

The Consequences of the End of VAMP's Export Restrictions

*Water exporters benefit and salmon and delta smelt pay
the price*

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Introduction

The Vernalis Adaptive Management Program or VAMP was an experimental combination of enhanced San Joaquin Delta inflows and Delta export reductions (limitations) during the spring period of mid-April to mid-May.¹ The concept of pulse flows and export restrictions was rooted in earlier biological opinions and the Central Valley Project Improvement Act (CVPIA). The goal was to improve survival of San Joaquin River Chinook salmon smolts migrating through the Delta to the ocean. But, the export limitations also protected Delta pelagic species, like delta smelt, from being pulled into the vast pumps at the Tracy and Banks facilities.

Vamp was incorporated into the State Water Resource Control Board's Water Rights Decision D-1641 in 2000, which implemented the 1995 Water Quality Control Plan for the Delta. The experiment effectively ended in 2011 after more than a decade of providing a measure of protection for Delta fish and their habitats.

However, a number of VAMP provisions were never implemented and the full range of flows and export limitations were never provided to complete the experiment. This report summarizes some of the benefits the export limitations of VAMP provided and, in their absence, what protections are now lacking and how water purveyors have manipulated the system.

A brief summary of the remaining inadequate fish protection measures and fisheries decline is followed by a discussion of events in the last VAMP year of 2010 and each of the three post-VAMP years.

NMFS OCAP Biological Opinion

The National Marine Fisheries Service OCAP Biological Opinion² provides Old and Middle River (OMR) negative flow restrictions to limit exports. Second, it provides San Joaquin inflow to export ratio criteria (I/E) to limit exports. Third, it retains spring closures of the Delta Cross Channel.

SMELT OCAP Biological Opinion

The U.S. Fish and Wildlife Service Smelt Biological Opinion³ replaced the VAMP protections with OMR limitations in the range of -1250 to - 6100 cubic feet per second (cfs).

¹ http://www.sjrg.org/peerreview/review_vamp_panel_report_final_051110.pdf

² http://www.swr.noaa.gov/ocap/doss/DOSS_annual_report_2011.pdf

³ <http://www.fws.gov/sfbaydelta/cvp-swp/cvp-swp.cfm>

Delta Water Quality Standards - D-1641

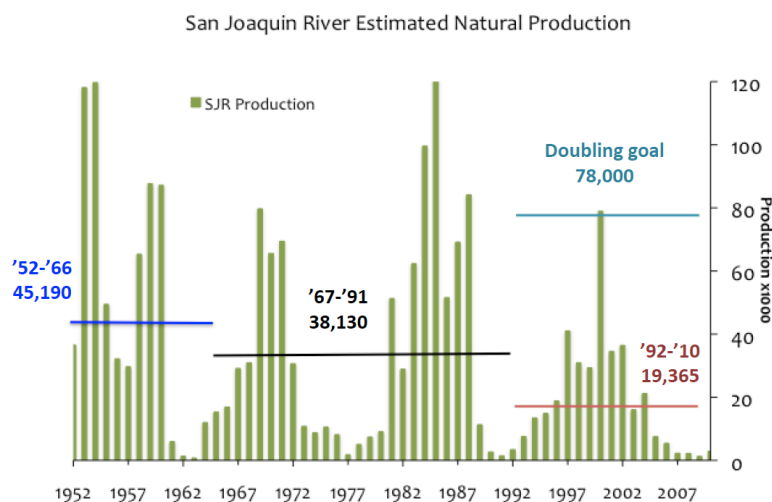
Pursuant to D-1641, a flow pulse (3100 - 8600 cfs depending on water year type) is required from the San Joaquin River into the Delta from mid April to mid May.

Unfortunately, in drier years, the biological opinions and delta water quality standards fail to provide adequate protection for salmon and delta smelt. The lack of export limitations in dry years has provided water contractors the opportunity to manipulate the system and opened the door to unauthorized water transfers to the detriment of fisheries.

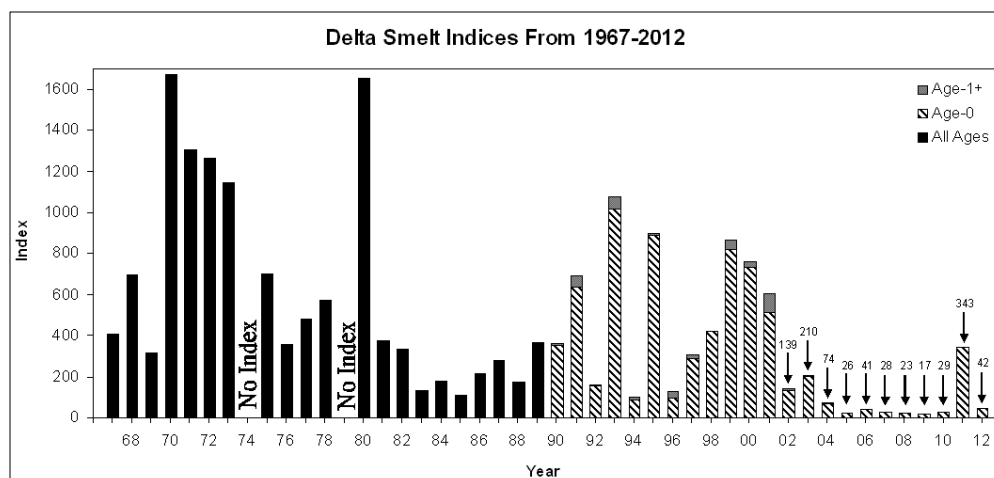
The Long Decline of Salmon and Delta Smelt

Population levels of San Joaquin River Chinook salmon have plummeted since the construction of the rim dams and completion of the export projects. The Spring-run is extirpated and the numbers of Fall-run declined by more than half between 1952-1966 and 1992-2010 and are less than a fourth of the CVPIA's fish doubling goal.

Decline of San Joaquin River Fall Run Chinook salmon

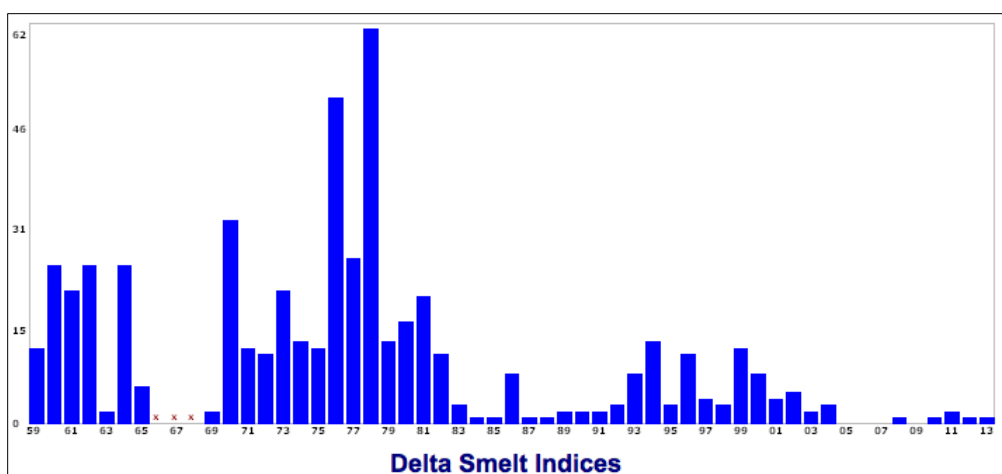


Pelagic species in the Delta have fared far worse. As recently as thirty years ago, the delta smelt was one of the most common and abundant pelagic species in the estuary. The abundance index for adult delta smelt in the California Department of Fish and Wildlife's Fall Mid-Water Trawl average 806 in the first 16 years (1967-1982) but declined to 88 in the most recent ten years (2002-2012), a decline of almost 90%.



Fall Mid-Water Trawl: <http://www.dfg.ca.gov/delta/data/fmwt/Indices/sld002.asp>

The Summer Towntnet Survey's index for juvenile delta smelt averaged 21.2 between 1959 and 1978 but only 1.1 between 2003 and 2013, a decline of almost 95%.

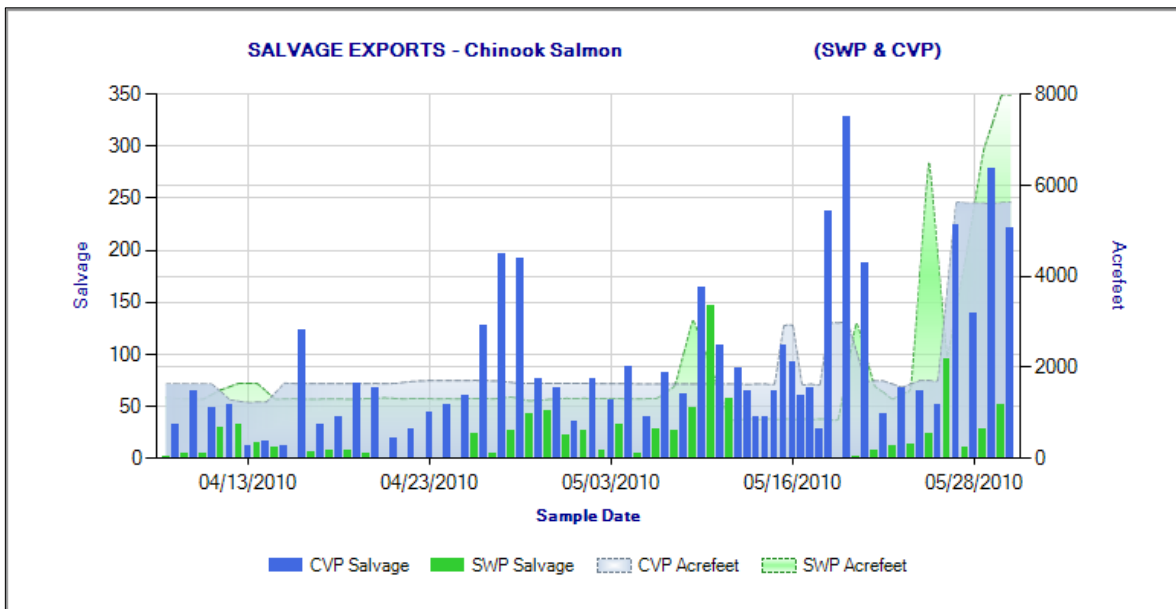
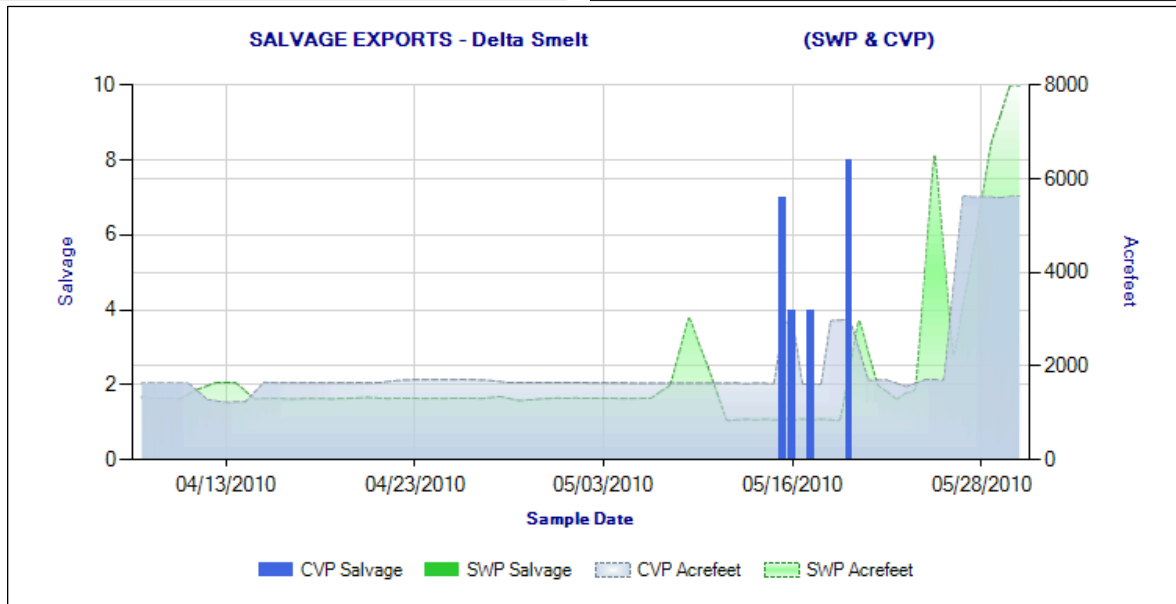
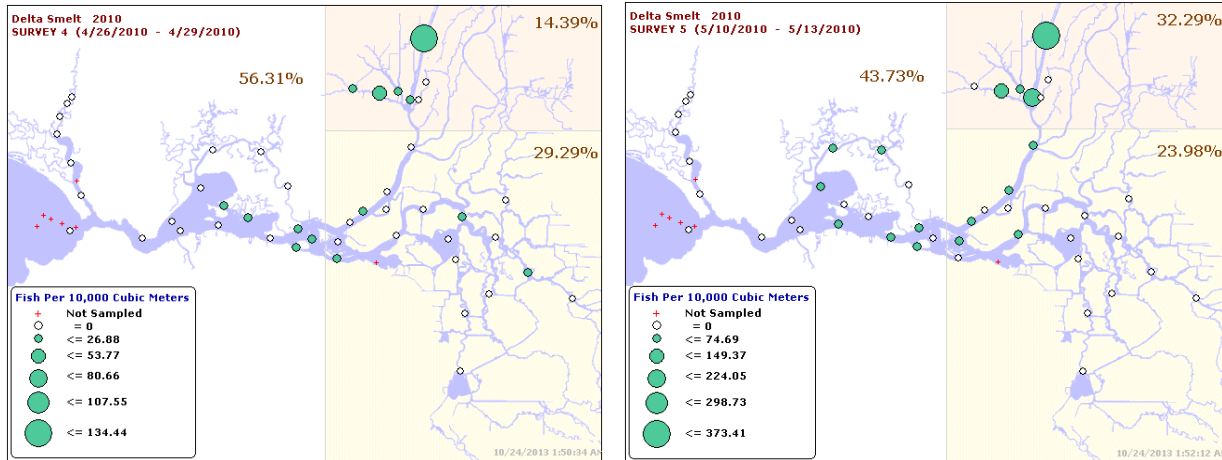


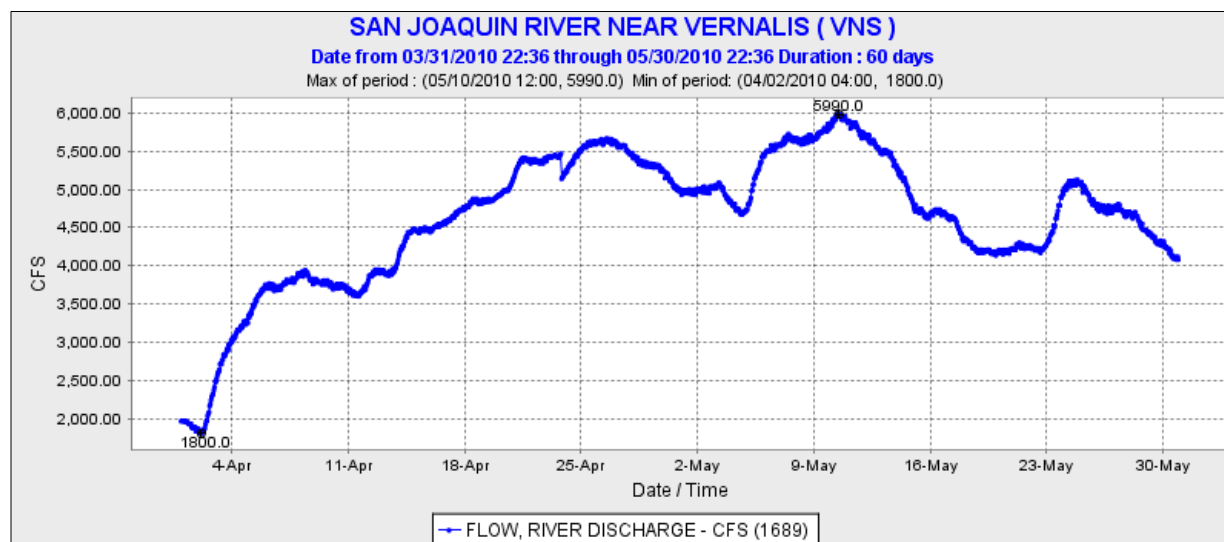
Summer Towntnet: <http://www.dfg.ca.gov/delta/data/towntnet/indices.asp?species=3>

April - May 2010

Year 2010 was the last effective year of VAMP and an above-normal year on the San Joaquin River. Inflows from mid April to mid May ranged from 4500-6000 cfs and exports were about 1500 cfs. Although 24-29% of delta smelt were in the western Delta, losses were extremely low because of VAMP export limits. This likely contributed to the 2011 population rebound. Salmon salvage during the pulse flow period was also relatively low.⁴

⁴ The Delta smelt survey maps in this report are from the DFW's 20mm survey found at: <http://www.dfg.ca.gov/delta/projects.asp?ProjectID=20mm>. The salvage/export data are from: <http://www.dfg.ca.gov/delta/apps/salvage/Default.aspx> and the Vernalis flow data can be found at DWR's California Data Exchange Center at: http://cdec.water.ca.gov/cgi-progs/staMeta?station_id=ver.





April - May 2011

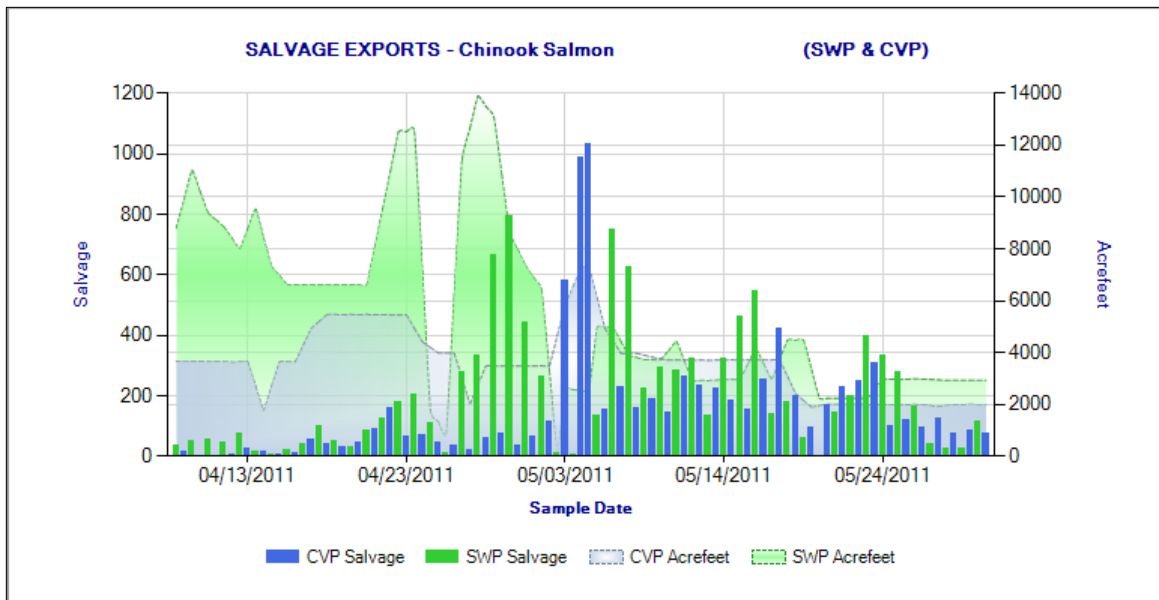
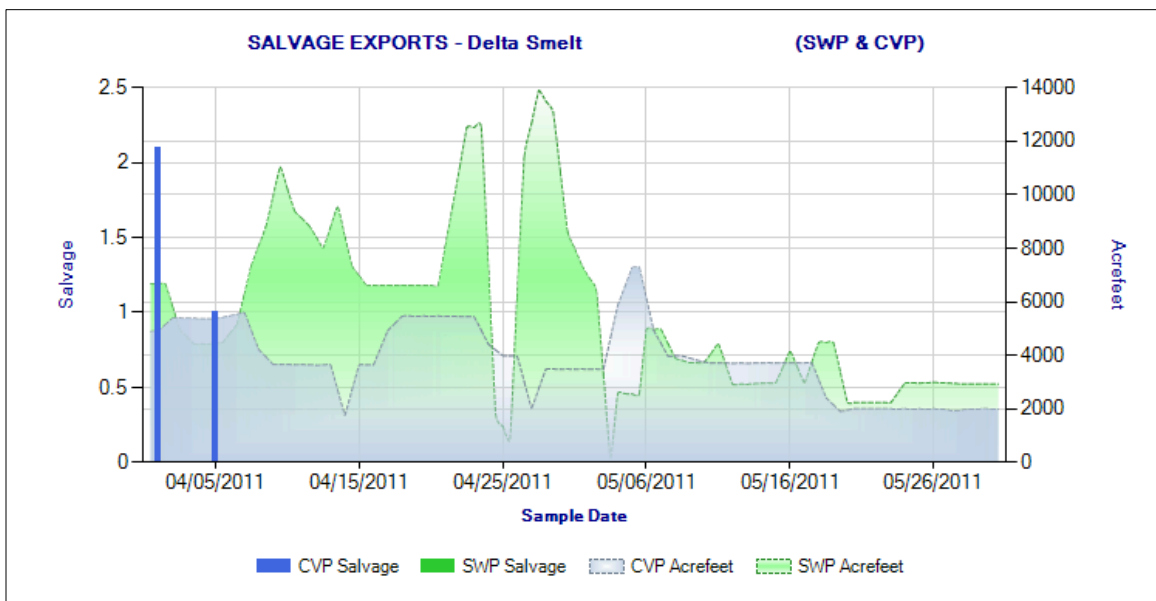
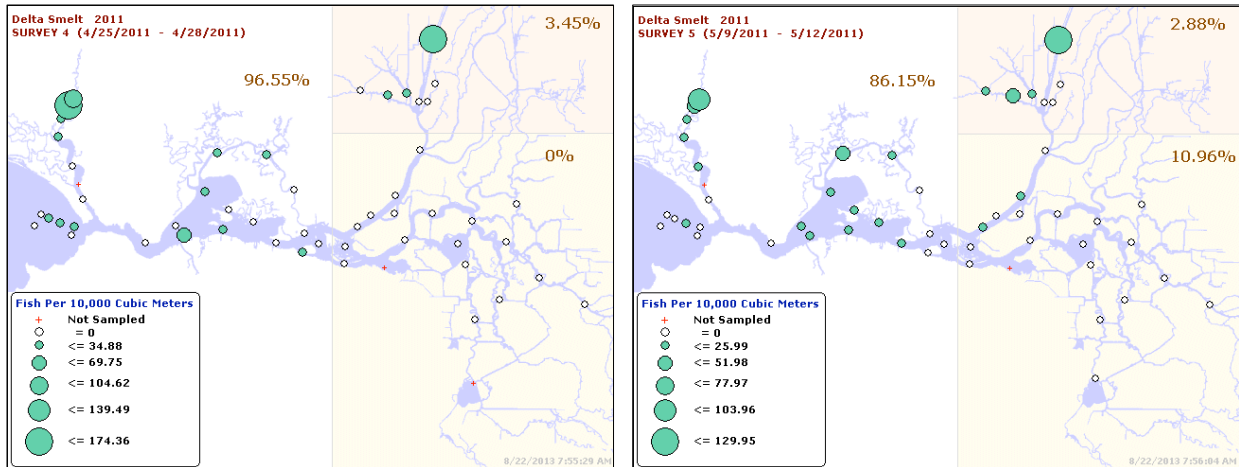
Year 2011 was a wet year on both the Sacramento and San Joaquin Rivers with San Joaquin inflows ranging from 10000 to 26000 cfs between mid April and mid May. The high flows resulted in only a small percentage of the delta smelt population being in the western Delta. Even though exports were 3000-9000 cfs, much higher than levels required by VAMP (1500 cfs in 2010), delta smelt losses were non-existent low and was likely a major factor in the population recovery in 2011.

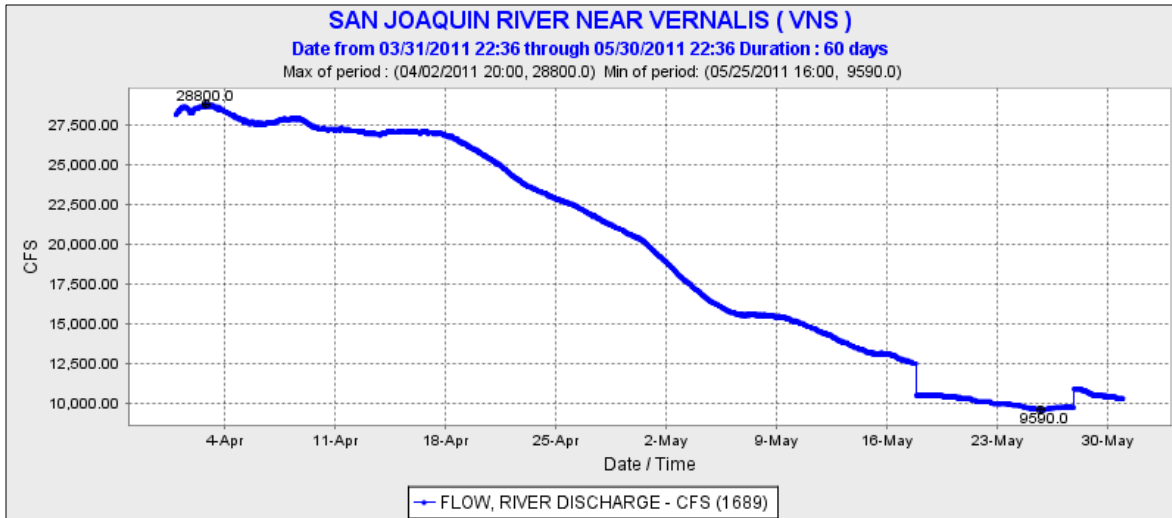
Salmon were salvaged in higher numbers because of the higher exports. Salvage was highest during peak exports. Salvage was roughly triple 2010 levels under VAMP 1500 cfs export limits. With the Delta Cross Channel closed the burden of exposure to increased exports likely was on San Joaquin salmon.

A Note About Salvage: As many as 15 million fish, of all species, are “salvaged” each year at the pumps. However, salvage numbers only represent the tip of the iceberg. Only about 11-18% of salmon entrained in Clifton Court Forebay survive. Based upon numerous studies, 75% of entrained salmon are lost to predation (or 85.6% if all eight studies are averaged), 20-30% of survivors are lost at the salvage facility louvers, 1-12% of salvage fish are lost during handling plus an additional 12-32% lost to post-release predation.⁵ Delta smelt losses are far higher. For every adult delta smelt counted in salvage, at least 37 perished before reaching the fish salvage facility and none of the “salvaged” are likely to survive transport. Larval delta smelt are simply too small to be screened and counted.⁶

⁵ Larry Walker Associates. A Review of Delta Fish Population Losses from Pumping Operations in the Sacramento-San Joaquin River Delta. January 2010. P.2.

⁶ The Bay Institute. Collateral Damage. March 2012. P.14.

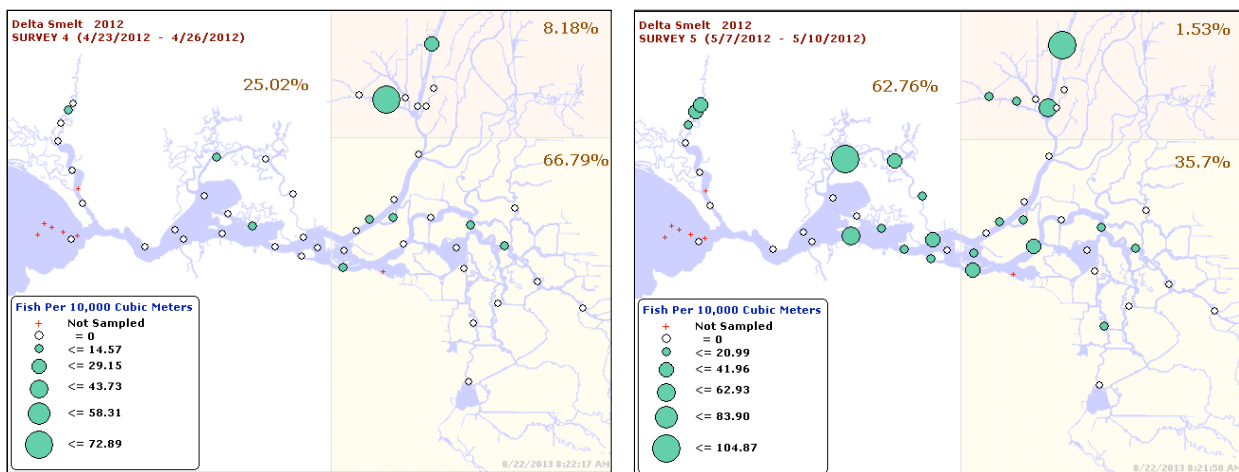


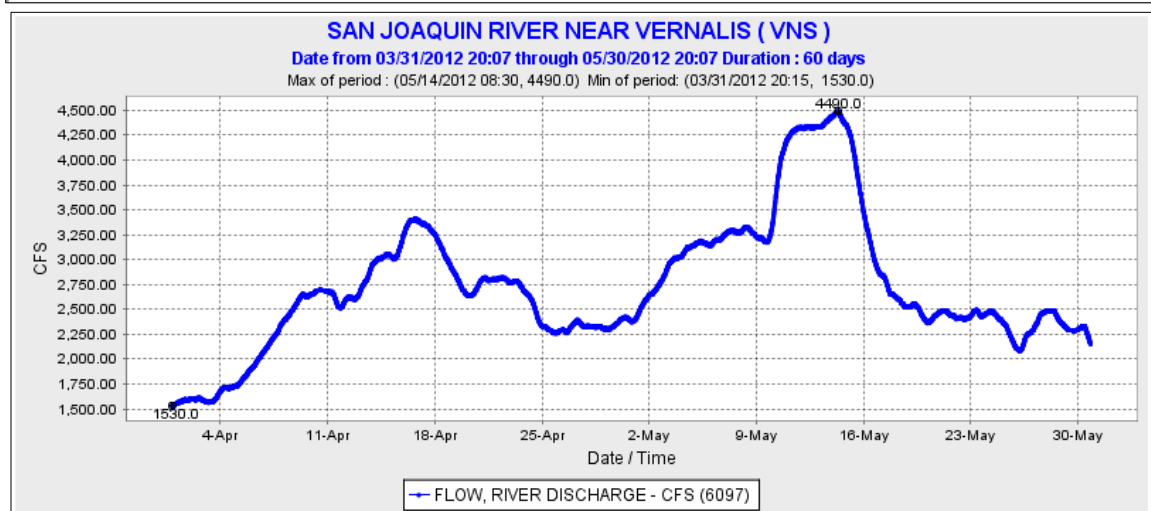
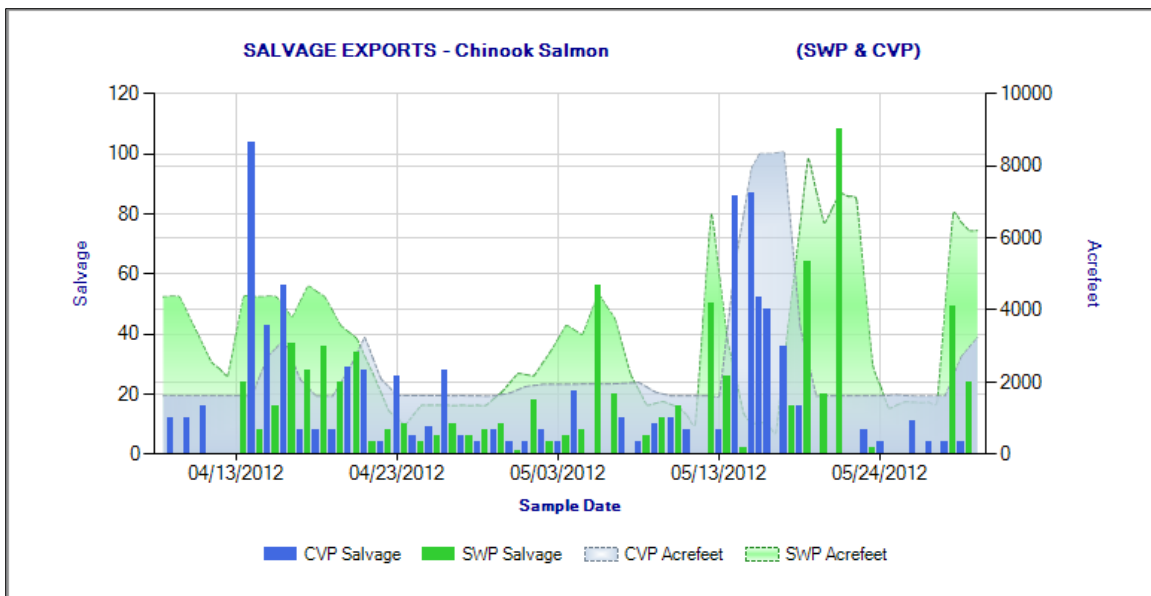
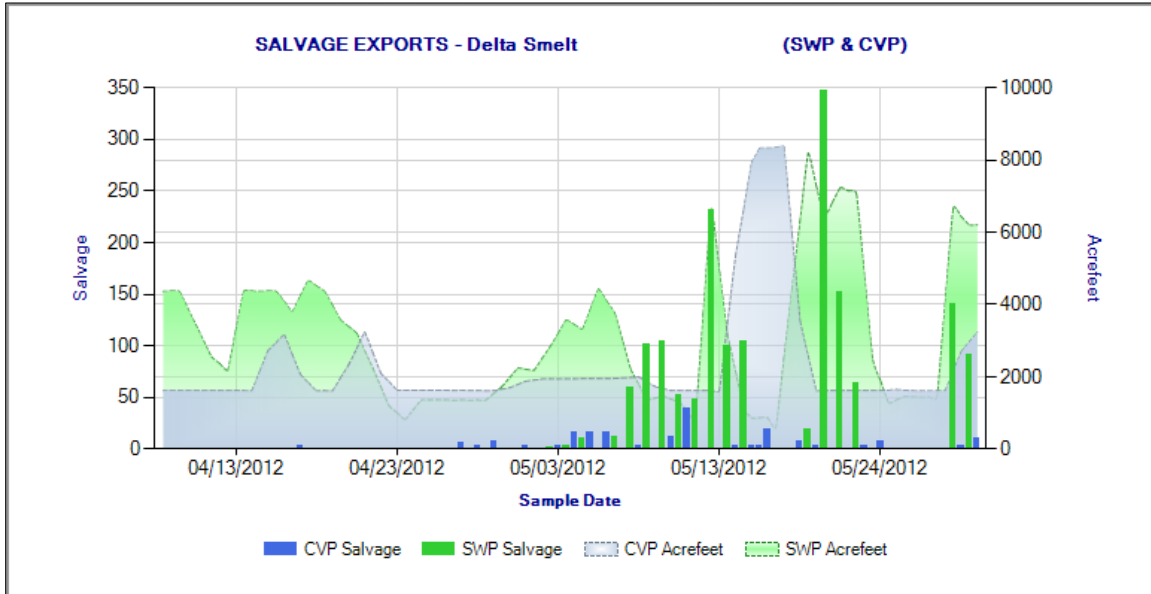


April - May 2012

VAMP export restrictions would have been valuable in the drier year of 2012 (dry on the San Joaquin and below normal on the Sacramento). A third to two-thirds of the smelt population was in the western Delta and vulnerable to exports.

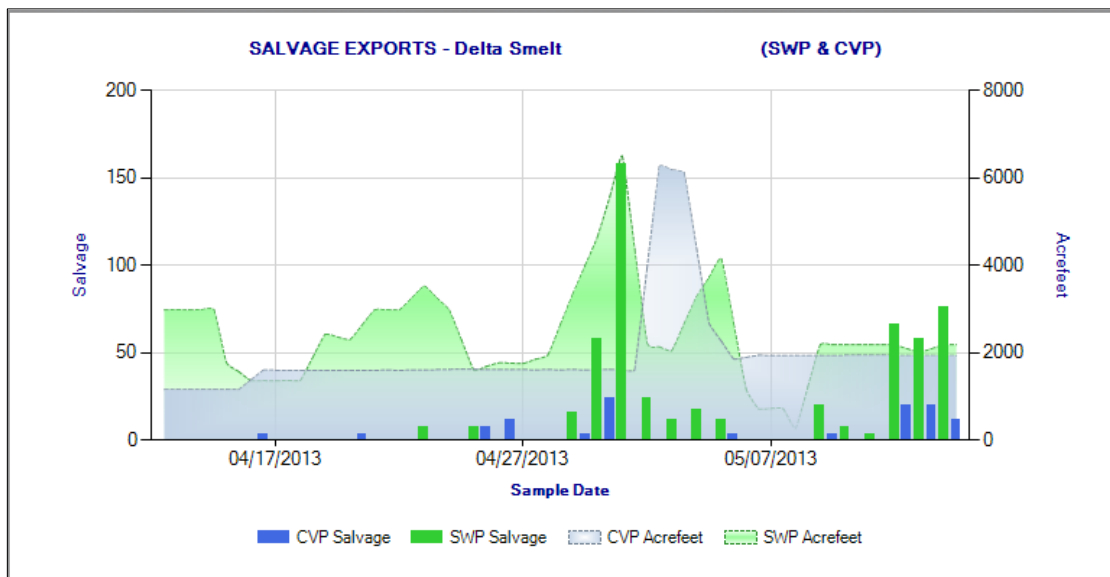
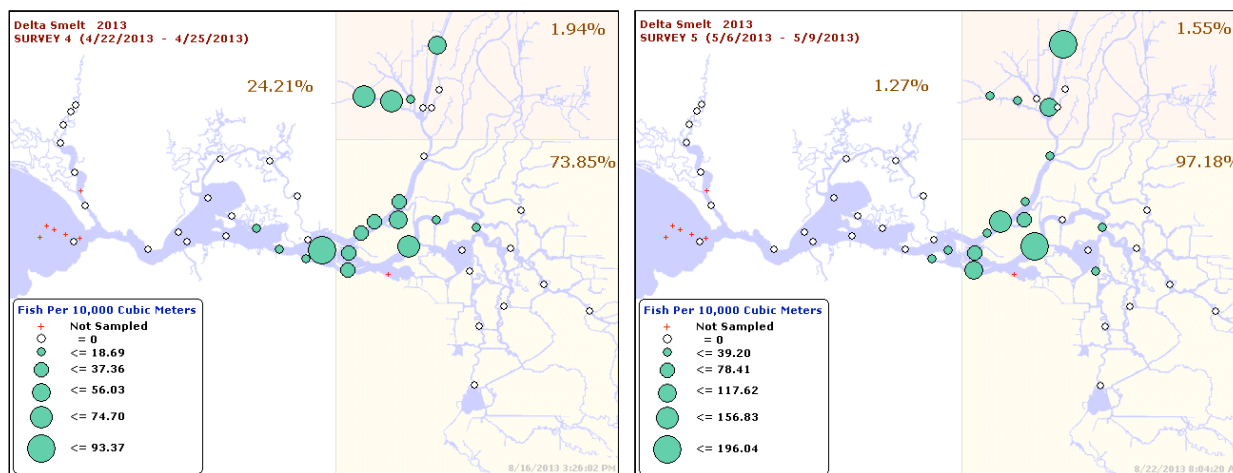
The Biological Opinions, through limitations on OMR negative flows and higher San Joaquin inflows provided some protections, but exports reached 2000-4500 cfs (allowed with the pulsed flows) leading to a period of moderate delta smelt losses. As noted above, salvage numbers are a small fraction of the losses incurred in Clifton Court Forebay. Salmon salvage was relatively low under the modest exports, but the closure of the DCC puts more of a burden on delta smelt and San Joaquin salmon.

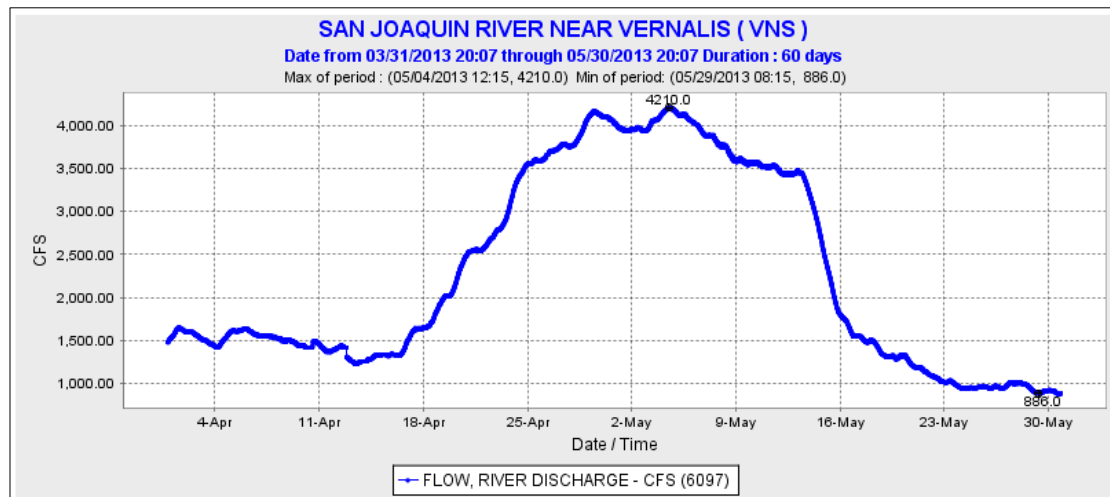
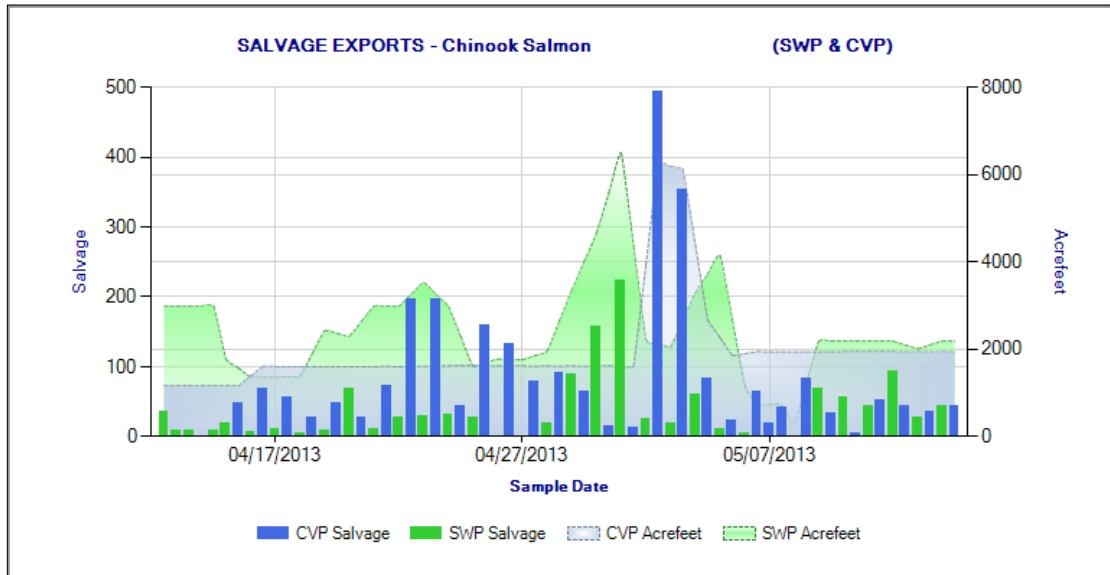




April - May 2013

The loss of the export limitation under VAMP hammers delta smelt and San Joaquin salmon in dry years like 2013 (dry on the Sacramento and critically dry on the San Joaquin). Much of the delta smelt population (74-97%) was in the Delta and vulnerable to exports. Instead of 1500 cfs, exports ranged between 2000-4000 cfs (again allowed because of the flow pulse). With exports controlled only by inadequate OMR and I/E restrictions, exports ramped up during the late April-early May San Joaquin flow pulse, essentially negating any benefits of the pulse. In effect the pulse became a water transfer. Again, with the DCC closed the burden of the higher exports without VAMP falls on smelt and San Joaquin salmon.





Manipulation of the System in the Absence of VAMP

Under the export limits required by VAMP, the 15 April - 15 May San Joaquin River pulse flow mandated by D-1641 could not be exported because of export restrictions. The pulse flow assists out-migrating salmon in reaching the ocean and the export limits prevent high numbers of salmon and smelt from being drawn to the export pumps. There was no required pulse flow in 2011 because of wet year high flows in the river. D-1641 pulse flow requirements were ignored and violated in water year 2012.

However, pulse flows were met in 2013 when South San Joaquin Irrigation District (SSJID) and Oakdale Irrigation District (OID) realized that the water could be sold and exported at a profit. SSJID/OID arranged for water to be released from New Melones Reservoir on the Stanislaus River to meet the pulse flow at Vernalis. That water was then exported from the Delta to customers in the San Joaquin Valley. This arrangement was essentially an

underground water transfer that avoided normal legal requirements pertaining to water transfers, which are regulated by the State Water Resources Control Board and subject to a number of regulatory requirements to protect fisheries. SSJID/OID manipulated the system, made a profit and, in the process, killed a lot of fish.

Summary and Conclusions

The OMR and I/E limitations in the OCAP BOs, which help to limit exports and minimize fish losses during the critical mid-April to mid-May period, are inadequate during drier years, especially during San Joaquin flow pulses. Higher exports during the flow pulses negate the benefits of the pulse, essentially providing a water transfer to the south. With the DCC closed to protect Sacramento salmon and steelhead, there is a maximum impact of exports on delta smelt and San Joaquin salmon and steelhead. A simple solution to help reduce these effects is to not allow the export of water during the critical San Joaquin pulse flow period, which was designed to help San Joaquin salmon and steelhead pass through the Delta and improve water quality.