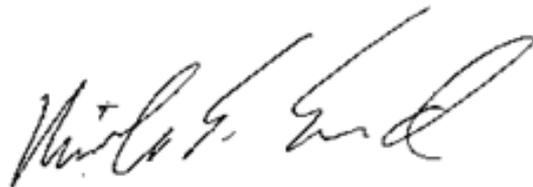


**SHR-20****Statement of Verification of Data Contained Within this Document**

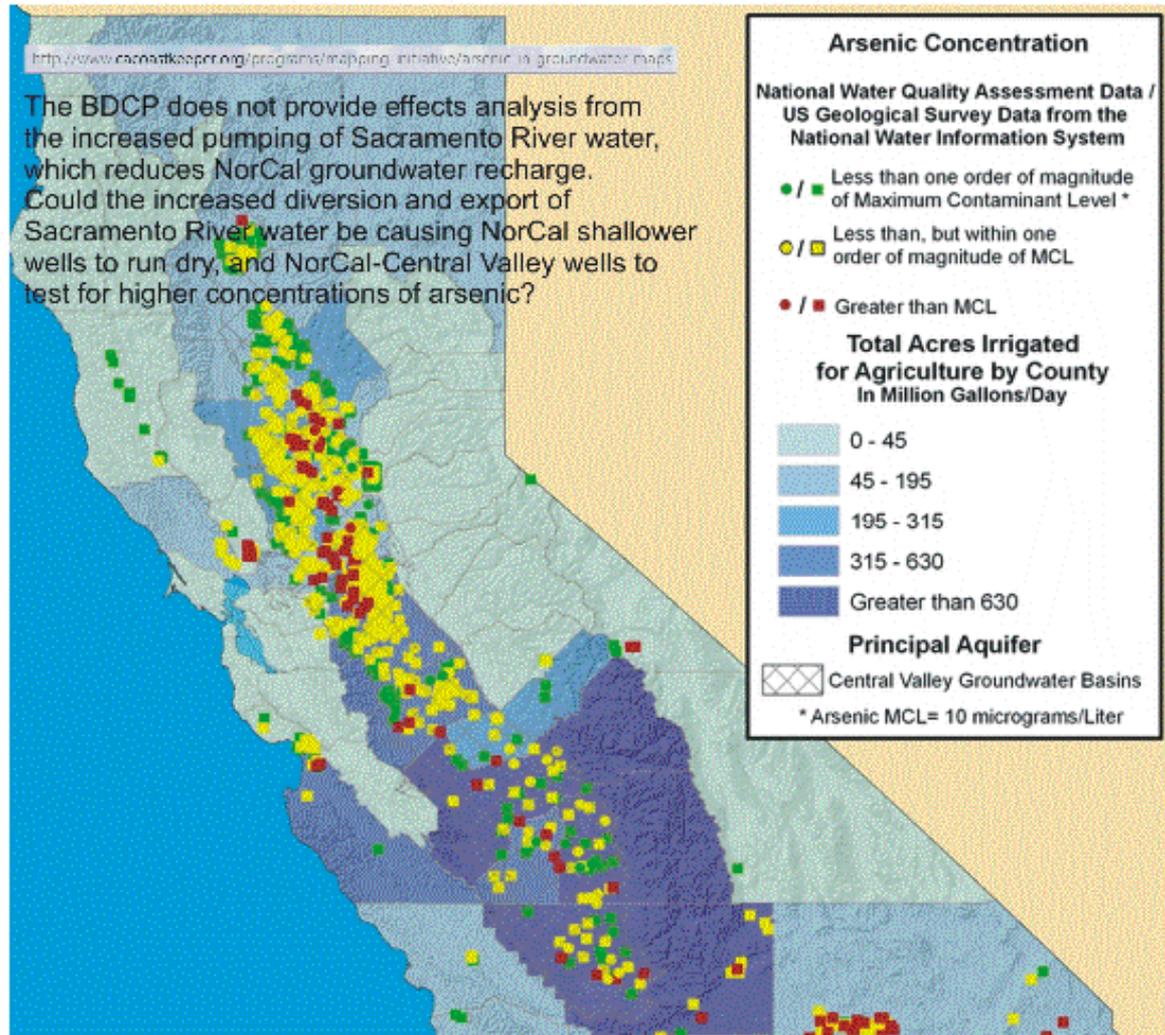
I, Nicole S. Suard, Esg, Managing Member, of Snug Harbor Resorts, LLC certify and confirm, under penalty of perjury, that the documents contained in this Exhibit were compiled by me for the original purpose of educational research, and are submitted as evidence of the existence of research and data compiled by others that should be considered as applicable to possible negative impacts from ongoing and proposed actions or modifications to Sacramento River flows in the Delta, related to California WaterFix Water Rights hearings. I certify that data contained herein are exact screen prints, with the online location link added to the screen print. If additional data was added to screen print as notations, such additions will be noted herein.

Date: 8-29-2016

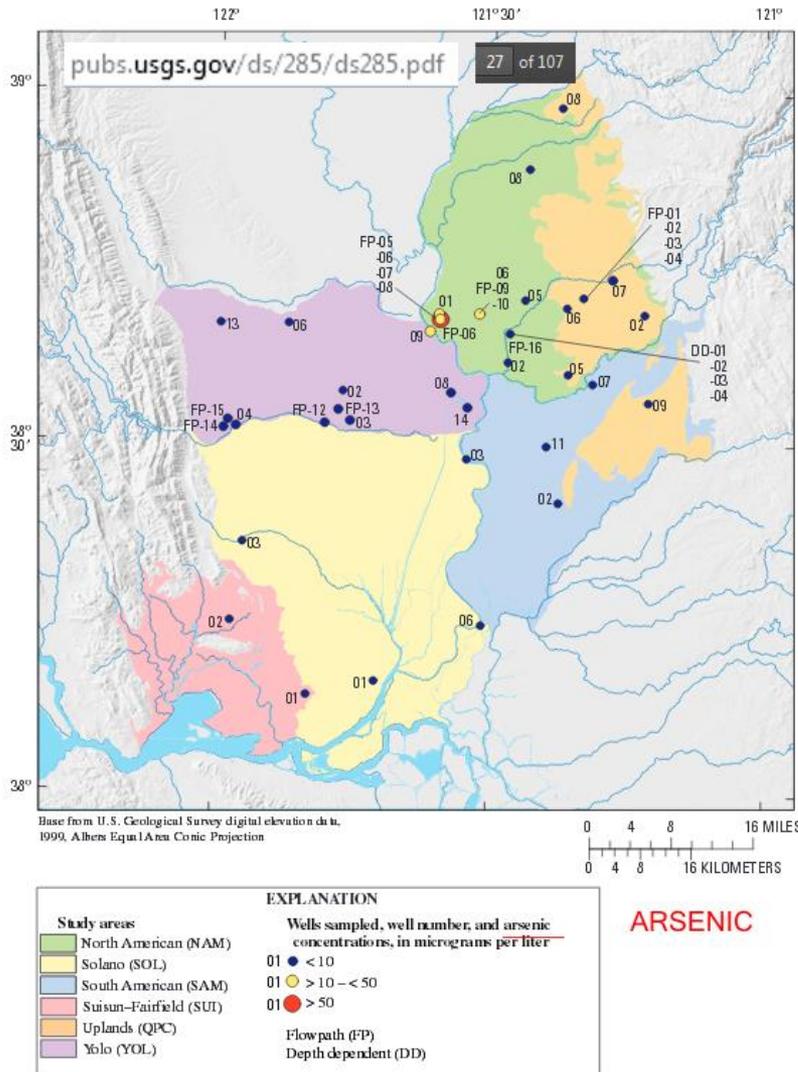
Signature:

A handwritten signature in black ink, appearing to read "Nicole S. Suard". The signature is written in a cursive style with a large, sweeping initial "N".

Screen prints of reference maps regarding Water Quality Concerns: Arsenic, Mercury, Selenium, and more. Online location of map shows in the screen print for each map.



# SHR-20

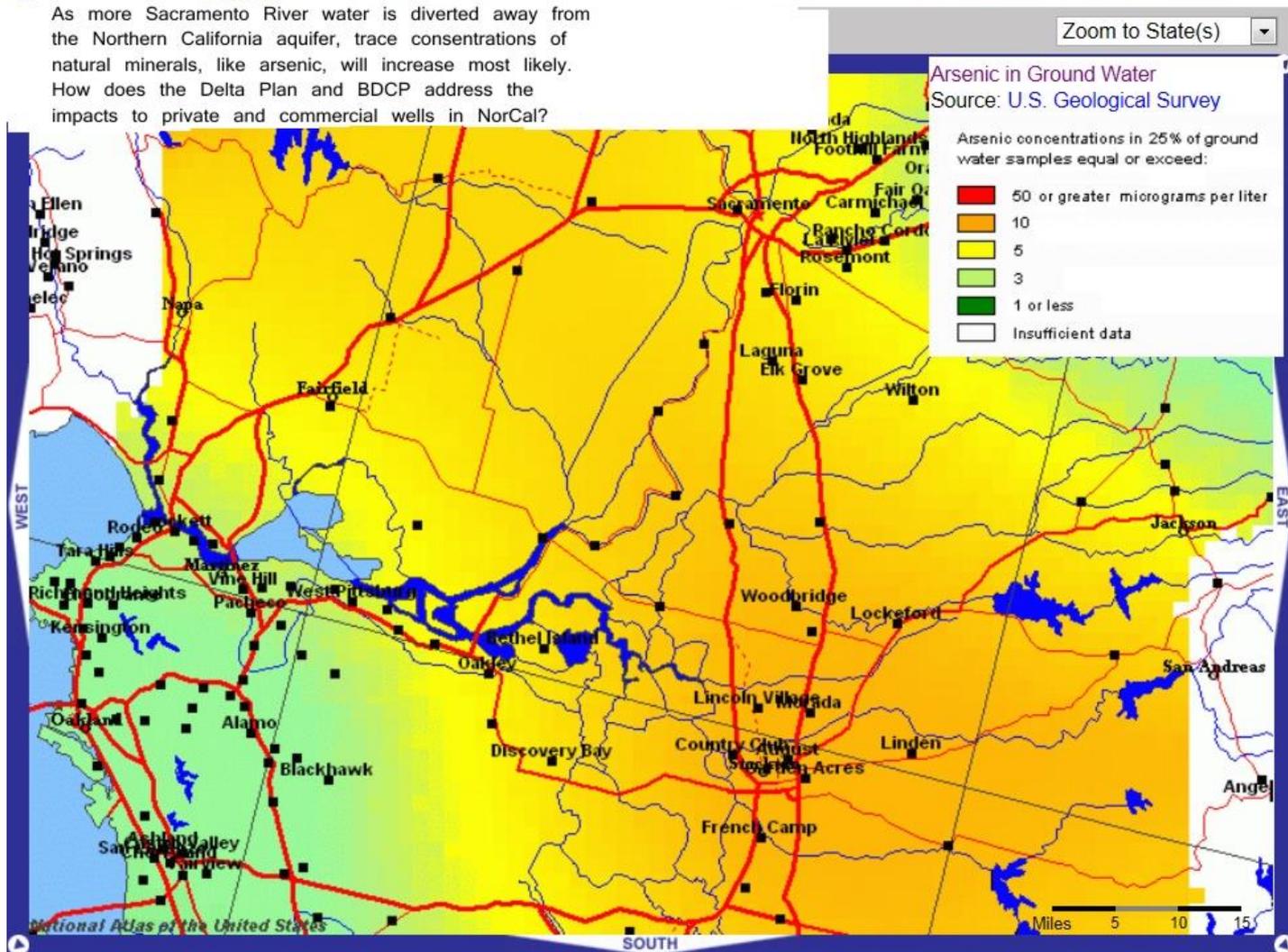


In the 2005 USGS report, wells tested in and around the Delta region resulted in arsenic below the MCL of 10 ppb, as shown on the map to the left

Copy of full study is provided As SHR-34f

**Figure 5** Arsenic concentrations in ground water in the study areas of the Southern Sacramento Valley Ground-Water Ambient Monitoring and Assessment (GAMA) study unit.

As more Sacramento River water is diverted away from the Northern California aquifer, trace concentrations of natural minerals, like arsenic, will increase most likely. How does the Delta Plan and BDCP address the impacts to private and commercial wells in NorCal?





SHR-20

Studies such as the Drinking Water Quality Management Plan for the Delta Region did not show increase in arsenic as a concern for drinking water, indicating the changes to the drinking water aquifer had not yet begun or were measured.

# Delta Water Quality

CALFED Bay-Delta Program

August 2007

This paper presents summaries of the most important water quality issues addressed by the CALFED Bay-Delta Program. These issues are also essential to the Delta Vision goal of managing the Delta as a sustainable ecosystem that continues to support critical environmental and economic functions. It is intended to provide a brief overview of the status and future of some of the Delta's highest priority water quality problems. The body of the report is in the form of a series of fact sheets covering individual water quality topics. The key themes and conclusions from individual fact sheets are synthesized herein.

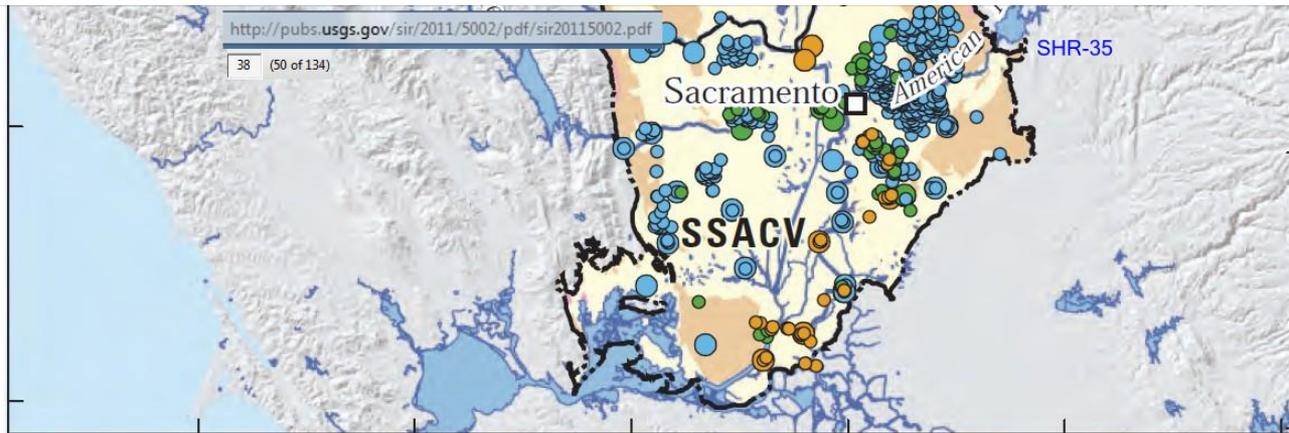
The water quality topics covered are: Dissolved Oxygen, Pesticides, Selenium, Mercury, Toxicity of Unknown Origin, and Drinking Water Quality. Although not a comprehensive list of Delta water quality issues, these are the issues that were and are considered some of the highest priorities for the CALFED program. Salinity, as an ecosystem water quality issue is not included here because it is dealt with at length elsewhere in the Delta Vision briefing materials. Nutrients as they relate to the aquatic food web are also not covered here because they have not been clearly defined as impairing beneficial uses of Delta water.

This report was prepared based on a series of interviews with subject matter experts, available reports, and information available on the internet. It was funded in large part by the CALFED Science Program through a contract with Brown and Caldwell Consulting, Inc. The fact sheets were finalized and reviewed by CALFED Water Quality Program

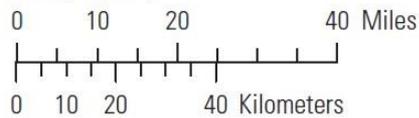
To the left is a screen print of a document distributed by the CALFED Bay-Delta Program in August 2007. Document lists the constituents of concern for the Delta Water Quality review for BDCP planning. Arsenic in drinking water is not listed as a concern as of August 2007

Full Document is labeled as SHR-355 and is also available online at <http://www.deltarevision.com> in the page or series of data collected on water quality in the Delta and California

By the time the 2011 USGS study is published, arsenic in drinking water wells in and around the Delta region Has increased substantially, as shown by the map from the report. Full report is provided as SHR-35f.



Shaded relief derived from U.S. Geological Survey National Elevation Dataset, 2006, Albers Equal Area Conic Projection Horizontal datum: North American Datum of 1983 (NAD 83)



**Geology**

- Quaternary alluvium (Q)
- Quaternary/Plio-Pleistocene semiconsolidated (QPc)
- Quaternary/Tertiary volcanic pyroclastic (QTvp)

**EXPLANATION**

**Relative-concentration of arsenic in:**

**USGS-Grid wells**

- High
- Moderate
- Low

**CDPH wells**

- 
- 
- 

**--- Boundary of Sacramento Valley**

**— Study units**

- Northern Sacramento Valley study unit (NSACV)
- Middle Sacramento Valley study unit (MSACV)
- Southern Sacramento Valley study unit (SSACV)

**WHY is there such high reading in wells on Sacramento River just north of Steamboat and Sutter? And on lower Sac River?**

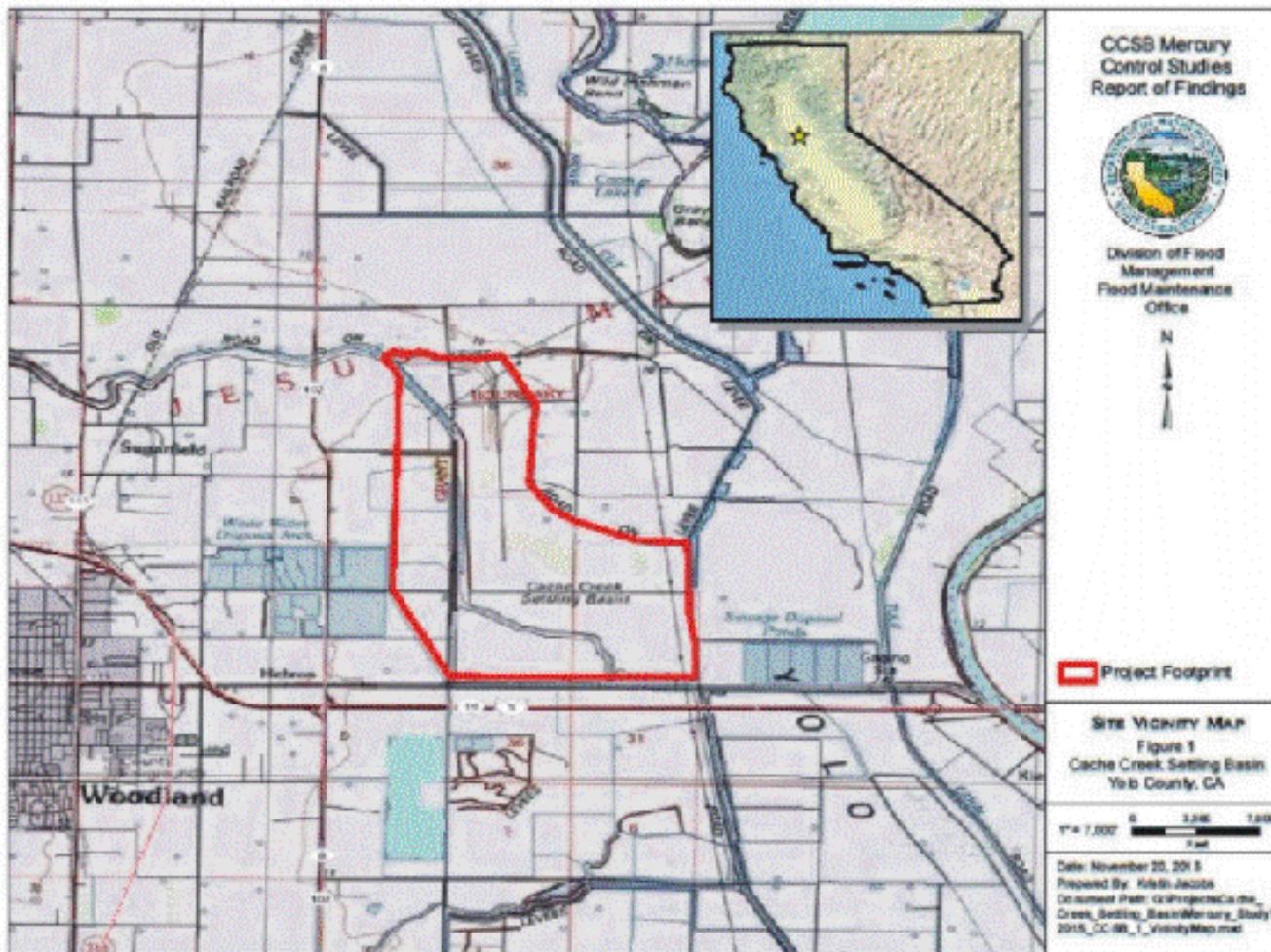
Catchment Basin near Woodland, which is the subject of studies regarding Mercury impacts to fish and humans is located near the site of highest arsenic concentrations in groundwater per the 2005 USGS study noted in this SHR map series.

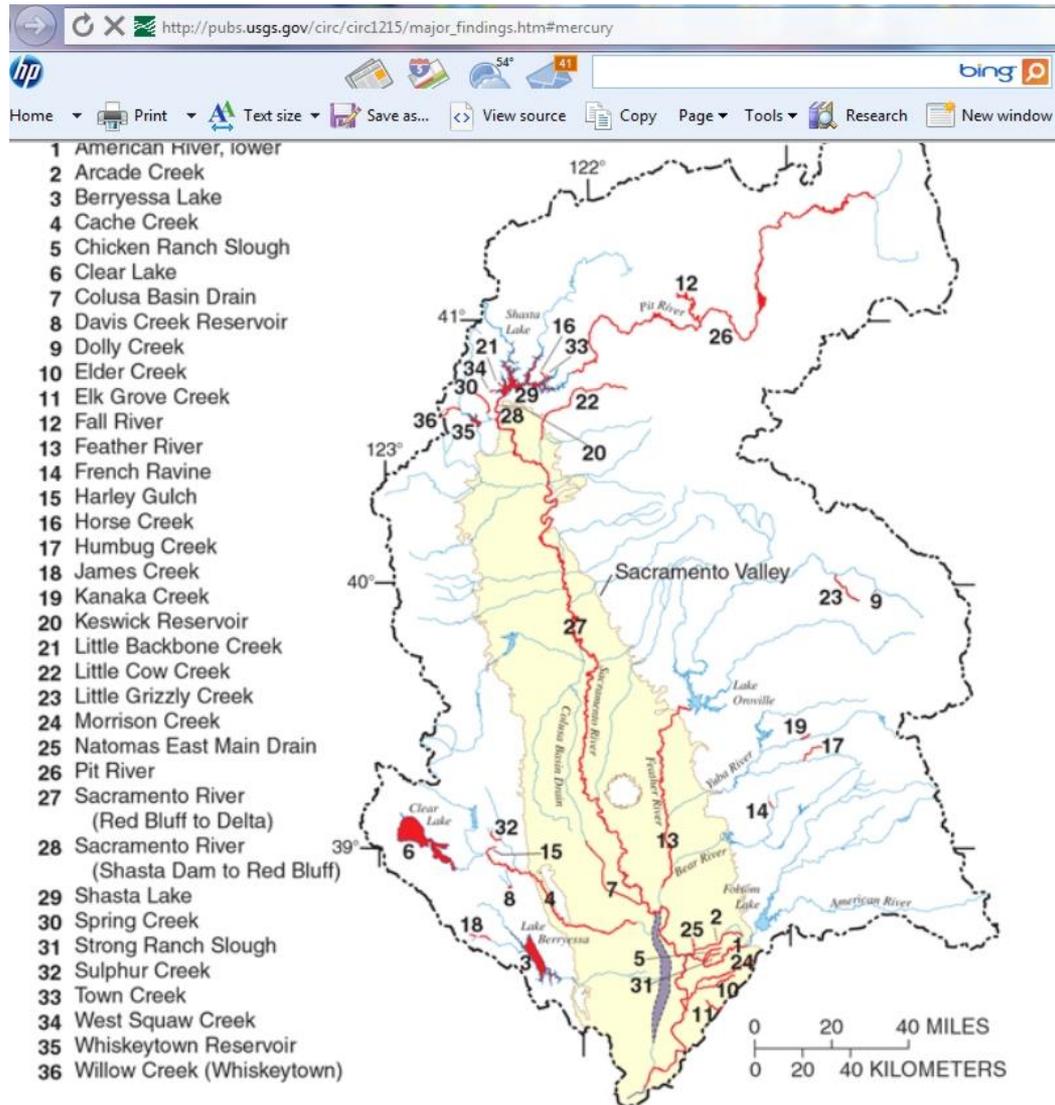
[www.swrcb.ca.gov/centralvalley/water\\_issues/tmdl/central\\_valley\\_projects/delta\\_hg/control\\_studies/delta\\_hg\\_oct2015pr\\_cacheckr.pdf](http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/control_studies/delta_hg_oct2015pr_cacheckr.pdf)

CCSB Mercury Control Studies

2

11/21/15





**Figure 8.** Impaired water bodies of the Sacramento River Basin according to the California 303(d) list (U.S. Environmental Protection Agency, accessed January 2, 2000). Impaired water bodies require the implementation of a management plan called a Total Maximum Daily Load (TMDL) to bring the water body into compliance with existing standards. Most of the impairments are the result of pesticides from agricultural or urban use, or from metals derived from historical mining operations.

TMDLs impacts to drinking water aquifer from hydraulic flow changes is simply ignored when considering the impacts to persons located within and near the entire legal Delta region.

Executive Summary

DELTA REGION DRINKING WATER  
Quality Management Plan

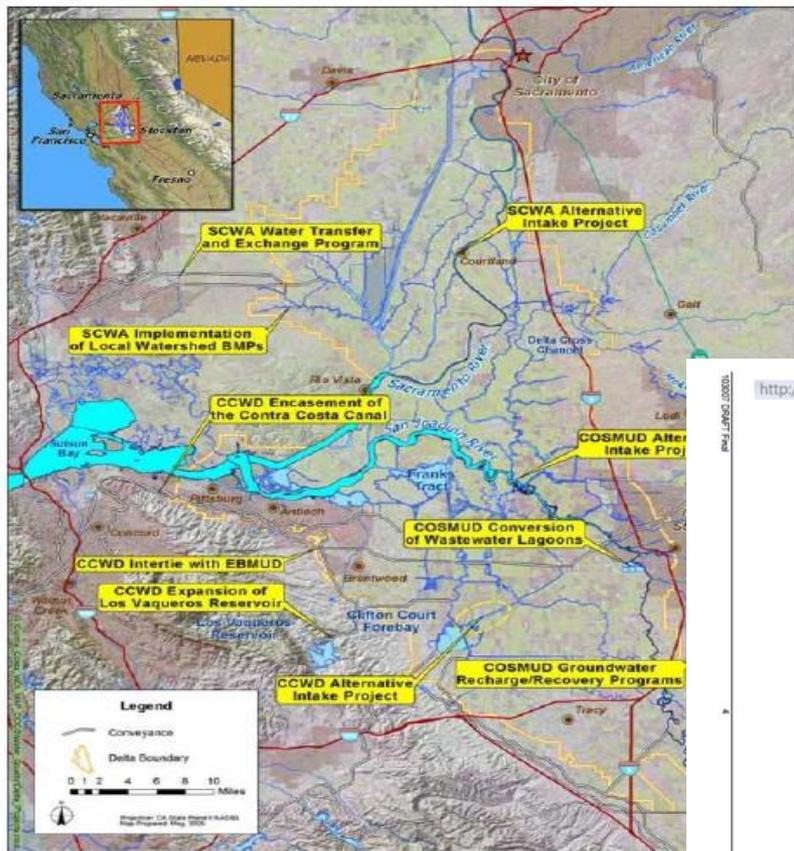


Figure ES-5 Proposed Delta Region Projects and Programs<sup>1</sup>

<sup>1</sup> CCWD and SCWA also are pursuing advanced treatment technologies. The local water treatment plants are not depicted in this figure.

June 2005

ES-8

CALIFORNIA SAN JUAN DELTA PROGRAM  
PROGRAM PLAN YEAR 8  
CONVEYANCE PROGRAM

Screen print of CALFED/BDCP actions which may have caused or substantially contributed to the increased levels of arsenic in the drinking water aquifer of the Delta region.

[http://www.calwater.ca.gov/content/Documents/meetings/2007/WSS\\_MeetingNotes\\_11-14-07/Conveyance\\_Program\\_Plan\\_Year8.pdf](http://www.calwater.ca.gov/content/Documents/meetings/2007/WSS_MeetingNotes_11-14-07/Conveyance_Program_Plan_Year8.pdf)

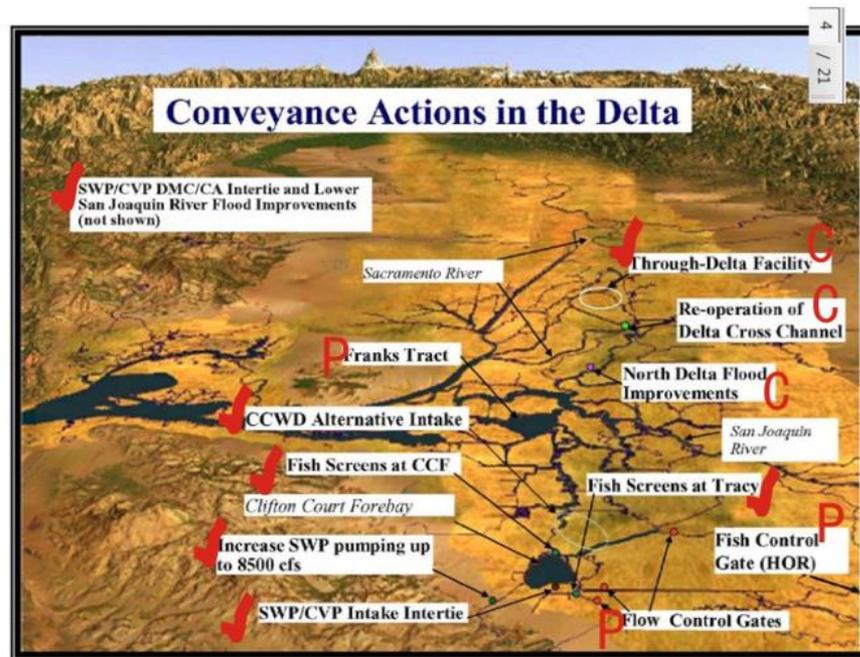


Figure 1

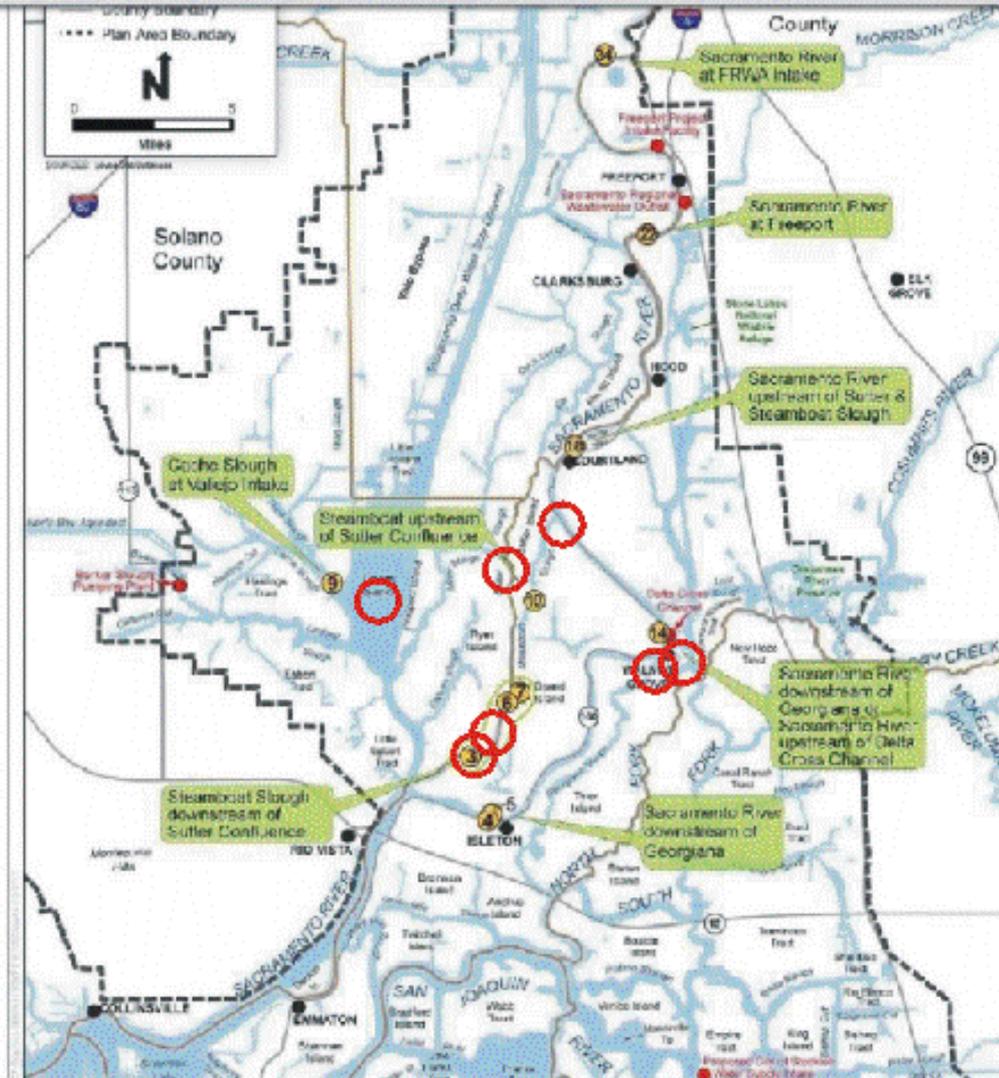


Figure C.4-15. Bench Habitat Analysis Sites

Screen print of CALFED/BDCP /WaterFix/EcoFix actions which may have caused or substantially contributed to the increased levels of arsenic in the drinking water aquifer of the Delta region. Red circles added to the map to show locations of actions that have caused hydrodynamic changes that have negatively impacted surface water quality in the North Delta in the last 8 to 10 years, and impacts to Delta drinking water aquifer started to be impacted by 2010.

1  
2

<https://vimeo.com/139882865> Liberty Island “5000 acre reservoir” per DSM2?



<https://vimeo.com/139882865> Liberty Island “5000 acre reservoir” per DSM2?

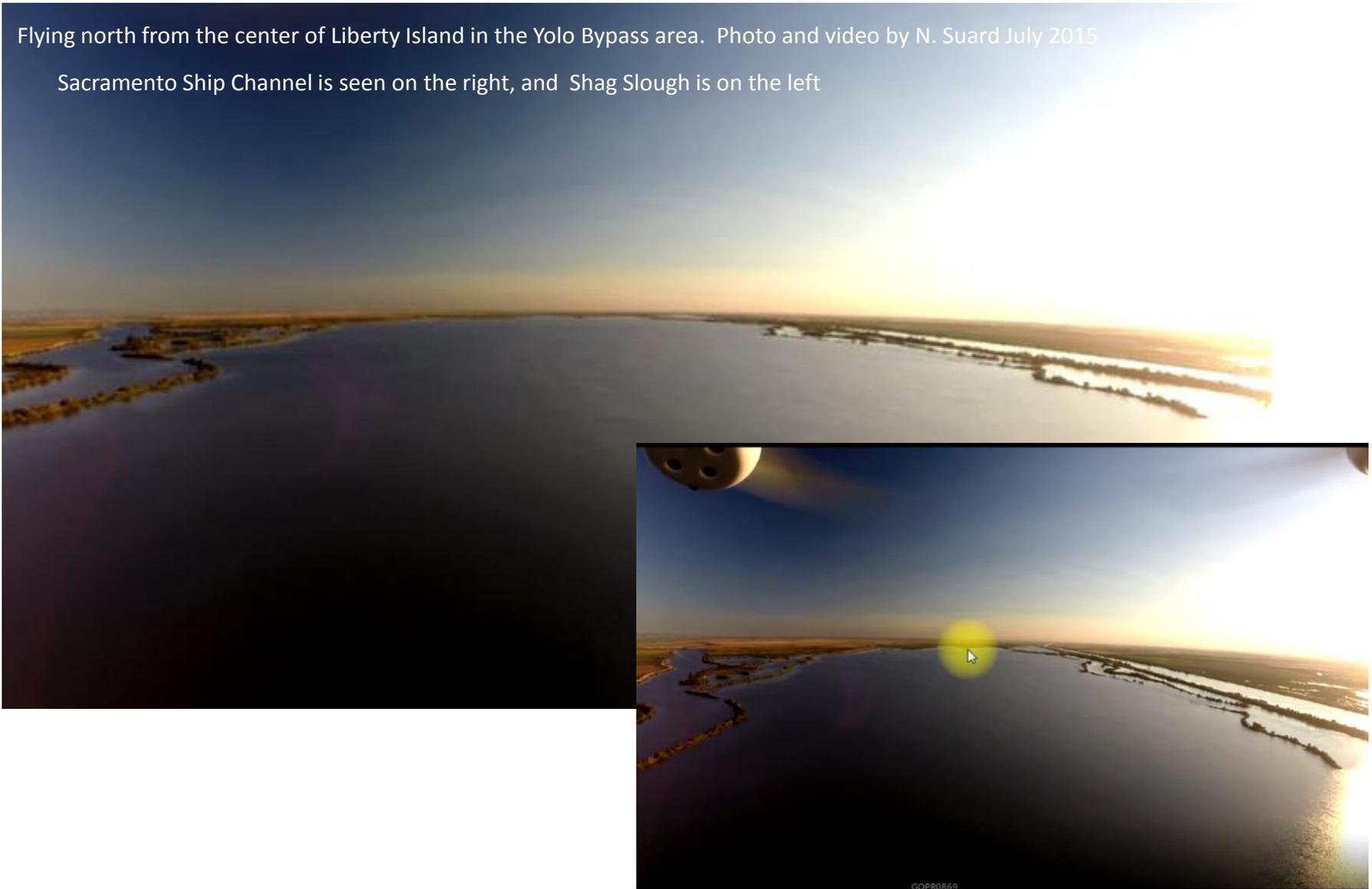
Looking north from the southern end of  
Liberty Island July 2015.  
N. Suard photo & aerial video



<https://vimeo.com/139882865> Liberty Island “5000 acre reservoir” per DSM2?

Flying north from the center of Liberty Island in the Yolo Bypass area. Photo and video by N. Suard July 2015

Sacramento Ship Channel is seen on the right, and Shag Slough is on the left



<https://vimeo.com/139882595> and <https://vimeo.com/139881993> Prospect Island



Prospect Island water hyacinth nursery early Fall 2015  
Photo and video by N. Suard

<https://vimeo.com/139882595> and <https://vimeo.com/139881993> Prospect Island



Prospect Island area water hyacinth nursery and “restoration” project, early fall 2015

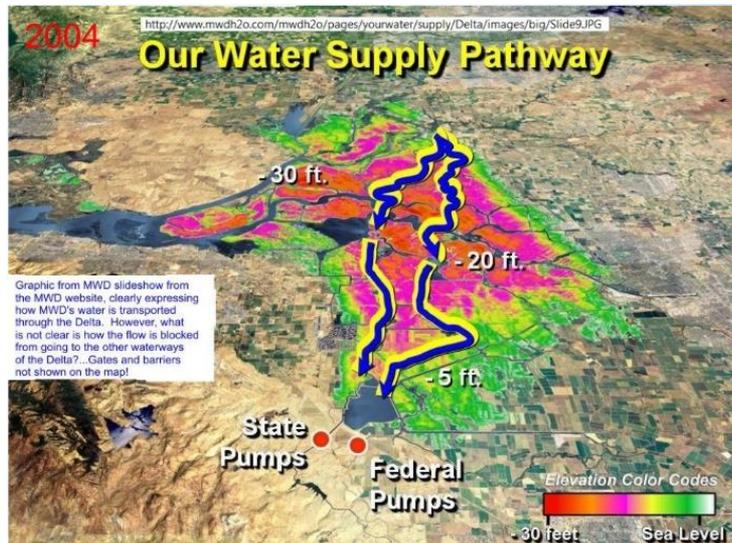
**From:** "Marshall, Paul@DWR" <Paul.Marshall@water.ca.gov> (Add as Preferred Sender)   
**Date:** Tue, Jun 17, 2014 11:05 am  
**To:** "sunshine@snugharbor.net" <sunshine@snugharbor.net>

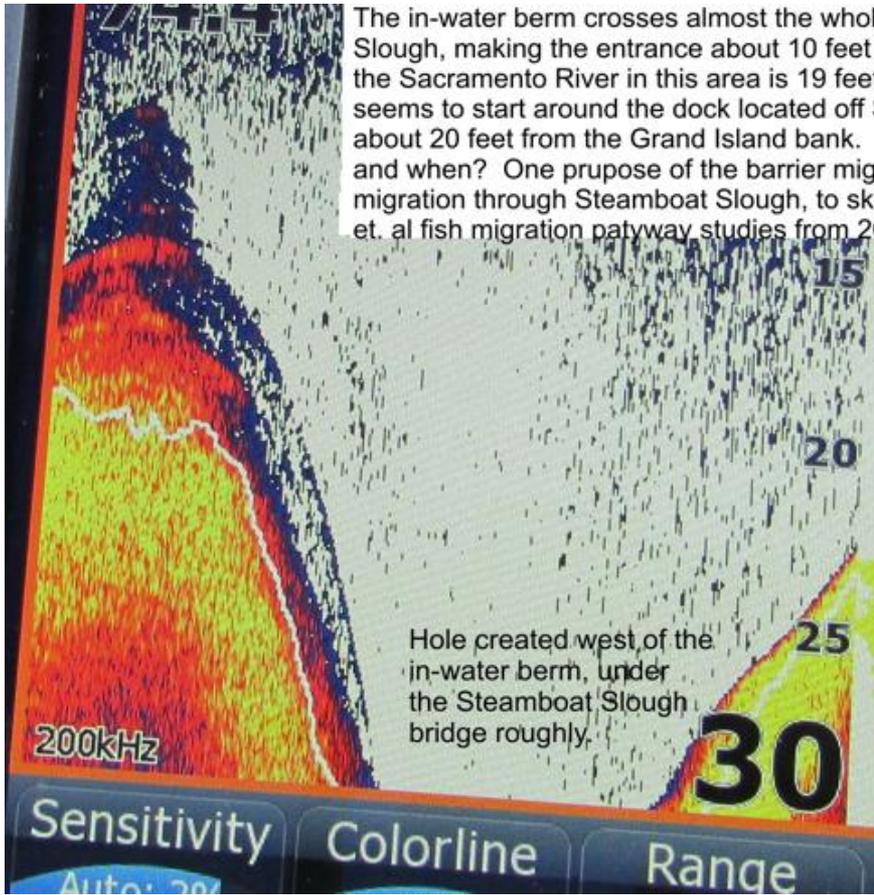
Nicky,

Sorry it has taken a while to get back to you. As you have no doubt heard, the Emergency Drought Barriers have been shelved for 2014. No telling what drought conditions in 2015 might bring, but DWR is working on a contingency plan to show the potential uses of drought barriers and under what circumstances they might be necessary. Stay tuned.

I do have an answer for you on the obstruction at the head of Steamboat Slough. The underwater berm you speak about is actually a naturally occurring shoal. Attached are slides that show a progression of siltation over the past decade or so. The Profiles in one slide compare all the profiles together. The right bank has moved south a bit and a shoal has developed. The bathymetry for the 1998-2000 study shows little presence. The 2008 bathymetry shows more presence than before. The 2014 presence the shoal is pronounced. As you suspect, the presence of the shoal may be contributing to the erosion on the southern bank. The reclamation district should continue to monitor the levee there and possibly talk with the Delta Levees program. I know all of the RDs are plugged into that program.

Paul

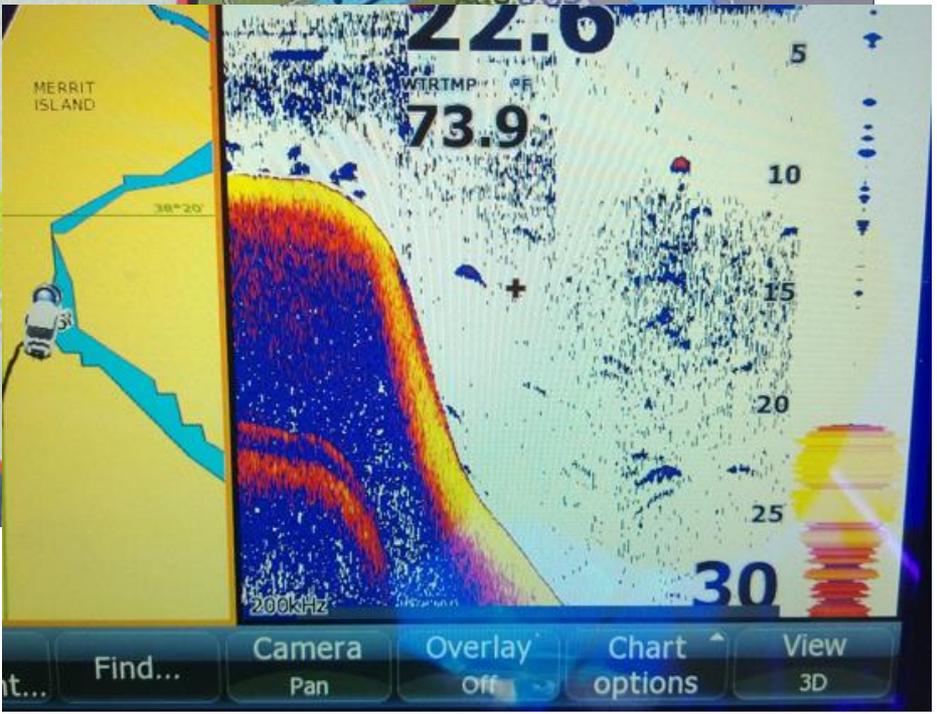




The in-water berm crosses almost the whole entrance to Steamboat Slough, making the entrance about 10 feet deep at low tide, while the Sacramento River in this area is 19 feet or deeper. The berm seems to start around the dock located off Sutter Island, and stop about 20 feet from the Grand Island bank. Who installed this berm and when? One purpose of the barrier might be to block salmon migration through Steamboat Slough, to skew the data of the Perry et. al fish migration pathway studies from 2006 to 2012.



Hole created west of the in-water berm, under the Steamboat Slough bridge roughly.



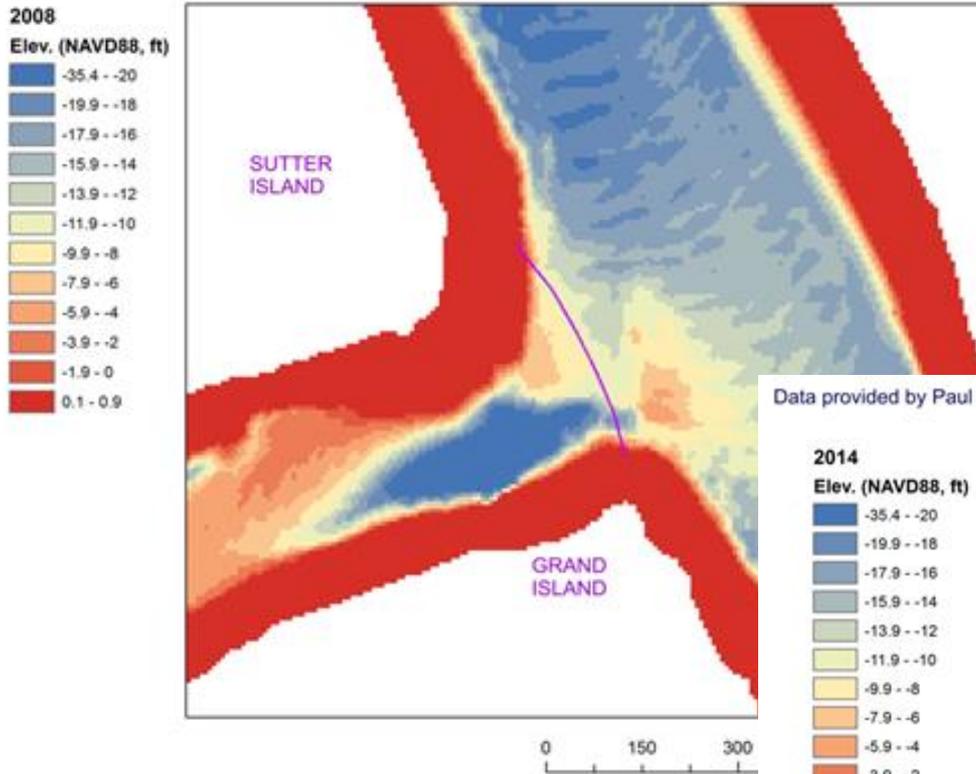
[http://snugharbor.net/sacramento\\_river\\_barrier.html](http://snugharbor.net/sacramento_river_barrier.html)

Photos show pour—in-place cement, revertment rock, large river rock not normally found on the river bed In this area of the Delta, and sheer wall which could not be “naturally formed” per Paul Marshall.



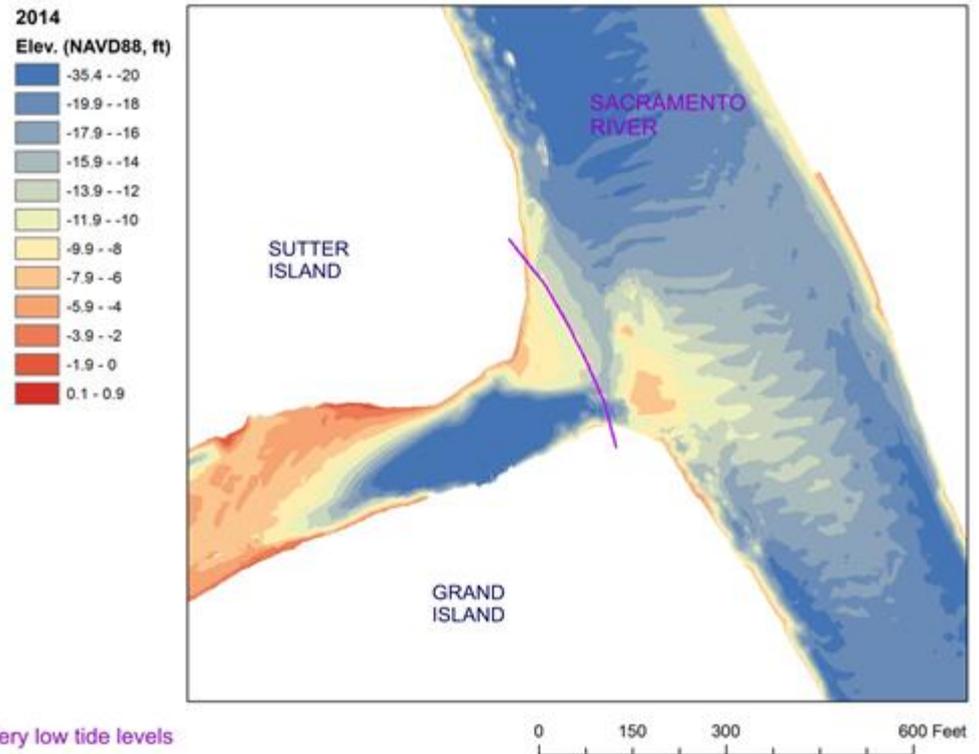


[http://snugharbor.net/sacramento\\_river\\_barrier.html](http://snugharbor.net/sacramento_river_barrier.html)

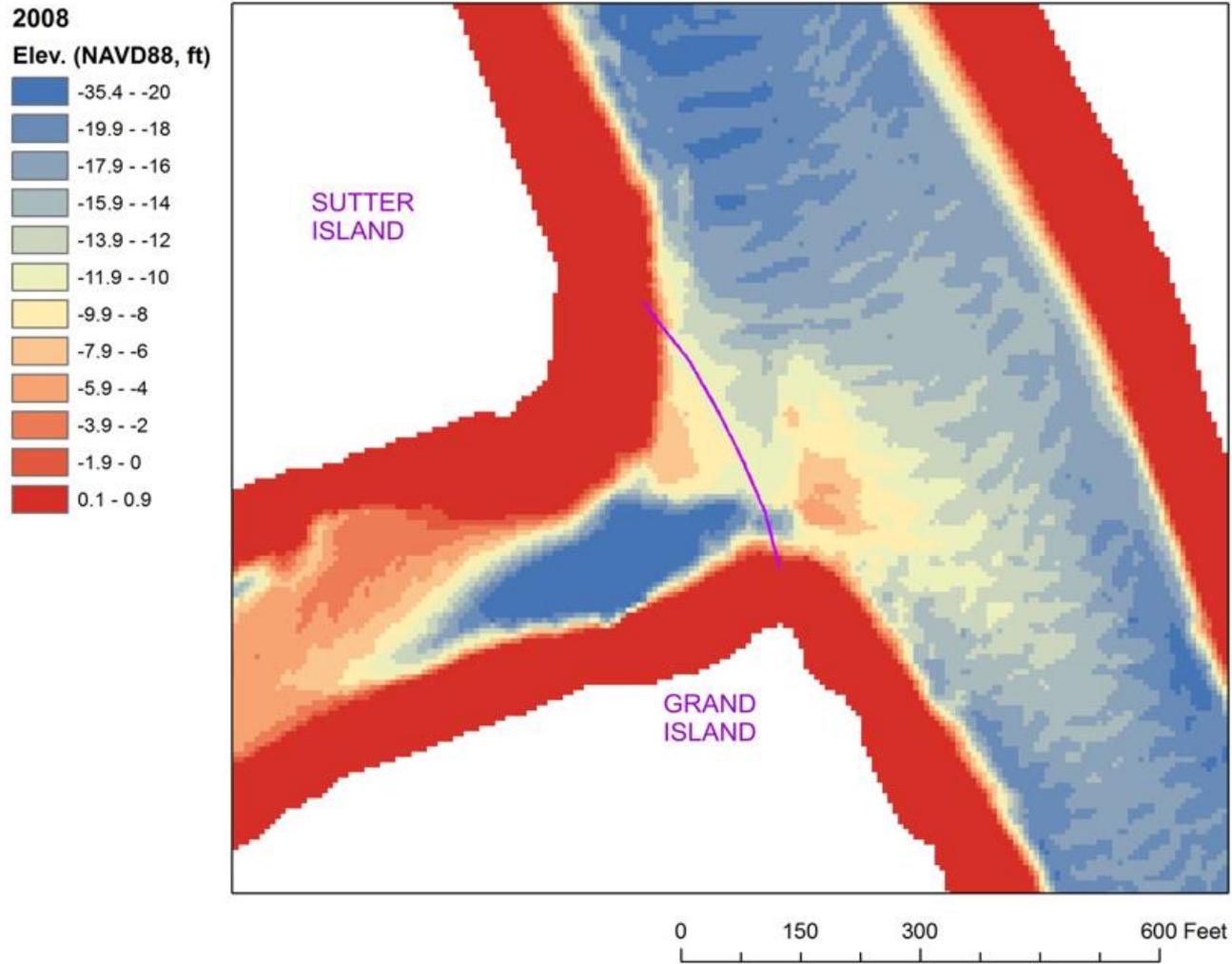


Data provided by Paul Marshall of DWR shows elevations, not water depth. At low tides, Steamboat Slough is 8 to 10 feet Deep as of 2014 and 2015 sidescan sonar survey By SHR team.

Data provided by Paul Marshall, DWR on 6/17/14 Shows berm or shoal, and a very deep hole.

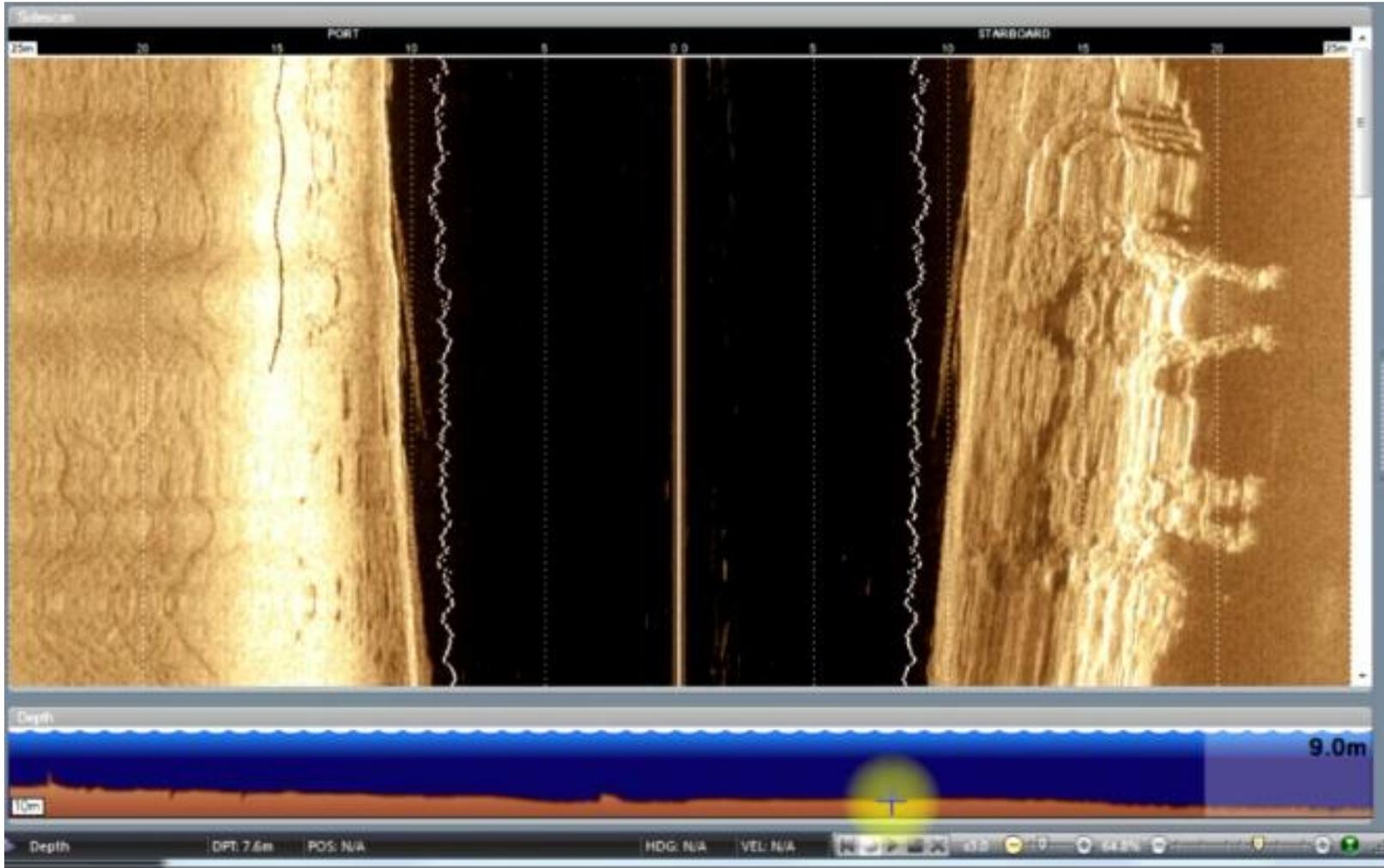


Data provided by Paul Marshall, DWR 6/17/14



<https://vimeo.com/150365468>

30 to 40 foot deep hole located downstream of the subsurface flow barrier on Steamboat Slough. Hole continues to scour when higher Sacramento River flows enter Steamboat Slough. Deep hole starts under the Steamboat Slough bridge and progresses downriver for at least 50 feet, and is located towards the Grand Island side of the waterway, which might explain the visible ongoing damage to Grand Island levee rock on that side.



<https://vimeo.com/150365468>

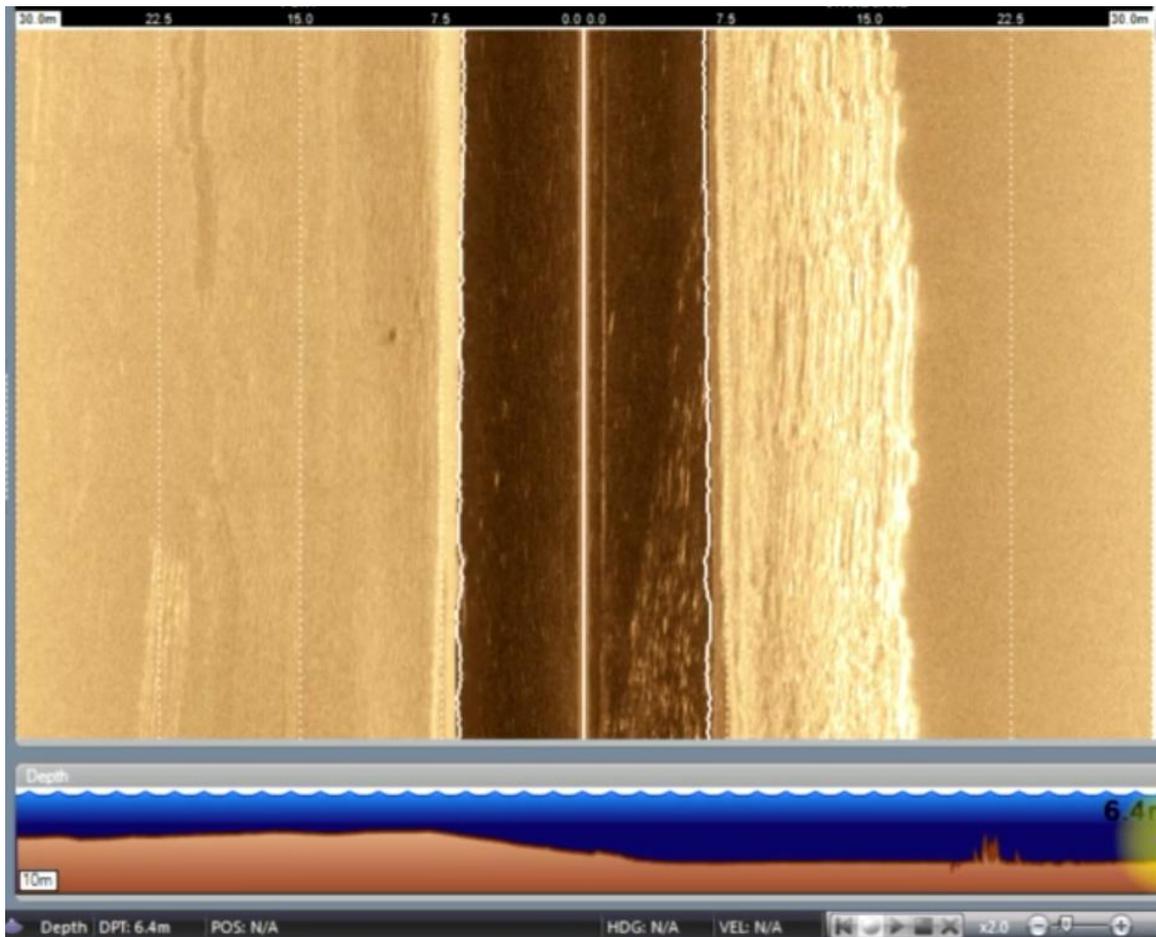


<https://vimeo.com/150365468>



Flow barriers cause silting and shallow water both upstream and downstream of the flow barrier

<https://vimeo.com/150367315> Sidescan sonar of Sutter Slough passing by Miner's Slough Confluence, heading downstream on Sutter Slough. This scan shows a deeper hold where the Water is blocked from going into Sutter Slough and instead flows into Miner's Slough, which is Not the normal pattern of flow.



<https://vimeo.com/150367315> Sidescan sonar of Sutter Slough passing by Miner's Slough Confluence, heading downstream on Sutter Slough, blocking flows into Sutter Slough and thereby diverting those flows into Miner's Slough. Location of this flow barrier is adjacent to the newer rock placed on Ryer Island below the confluence of Sutter and Miner Sloughs.

