State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400
Web: http://www.waterboards.ca.gov/waterrights
PROTEST– PETITION

I (We) have carefully read the notices (state name):

January 23, 2015, Temporary Urgency Change Petition filed by California Department of Water Resources and United States Bureau of Reclamation Regarding Permits and License of the State Water Project and the Central Valley Project In Response to Current Dry Conditions

And

February 3, 2015, Order by the Executive Director Approving In Part And Denying In Part a Petition for Temporary Urgency Changes to License and Permit Terms and Conditions Requiring Compliance with Delta Water Quality Objectives In Response to Drought Conditions

Address, email address and phone number of protestant or authorized agent:

Gary Bobker, Program Director, The Bay Institute, 350 Bay Street #100 PMB 316, San Francisco, CA 94133, bobker@bay.org, 415-272-6616

Protest and objections based on ENVIRONMENTAL OR PUBLIC INTEREST CONSIDERATIONS

· not best serve the public interest

· have an adverse environmental impact

State facts which support the foregoing allegations

· see attached

Under what conditions may this protest be disregarded and dismissed? (Conditions should be of a nature that the petitioner can address and may include mitigation measures.)

· see attached

All protests must be signed by the protestant or authorized representative:

Signed:

Date: February 13, 2015

All protests must be served on the petitioner. Provide the date served and method of service used:

Email transmitting this protest and objections form cc'd to James.Mizell@water.ca.gov and Amy.Aufdemberge@sol.doi.gov.

The Bay Institute

ENVIRONMENTAL AND PUBLIC INTEREST CONSIDERATIONS REGARDING THE BAY INSTITUTE'S PROTEST OF THE JANUARY 23, 2015, PETITION TO THE STATE WATER RESOURCES CONTROL BOARD FOR TEMPORARY URGENCY CHANGES TO LICENSE AND PERMIT TERMS AND CONDITIONS REQUIRING COMPLIANCE WITH DELTA WATER QUALITY OBJECTIVES IN RESPONSE TO DROUGHT CONDITIONS AND OBJECTIONS TO THE FEBRUARY 3, 2015, SWRCB EXECUTIVE DIRECTOR'S ORDER APPROVING IN PART AND DENYING IN PART THE PETITION

The Bay Institute's protest of the January 23, 2015 petition and objections to the February 3, 2015 order are based on the following environmental and public interest considerations:

1. Reducing Delta outflows required under D-1641 in February and March will exacerbate extremely adverse habitat conditions for pelagic fish species of the San Francisco Bay-Delta estuary that are at extremely high risk of extinction. In addition, reducing required Delta outflows in combination with the proposed relaxation of the Vernalis flow objective will also decrease river flows into the Delta (to the extent that those are controlled by reservoir releases) and degrade habitat conditions for migratory fish species. The benefits afforded to imperiled populations from D-1641 objectives for March – required by February runoff well in excess of the triggers for relaxing these objectives – would be completely eliminated, and one of the few chances to ameliorate the effects of the drought on the estuary lost.

2. Part of the stated basis for relaxing Delta outflow requirements is to preserve storage to provide adequate upstream habitat conditions for salmonids, but there is little assurance or likelihood that such storage can or will be used to provide for the needs of salmonids spawning in 2015 and migrating downstream in subsequent years. Failure to protect either 2014 outmigrating salmonids or the 2015 year class throughout the freshwater stages of their life history could very well result in the extinction of winter-run Chinook salmon and severe impacts to other runs. Maintaining required outflows, on the other hand, will reduce extinction risk for both imperiled pelagic species and migratory species by minimizing the degradation of habitat conditions in the Delta.

3. Increasing Delta exports, especially when flows into and out of the Delta are low and OMR restrictions have also been relaxed, risks major population losses to both pelagic species and migratory salmonids, and the February 3 order rightly denies this part of the petition.

These considerations are addressed in greater detail below.

Reducing Delta outflows required under D-1641 in February and March will exacerbate adverse habitat conditions for pelagic fish species of the San Francisco Bay-Delta estuary at extremely high risk of extinction. In addition, reducing required Delta outflows in combination with the proposed relaxation of the Vernalis flow objective will also decrease river flows into the Delta (to the extent that those are controlled by reservoir releases) will degrade habitat conditions for migratory fish species. The benefits afforded to imperiled populations from D-1641 objectives for March – required by February runoff well in excess of the triggers for relaxing these objectives – would be completely eliminated, and one of the few chances to ameliorate the effects of the drought on the estuary lost.

The population viability of many aquatic organisms in the Bay-Delta estuary is strongly and significantly correlated to Delta outflow (Figure 1), and for these organisms viability increases as outflow increases. The vast and overwhelming evidence for the critical importance of these flow-viability relationships is well documented, and described in detail in the SWRCB's 2010 "Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem" report and the record of the 2012 workshops pertaining to Phase 2 of the SWRCB's update of the Bay-Delta Water Quality Control Plan. The Interagency Ecological Program's January 2015 "Delta Smelt MAST Synthesis Report" updates available information regarding flow effects on this once common, now extremely rare species.

Flow-dependent estuarine species include American shad, Delta smelt, longfin smelt, Sacramento splittail, starry flounder, striped bass, and *Crangon* shrimp. Some of these species are at high risk of extinction and most are experiencing record or near-record low population levels (Figure 2; Figure 4). The 2014 Fall Mid-Water Trawl survey found that Delta smelt abundance is the lowest level ever recorded, and longfin abundance is at the second lowest level on record[1]. Populations of American shad, striped bass, and threadfin shad are also at near-record low levels, clearly indicating that estuarine habitat conditions are grossly inadequate to support fish and wildlife beneficial uses.

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[1] In presentations to the SWRCB in the last several years, the Metropolitan Water District of Southern California has suggested that the tremendous decline in the FMWT index of longfin smelt was due to changing environmental conditions and/or changing efficiency of the sampling gear. However, two other data sets, which sample the entire pelagic extent of the estuary with different gear (the Bay Study's midwater trawl and otter trawl) have also detected statistically significant and very large declines in longfin smelt. Preliminary analysis of longfin smelt catches in these other surveys in 2014 indicate that longfin smelt abundance was either the third lowest on record, as measured by the Bay Study Otter Trawl, or the fourth lowest on record, as measured by the Bay Study Midwater Trawl respectively (Figure 4). This should lay to rest the suggestion that the decline (of more than 99%) in longfin smelt abundance is attributable to the particulars of any one sampling program or region of the estuary.

Due to long-term water management (and occasional natural droughts), these species have experienced catastrophically low outflow conditions for half of the past 45 years (Figure 3). The long-term decline in populations caused by persistently inadequate flows has been exacerbated by the current drought. In addition, migratory species, including Chinook salmon, steelhead, green sturgeon, and Sacramento splittail, benefit from higher river inflows to the Delta. As a result of human water management practices and habitat degradation, two Sacramento River Chinook salmon runs (winter and spring), Central Valley steelhead, and green sturgeon are listed as threatened or endangered, and the fall run of Chinook salmon has suffered very large population impacts. Reducing river inflows this year (both as a result of reduced Delta outflow requirements and as a direct modification to the San Joaquin flow standard at Vernalis) will add severe impacts to these populations as their juveniles migrate to and through the Delta. Similar impacts were noted last year when fresh water flows into, through, and out of the Delta were reduced as part of a temporary urgency change (USFWS. 2014. Contingency Release Strategies for Coleman National Fish Hatchery Juvenile Fall Chinook Salmon due to Severe Drought Conditions in 2014).

For many of these species, there is no margin of error. Causing additional impacts on top of those created by the natural drought risks the loss of imperiled populations forever. In particular, species with short life spans that spawn only one time (semelparous species such as Delta smelt, longfin smelt, and Chinook salmon) are extremely vulnerable to the negative conditions contemplated by the proposed changes to fresh water flow and water quality; they simply cannot wait out bad years and spawn when wetter conditions return. The extremely depressed population levels that these species now are experiencing therefore make them highly vulnerable to acute reductions in outflow. Relaxing Delta outflow requirements (and associated levels of flow into and through the Delta) during the critical February through June period in 2015 could result in the extinction of these species; at best, reduced Delta outflows will continue to cause their populations to contract.

Denying the petition's request to relax Delta outflows will not result in recovery of these species to viable population levels. Only timely action by the SWRCB to adopt and implement water quality objectives and other requirements to fully protect estuarine habitat and other fish and wildlife beneficial uses will accomplish that goal. But ensuring that the minimal Delta outflows and San Joaquin River inflows required by D-1641 actually occur will significantly reduce the very real risk of extinction for several pelagic and migratory species.

Indeed, projected March outflows under D-1641 could contribute significantly to population increases for many of these species. The current estimated February 8-River index is 2.511 MAF, which would trigger 31 days of compliance with the Chipps Island outflow objective in March. Far from reducing outflows from 7,100 cfs to 4,000 cfs, the proposed relaxation would decrease outflows by over two thirds of the required 11,400 cfs outflow under D-1641. To reduce outflows so drastically from the existing requirements is neither justified by current hydrological conditions nor responsible in the face of the severe and perhaps irreversible consequences likely to ensue for populations at record or near-record lows.

Part of the stated basis for relaxing Delta outflow requirements is to preserve storage to provide adequate upstream habitat conditions for salmonids, but there is little assurance or likelihood that such storage can or will be used to provide for the needs of salmonids spawning in 2015 and migrating downstream in subsequent years. Failure to protect either 2014 outmigrating salmonids or the 2015 year class throughout the freshwater stages of their life history could very well result in the extinction of winter-run Chinook salmon and severe impacts to other runs. Maintaining required outflows (and river inflows), on the other hand, would reduce extinction risk for both imperiled pelagic species and migratory species by minimizing the degradation of habitat conditions in the Delta.

There are rational arguments to be made that relaxing Delta outflow requirements during extreme drought conditions may be prudent. Such actions might allow the Central Valley Project and the State Water Project to store cold water in their upstream facilities in order to release water to maintain downstream spawning habitat conditions for salmonids later in the year. The question for the SWRCB to consider in evaluating this particular petition is whether relaxing outflows is likely to result in increased protection of this year's salmonid year class during its incubation phase *and* when those fish hatch and begin their journey downstream to the ocean. The evidence is that approving the petition will not.

The SWRCB approved a previous petition by the CVP and SWP in 2014 based on a similar rationale. As a result, very poor estuarine habitat conditions in 2014 were further degraded, and estuarine fish population indices fell to record or near-record lows. In addition, salmonid juveniles that were migrating into and through the Delta during 2014 (fish that spawned during 2013) experienced elevated mortality resulting from reduced fresh water flow rates[2]. The proposed benefits for salmonids spawning in 2014 that justified the relaxation were not realized, however. CVP and SWP operations failed to protect either the outmigration of the 2013 salmonid year class nor the egg stage of the 2014 year class; only 5% of the 2014 year class of winter-run salmon is estimated to have survived to-date, and these fish must still transit the Delta.

Now, petitioners propose to reduce the flow into and through the Delta needed to aid the remnants of the 2014 year class as it struggles to reach the ocean as a tradeoff for "protecting" the 2015 spawning class. Maintaining the minimum Delta outflow requirements in 2015 is the only way to protect the remaining 5% of the 2014 winter-run Chinook salmon year class. If the drought continues, the ability of the projects to maintain sufficient storage to protect *both* the egg stage and the outmigration of the 2015 year class is extremely doubtful (protection of only a

[2] For example, in 2014, USFWS wrote: "Decreased flows in the Sacramento River lead to significantly reduced survival of juvenile salmon because of reduced travel times exposing the fish to increased predation and increased risk of diversion into the interior Delta where survival is significantly reduced." [p. 2-3 in USFWS 2014, cited above]

fraction of the life cycle, at the expense of protections in the remainder of the life cycle simply does not make sense). If the proposal to reduce fresh water flows needed by the 2014 year class to complete their freshwater journey is implemented, the 2014 year class will be lost – and the 2013 year class was sacrificed to protect the 2014 year class. The best chance to avoid the potential destruction of the 2014 year class of all runs of Chinook salmon and steelhead and at the same time prevent extinction of estuarine pelagic species at risk and of the winter Chinook salmon run and to ameliorate the effects of the continuing drought on the public trust values of the Bay-Delta ecosystem is to maintain the minimal Delta outflow requirements in 2015.

<u>Increasing Delta exports, especially when flows into and out of the Delta are low and OMR restrictions have also been relaxed, risks major population losses to both pelagic species and migratory salmonids, and the February 3 order rightly denies this part of the petition.</u>

Both estuarine fish species and migrating salmonids are highly vulnerable to entrainment mortality and other effects of Delta export pumping. The impact of export pumping to these populations is greatest when flows through and out of the Delta are low. Allowing elevated exports when Delta outflows are lower than the level set in D-1641 represents a very grave risk that the projects will entrain and kill a disproportionately large fraction of one or more imperiled populations.

The best available scientific evidence indicates that up to 40% of the delta smelt population and 15% of outmigrating Chinook salmon are lost to entrainment when Delta exports occur at high levels relative to Delta outflows[3]. These figures do not factor in the indirect effects of entrainment on survival of these species.

Longfin smelt are particularly susceptible to entrainment impacts (as indexed by salvage at the CVP/SWP fish screening facilities) during years with low outflow (Figure 5). This is hypothesized to be because the location of longfin spawning and early rearing is focused upstream of the salinity field – as the salinity field moves to the east during January through April (the longfin spawning period), the fish move closer to the export facilities[4]. In addition, the rate of longfin entrainment accelerates rapidly as OMR flows become more negative[5]. Thus, allowing decreased freshwater flows out of the Delta puts the already severely imperiled longfin population in harm's way and increasing exports and reducing San Joaquin inflow to the Delta

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[3] See: Kimmerer, W.J. 2008. Losses of Sacramento River Chinook Salmon and Delta Smelt to Entrainment in Water Diversions in the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science, 6(2).

[4] See: Rosenfield, J.A. 2010. Conceptual life-history model for longfin smelt (Spirinchus thaleichthys) in the San Francisco Estuary. California Department of Fish and Game, Sacramento, CA.

[5] See: Grimaldo, L. F., T. Sommer, N. Van Ark, G. Jones, E. Holland, P. B. Moyle, B. Herbold, and P. Smith. 2009. Factors Affecting Fish Entrainment into Massive Water Diversions in a Tidal Freshwater Estuary: Can Fish Losses be Managed? North American Journal of Fisheries Management 29:1253-1270.

(both of which lead to increasingly negative OMR flows) is a recipe for entraining and killing a very large fraction of the longfin spawning and larval rearing populations.

In conclusion, the D-1641 objectives for Delta outflow and Vernalis inflows should not be relaxed, and the D-1641 export criteria maintained per the February 3 order, in order to:

- Avoid the very real prospect of causing the extinction of one or more pelagic estuarine or migratory salmonid populations.

- Avoid repeating the mistakes of 2014, when Delta outflows were relaxed for the ostensible purpose in part of protecting migratory salmonids, and as a result both pelagic estuarine and migratory salmonid populations were devastated.

- Avoid the likelihood of catastrophic effects on imperiled populations from the combined effects of relaxing outflow and export criteria in tandem.

- Ameliorate the effects of the drought on the Bay-Delta estuary ecosystem by providing the benefit of improved conditions as required under D-1641 – a long-awaited opportunity to ease the pressure on an ecosystem and species at risk.

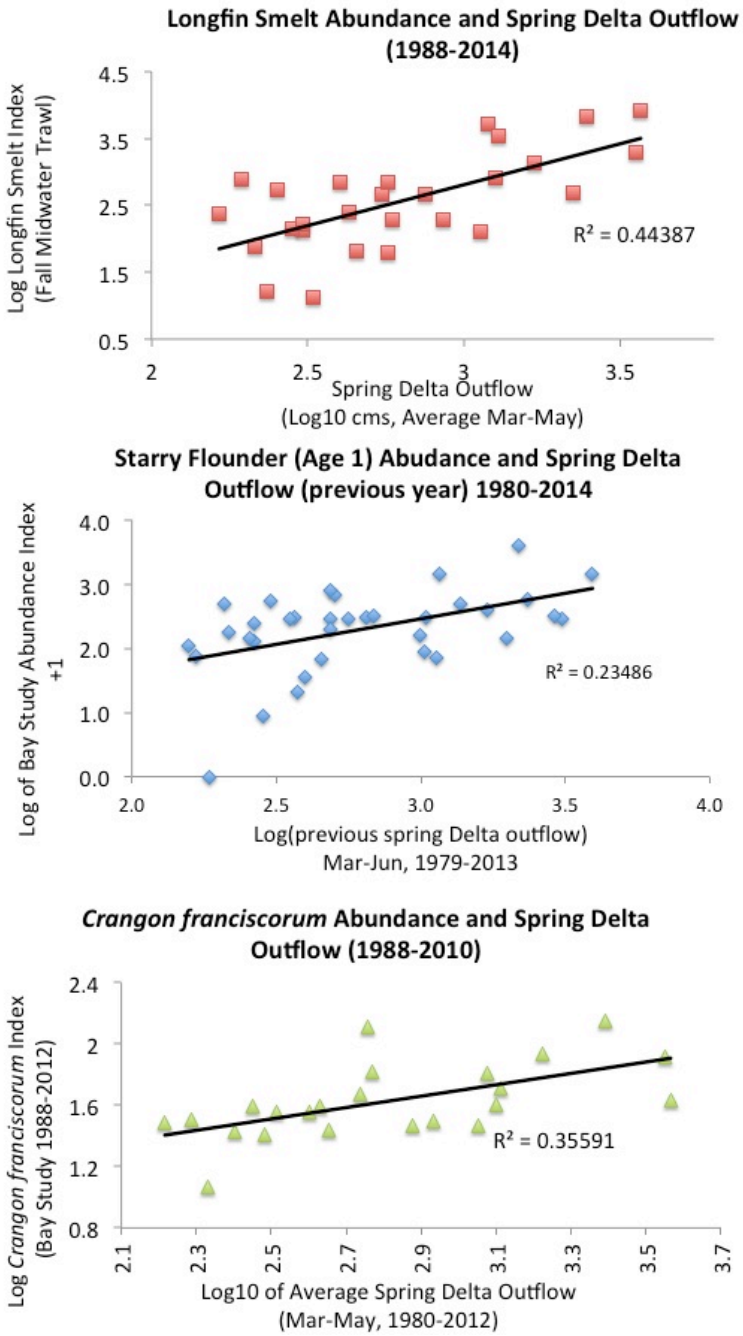

Figure 1: Long term relationship of Delta outflow and abundance indices for three estuarine species. These species display a range of trophic levels, behaviors, and ecological tolerances. They are also representative of a broader suite of species that show similar long-term positive relationships between abundance and winter-spring Delta outflow. Starry flounder and *Crangon* shrimp data courtesy of CDFW's San Francisco Bay Study and the Interagency Ecological Program for the San Francisco Estuary.

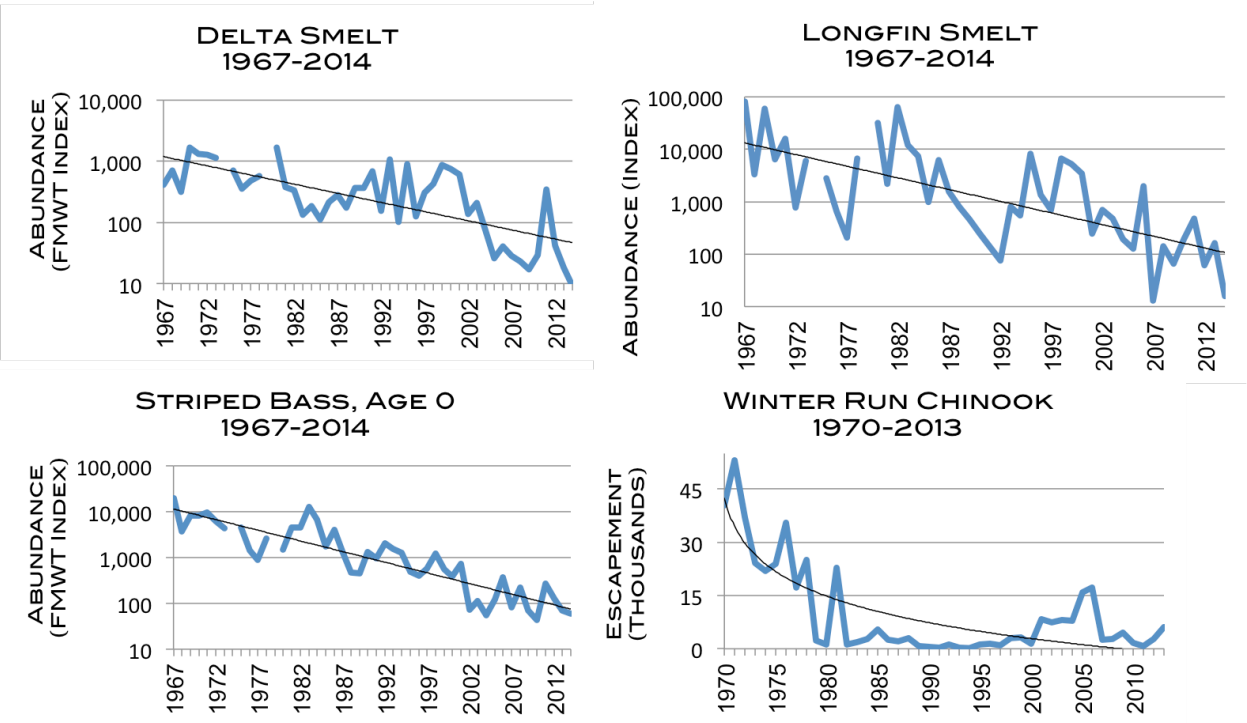

Figure 2: Long-term decline of four fish species of the San Francisco Bay-Delta estuary. The pelagic species have declined by at least 99% over the period of record. Note that the y-axis for Delta smelt, longfin smelt, and Age-0 striped bass is a log-scale; each scale value is 10x the scale value immediately below. The y-axis for the winter-run Chinook salmon is linear.

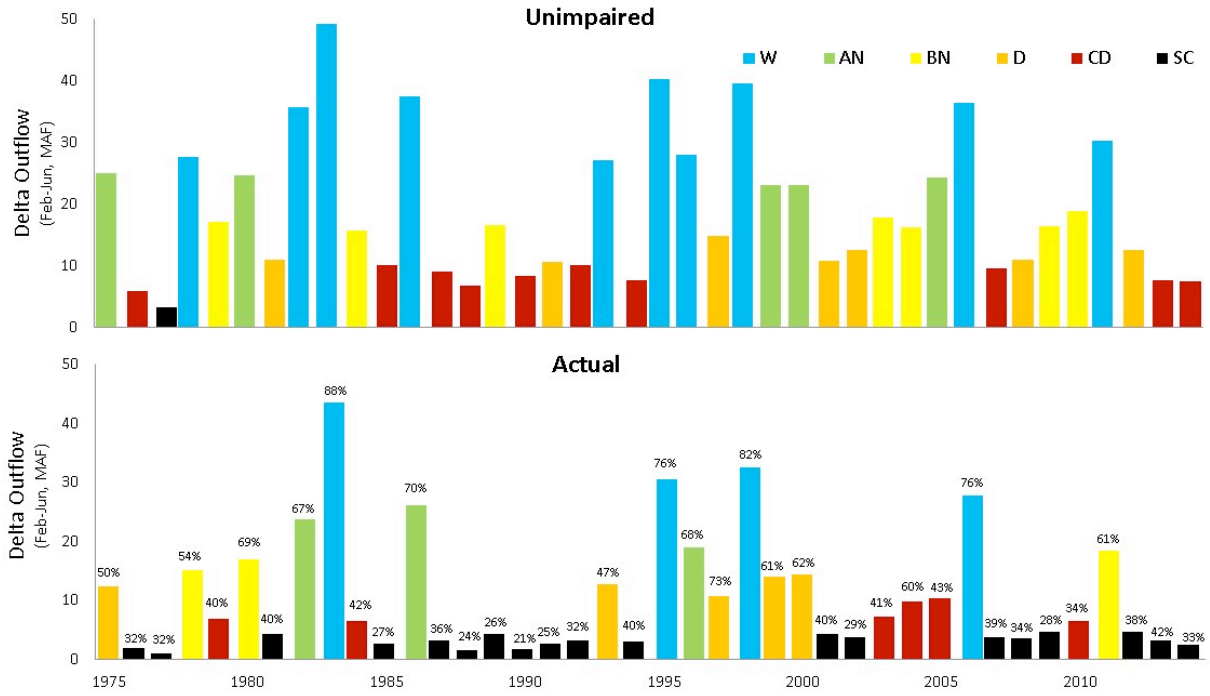

Figure 3: Persistent, man-made drought experienced by the San Francisco Bay-Delta estuary ecosystem. Bars represent the volume of Delta fresh water outflows that would be expected under current landscape conditions without storage or diversion (upper panel; unimpaired) and those that actually occurred (lower panel; actual). Colors represent water year types (W=wet, AN=Above Normal, BN = Below Normal, etc.). Black bars represent Super-critically Dry (SC) runoff conditions that occur naturally in <3% of years (e.g., 1977 in the upper panel). Actual outflows have been equal to or less than the Super-critical threshold in 19 of 40 years since 1975 (47.5% of years). Since 1995, Wet years and Above Normal years have occurred naturally 40% of the time, but the estuary has only experienced those conditions in 20% of years. Since 1995, Super-critically Dry conditions have occurred in the estuary in twice as many years as Wet + Above Normal conditions.

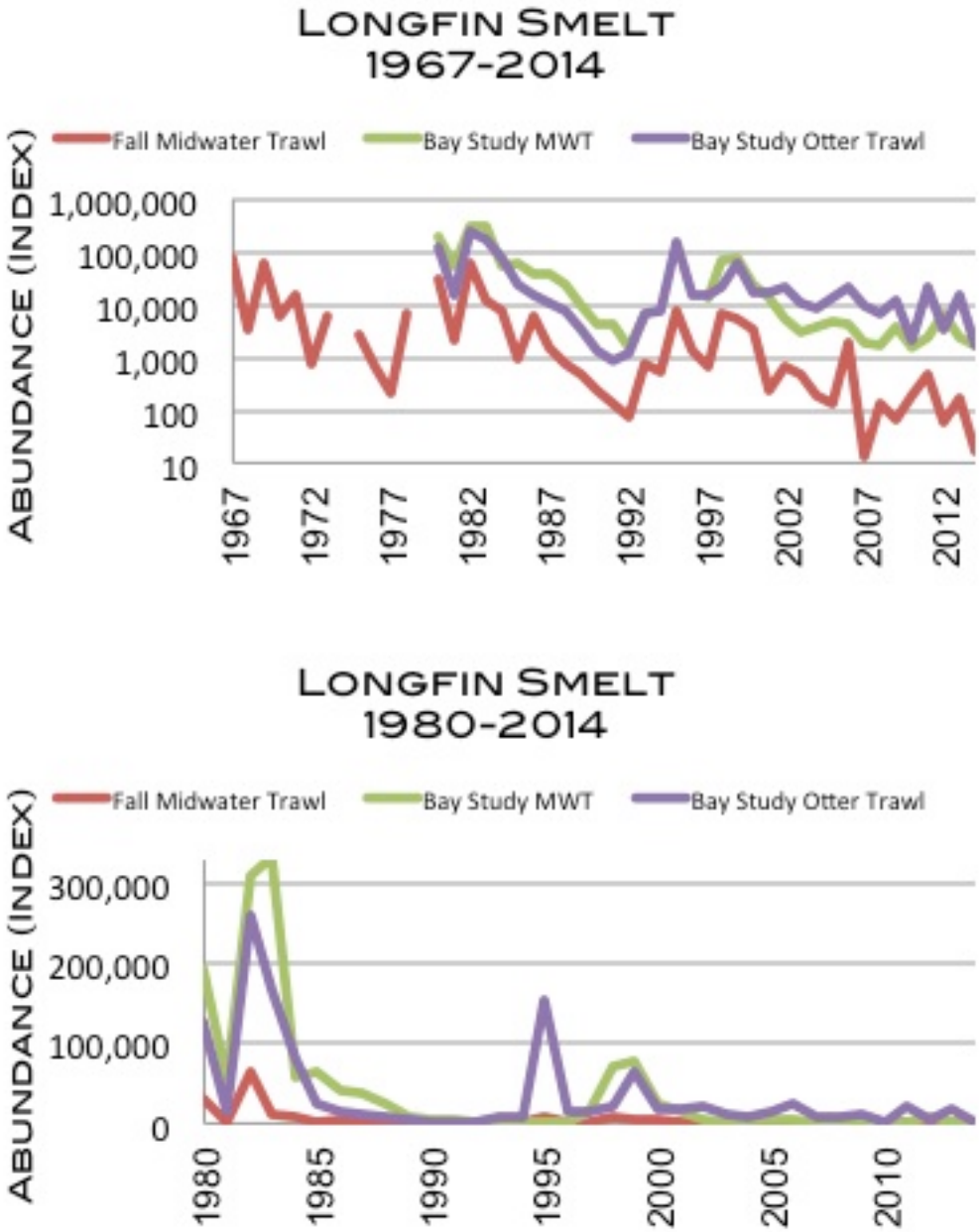

Figure 4: Decline in longfin smelt abundance indices from three different sampling programs in the San Francisco Bay Estuary. For each sampling program the decline from the largest index on record to the most recent (2014) index is greater than 99%. The y-axis in the top panel displays index values on a $\log_{10}$-scale; this allows for visualization of the orders of magnitude changes in all three indices over time. The y-axis in the bottom panel shows index value on a normal linear y-axis – the x-axis here begins in 1980 to show only the period when all three sampling programs were active.

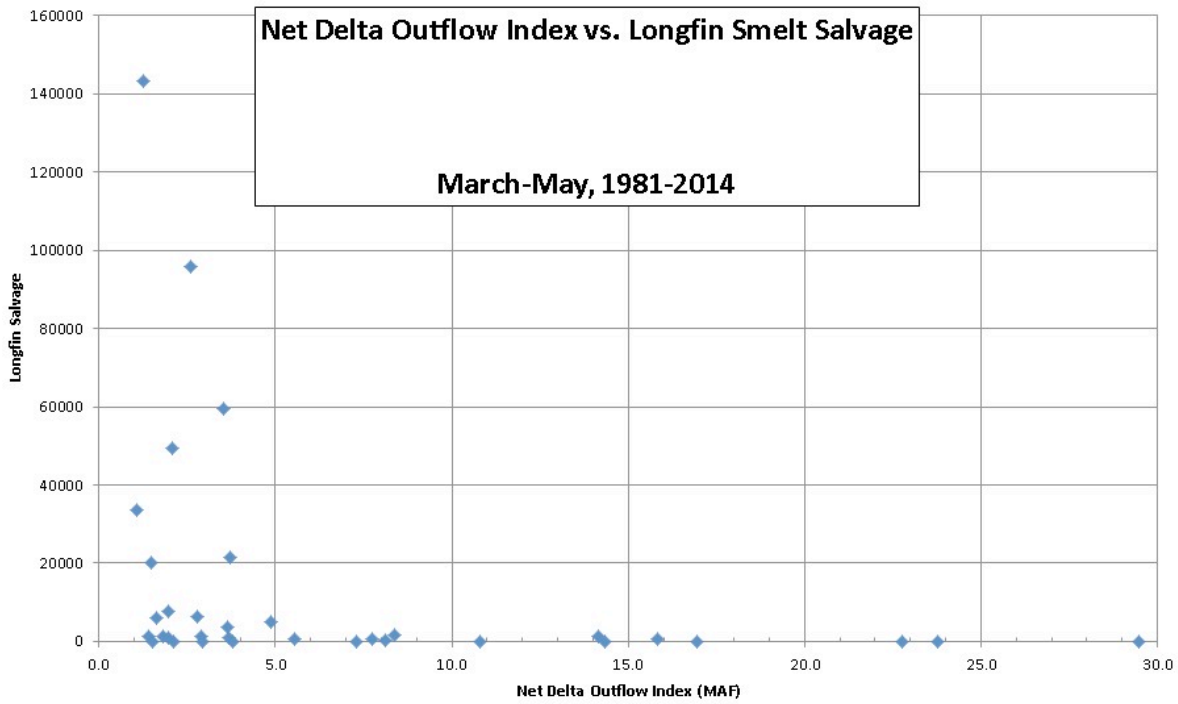

Figure 5: Historical salvage of longfin smelt at SWP and CVP salvage facilities, as a function of Delta outflow. Most salvage occurs when Delta outflows are low in the winter and spring, probably because longfin smelt focus spawning east of the salinity field and, as the salinity field moves further east, spawning adults, larval, and juvenile longfin aggregate closer to the export facilities. This effect, combined with the strong correlation between salvage and OMR flows or exports, suggests that longfin smelt entrainment risk is highest when outflows are low and exports are high.