California Sportfishing Protection Alliance

"An Advocate for Fisheries, Habitat and Water Quality"

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28 July 2014

Mr. Ryan Wulff
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814
BDCP.Comments@noaa.gov

VIA: Electronic Submission
Hardcopy if Requested

RE: Comment Letter No. 3: Bay Delta Conservation Plan and Associated EIR/EIS Related to Delta Smelt and Summer Outflow Protection

Dear Mr. Wulff,

The California Sportfishing Protection Alliance (CSPA) has reviewed the proposed Bay Delta Conservation Plan and associated Environmental Impact Report/Environmental Impact Statement (hereinafter, BDCP) submits the following comments. Comment Letter No. 3 relates to Delta smelt and summer outflow protection and includes a report, included below, titled *Delta Smelt on the Scaffold,* and an attached report titled, *The Summer of 2013, The demise of Delta smelt under D-1641 Delta Water Quality Standards.* The three documents constitute our comments on juvenile Delta smelt and we request that all three be considered and responded to as a single submittal.

CSPA worked closely with the Environmental Water Caucus (EWC) in developing their comments and incorporates by reference into these comments both submittals by the EWC on all issues related to BDCP. We also incorporate by reference the submittal by Michael Jackson on behalf of CSPA, California Water Impact Network and AquAlliance, as well as the individual comments submitted by AquAlliance. We further incorporate by reference the submittals by the County of San Joaquin, South Delta Water Agency, Central Delta Water Agency, Restore the Delta, Earth Law Center and Friends of the River.

The BDCP and the EIR/EIS inexplicable fail to acknowledge, analyze or discuss the presence of juvenile Delta smelt in the western Delta during summer and fail to acknowledge, analyze or discuss the preferred Alternative's potential adverse impacts on juvenile Delta smelt in July and August. Consequently, the BDCP and EIR/EIS are deficient and fail to comply with minimum CEQA and NEPA requirements for an environmental review document.

Since the start of Delta export pumping by the State Water Project in 1967, California Department of Fish and Wildlife (CDFW) Fall Midwater Trawl abundance indices for Delta smelt, striped bass, longfin smelt, American shad and threadfin shad have declined 95.6, 99.6, 99.8, 90.9, 98.5, 97.8 percent, respectively. The five-year abundances between 1967-1971 and

2009-2013 for Delta smelt, striped bass, longfin smelt, American shad and threadfin shad have declined 89.8, 98.8, 99.4, 87.7 and 98.1 percent, respectively. The abundance indices of CDFW's Summer Townet Survey for Delta smelt and striped bass declined 94.2 and 98.2 percent, respectively, between 1967 and 2013 and the five year average decline between 1967-1971 and 2009-2013 for Delta smelt and striped bass was 93.8 and 98.1 percent, respectively.

Of these pelagic species, Delta smelt are likely at serious risk of short-term extinction. Last year the Fall Midwater Trawl abundance index for Delta smelt was the second lowest in history, indistinguishable from the lowest. This year CDFW's 20-mm Survey 9 collected the fewest Delta smelt in history. Inexplicably, the BDCP and EIR/EIS virtually ignore the critical juvenile life-stage of Delta smelt in the summer months.

While there is extensive discussion of the impacts of entrainment (understating risks to eggs and sensitive life stages and impingement), predation (ignoring the project's creation of habitat favoring predators) and habitat area (based upon flawed optimistic projections of expanded habitat acreage) we could find no discussion regarding the significant impacts of near-lethal or lethal July-August temperatures and low June-August Delta outflows, with respect to juvenile life stages of Delta smelt. We also could not find substantial discussion of effects of low outflow during drier years and how low outflow, coupled with water exports, draws the low salinity zone (LSZ) into the western Delta. This omission is apparently based on the assumption that, since habitat conditions in the western Delta during the summer are not good for Delta smelt, they aren't there. Almost twenty years of 20-mm surveys demonstrate that this is simply not true. Low outflow conditions, coupled with exports, draw the LSZ and Delta smelt into the western Delta. At times, the majority of juvenile Delta smelt is in the western Delta in late June and early July.

The EIR/EIS acknowledges that outflow will decrease in summer months. Chapter 11, Fish and Aquatic Resources, Section 11.0.2.8, Alternative 4-Summary of Effects, states,

> *"SWP and CVP exports in summer months would increase and result in lower outflow under all four scenarios compared to No Action Alternative."* Page 11-52, lines 23-25.

The four evaluated operating scenarios of the preferred alternative included or excluded enhanced flows in spring or fall. Protective summer outflows were essentially ignored.

The Chapter 11, beginning on page 11-1289 describes the differences between the four scenarios of Alternative 4 as:

> *"Scenario H1 – Does not include enhanced spring outflow or Fall X2 requirements.*
>
> *Scenario H2 – includes enhanced spring outflow, but not Fall X2 requirements. This scenario lies within the range of the other scenarios.*

Scenario H3 – Does not include enhanced spring outflow, but includes Fall X2 requirements 16 (similar to Alternative 2A). This scenario lies within the range of the H1 and H4 scenarios.

Scenario H4 – Includes both enhanced spring outflow requirements, and Fall X2 requirements."
Page 11-1290, Lines 13-18.

In discussing Impact AQUA-4: Effects of Water Operations on Spawning and Egg Incubation Habitat for Delta Smelt, the EIR/EIS states,

*"**CEQA Conclusion**: As described above, operations under Alternative 4 would not reduce abiotic spawning habitat availability or change water temperatures for spawning delta smelt under any of the proposed flow scenarios. Consequently, the impact would be less than significant, and no mitigation is required."* Page 11-1295, lines 29-32

However, we could find no discussion regarding summer juvenile rearing impacts, except for a brief mention in the EIR/EIS's discussion of Impact AQUA-5; Effects of Water Operation on Rearing Habitat for Delta Smelt, which states,

"They also concluded that water temperature was not a predictor of delta smelt presence in the fall, although it has been shown to be important during summer months (Nobriga et al. 2008)." Page 11-1296, Lines 11-13.

Chapter 5 of BDCP Effects Analysis seems to imply that Delta smelt cannot by found in areas of the Delta where key habitat attributes are not met. It states;

"During summer, water temperatures can reach stressful if not lethal levels in parts of the estuary (Nobriga et al. 2008), a trend that is anticipated to worsen given projected climate warming (Brown et al. 2013). Further, the interaction of water temperature and prey density is a widely agreed-upon constraint on delta smelt (Kimmerer 2008; Mac Nally et al. 2010; Maunder and Deriso 2011; Miller et al. 2012; Rose et al. 2013a, 2013b). However, low water salinity and transparency contribute to delta smelt's occurrence at Liberty Island and the adjacent reach of the Sacramento Deep Water Shipping Channel in the Cache Slough subregion (e.g., Nobriga et al. 2005). ***In addition, the trawl survey sampling grids are large enough to have robustly documented that delta smelt cannot be expected to occur in large numbers where the key abiotic habitat attributes (low salinity/low turbidity, and low water temperature in the summer) are not met*** *(Feyrer et al. 2007; Nobriga et al. 2008; Kimmerer et al. 2009; Feyrer et al. 2011; Sommer and Mejia 2013)."* Page 5.5.1-19, lines 14-24.

The assumption that significant numbers of Delta smelt are not expected to be in waters that potentially jeopardizes their existence apparently is the basis for the U.S. Fish and Wildlife (USFWS) Biological Opinion that provides no protection for Delta smelt in July and August and

why the State Water Resources Control Board (SWRCB), with the concurrence of state and federal agencies, reduced Delta outflow requirements in July of this year and allowed the salinity compliance point at Emmaton to be moved upstream to Three Mile Slough. Unfortunately, as we document below, it's simply not accurate.

This belief is apparently why the U.S. Fish and Wildlife (USFWS) Biological Opinion provides no protection for Delta smelt in July and August and why the State Water Resources Control Board (SWRCB), with the concurrence of state and federal agencies, reduced Delta outflow requirements in July of this year and allowed the salinity compliance point at Emmaton to be moved upstream to Three Mile Slough. This belief is apparently why BDCP and the EIR/EIS virtually ignored and failed to discuss juvenile Delta smelt and the impacts of lethal temperatures and low outflow during summer periods and failed to consider protective outflows in summer.

Given the decades-long collapse of smelt populations amid the astonishing array of biological opinions, water quality control plans, water rights decisions and adaptive management programs and habitat restoration projects; no professional deference can be accorded to the agencies involved in the planning, management, analysis or approval of BDCP. These agencies have literally escorted Delta smelt to the brink of extinction. And no deference or benefit-of-doubt can be accorded to the speculative claims and assurances that habitat restoration projects and adaptive management efforts will be more successful and result in different outcomes this time around. Especially, given agency's historical track record of failure.

Contrary to the assumptions of BDCP and the EIR/EIS, large percentages of Delta smelt juveniles are in the western Delta in late June and early July and probably August, especially in drier years. In fact, 100% of the Delta smelt identified in the recently completed Survey 9 of the 20-mm survey, are at the southern end of Sherman Island and not in Suisun Bay where the BDCP and the EIR/EIS seem to assume they are. In 2013, more than 60% of Delta smelt juveniles were in the western Delta.

Over centuries, Delta smelt evolved within salinity parameters for various life stages. They can't magically change their habitat needs simply because it inconveniences water exporters. Low Delta outflow, coupled with excessive water exports, shifts the low salinity zone (LSZ) and juvenile Delta smelt eastward into the western Delta where smelt are exposed to near-lethal and lethal water temperatures during heat waves similar to what occurred in July 2013 and is occurring in July 2014.

The attached CSPA report titled *The Summer of 2013, the demise of Delta smelt under D-1641 Delta Water Quality Standards*, chronicles conditions in 2013 when Delta outflow was suddenly reduced and water exports by the state and federal project facilities dramatically increased. The LSZ and juvenile Delta smelt were drawn into the western Delta where they encountered lethal water temperatures. As predicted, the 2013 Fall Midwater Trawl Delta smelt Index plunged to its second lowest on record, statistically indistinguishable from the lowest.

Delta Smelt on the Scaffold, included below, contains;

- CSPA developed indexes that reveal that, based on CDFW 20-mm survey data, abundances of juvenile Delta smelt reached their lowest level in history in late June and

early July 2014. Survey 9, of the 20-mm Survey collected only two Delta smelt in 141 separate trawls at 40 locations stretching from Cache Slough to San Pablo Bay.

- Examination of the startling difference between the calculated Net Delta Outflow Index (NDOI), relied upon by the SWRCB, USBR, DWR to measure compliance with D-1641 outflow requirements, and the actual tidally filtered data collected by the U.S. Geological Survey's (USGS) stations at Rio Vista, Three Mile Slough, San Joaquin River at Jersey Point and Dutch Slough. The USGS gaged results of Delta outflow better correlate with salinity intrusion that the NDOI.

- Late June and early July 20-mm surveys for Delta smelt between 1998 and 2014.

Together, they establish, contrary to conclusions in the BDCP and the EIR/EIS, that juvenile Delta smelt are in the western Delta during June, July and potentially August, where they are at risk from lethal temperatures. They also establish that the NDOI relied upon to determine compliance with water quality and flow standards established by the SWRCB are flawed and overestimate actual outflow.

Consequently, any assumptions, analyses, conclusions or determinations contained in the BDCP or the EIR/EIS that rely on the NDOI as representing actual Delta outflow are inaccurate. Likewise, any assumptions, analyses or conclusions that compliance with D-1641's flow and water quality standards are protective of identified beneficial uses are similarly flawed.

BDCP and the EIR/EIS are inadequate and violate CEQA and NEPA by failing to disclose these facts and analyze the project's potential adverse impacts to juvenile Delta smelt in summer.

Thank you for considering these comments. If you have questions or require clarification, please don't hesitate to contact us.

Sincerely,

Bill Jennings, Executive Director
California Sportfishing Protection Alliance

Enclosed: CSPA, No. 3, Exhibit 1: Delta Smelt on the Scaffold
Attachment: CSPA, No. 3, Exhibit 2: The Summer of 2013, The demise of Delta smelt under D-1641 Delta Water Quality Standards

Delta Smelt on The Scaffold

Juvenile Delta Smelt Abundance Levels at All-Time Low

Thomas Cannon
Bill Jennings

California Sportfishing Protection Alliance

July 2014

During the summer of 2013, reductions in outflow, coupled with increased water exports, drew the low salinity zone (LSZ) and Delta smelt eastward into the western Delta where smelt encountered lethal water temperatures. That situation was chronicled in a California Sportfishing Protection Alliance (CSPA) report titled *The Summer of 2013, the demise of Delta smelt under D-1641 Delta Water Quality Standards*, which predicted that the smelt population would plunge.[1] As we predicted, the following Fall Midwater Trawl's Delta smelt abundance index was the second lowest level on record, statistically indistinguishable from the absolute lowest.

In 2014, the State Water Resources Control Board has significantly relaxed flow and water quality standards protecting the estuary. Delta outflow is below levels in recent memory. Exports and water transfers are being approved with little environmental review because state and federal agencies claim that Delta smelt are not in the Delta in late June and July. As we show below, this is simply not true. Low outflows have drawn Delta smelt into the Delta where they're at risk from lethal temperatures. Further, outflows are significantly less than being reported by the agencies. Delta smelt populations are headed for new record lows. The point of no return, i.e., the level where the population cannot recover, is unknown. But, that point is likely approaching.

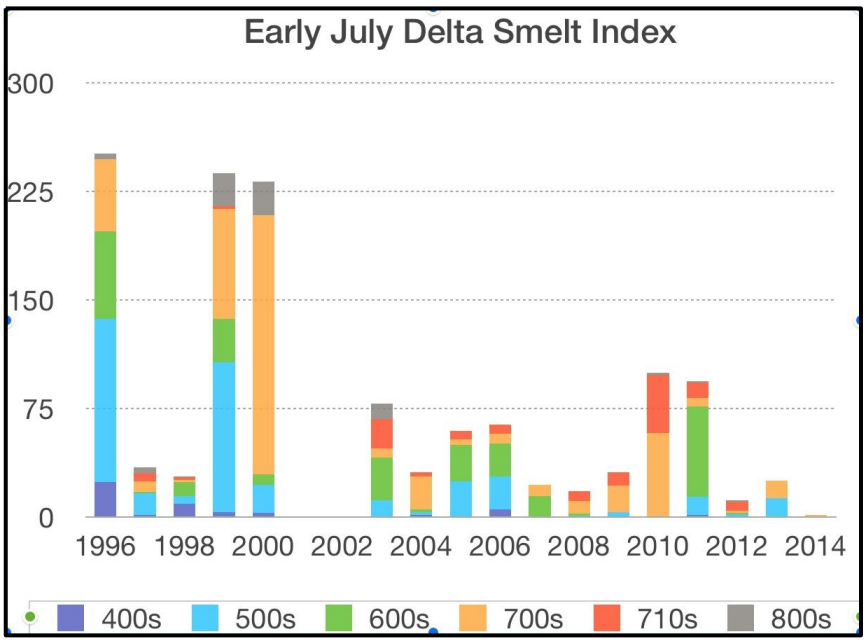
The California Department of Fish and Wildlife (DFW) conducts four primary surveys of Delta smelt in the Bay-Delta: Smelt Larval Survey, 20-mm Survey, Summer Townet and Fall Midwater Trawl. Each survey provides an annual index of abundance for specific life stages of Delta smelt. The 20-mm survey monitors post-larval-juvenile Delta smelt and comprises nine separate surveys. However the 20-mm index is based on initial surveys in March/April and do not reflect conditions in late June and early July, as smelt are drawn into the Delta by low outflow and export pumping and exposed to high temperatures. DFW's Smelt larval & 20-mm survey indices are not published.

Because DFW's 20-mm index doesn't reflect what happens to Delta smelt in June and July, CSPA took DFW's 20-mm survey data and developed indices for early June, late June and early July between 1996-2014. Our method simply stacks average densities from survey areas for each survey on a bar graph to derive an index. Our index demonstrates changes over the three survey periods and the relative contribution of the six different Delta regions. It is not weighted by the area or volume of the regions and includes the northern population of smelt and includes stations in Cache Slough and the Sacramento Deep Water Ship Channel that were added to the 710s group in the past decade.

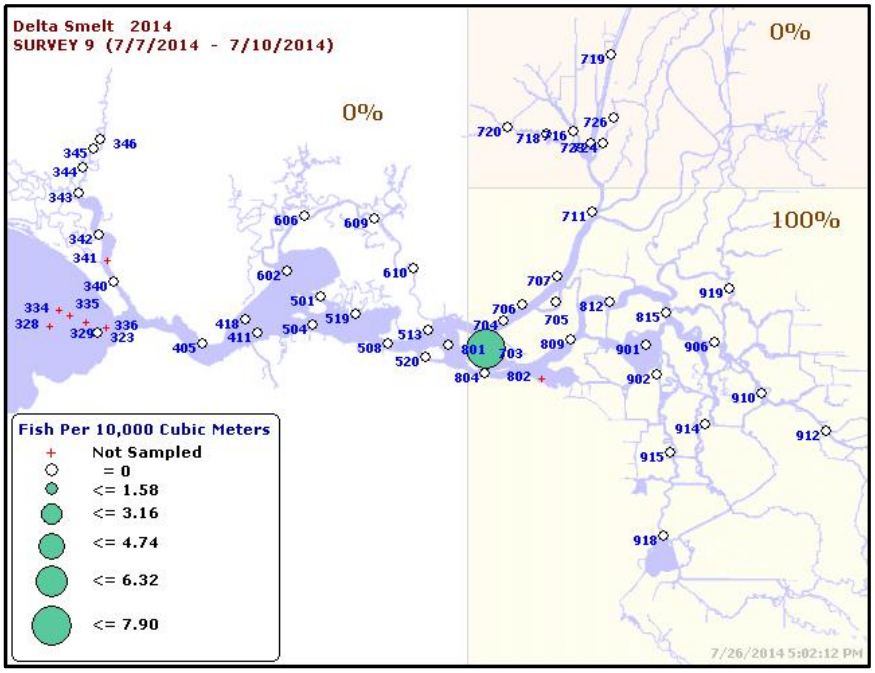
The two methods provide similar indices and patterns of indices over the years. The early June smelt index was the second lowest in history but the late June and early July indexes were, by a significant margin, the lowest in history. Astonishingly, DFW's early July 2014 20-mm survey managed to capture only 2 smelt in 147 separate trawls. The early July index pattern over the years is also similar to the Fall Midwater Trawl Indices, which is an alarming indication of likely results from this fall's upcoming FMWT index.

Following are the CSPA Delta smelt indexes for June and July 2014, DFW's June/July 2014 survey results, a discussion concerning the inadequacies of DWR, USBR Delta outflow calculations and the DFW 20-mm surveys between 1996 and 2014.

[1] http://calsport.org/news/wp-content/uploads/CSPA-Cannon-Summer-2013-6.pdf

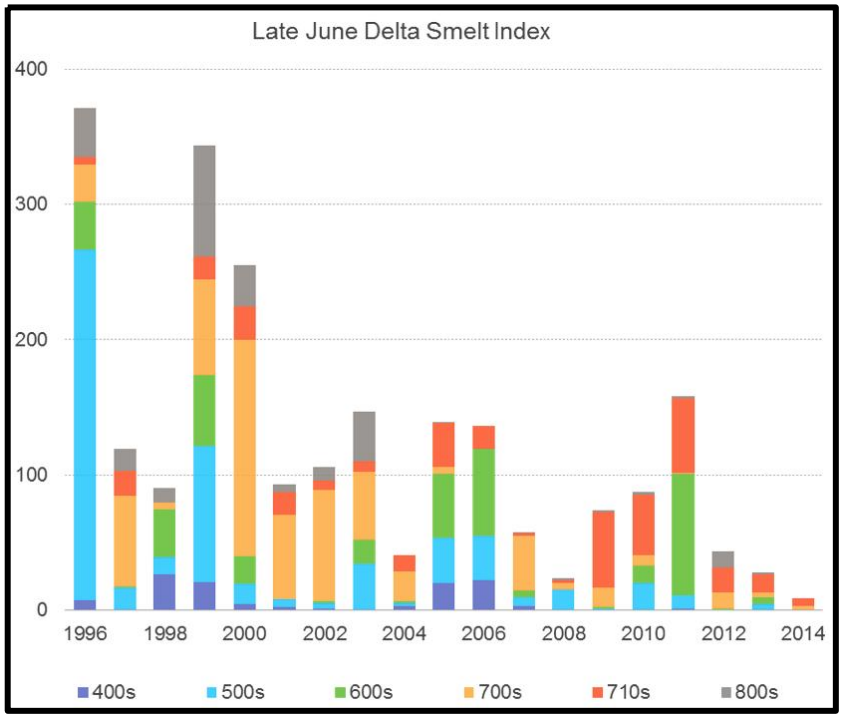


CSPA Index by Catch and Sampled Area, 20mm DFW Survey 8, Early July, no survey 2001-2002
Note: 400s = West Suisun Bay; 500s = East Suisun Bay; 600s = Montezuma Slough; 700s = Lower Sacramento River; 710s = Cache Slough/Sacramento Ship Channel; 800s = Lower San Joaquin River



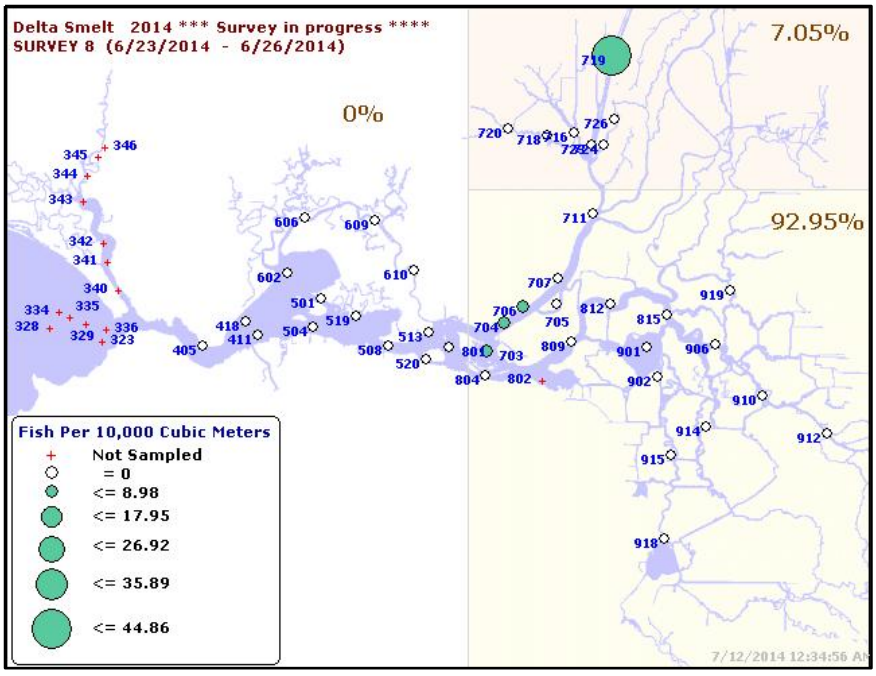
California Department of Fish and Wildlife 20mm Delta Smelt Survey 9, 7-10 July 2014 Chart weighted by volume of area sampled.[2]
Only 2 Delta smelt were collected in 141 trawls (3 trawls at each of 47 locations).

[2] http://www.dfg.ca.gov/delta/data/20mm/CPUE_map.asp



CSPA Index by Catch and Sampled Area, 20mm DFW Survey 8, Late June

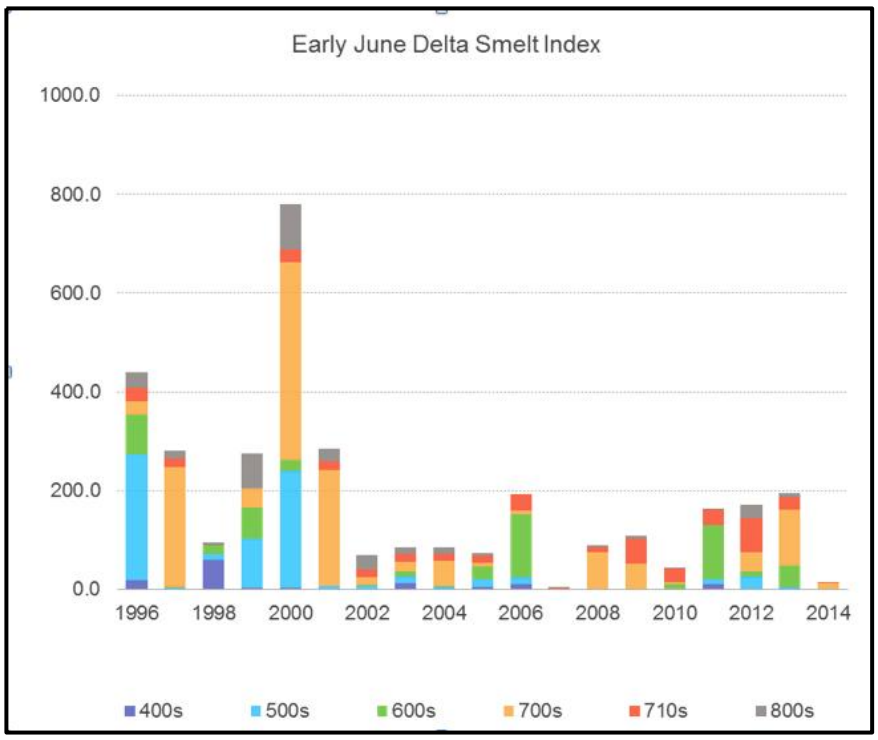
Note: 400s = West Suisun Bay; 500s = East Suisun Bay; 600s = Montezuma Slough; 700s = Lower Sacramento River; 710s = Cache Slough/Sacramento Ship Channel; 800s = Lower San Joaquin River



California Department of Fish and Wildlife 20mm Delta Smelt Survey 8, 23-26 June 2014 Chart weighted by volume of area sampled.[3]

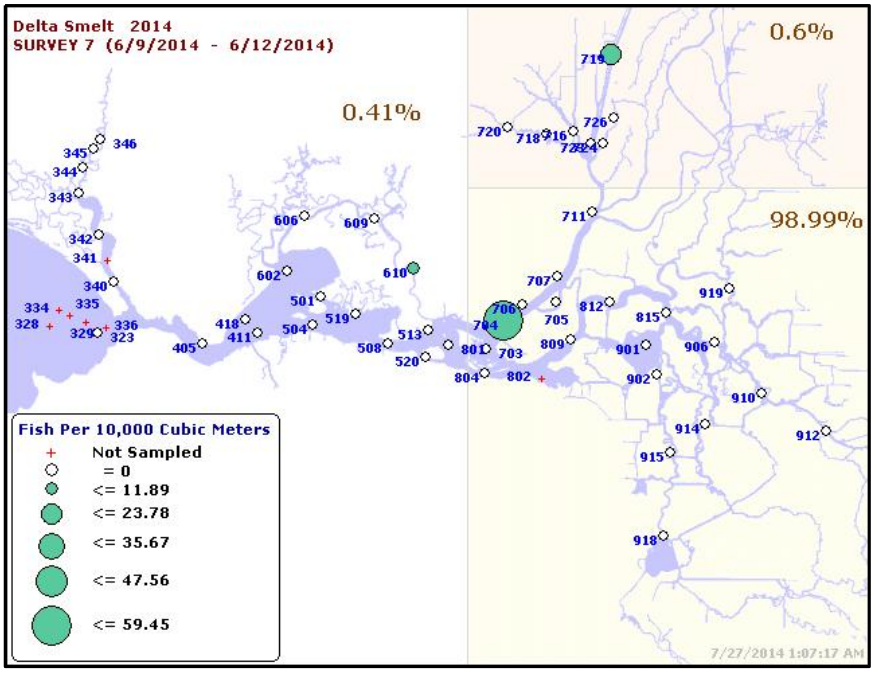
Only 18 Delta smelt were collected in 120 trawls (3 trawls at each of 40 locations).

[3] http://www.dfg.ca.gov/delta/data/20mm/CPUE_map.asp



CSPA Index by Catch and Sampled Area, 20mm DFW Survey 8, Early June

Note: 400s = West Suisun Bay; 500s = East Suisun Bay; 600s = Montezuma Slough; 700s = Lower Sacramento River; 710s = Cache Slough/Sacramento Ship Channel; 800s = Lower San Joaquin River

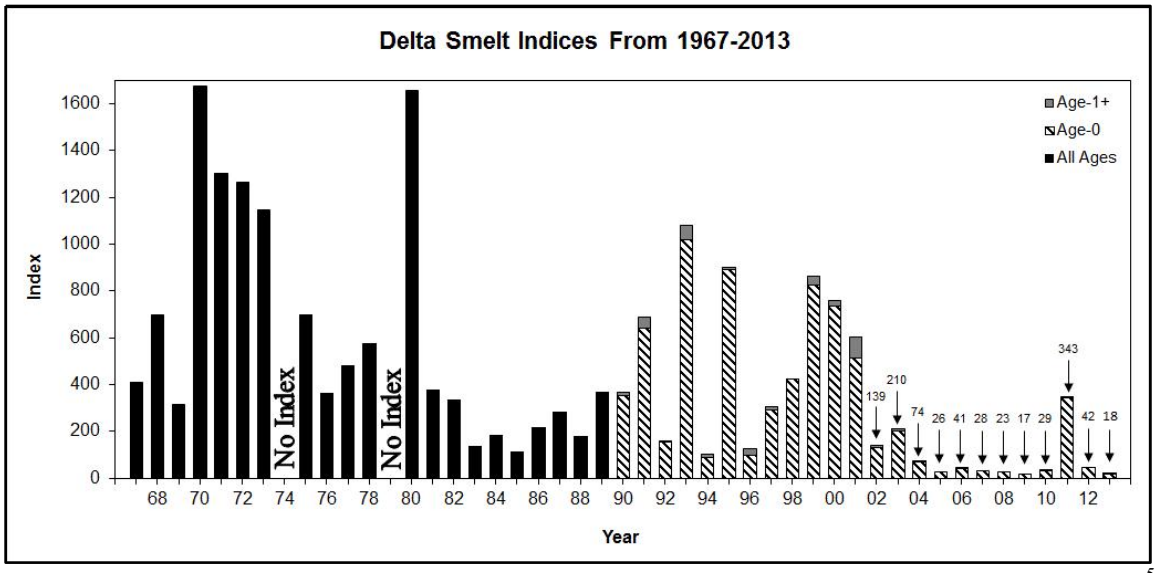


California Department of Fish and Wildlife 20mm Delta Smelt Survey 8, 6-12 June 2014 Chart weighted by volume of area sampled.[4]

Only 24 Delta smelt were collected in 141 trawls (3 trawls at each of 47 locations).

[4] http://www.dfg.ca.gov/delta/data/20mm/CPUE_map.asp

This pattern is replicated in the annual abundance indices of the Fall Midwater Trawl, which illustrates the continued decline of Delta smelt since the State Water Project began exporting water in 1967.



California Department of Fish and Wildlife: Delta Smelt Fall Midwater Trawl Indices 1967-2013.[5]

The decline of Delta fisheries is not limited to Delta smelt but encompasses the entire range of pelagic species.[6]

Pelagic Fisheries Have Collapsed
Percent Decline in Delta Fish Population Abundance Indices

Fall Midwater Trawls

Species	1967 v. 2013	Five Year Average 67-71 v. 09-13
Striped Bass	-99.6%	-98.8%
Delta Smelt	-95.6%	-89.8%
Longfin Smelt	-99.8%	-99.4%
American Shad	-90.9%	-99.4%
Splittail	-98.5%	-87.7%
Threadfin Shad	-97.8%	-98.1%

Summer Townet Survey

Species	1967 v. 2013	Five Year Average 67-71 v. 09-13
Striped Bass	-98.2%	-98.1%
Delta Smelt	-94.2%	-93.8%

Native lower trophic orders reflect similar magnitude declines.

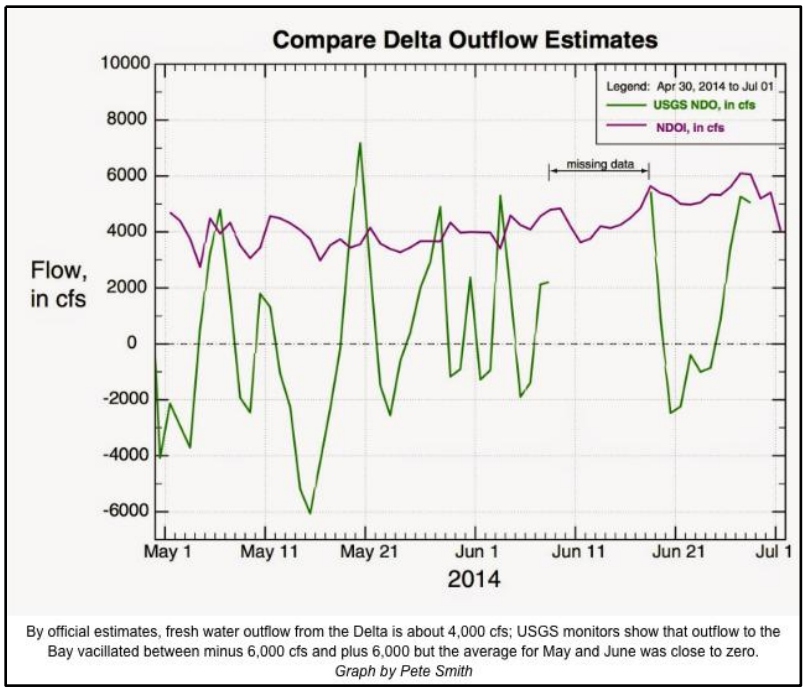
[5] http://www.dfg.ca.gov/delta/projects.asp?ProjectID=FMWT
[6] http://calsport.org/news/wp-content/uploads/St-Bd-Drought-Wkshp1.pdf

The problem has been exacerbated in recent years by excessive water exports from the Delta coupled with extremely low outflow to the Bay and relaxed or ignored flow and water quality standards. This combination low flow and exports draws the crucial low salinity zone (LSZ) into the Delta where pelagic species are subjected to entrainment in the massive export pumps and lethal summer water temperatures. Last year was bad as a combination of low outflows and high exports hammered Delta smelt.[7] This year is likely to be much worse and Delta smelt are literally on the brink of extinction.

The Estimates of Delta Outflow by USBR and DWR are Simply Wrong!

U.S. Bureau of Reclamation (USBR) and California Department of Water Resources (DWR) claim that net Delta outflow (NDOI) averaged 3170 cubic feet per second (cfs) between I July and 11 July 2014.[8] However, the NDOI, which is a complicated computation that guesses at net Delta channel depletion, is simply wrong.

The U.S. Geological Survey (USGS) maintains four state-of-the-art UVM flow gages on the Sacramento and San Joaquin Rivers and Three-mile and Dutch Sloughs that, cumulatively, record total Net Delta Outflow (NDO). Examination of tidally filtered outflow data from these gages reveals that the outflows reported by USBR and DWR are seriously inflated in low water conditions.

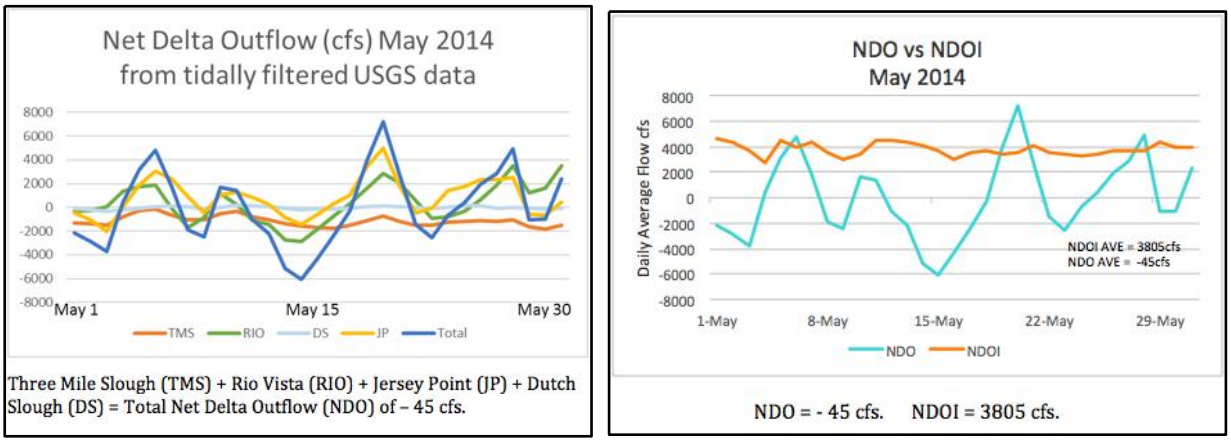


By official estimates, fresh water outflow from the Delta is about 4,000 cfs; USGS monitors show that outflow to the Bay vacillated between minus 6,000 cfs and plus 6,000 but the average for May and June was close to zero.
Graph by Pete Smith

Retired USGS Engineer, Pete Smith, prepared the above comparison of NDO versus NDOI that was recently reported in the California Spigot.[9]

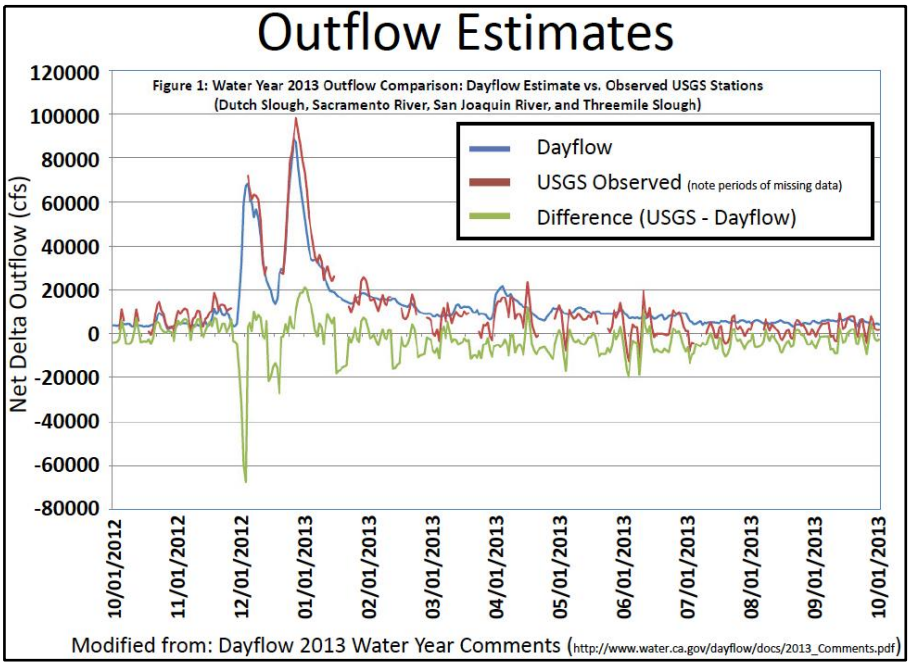
[7] http://calsport.org/news/wp-content/uploads/CSPA-Cannon-Summer-2013-6.pdf
[8] http://www.usbr.gov/mp/cvo/vungvari/doutdly.pdf
[9] http://www.californiaspigot.blogspot.com

CSPA fishery consultant and biostatistician, Thomas Cannon, also prepared an assessment for CSPA that analyzed the NDOI index and discovered that it seriously overestimates actual Delta outflow. Mr. Cannon calculated that the actual Delta outflow in May 2014 was a minus 45 cfs, instead of the positive 3805 cfs claimed by USBR and DWR. He also discovered that DWR had long aware been of the discrepancy.[10]



Thomas Cannon: Net Delta Outflow in May 2014 and NDO vs. NDOI.

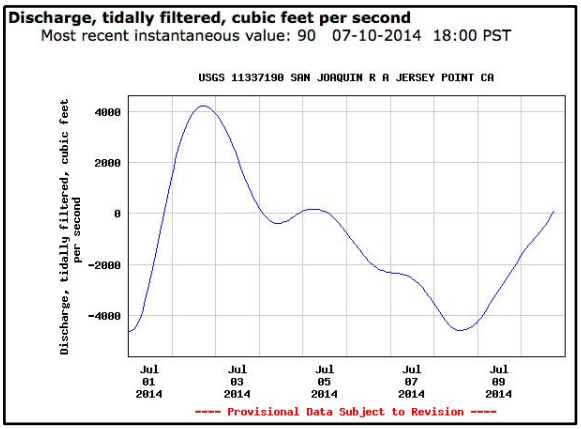
Dr. Michael L. MacWilliams, of Delta Modeling Associates, in a presentation to the Delta Science Program's workshop on Delta outflows and related stressors, observed that NDOI estimates during the fall of 2013 were more than double the USGS measured outflows.



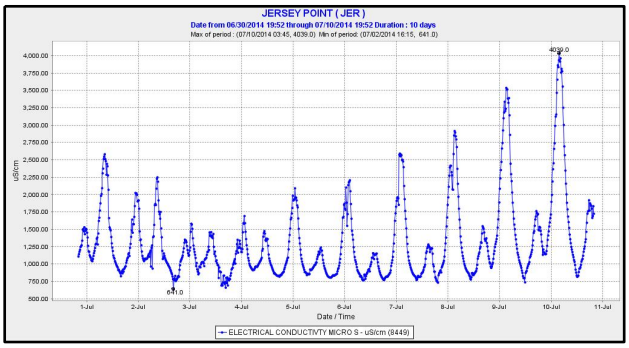
[10] http://calsport.org/news/wp-content/uploads/CSPA-NDO-v-NDOI-2.pdf

Dr. MacWilliams testified that, based on measured data for salinity intrusion and X2, the NDOI estimates appeared to be clearly incorrect.[11]

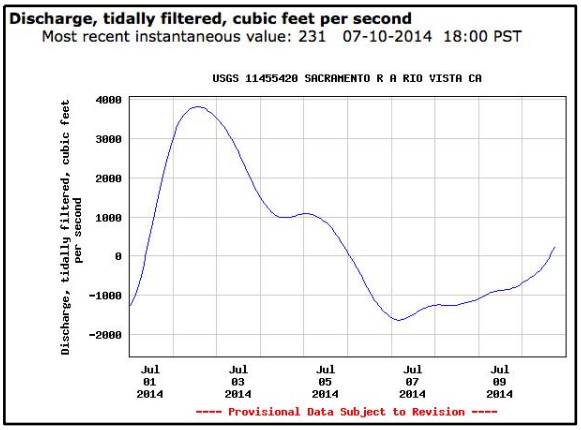
During the first ten days of July 2014, the NDOI was reported as a positive outflow averaging 3170 cfs. However, examination of the four USGS tidally filtered stations at Rio Vista, Threemile Slough, Jersey Point and Dutch Slough reveals that outflow had become negative, beginning around 4/5 July. Inflow from the Bay approached 7000 cfs by 8 July. This was reflected in sharply increasing salinity (EC) levels in the Delta, which could not have occurred under a positive NDOI outflow.



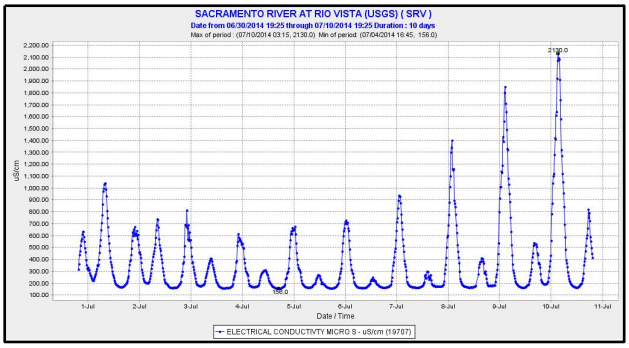
USGS Jersey Point Flow (11337190)



CDEC Jersey Point EC (JER)

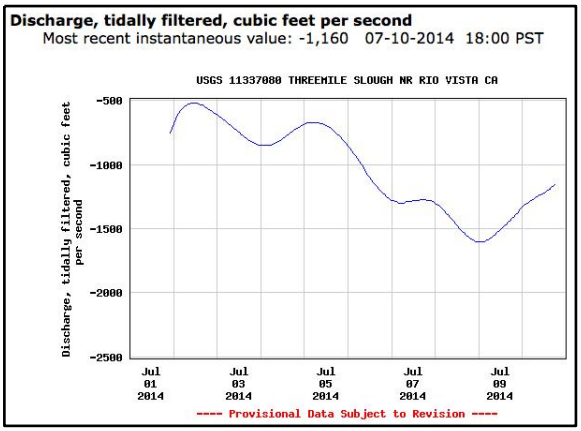


USGS Rio Vista Flow (11455420)

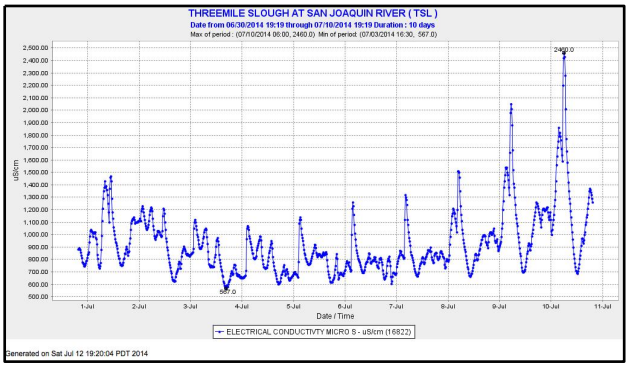


CDEC Rio Vista EC (SRV)

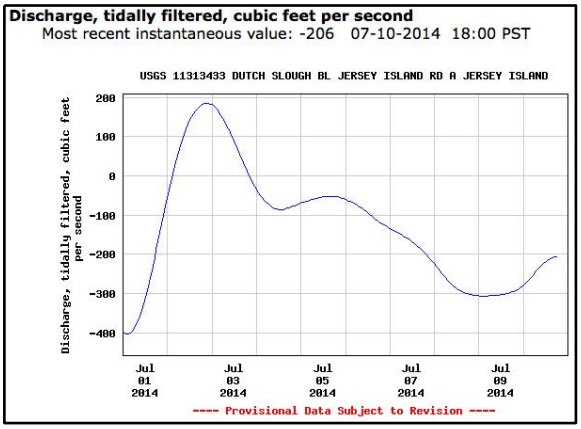
[11] http://deltacouncil.ca.gov/sites/default/files/documents/files/10-Outflow-Workshop-MacWilliams-02-10-14-Final.pdf



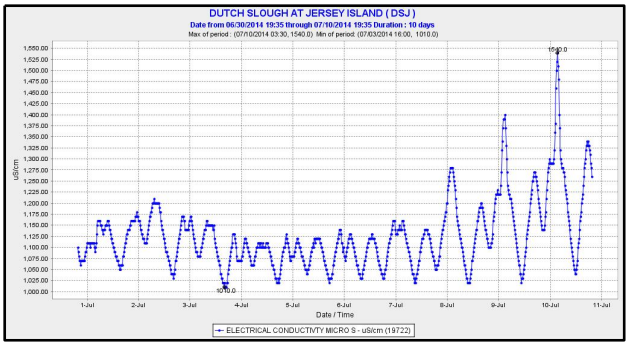
USGS Threemile Slough Flow (11337080)



CDEC Threemile Slough EC (SJJ)



USGS Dutch Slough Flow (11313433)



CDEC Dutch Slough EC (DSJ)

Real time data from the USGS[12] and California Data Exchange Center (CDEC)[13] can be accessed online.

The final report of the expert panel observed that, "Although a precise estimate of the accuracy of the measured outflow is not known, the measured values should be more accurate than the NDOI as long as the four monitoring stations used in the calculations are operating properly." The panel asked, "why the measured outflows (rather than NDOI) aren't used for the specific outflow standards during the July-to-January period, and also why they aren't used as the alternative flow compliance option in the springtime X2 standard."[14]

The California Spigot quoted State Water Resources Control Board engineer, Rick Satkowski, as saying, in light of these findings, the State Board will be looking at, "possible changes in determining outflow.

[12] http://waterdata.usgs.gov/ca/nwis/current/?type=flow&group_key=basin_cd

[13] http://cdec.water.ca.gov/staMeta.html

[14] http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta-Outflows-Report-Final-2014-05-05.pdf

USBR and DWR have long known of the difference between measured net delta outflow and the calculated net delta outflow index. They have long known that they do not have reliable data on in Delta channel depletions. They have long known that not all inflow into the Delta from tributary streams is accurately gaged. But they are also aware that if NDO, instead of the NDOI, is used as the standard of net delta outflow, more water will have to be directed to outflow and less to exports, especially in dry years.

USBR and DWR are committed to maximizing water deliveries to contractors, even if it sends the Delta smelt, once the most abundant fish in the Delta, toward extinction. That is unacceptable!

Contrary to USBR and DWR Claims, Delta Smelt are in the Delta in June, July and August

The USFWS Biological Opinion for Delta smelt provides no protection in July and August because the service claims that there are no Delta smelt in the Delta during those months. On that basis, USBR and DWR, with USFWS concurrence, provided no protection for smelt during water transfers. Earlier this year, the State Water Board, again with USFWS concurrence, lowered the Delta outflow criteria, contained in D-1641, from 4000 cfs to 3000 cfs during the months of May and July. However, they are simply wrong!

Last year, as chronicled in CSPA's report titled *The Summer of 2013, the demise of Delta smelt under D-1641 Delta Water Quality Standards*,[15] reductions in outflow, coupled with increased water exports, drew Delta smelt into the western Delta where they encountered lethal water temperatures. Abundance levels plunged.

Delta smelt are in the Delta. They shouldn't be. During late June and July, Delta smelt should be in the LSZ in Suisun Bay, protected from the lethal 76-77 degrees water temperatures frequently found in the Delta during summer. However, a combination of low outflow and excessive exports draws the LSZ and Delta smelt into the Delta during drier years.

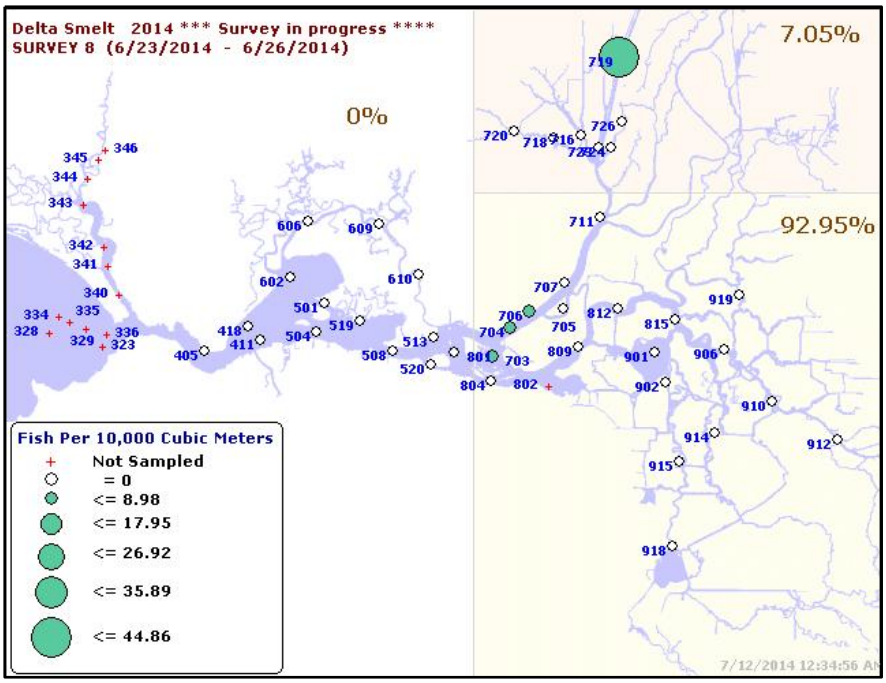
There is also a small population of smelt that spawn in the Cache Slough-Sacramento Ship Channel area. However, they become trapped and unable to migrate back to the LSZ and seek to survive in the stratified waters of the deep water in the ship channel. Extended heat waves pose a severe threat to that population, as the coldwater pool will ultimately dissipate. In 2009, the California Department of Fish and Wildlife (CDFW) conducted supplemental monitoring at six sites in the ship channel and found that smelt populations decreased through July and virtually disappeared by August. The USFWS's 2008 Biological Opinion does not suggest that the Cache Slough-Sacramento Ship Channel area provides a viable temperature refuge for Delta smelt when their only recognized habitat – the LSZ in the Delta – has been rendered unsuitable for survival.

Below are the CDFW's late June and early July 20mm Delta smelt surveys from 1996 to 2014. The 20mm surveys are comprised of three separate trawls conducted at 40 sites in the Delta. They demonstrate that in all but the wettest years, Delta smelt are in the Delta during late June and early

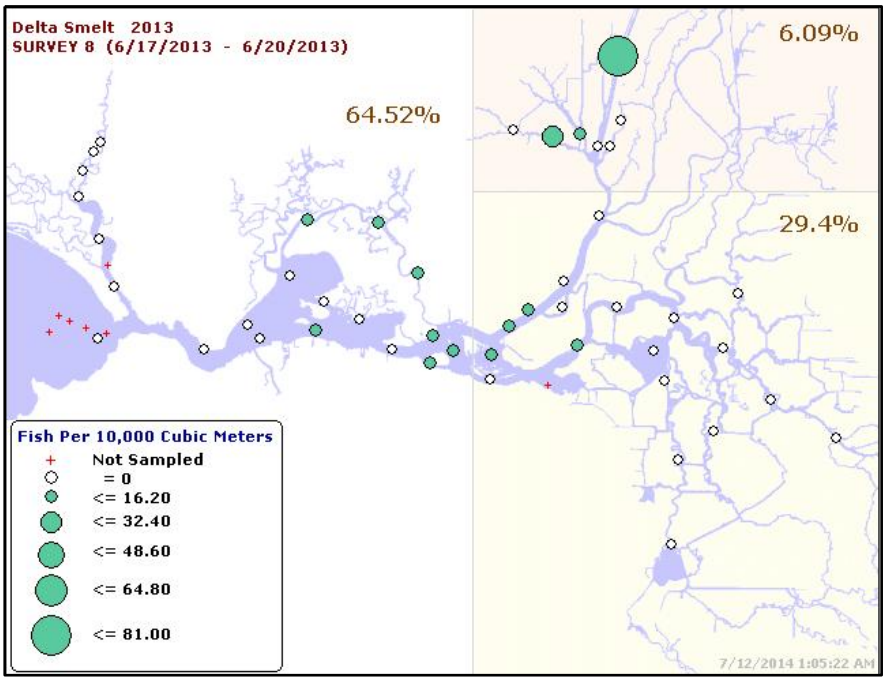
[15] http://calsport.org/news/wp-content/uploads/CSPA-Cannon-Summer-2013-6.pdf

July. In drier years, a significant percentage of Delta smelt, perhaps the majority of juveniles, are in the Delta.

CDFW: 20mm Delta Smelt Surveys, Late June 1996-2014 (with percentages)[16]

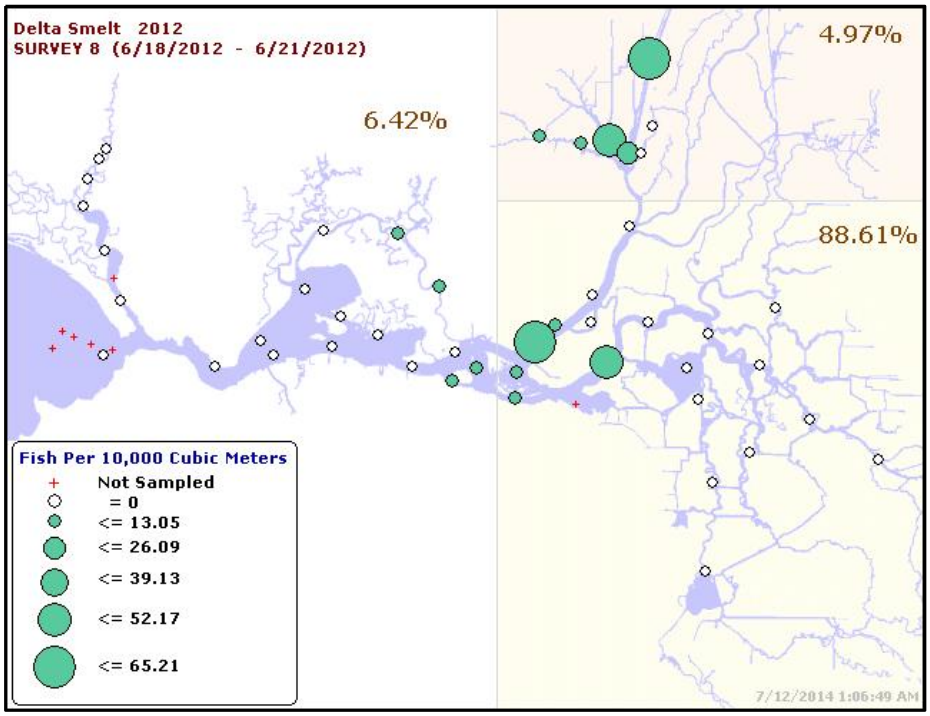


2014 Water Year: Sacramento = Critical; SJR = Critical

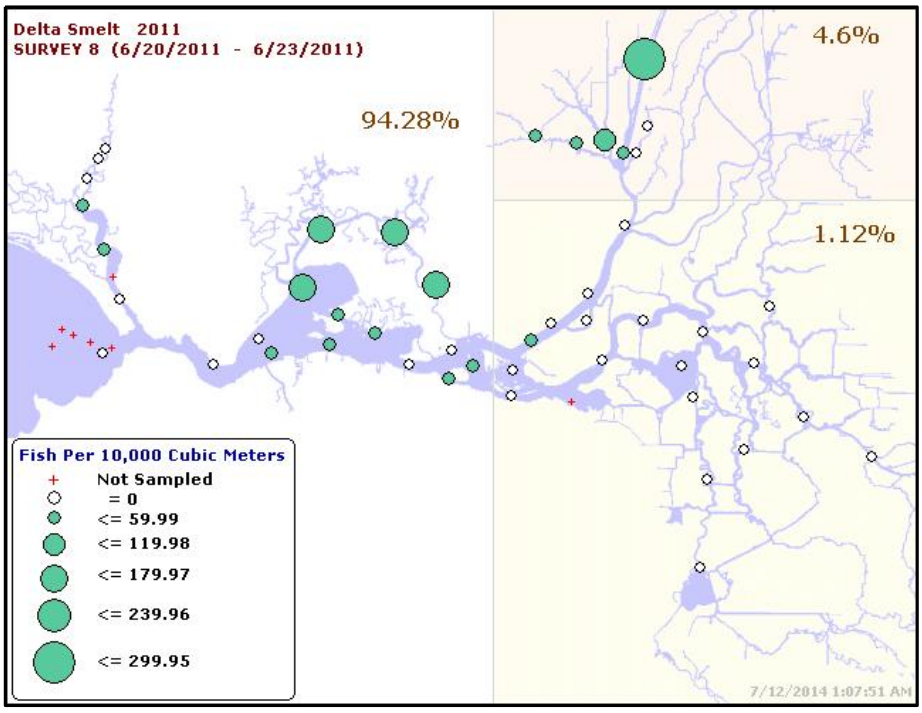


2013 Water Year: Sacramento = Dry; SJR = Critical

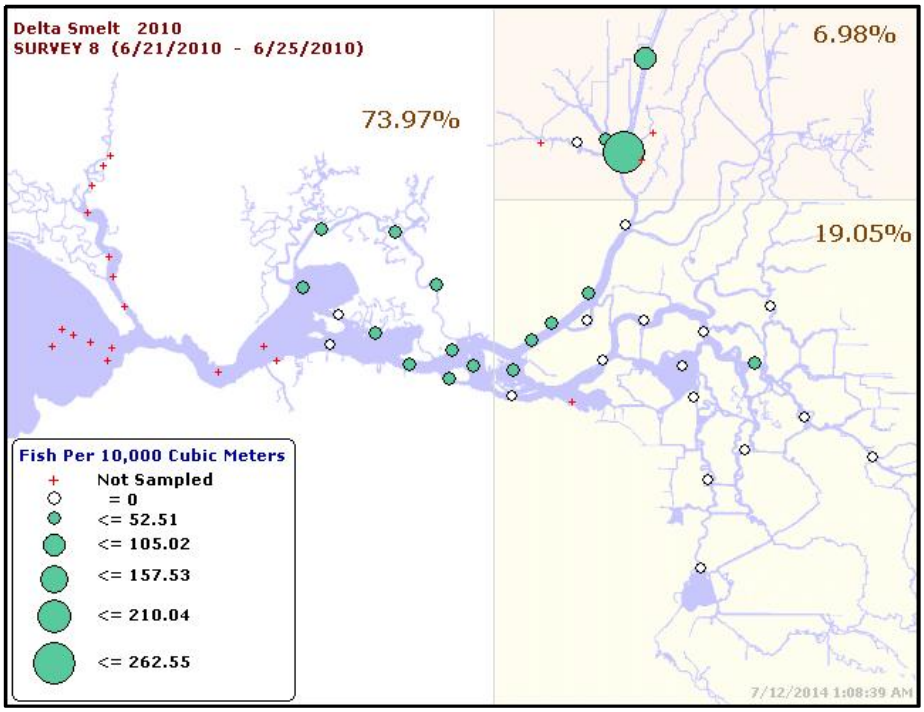
[16] http://www.dfg.ca.gov/delta/data/20mm/CPUE_map.asp



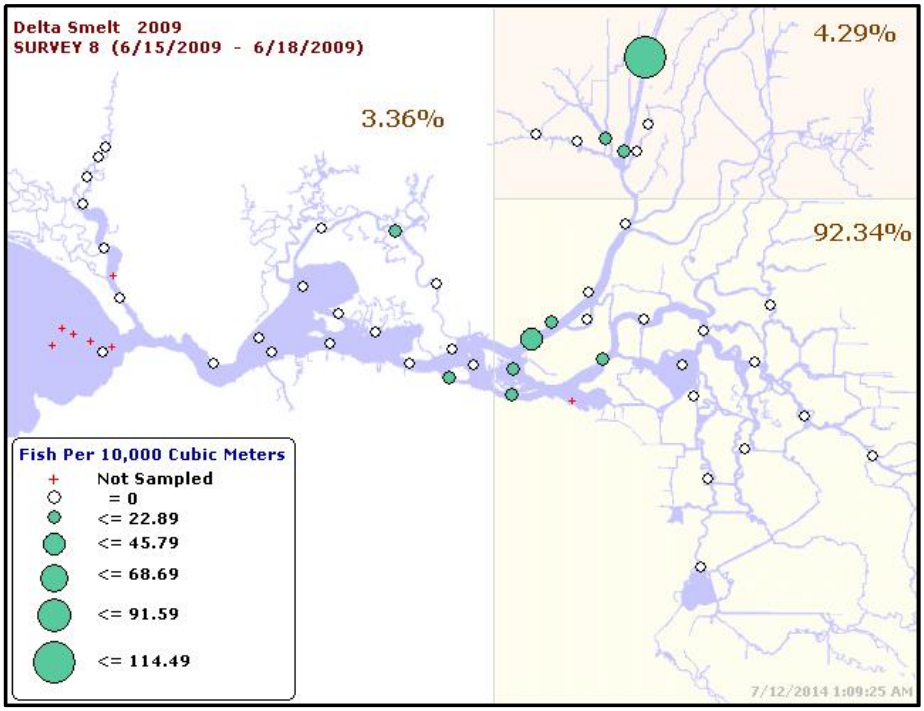
2012 Water Year: Sacramento = Below Normal; SJR = Dry



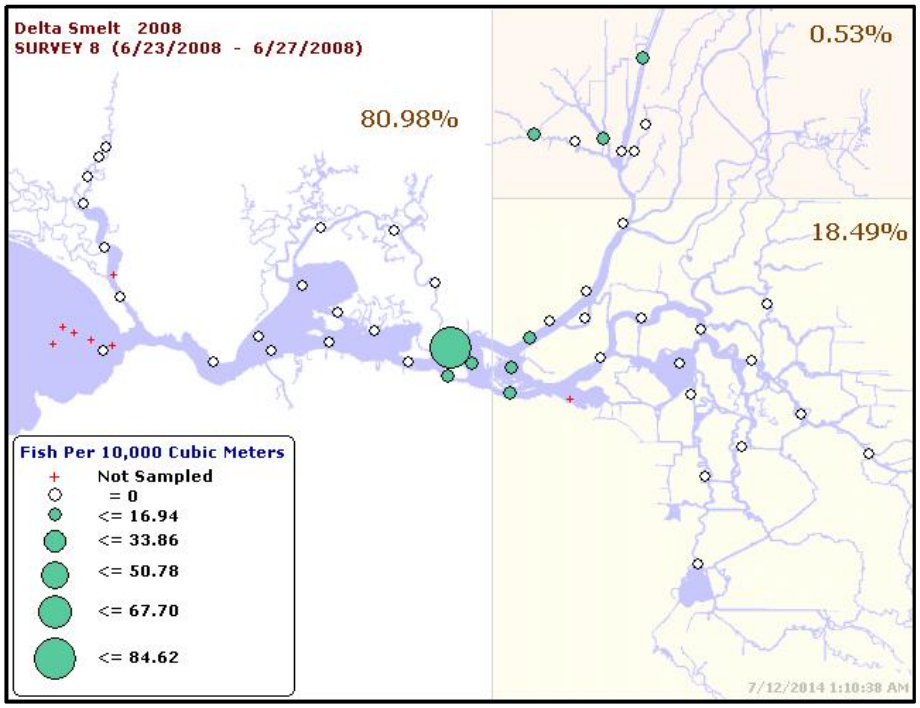
2011 Water Year: Sacramento = Wet; SJR = Wet



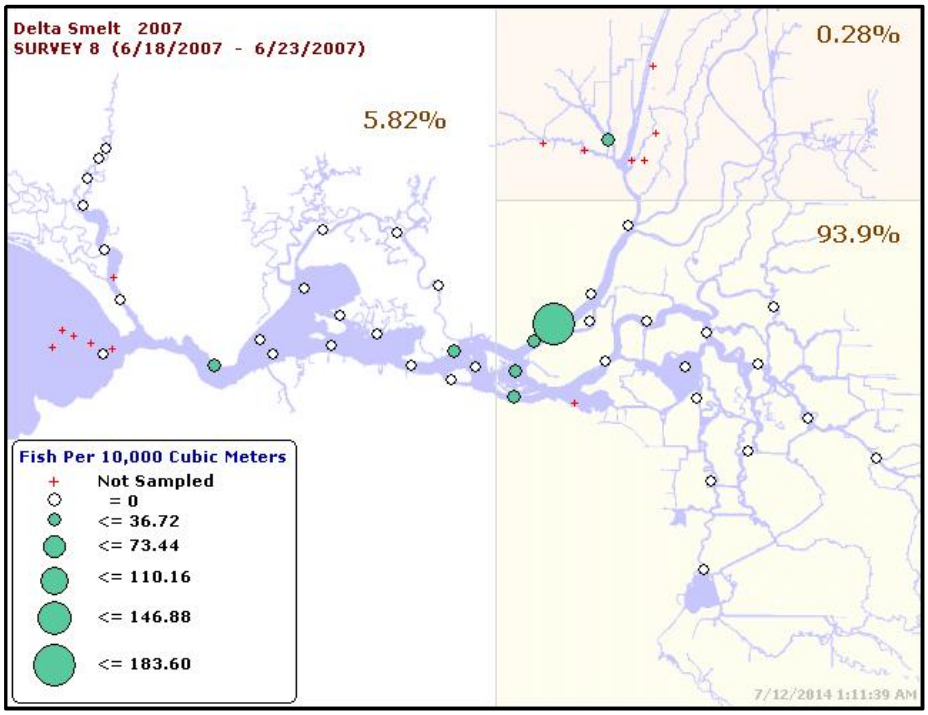
2010 Water Year: Sacramento = Below Normal; SJR = Above Normal



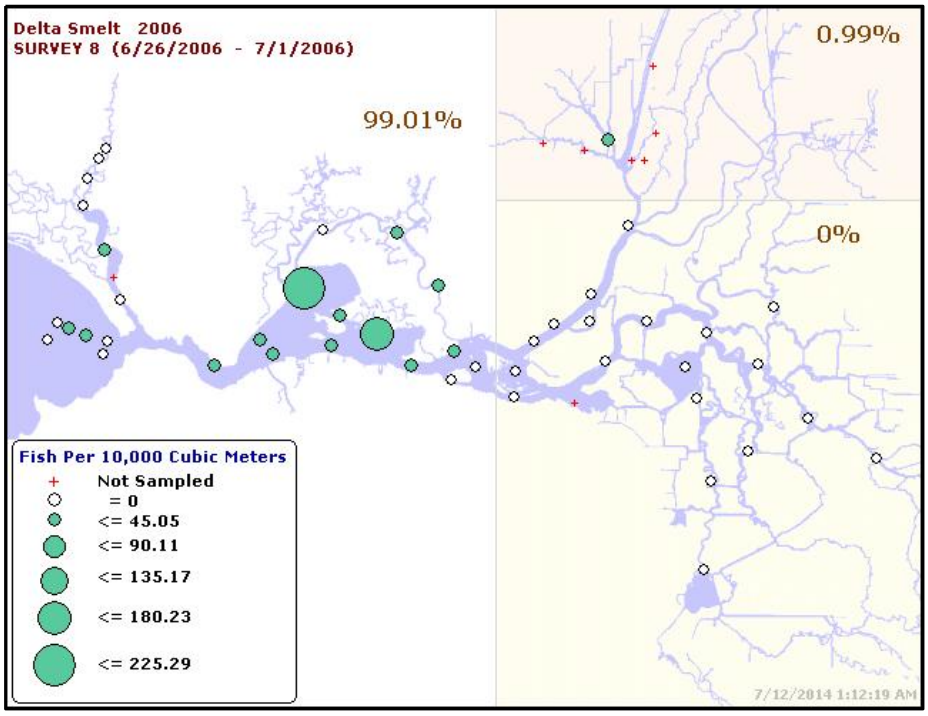
2009 Water Year: Sacramento = Dry; SJR = Dry



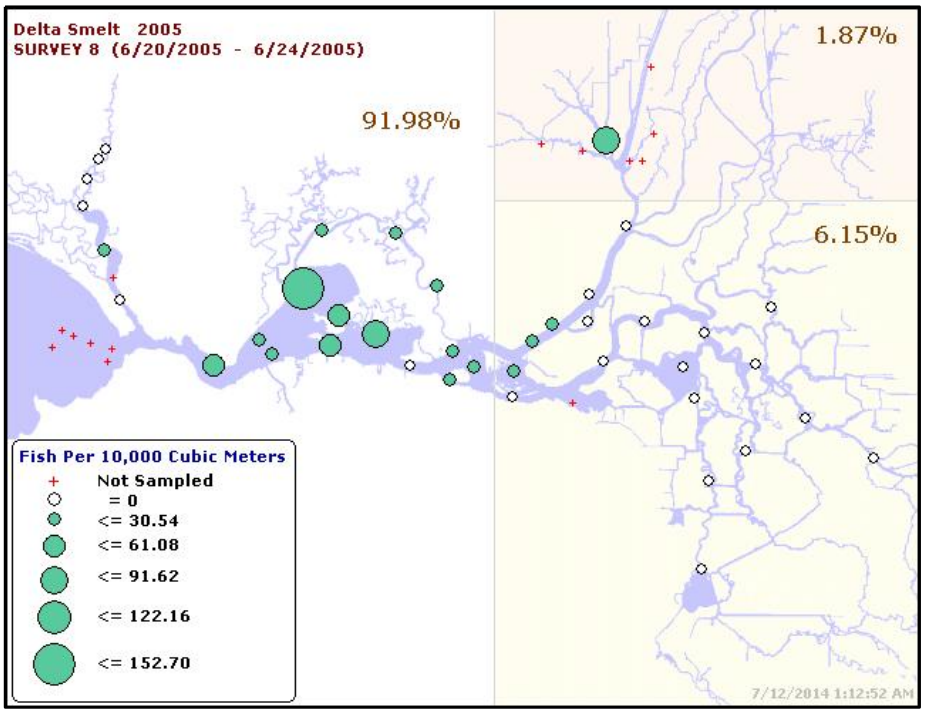
2008 Water Year: Sacramento = Critical; SJR = Critical



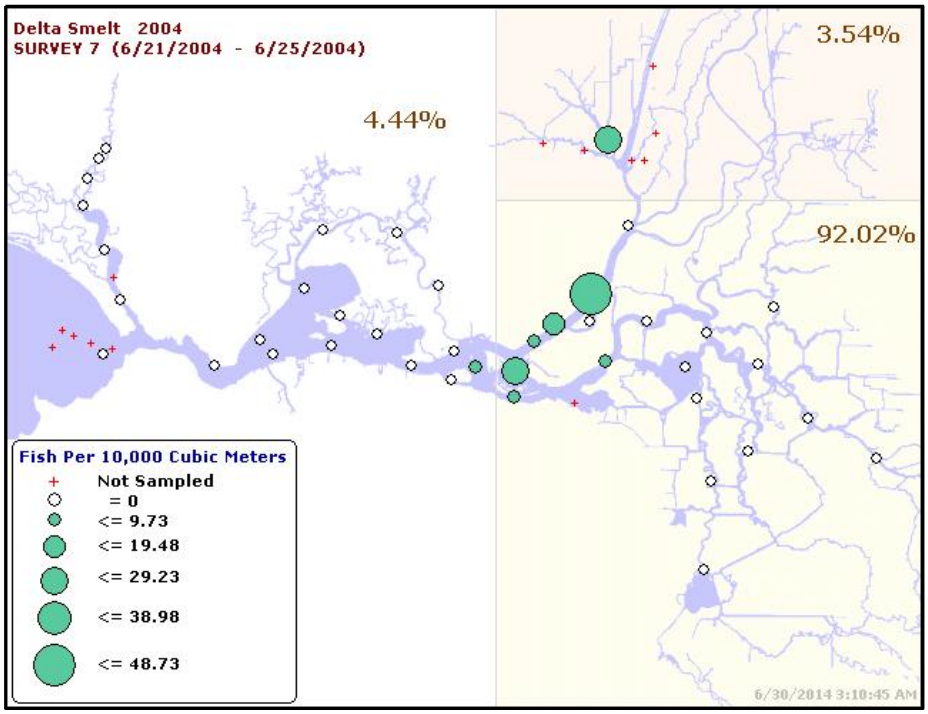
2007 Water Year: Sacramento = Dry; SJR = Critical



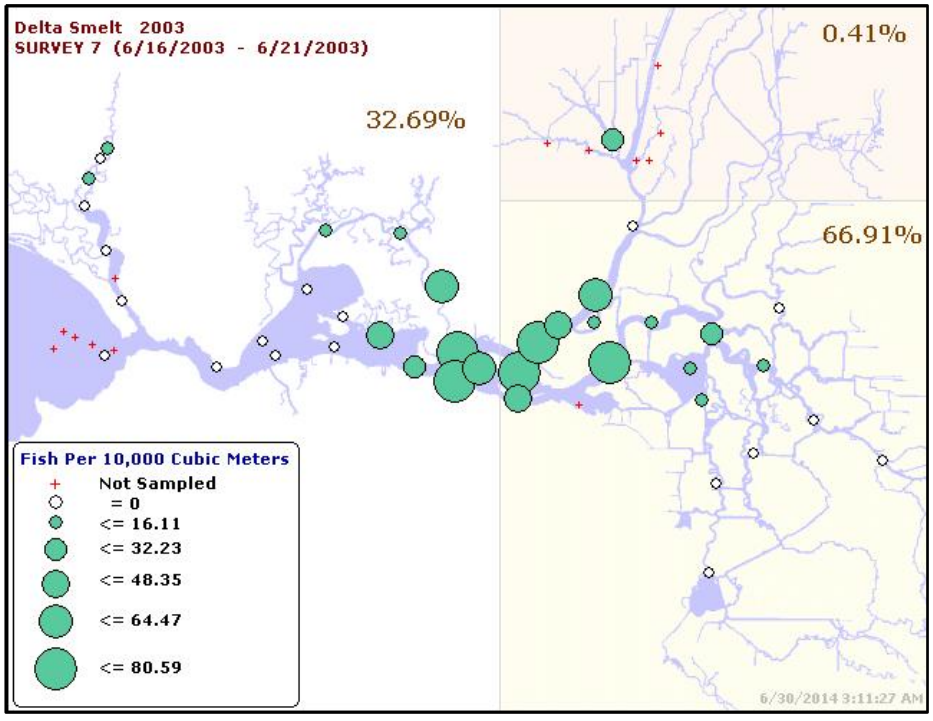
2006 Water Year: Sacramento = Wet; SJR = Wet



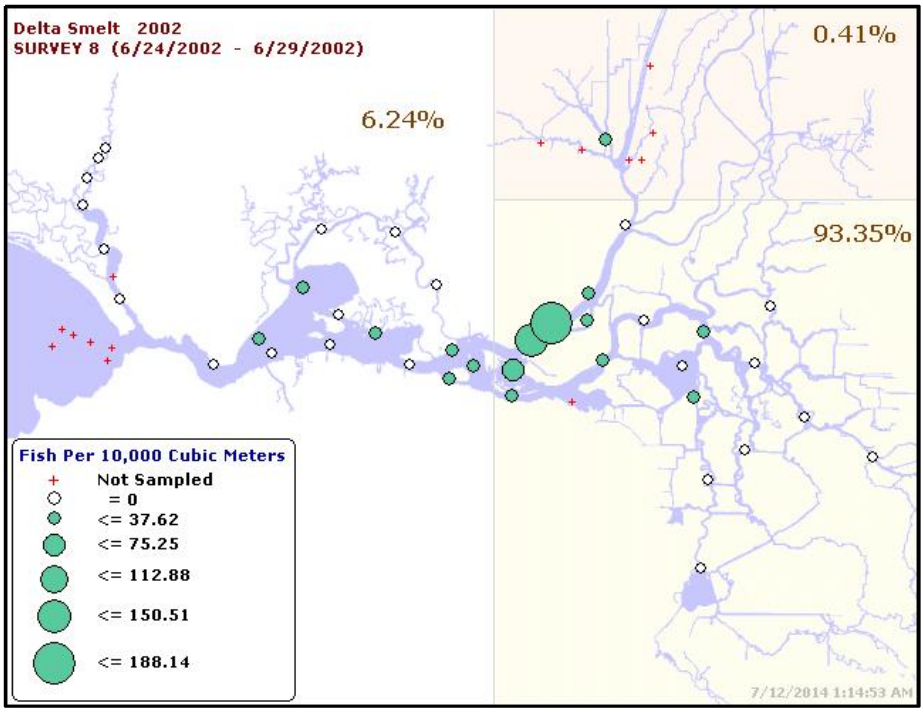
2005 Water Year: Sacramento = Above Normal; SJR = Wet



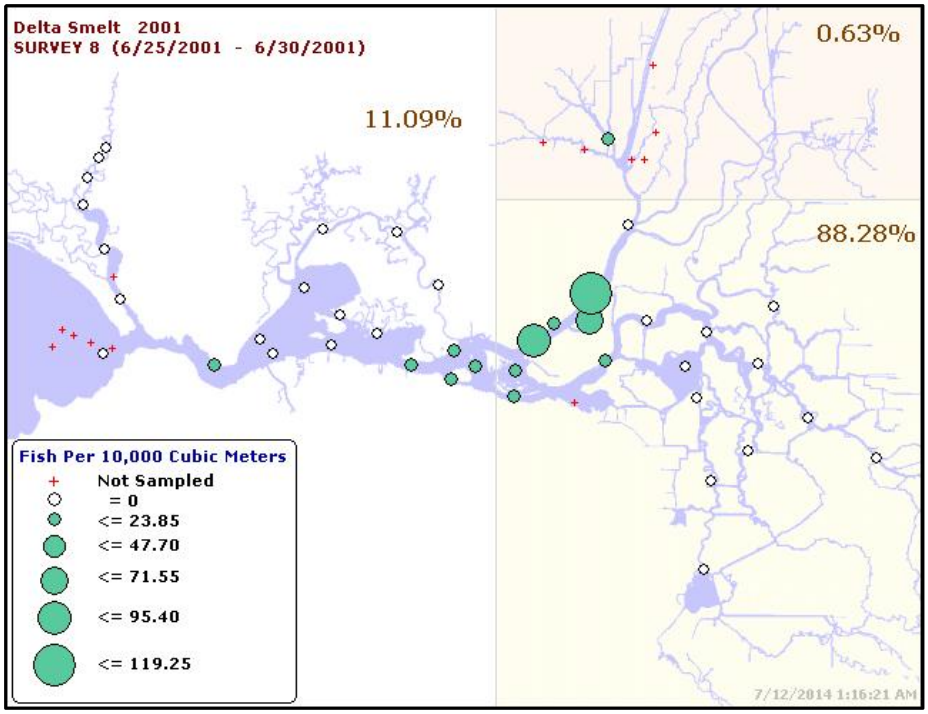
2004 Water Year: Sacramento = Below Normal; SJR = Dry



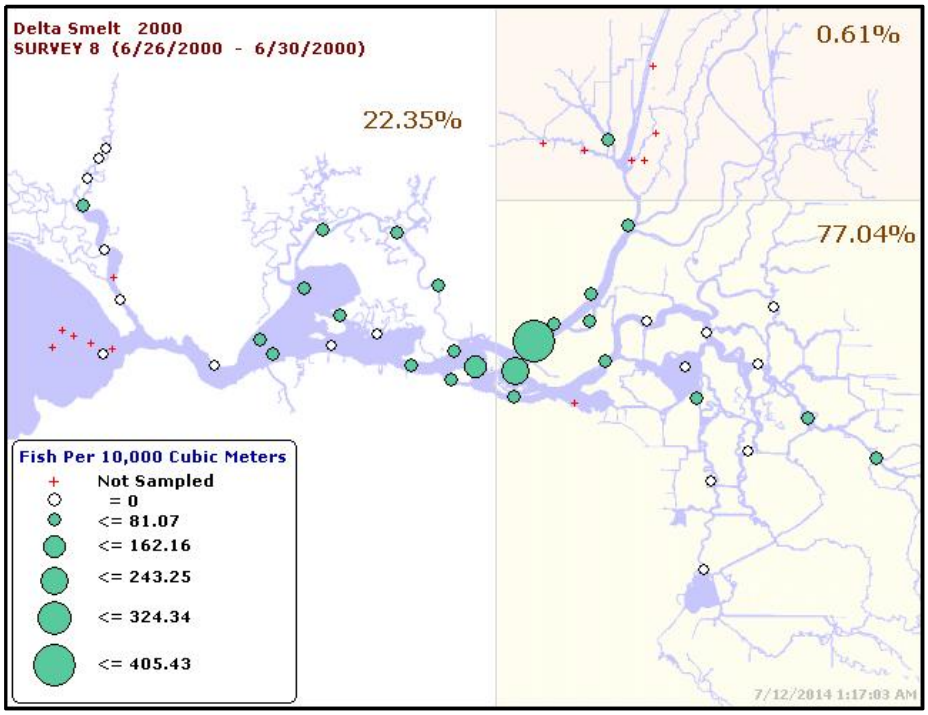
2003 Water Year: Sacramento = Above Normal; SJR = Below Normal



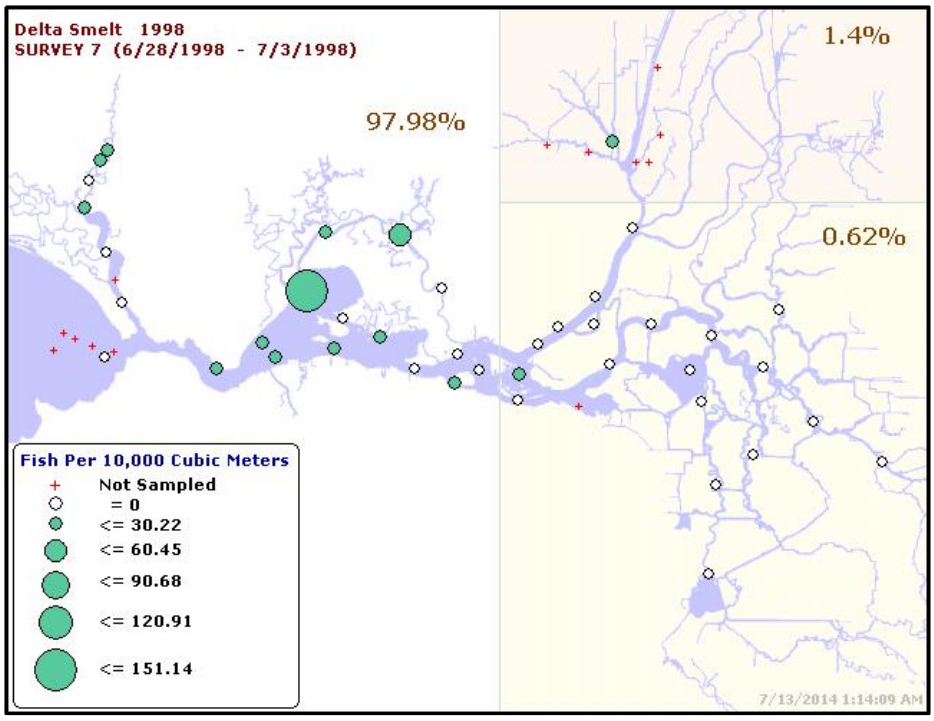
2002 Water Year: Sacramento = Dry; SJR = Dry



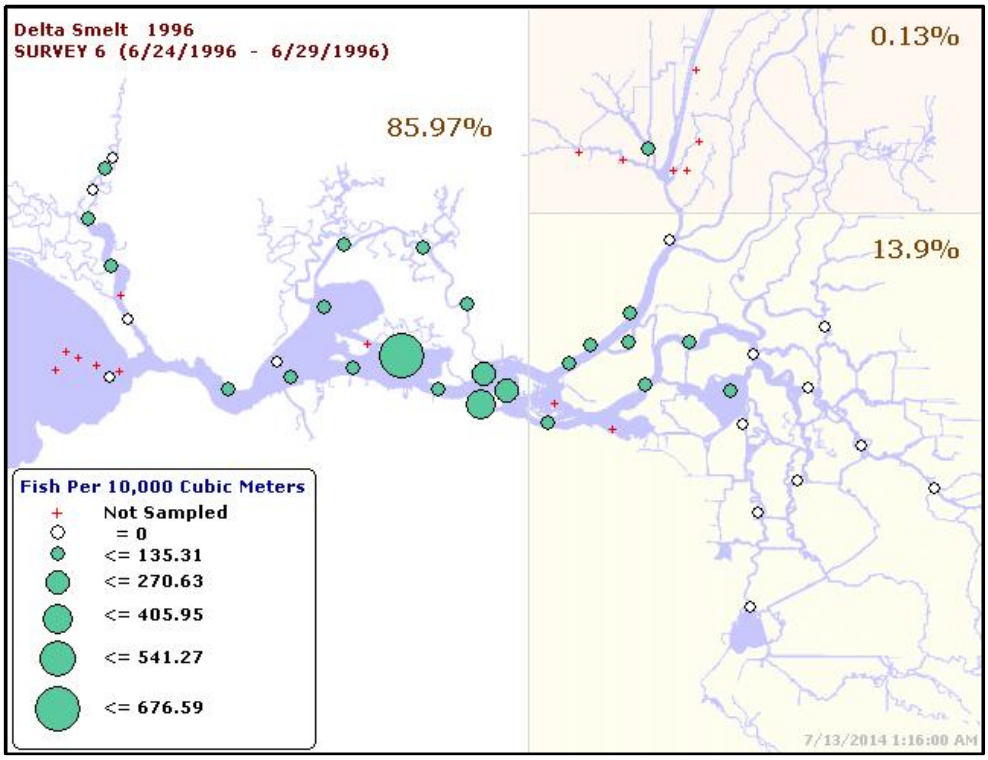
2001 Water Year: Sacramento = Dry; SJR = Dry



2000 Water Year: Sacramento = Above Normal; SJR = Above Normal



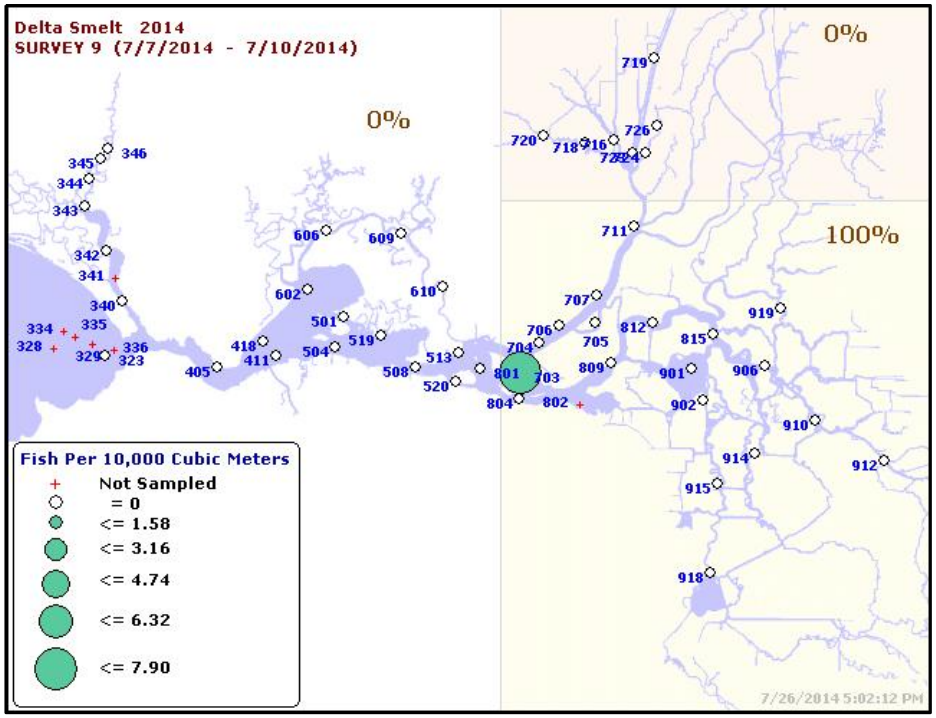
1998 Water Year: Sacramento = Wet; SJR = Wet



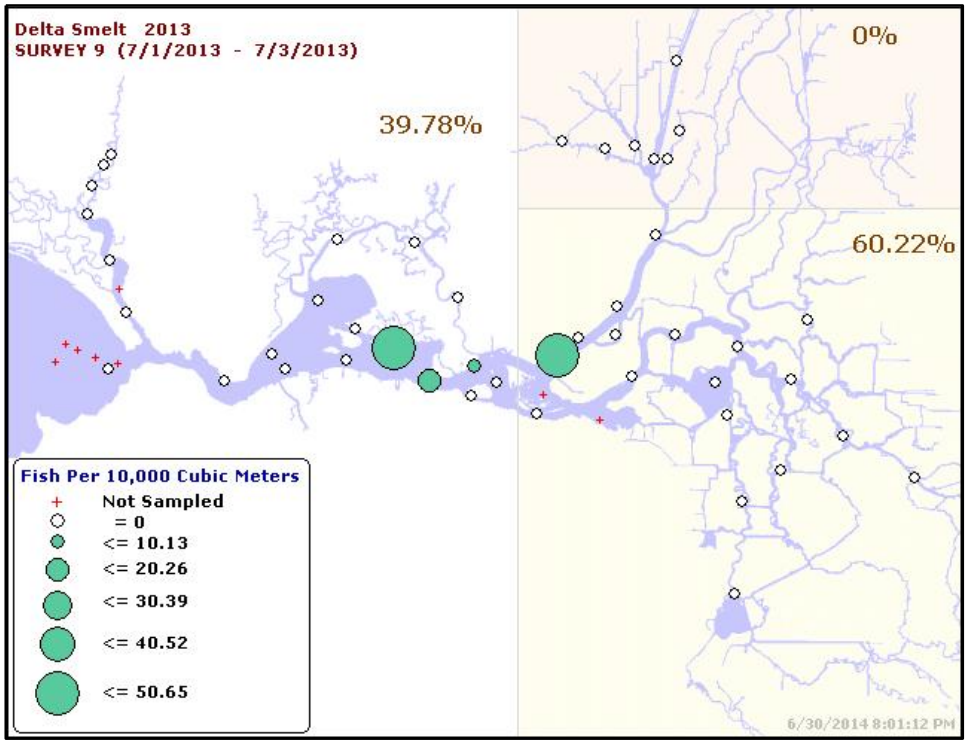
1996 Water Year: Sacramento = Wet; SJR = Wet

CDFW: 20mm Delta Smelt Surveys, Early July 1996-2013

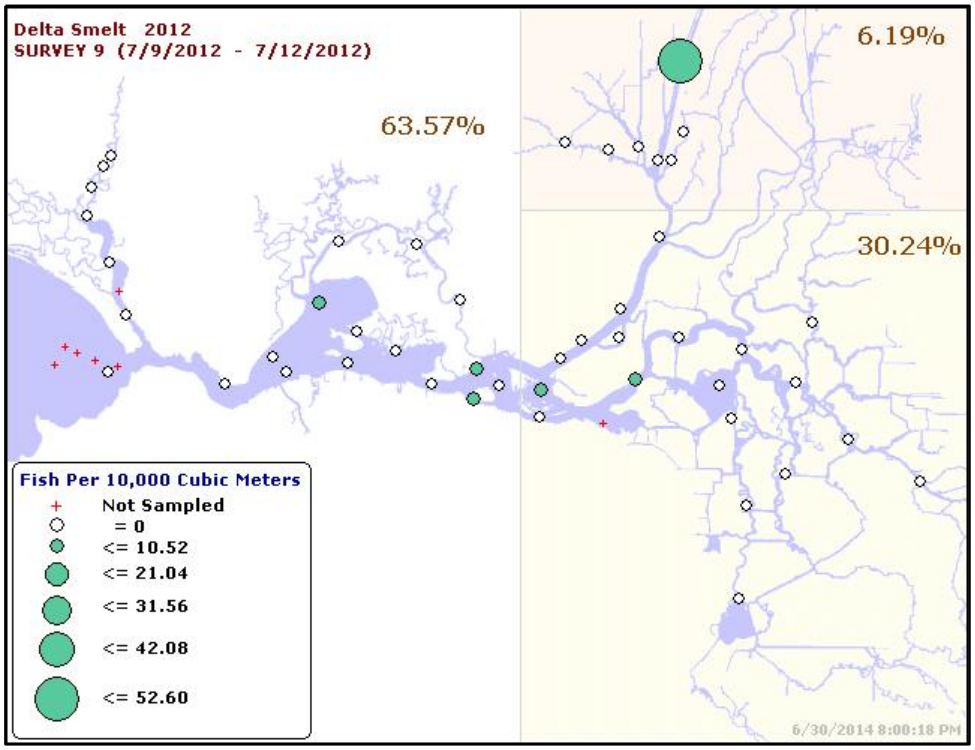
(with percentages)



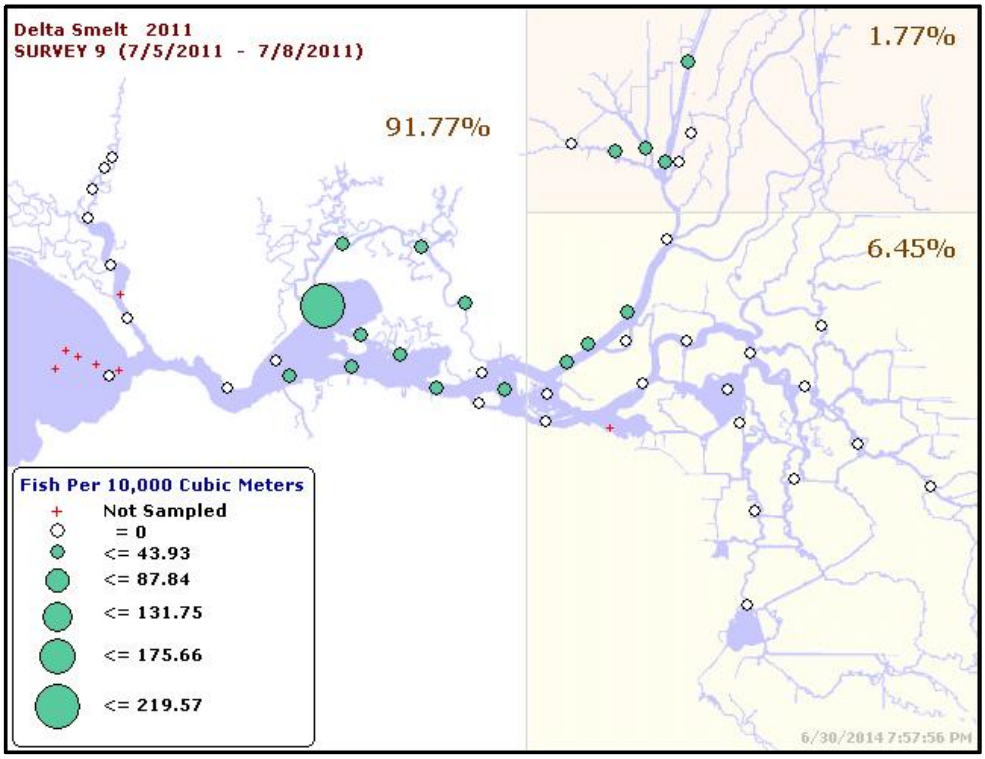
2014 Water Year: Sacramento = Critical; SJR = Critical



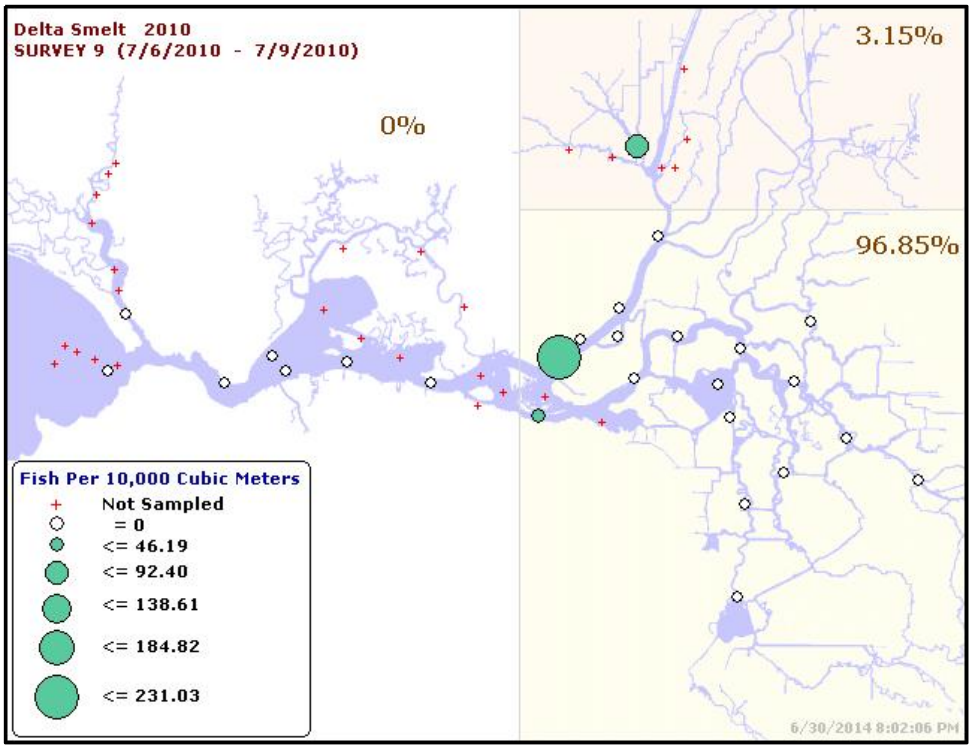
2013 Water Year: Sacramento = Dry; SJR = Critical



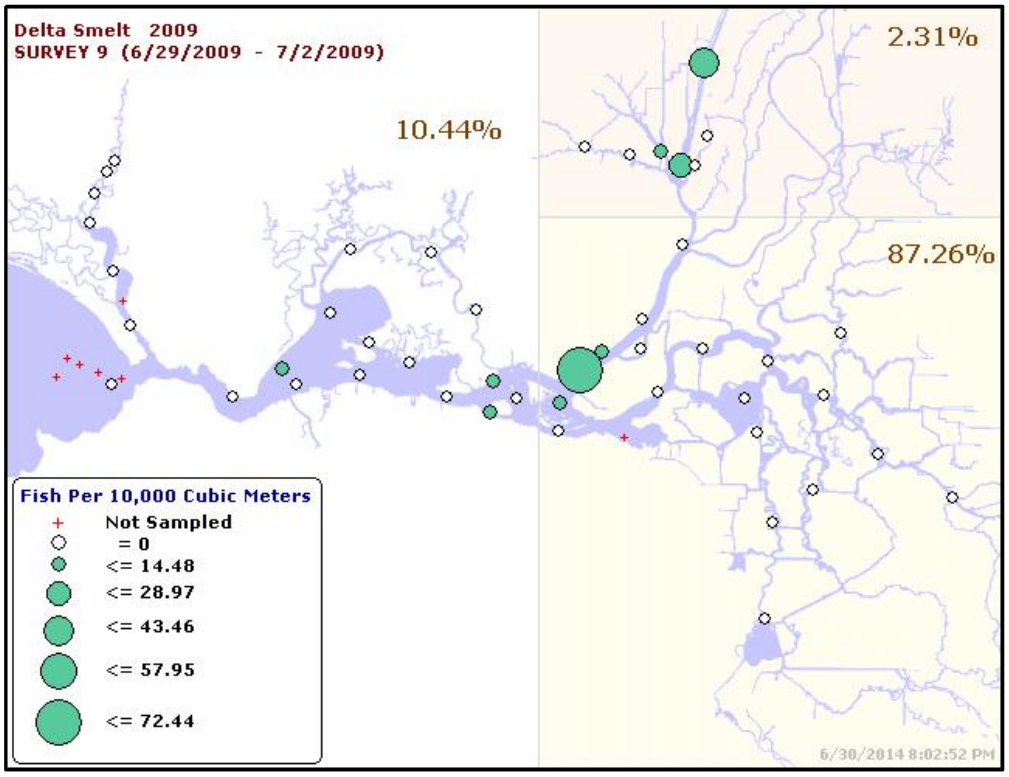
2012 Water Year: Sacramento = Below Normal; SJR = Dry



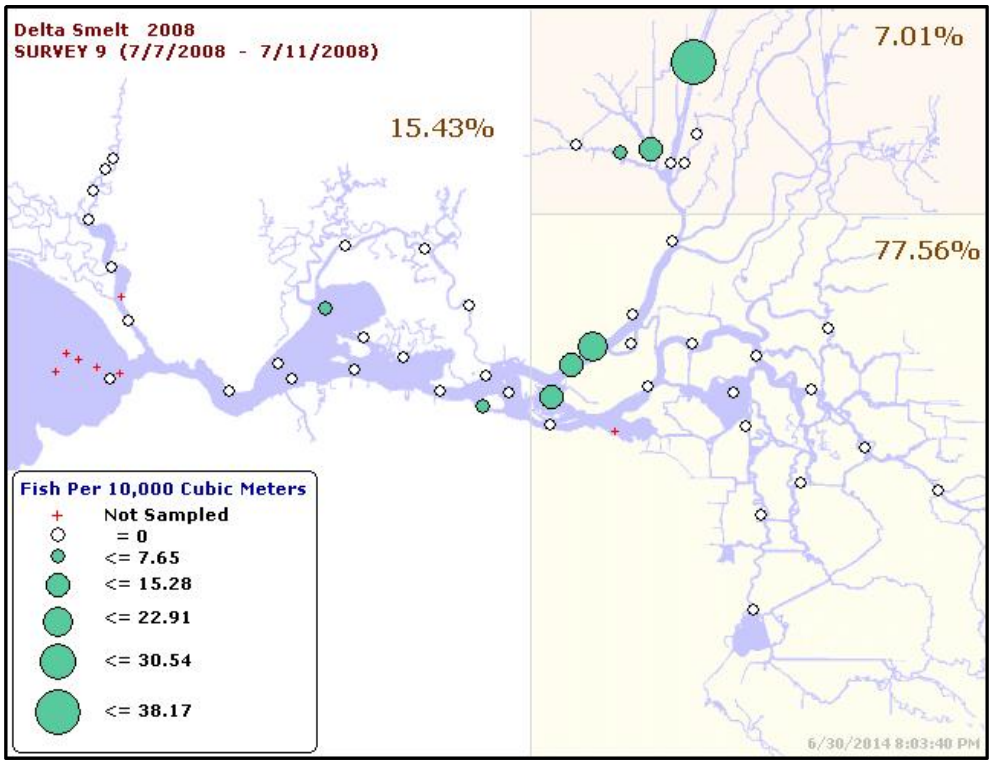
2011 Water Year: Sacramento = Wet; SJR = Wet



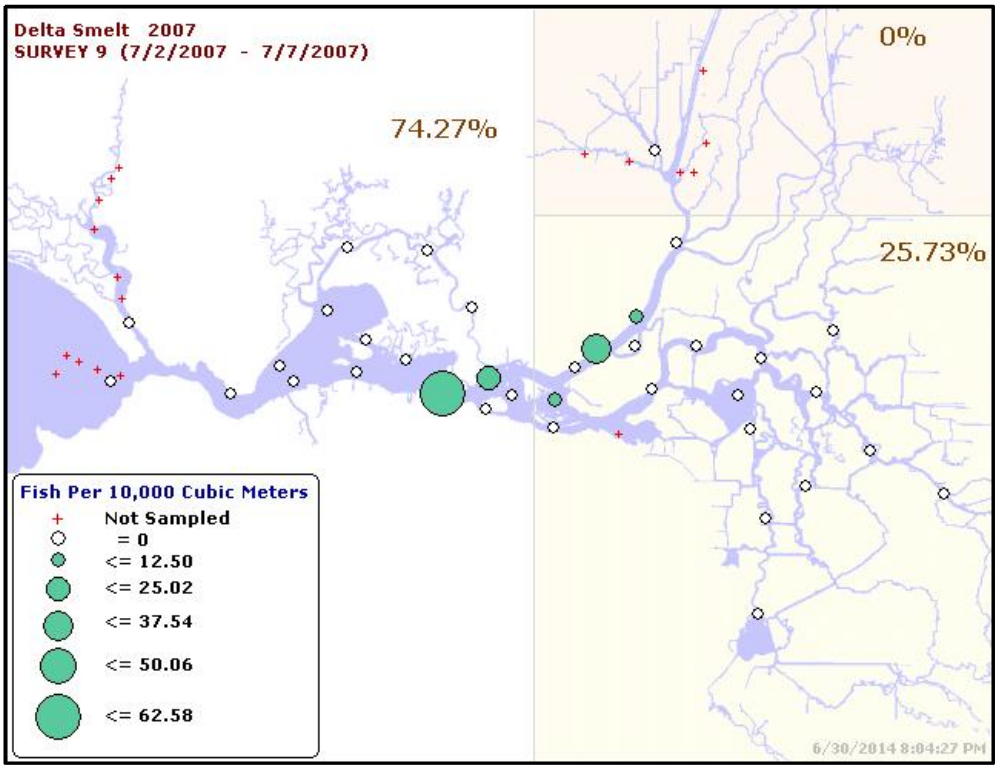
2010 Water Year: Sacramento = Below Normal; SJR = Above Normal



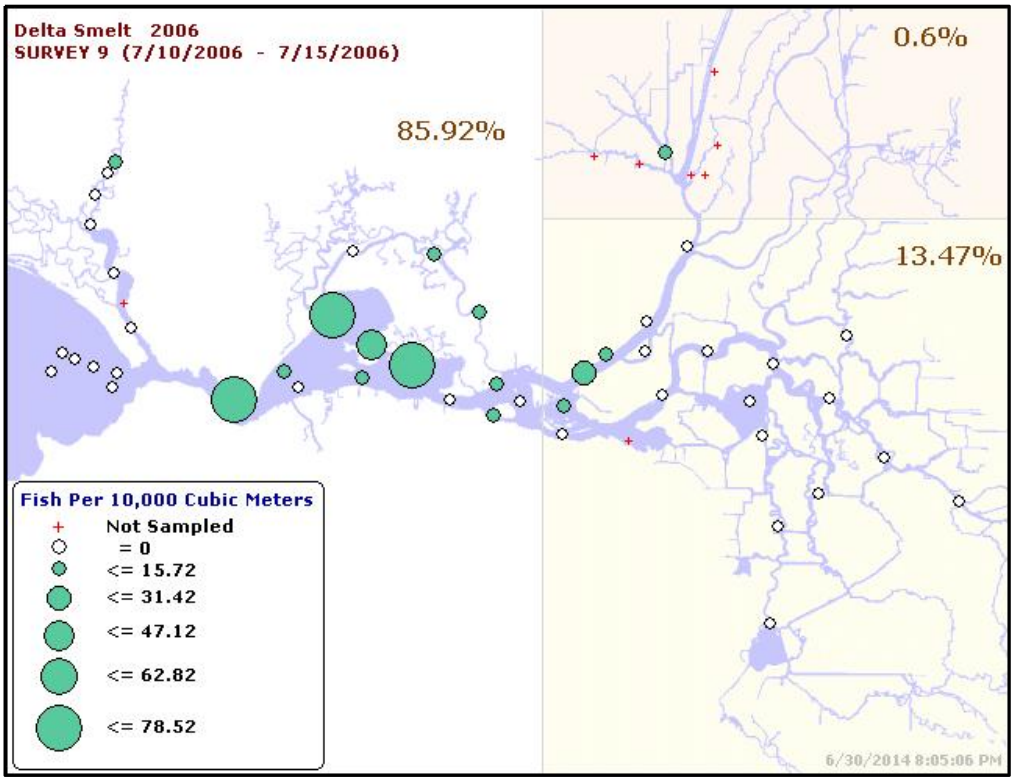
2009 Water Year: Sacramento = Dry; SJR = Dry



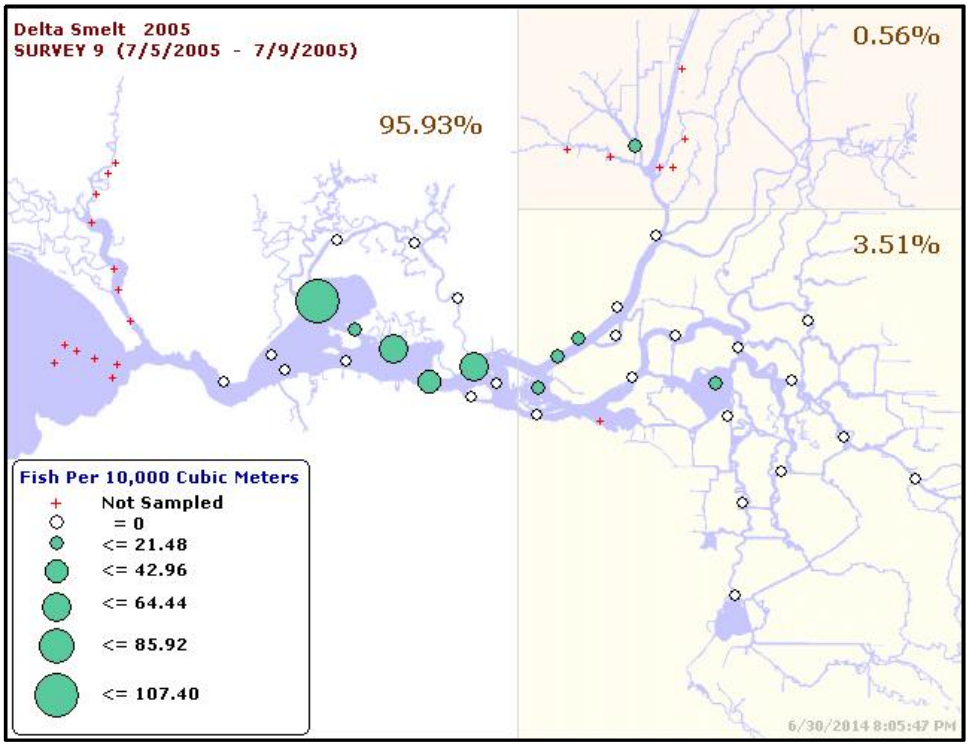
2008 Water Year: Sacramento = Critical; SJR = Critical



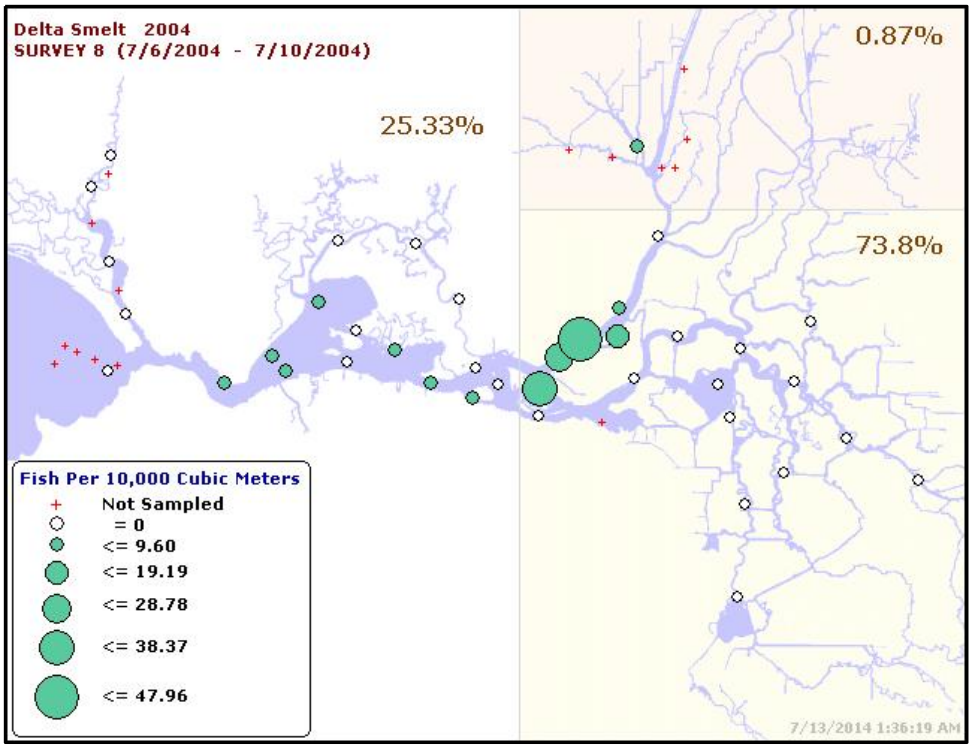
2007 Water Year: Sacramento = Dry; SJR = Critical



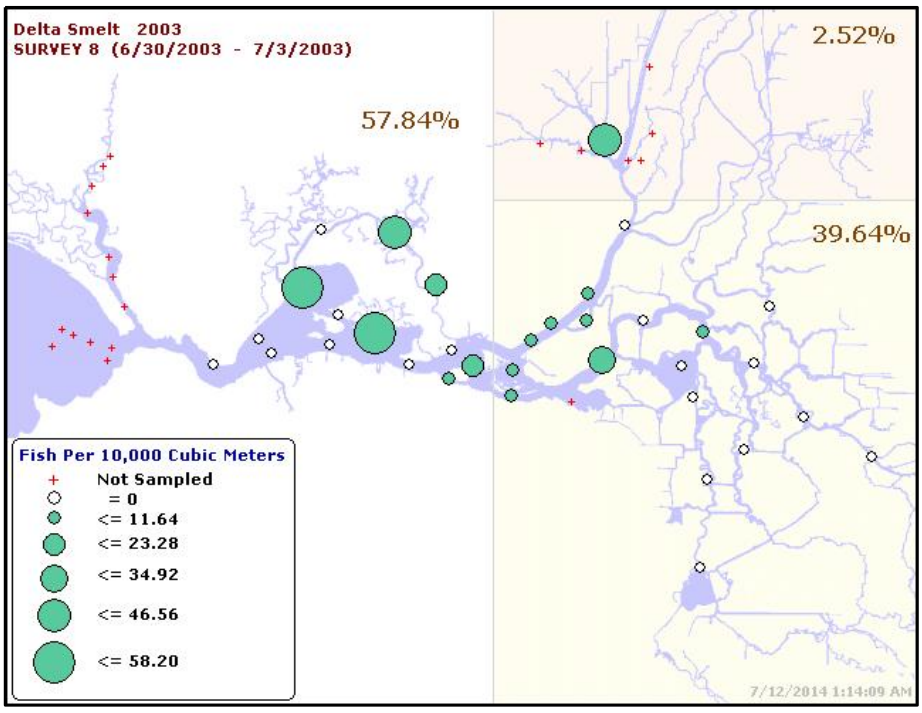
2006 Water Year: Sacramento = Wet; SJR = Wet



2005 Water Year: Sacramento = Above Normal; SJR = Wet

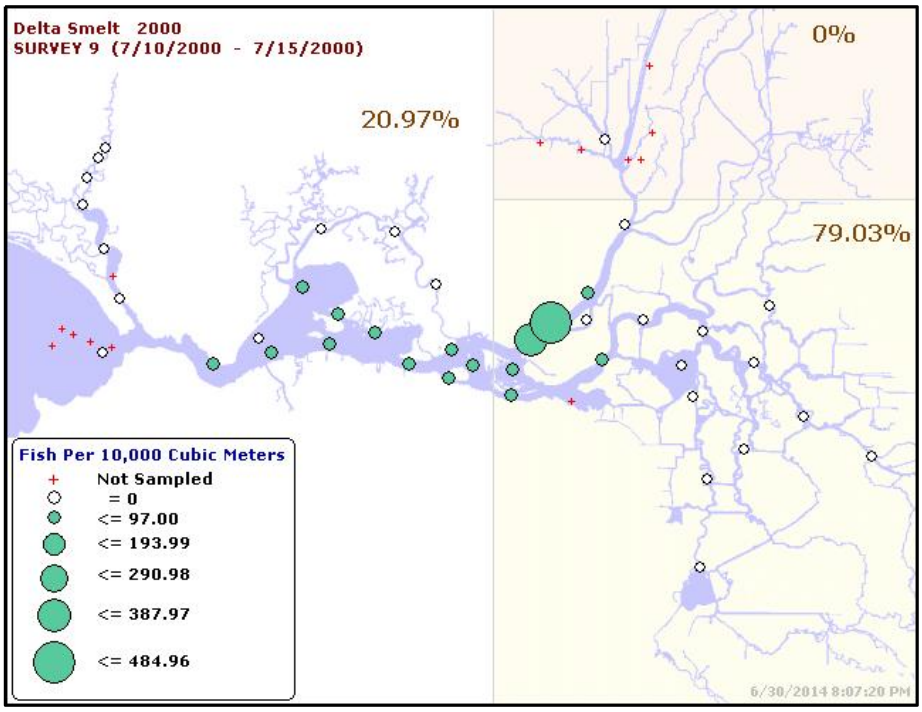


2004 Water Year: Sacramento = Below Normal; SJR = Dry

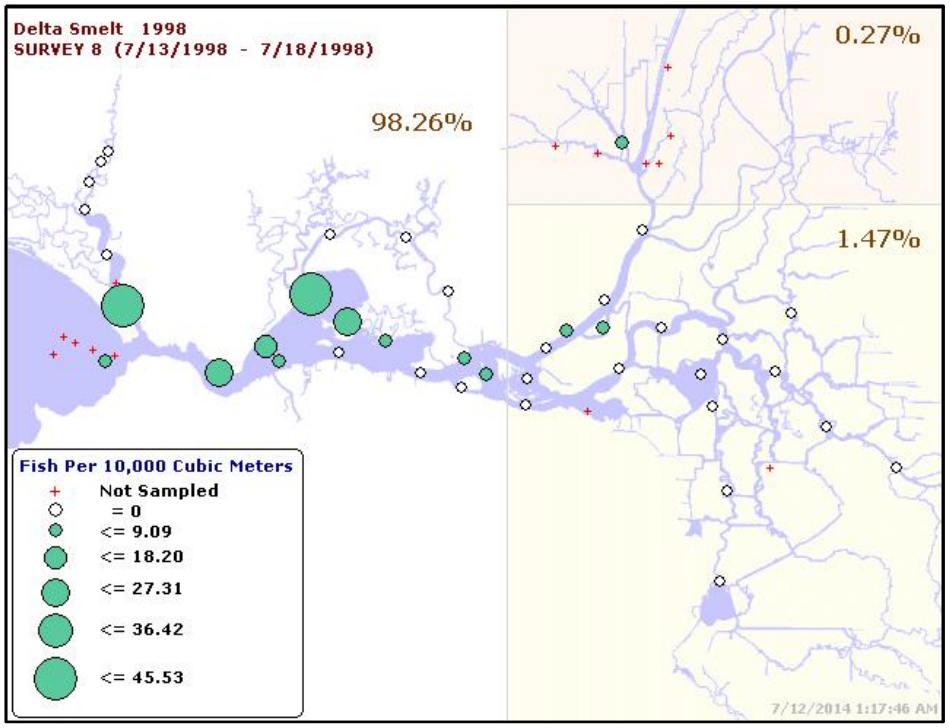


2003 Water Year: Sacramento = Above Normal; SJR = Below Normal

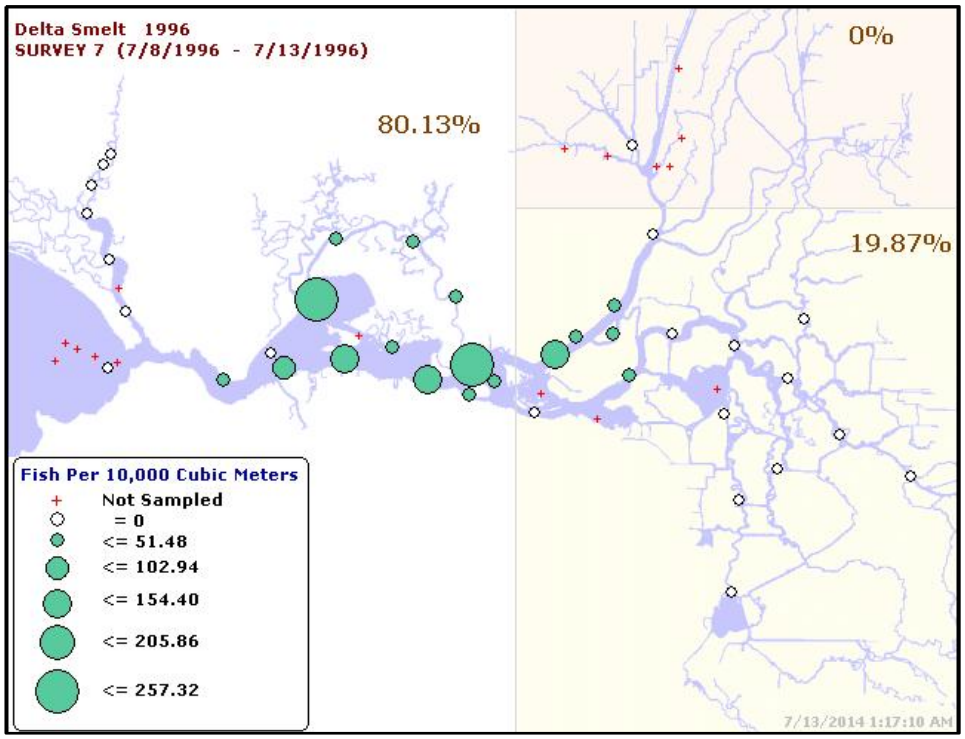
There Were No Early July Surveys in 2001 and 2002



2000 Water Year: Sacramento = Above Normal; SJR = Above Normal



1998 Water Year: Sacramento = Wet; SJR = Wet



1996 Water Year: Sacramento = Wet; SJR = Wet

Delta Smelt on the Scaffold

To summarize: during the summer of 2013, reductions in outflow, coupled with increased water exports, drew the LSZ and Delta smelt eastward into the Delta where smelt encountered lethal water temperatures. That situation was chronicled in a CSPA report titled *The Summer of 2013, the demise of Delta smelt under D-1641 Delta Water Quality Standards*, which predicted that the smelt population would plunge.[17] As predicted, the following Fall Midwater Trawl's Delta smelt abundance index was the second lowest level on record, statistically indistinguishable from the absolute lowest.

DFW conducts a series of 20-mm Delta smelt trawls monitoring post-larval-juvenile smelt. DFW does not publish their 20-mm Delta smelt indices, which are based on the initial surveys that begin in March of each year. CSPA took DFW 20-mm data and developed a series of indexes focused on the critical late June early July, when Delta smelt are drawn into the Delta be a combination of low outflow and export pumping. Those smelt are at risk of encountering lethal water temperatures. In 2014, juvenile Delta smelt were hammered by a combination of critically low outflow, water exports and lethal water temperature, as they were in 2013. The CSPA Delta

The previous low in 2009 was followed by a slightly better water year (below normal on the Sacramento and above normal on the San Joaquin) and smelt populations experienced a small rebound. This year, Delta smelt are being subjected to another year of critically dry conditions on both rivers. And this year, the State Water Board seriously weakened Delta flow and water quality standards. Delta outflow is below levels in recent memory and Delta smelt populations are at historic lows. Yet exports continue and water transfers are being approved with little environmental review.

The next Fall Midwater Trawl will almost surely find Delta smelt populations at new record lows. Population abundance levels over the last few years make the numbers of Delta smelt during the Pelagic Organism Decline (POD) in the early 2000s look robust. The POD years generated an enormous outcry. Myriad meeting were conducted, numerous studies funded and an array of programs launched. Today, the agencies that were so concerned about the POD are silent and have embraced measures they know will be disastrous for the species.

The point of no return, i.e., the level where the population cannot recover, is unknown. But, that point is likely approaching. A species that existed in this estuary for thousands of years and was the most abundant fish in the Delta is on the scaffold. Perhaps, the greatest tragedy is that our trustee agencies charged with the protection of Delta smelt; the USFWS, CDFW and the State Water Board have escorted it there.

[17] http://calsport.org/news/wp-content/uploads/CSPA-Cannon-Summer-2013-6.pdf