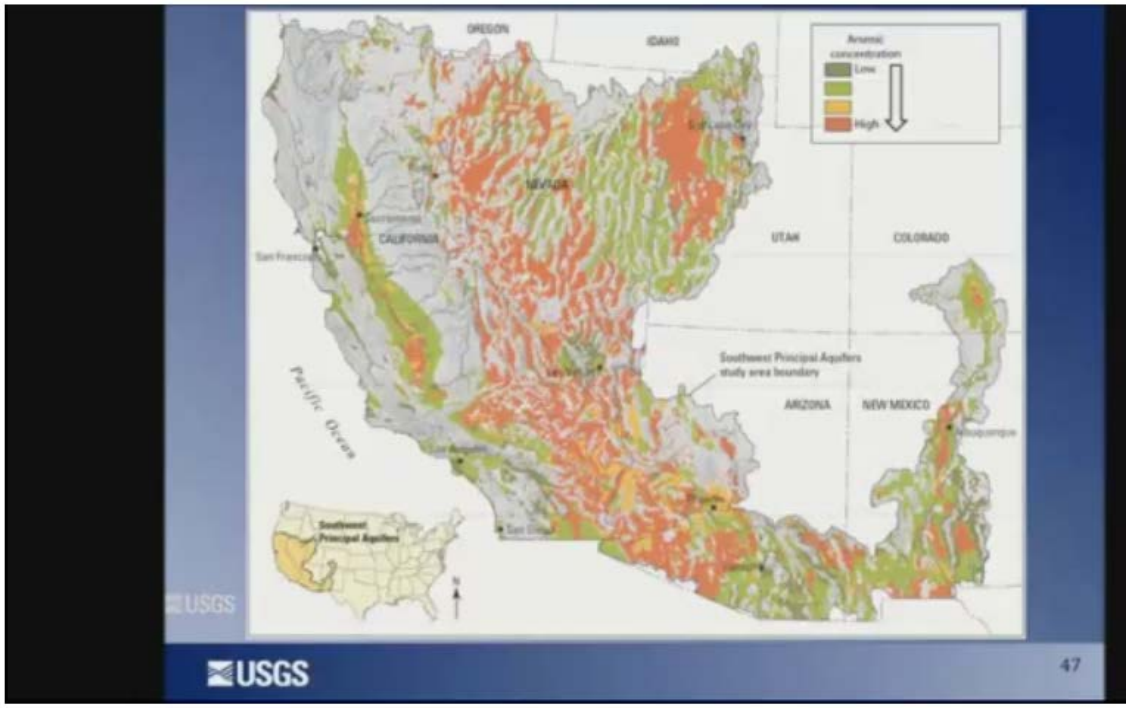

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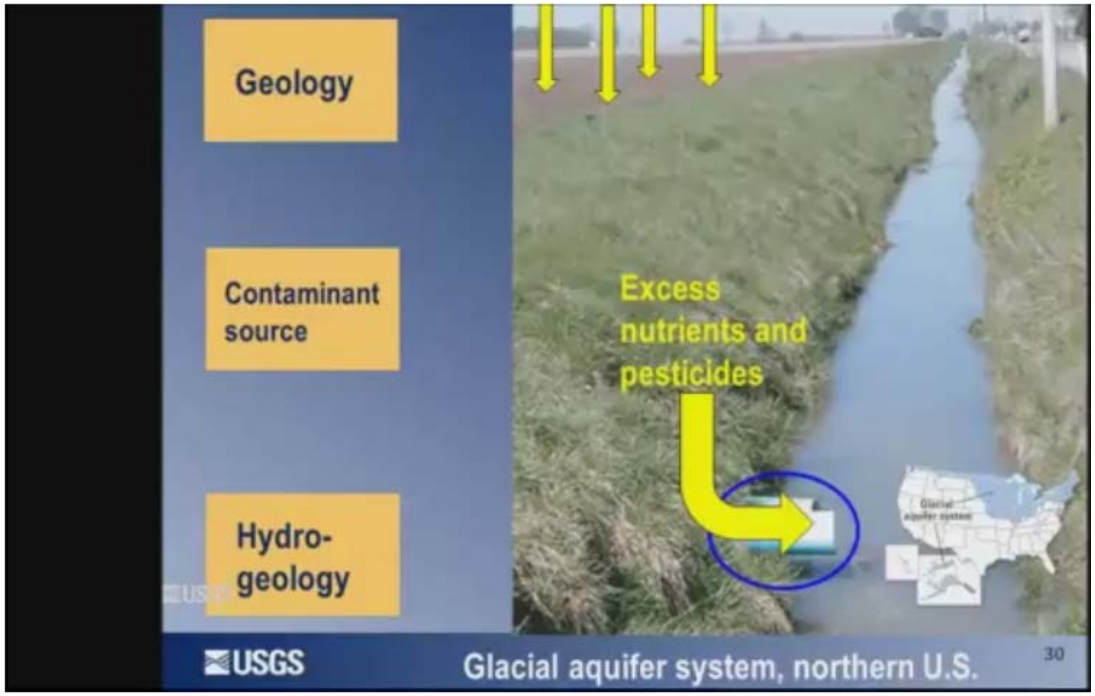

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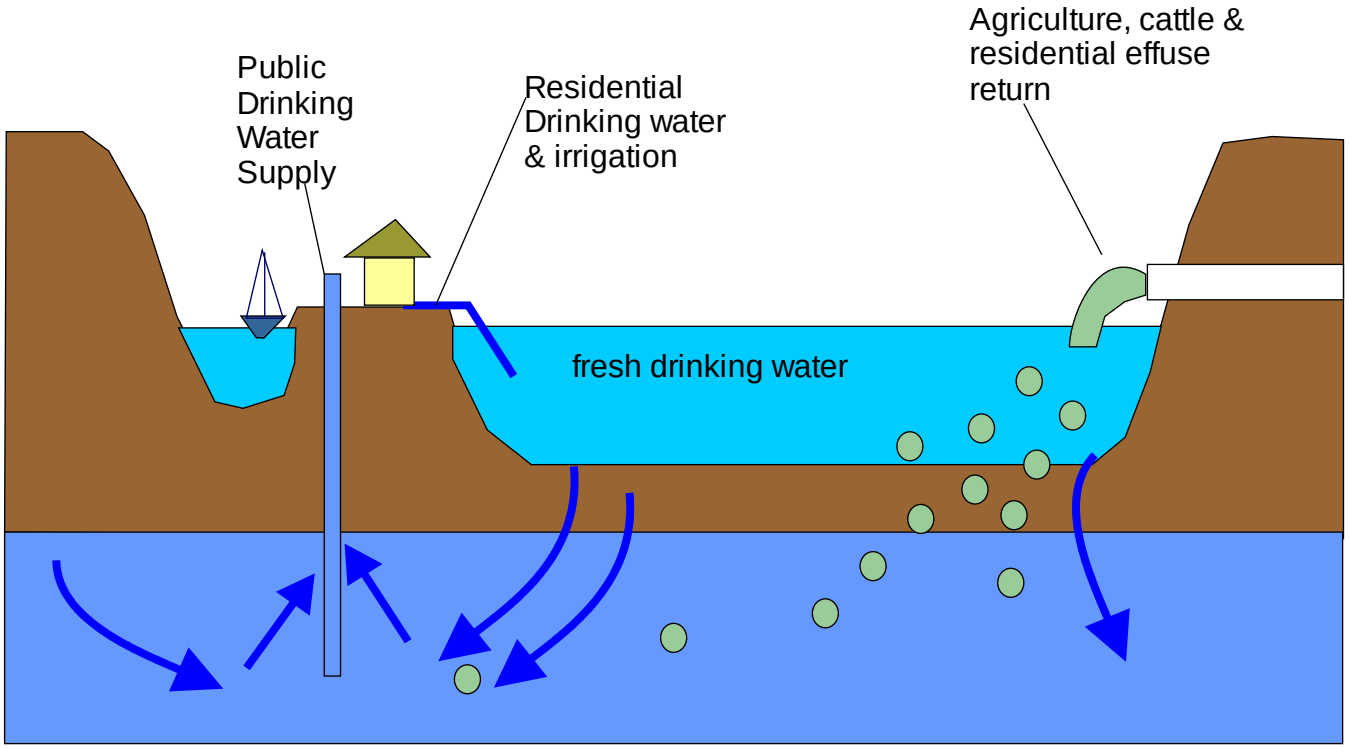
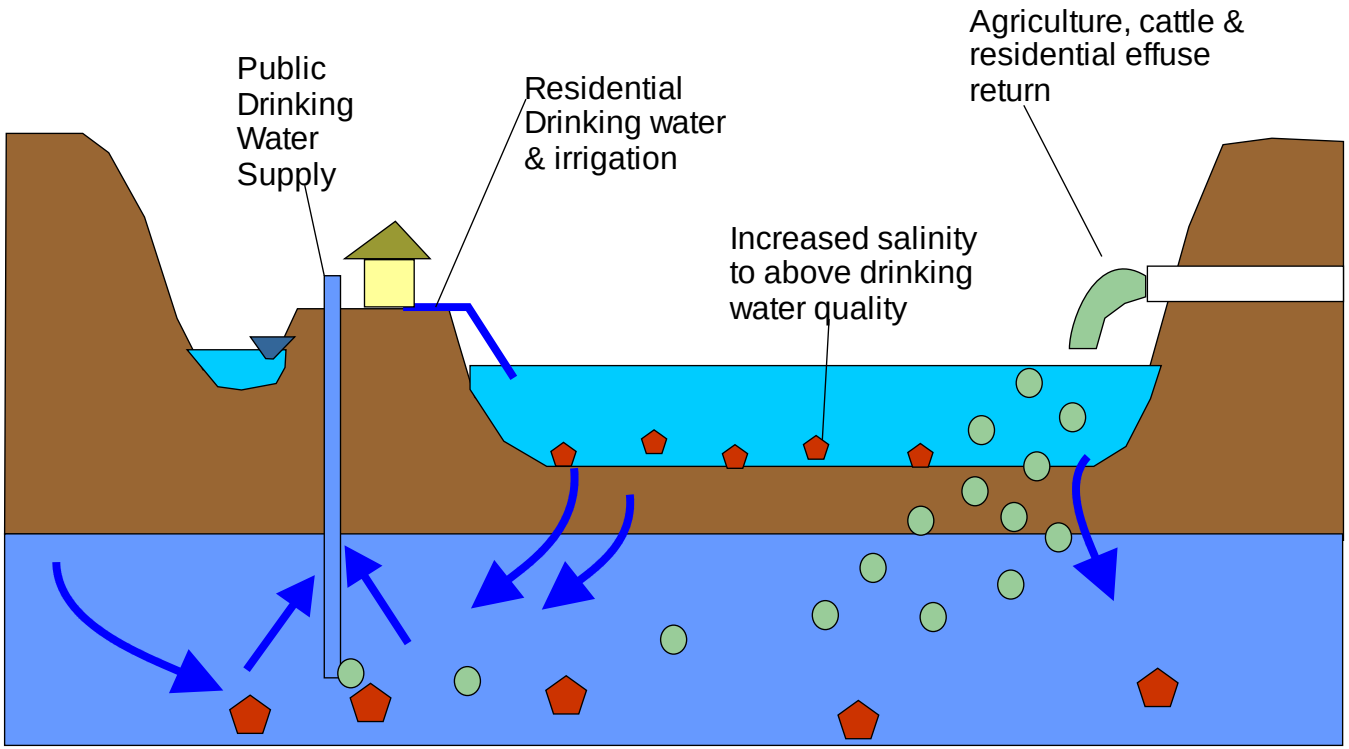
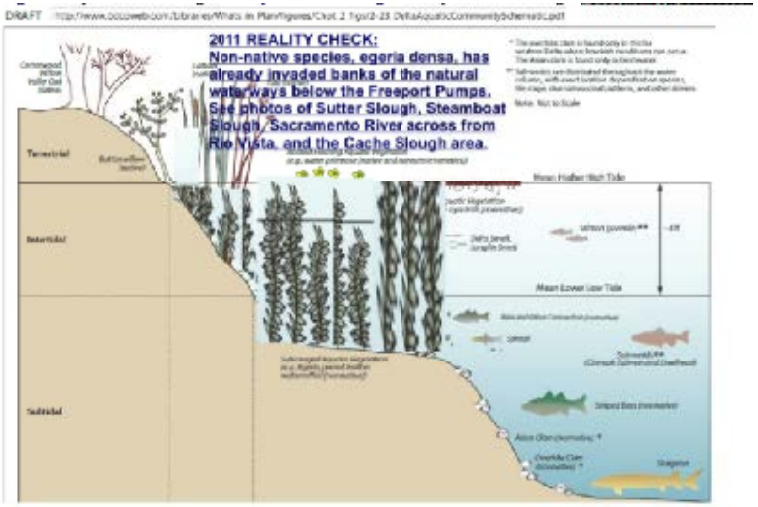


1930 to 2007 records show drinking water quality remains adequate for human consumption for well and surface water withdrawal on lower Steamboat Slough



2007 and thereafter observed changes to inflows and outflows, nearby changes to land and waterway uses, active drilling in the Delta, manufactured low tides and pulse flows appear to begin to affect drinking water quality

REALITY CHECK 2012: The study sites on Steamboat Slough, at both the Grand Island and Ryer Island sites, have been invaded by egeria densa, which eliminates the shallow water protection areas for the salmonid passing through. (See BDCP edited graphic for example) The branches and twigs inserted into the water creates navigation hazzards and is spreading more invasive species, it appears. Large logs and brush "inserted" into Steamboat Slough catch onto existing bank roots that have been newly-exposed due to the unnaturally low tides (variable tides experiment). As the heavy but floating woody materials gather along the newly-exposed roots, eventually the soil under the existing trees or bush roots is eroded and the tree or bush falls into the water, releasing a new tree and all the other caught materials to float further downstream. The bank area that was just eroded due to the tree falling further erodes, and if the tree roots were deep enough into the levee, repeated incidents of tree and bank loss could threaten the levee integrity.



654 / 958 http://baydeltaconservationplan.com/Libraries/Whats_in_Plan/AppendixF_DRERIP_Evaluation_Results.pdf

Action Description and Clarifying Assumptions

Enhance channel margin habitats along between 12 and 36 miles of Steamboat and Sutter Sloughs to improve habitat conditions for covered fish species.

Option #1: 12 miles = 6 miles of channel, each side

Option #2: 36 miles = 18 miles of channel, each side

Approach

1. Modify channel geometry in Steamboat and Sutter Sloughs to improve hydrodynamic and structural complexity.
2. Allow for establishment of native emergent vegetation in intertidal elevations.
3. Establish woody riparian vegetation along banks that do not already support woody riparian vegetation.

Intended Outcomes as Stated in Conservation Measure

1. Increase the extent of shaded riverine aquatic cover and increasing instream structural complexity through contributions of instream large woody material.
2. Provide inputs of organic material (e.g., leave and twig drop) in support of aquatic foodweb processes.
3. Increase production and export of terrestrial invertebrates into the aquatic ecosystem.
4. Improve connectivity with upstream habitat areas, including existing and future restored habitats.
5. Reduce the risk for predation on covered fish species by non-native fish predators.
6. Reduce the risk for entrainment of juvenile salmonids by providing a migration corridor that bypasses the intakes of a new north Delta diversion point, the Delta Cross Channel, and Georgiana Slough.

Positive

P1 Increased establishment of instream structure through export of LWD to benefit covered species.

P2 Additional splittail spawning habitat on narrow floodplain margin

P3 Additional rearing habitat for splittail, green and white sturgeon, Chinook salmon and steelhead (consider loss to entrainment)

Approach:

1. Modify channel geometry in Steamboat and Sutter Sloughs to improve hydrodynamic and structural complexity. **Outcome: The combined projects/studies on Steamboat Slough has resulted in a narrowing of the channel, causing flow backup & Snug Harbor high water onto privately-owned lands. The unnaturally high and low tides operate to erode the banks underneath existing woody and riparian vegetation, causing damage to the banks and levees.**

2. Allow for establishment of native emergent vegetation in intertidal elevations. **Outcome: Invasive species has overtaken native aquatic species, resulting in further hindrance to normal water outflow. Excessively low and unnatural tides appear to encourage the growth of non-native aquatic plant species like egeria densa. The density of the non-native species on the channel shelf (i.e. See Steamboat Slough side) eliminates the possibility of use of the shelf for salmonid attempting to evade larger predator fish. Warmer water due to low water flow also appearss to encourage the growth of invasive aquatic plant species.**

3. Establish woody riparian vegetation along banks that do not already support woody riparian vegetation. **Outcome: More trees is a great idea, but like the existing trees and brush, the bank will be eroded and the riparian vegetation will be destroyed if the excessive low tides are allowed to continue. In addition, the logs, trees, twigs and other woody materials intentionally inserted into the waterway create intentional hazards to navigation, and when the woody materials stop floating or get imbedded in the slough bottom with portions sticking up to near the surface of the waterway, severe damage to vessels and humans coud occur.**

Herbicide treatment of invasive floating aquatic vegetation began on March 1, 2017, the earliest date the program is permitted to start, in various areas of the Sacramento -San Joaquin Delta. For more information see the *Public Notice*.

Treatment Sites							
ALA	CC	MER	SAC	SJ	STAN	SOL	YOLO
	17a, 19b, 21a, 23b, 24b, 90a-92a, 93-97, 98b, 99a, 101a, 102, 103a, 104a, 106-118, 119b, 120b, 121b, 173-175	325 400-427, 500-537	18a, 19a, 20, 21a, 22, 23a, 24a, 119a, 120a, 121a, 122-132, 209a-213a, 214-239, 240b, 241-245, 246b-253b, 254, 255, 256b-258b, 285-289	6, 8-16, 17b, 18b, 25-58, 61, 62, 65-68, 90b-92b, 98a, 99b, 100, 101b,103b, 104b, 200-208, 209b-213b, 291, 300-309	200-208, 209b-213b, 310-323, 325, 400	176, 240a, 251a-253a, 256a, 257a, 260-267, 270, 272-275, 277-284	246a-250a, 258a, 259, 268, 269, 271, 276

View Larger Image

"Treatment sites and schedules are subject to change based on regulatory requirements, weather conditions, plant growth and movement, waterway traffic, listed fish presence surveys, and other conditions."

- Spraying will be conducted during the hours of 7am to 4pm weekly, Monday thru Friday.
- Herbicide applications during the treatment period will utilize Glyphosate (Roundup Custom), and Imazamox (Clearcast).

Treatment Period:

Area 2-4: Mar. 1, 2017 - Nov. 30, 2017
Area 1: June 1, 2017 - Nov. 30, 2017

County References:

Since March 1, 2017, approximately 2,024* acres of water hyacinth, spongeplant and/or water primrose have been treated at 144 sites with 484 total treatments.

** Data are preliminary and subject to change.*

Detailed Site Information

Southern Site Map

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- Salton Sea
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Delta Ecosystem Enhancement

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Lower Sacramento River Riparian Revegetation Project

Tule plantings as of June 2003 (left). Tule plantings after several years of establishment (2015, right).

Background

The Lower Sacramento River Riparian Revegetation Program is a joint feasibility study between the U.S. Army Corps of Engineers, Department of Water Resources, The Reclamation Board and the Metropolitan Water District of Southern California. Its purpose is to evaluate and develop methods for restoring and protecting riparian and shaded riverine habitat along the Sacramento River without affecting the flow capacity from Verona to Collinsville, including Steamboat and Sutter Sloughs.

The Sacramento River and many of the Delta Sloughs have been stripped of vegetation and lined with rock bank protection (riprap) to prevent erosion. The result has been a reduction of riparian and shaded riverine aquatic (SRA) habitat. The loss of SRA habitat is one possible contributor to the reduction of fish populations, including threatened and endangered species.

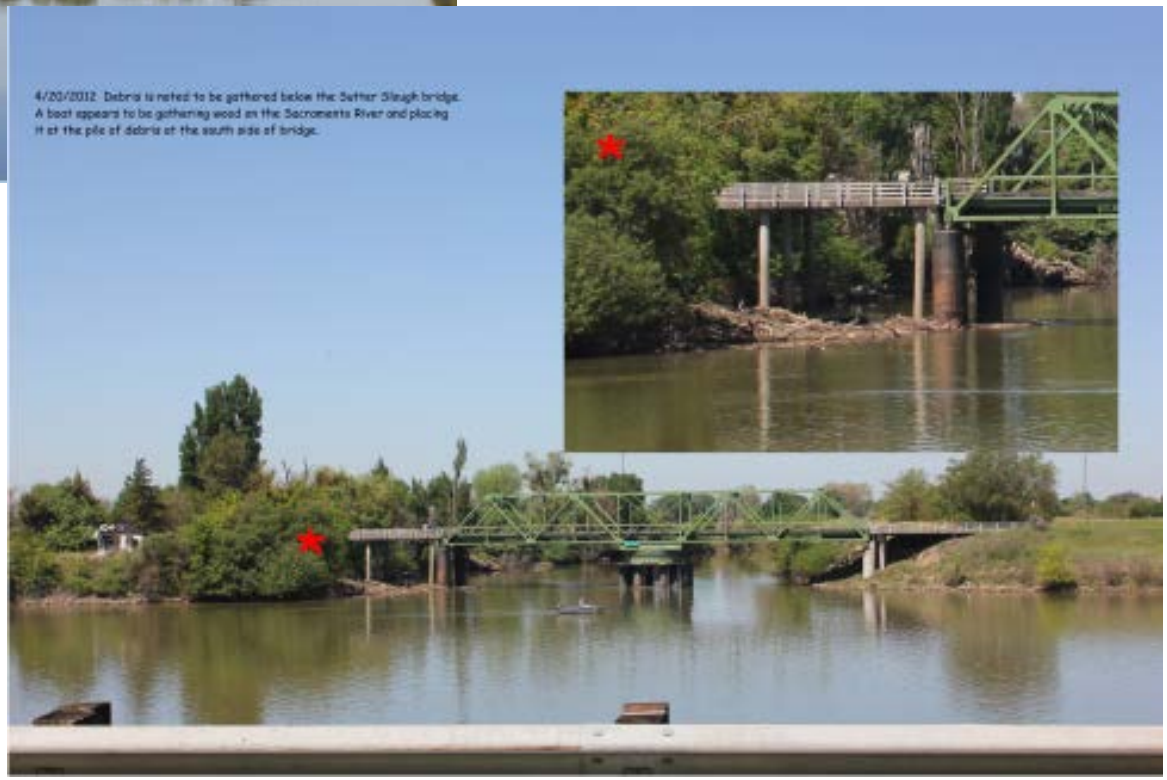
Project Description

The purpose of this demonstration was to verify that a properly designed levee site using appropriate plants, coordinated with floods and properly maintained can restore SRA habitat while maintaining adequate flood control and channel flow capacity.

Enhancement Projects
- (12) Decker Island
- (13) Dutch Slough Tidal Habitat Restoration
- (14) Grand Island Riparian Revegetation
- (15) Mayberry Farms
- (16) McCormack Williamson Tract (Cosumnes Levee Improvement Project)
- (17) Sherman Island Setback Levee
- (18) Twitchell Island Setback Levee
- (19) Twitchell Island Subsidence Mitigation through Rice Cultivation

4/20/2012 Standing on the public dock at Walnut Grove, looking at the barrier across Georgiana Slough on the left and the Sacramento River towards the right. Note that there is not one single twig or log on the waterway. Compare this to Steamboat Slough which received a huge amount of floating debris at the same time as there was no debris on the Sacramento River. Why?

4/20/2012 Debris is noted to be gathered below the Sutter Slough bridge. A boat appears to be gathering wood on the Sacramento River and placing it at the pile of debris at the south side of bridge.



Major Technical Results

- Existing statewide water demand estimates:
  - Demands were developed for each hydrologic region and user (urban, agricultural, and environmental).
  - Demands were based primarily on information from Update 2005 and adjusted to reflect historical water demands rather than water use.
  - Existing statewide water demands were estimated as follows:
    - **60.6 MAF** in average water years (based on water use and unmet demands in 2000)
    - **57.2 MAF** in dry water years (based on water use and unmet demands in 2001)

- Amount by which current statewide water demands exceed available water supplies:
  - Supply-demand gaps were calculated by totaling unmet urban, agricultural, and environmental demands and annual estimated groundwater overdraft. The resulting total was compared to current supplies.
  - Supply-demand gaps were determined on a regional basis, and only unmet demands (not surpluses) were added to regional and statewide totals. If one region has surplus supply, it cannot be assumed that the surplus water can be conveyed to fill another region's supply-demand gap because of regulatory and infrastructure limitations on conveyance and basin-to-basin transfers.
  - Current statewide supply-demand gaps were estimated as follows:
    - **2.3 MAF** in an average water year (2000)
    - **4.2 MAF** in a dry water year (2001)
- The largest existing water supply-demand gap is in the Central Geographic Zone.
- Projected 2030 statewide water demand estimates:
  - As with existing demand estimates, projected 2030 water demands were also developed for each hydrologic region and user.
  - Overall projected 2030 water demands were estimated to increase for urban users, decrease for agricultural users, and remain the same for environmental users.
  - Projected 2030 statewide water demands were estimated as follows:
    - **60.9 MAF** in average water years
    - **57.4 MAF** in dry water years
- Estimated amount by which projected 2030 statewide water demand exceeds available water supplies:
  - Projected 2030 supply-demand gaps were calculated using the same methodology as the existing supply-demand gap calculation. Future supplies were assumed to be similar to existing supplies, except for Colorado River supplies, which were projected to decrease to the State's 4.4 MAF allocation.
  - Although the 2030 demands are similar to existing (2000) demands, projected increases in urban water demand throughout the state—especially in the central and southern portions of the state—result in an increased statewide water gap. Similar to the existing supply-demand gap calculation, surplus supplies in one region cannot be assumed to fill another region's supply-demand gap because of regulatory and infrastructure limitations on conveyance and basin-to-basin transfers.
  - Projected 2030 statewide supply-demand gaps were estimated as follows:
    - **4.9 MAF** in average water years
    - **6.1 MAF** in dry water years
- The largest projected 2030 water supply-demand gap is in the South Geographic Zone.
- If the Level 1 storage and conveyance projects were constructed and the investments in foreseeable water management actions were made, the existing supply-demand gap could be met in average years, but a gap of over 0.8 MAF would remain in dry years. The projected 2030 supply-demand gap would remain at over 1.5 MAF in average years and over 2.2 MAF in dry years.
- When allocating 50 percent of project costs to water supply, the cost-of-service rate for financing the existing CVP capital costs and all Level 1 storage and conveyance projects is approximately $40 per acre-foot for irrigation users and $70 per acre-foot for M&I users.
- CVP contractor annualized willingness to pay for permanent water supply south of the Delta was determined to be approximately $130 per acre-foot for irrigation users and $185 per acre-foot for M&I users.

https://www.nwfsc.noaa.gov/research/divisions/fe/estuarine/oeip/g-forecast.cfm

	Juvenile Migration Year				Adult Return Outlook	
	2013	2014	2015	2016	coho 2017	Chinook 2017
Large– scale ocean and atmospheric indicators						
PDO (May - Sept)	■	■	■	■	●	●
ONI (Jan - Jun)	■	■	■	■	●	●
Local and regional physical indicators						
Sea surface temperature	■	■	■	■	●	●
Deep water temperature	■	■	■	■	●	●
Deep water salinity	■	■	■	■	●	●
Local biological indicators						
Copepod biodiversity	■	■	■	■	●	●
Northern copepod anomalies	■	■	■	■	●	●
Biological spring transition	■	■	■	■	●	●
Winter ichthyoplankton biomass	■	■	■	■	●	●
Winter ichthyoplankton community	■	■	■	■	●	●
Juvenile Chinook salmon catch – June	■	■	■	■	●	●
Juvenile coho salmon catch – June	■	■	■	■	●	●

Key ■ good conditions for salmon ● good returns expected
■ intermediate conditions for salmon ● intermediate returns expected
■ poor conditions for salmon ● poor returns expected

Ocean ecosystem indicators of the Northern California Current. Colored squares indicate positive (green), neutral (yellow), or negative (red) conditions for salmon entering the ocean each year. In the two columns to the far right, colored dots indicate the forecast of adult returns based on ocean conditions in 2016 (coho salmon) and 2015 (Chinook salmon).

Table SF-02 Rank scores derived from ocean ecosystem indicators data found in Table SF-03 and color-coded to reflect ocean conditions for salmon growth and survival (green = good; yellow = intermediate; red = poor). Lower numbers indicate better ocean ecosystem conditions, or "green lights" for salmon growth and survival. To arrive at these rank scores for each ocean ecosystem indicator, all years of sampling data from Table SF-03 were compared (within each row).