



# United States Department of the Interior



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IN REPLY REFER TO:  
FWS/R88/AC

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## Memorandum

To: Regional Director, US Bureau of Reclamation, Mid-Pacific Region,  
Sacramento, California

From: Regional Director, Pacific Southwest Region  
Sacramento, California

Subject: Targeted Reinitiation of Consultation on the 2008 FWS Coordinated Long-Term Operation of the CVP and SWP Biological Opinion and Revision of Adult Delta Smelt Incidental Take for the 2017 Water Year

This memorandum is in response to your March 16, 2017, request for targeted reinitiation of the Endangered Species Act Section 7(a)(2) consultation on the U.S. Fish and Wildlife Service's (Service) 2008 Biological Opinion (2008 BiOp) on the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (Service File No. 81420-2008-F-1482-5). The Bureau of Reclamation (Reclamation) has requested reinitiation to authorize additional take of adult delta smelt associated with water operations as a precautionary measure in anticipation of exceedance of the incidental take as quantified in our January 10, 2017 memo on the updated Incidental Take Statement (ITS) for Water Year (WY) 2017. A near-term operations plan specific to CVP and SWP operations through mid- to late-April, 2017, has been provided along with Reclamation's request to reinitiate. With this memorandum, the Service amends the incidental take for adult delta smelt that covers the remainder of WY 2017, ending September 30, 2017. The amendment is accompanied by a supporting effects analysis.

The following sources of information were used to develop this response: (1) your March 16, 2017, memorandum to the Service requesting targeted reinitiation; (2) the March 16, 2017, Combined Federal-State Delta Near-Term Operations Plan (Near-Term Operations Plan), prepared collaboratively with the California Department of Water Resources (DWR); (3) communications between the Service and Reclamation; and (4) other information available to the Service.

Reclamation also requested to reinitiate consultation on the 2008 BiOp in an August 2, 2016 letter, to address the long-term operations of the CVP and SWP as a whole and that larger effort is in the initial planning phase. The March 16, 2017, request is considered separate from the

larger reinitiation effort and specific to adult delta smelt take through the remainder of WY 2017, ending September 30, 2017.

### Status of the Species and Environmental Baseline

Please refer to the 2008 BiOp for the status of the species; however, the status and environmental baseline have changed since the issuance of the 2008 BiOP. An electronic copy of the 2008 BiOp is available at [https://www.fws.gov/sfbaydelta/Documents/SWP-CVP\\_OPs\\_BO\\_12-15\\_final\\_signed.pdf](https://www.fws.gov/sfbaydelta/Documents/SWP-CVP_OPs_BO_12-15_final_signed.pdf). The following information supplements and updates what is included in the 2008 BiOp.

Currently, the spawning stock of delta smelt appears to be at its second lowest abundance on record, the lowest having been recorded during WY 2016 (Table 1). The 2016 Fall Midwater Trawl (FMWT) Index was 8, the second lowest value on record. The California Department of Fish and Wildlife's (DFW) Spring Kodiak Trawl (SKT) monitors the adult spawning stock of delta smelt and serves as an indication for the relative number and distribution of spawners in the system. The Service has calculated an absolute abundance estimate<sup>1</sup> for adult spawners in water year 2017 using January and February SKT data. This absolute abundance estimate is also the second lowest on record (Table 1). The population size of adult delta smelt January-February (2017) was estimated to be between 22,000 and 92,000 fish with a point estimate of 47,786. The January-February (2016) point estimates were the lowest values since 2002 and suggested delta smelt experienced increased mortality during extreme drought conditions occurring during 2013-2015. While 2017 estimates likely represent an increase in recruitment and survival from the prior year, the continued low parental stock of delta smelt relative to historical numbers suggest the population will continue to be vulnerable to stochastic events and operational changes that may occur in response until successive years of increased population growth result in a substantial increase of abundance.

Table 1. Three indicators of adult delta smelt status for water years 2002-2017. Column 2 is the DFW Fall Midwater Trawl Index by water year (i.e., the indices for calendar years 2001-2016). Column 3 is the DFW Spring Kodiak Trawl Index. Column 4 is an estimate of adult delta smelt abundance during January and February that the Service calculates from the Spring Kodiak Trawl Survey. The SKT index will not be available until June 2017.

<u>Water Year</u>	<u>FMWT Index</u> (unitless)	<u>SKT Index</u> (unitless)	<u>Jan-Feb SKT</u> <u>abundance estimate</u> (thousands of fish)
2002	603		739.8
2003	139	80.6	634
2004	210	97.3	654.5
2005	74	51.2	477.8
2006	26	18.2	186.8

<sup>1</sup> The Service completed a new adult delta smelt abundance estimation procedure based on DFW's SKT data for January and February (see Table 1). This procedure has recently been updated from that used in 2016. While these estimates likely represent a minimum population size due to the method's reliance on survey data, this is our current best estimate of population size.

2007	41	32.5	292
2008	28	24.1	325.3
2009	23	44.6	365.9
2010	17	27.4	169.4
2011	29	20	290.8
2012	343	147.3	772.3
2013	42	21	212.5
2014	18	30.1	207.6
2015	9	13.8	139.3
2016	7	1.8	16.2
2017	8		47.8

### **Current Water Year Conditions and Provided Near-Term Operations Plan**

Following five consecutive years of drought conditions in California, precipitation in WY 2017 has been trending towards a Wet water year. Beginning in December, a consistent series of rain storm events led to extremely high flows in the Delta. Continued high flows in the San Joaquin River watershed have caused Old and Middle river (OMR) net flow to become positive (downstream) since mid-February. Net OMR flow peaked at 18,000 cubic feet per second (cfs) on February 24 and has remained above 10,000 cfs since February 19. The central Sierra Nevada snowpack is currently 170% of normal for March 23 and spring snowpack runoff is anticipated to contribute to elevated San Joaquin River flows at least through mid- to late- April. Additionally, storm events during the week of March 20 have helped to sustain high flow conditions within the Delta.

The Near-Term Operations Plan and correspondence with Reclamation indicates that due to an outage at the Clifton Court Forebay intakes, the SWP Banks Pumping Plant will likely not be exporting any water until mid- to late-April. A single, limited duration pumping event occurred on March 31 during which the SWP Banks Pumping Plant exported water for a total of 7.5 hours, drawing water from Clifton Court Forebay only to facilitate structural repairs and not taking in additional water from Old River. No delta smelt were salvaged during this pumping event. Communications with DWR to clarify their Near-Term Operations Plan have confirmed that additional exports at the SWP of this nature may occur through mid-April but will not draw additional water or entrain fish from Old River. The only anticipated south Delta exports that will intake water from the Delta will come from the CVP Jones Pumping Plant, ranging up to a maximum export rate of 4,200 cfs, depending on demand from south of Delta water contractors. This demand is not expected to be high due to recent wet conditions that have helped to fill San Joaquin basin reservoirs and generate a high snowpack in the southern Sierra. Flow forecasts for the San Joaquin River indicate that flows are expected to remain above 22,000 cfs at least through April 9, and likely longer, which should in turn keep OMR flow above 7,000 cfs.

The adult delta smelt incidental take number issued to the CVP and SWP for WY 2017 water operations under the 2008 BiOp was calculated by taking the 2016 FWMT index of 8 and

multiplying by a cumulative salvage index (CSI) of 7.98 (see memo dated January 10, 2017). As of March 23, 2017, the incidental take of adult delta smelt at the projects is 57<sup>2</sup>, or 89% of the adult incidental take number of 64. Nearly 50% of the take to date has occurred during March. Based on prior years with unusually high San Joaquin River flow, incidental take is expected to continue well into April. In addition, high flows often keep water temperatures cooler during the spring. This set of environmental conditions has prompted the need to reinitiate consultation in anticipation of Reclamation likely exceeding its adult delta smelt incidental take.

## **Effects Analysis**

The incidental take calculation approach used in the 2008 BiOp was modified in the February 22, 2013 memo to Reclamation using a method proposed by Reclamation. It was modified again in the memo dated December 23, 2015 to derive the current CSI of 7.98 by modifying Reclamation's method by using only years during which the CVP and SWP's combined operations would have been in compliance with the Reasonable and Prudent Alternative (RPA). The RPA actions were designed to capture a variety of environmental conditions and a range of OMR flow prescriptions to be applied under different biological and hydrological scenarios.

The following Effects Analysis details these points: (1) Water Year 2017 is an example of a fairly rare hydrologic condition in which winter inflow and turbidity from the San Joaquin River are elevated; (2) we think smelt could have migrated into the south Delta where they are vulnerable to salvage in early January when negative OMR<sup>3</sup> interacted with turbidity, or in mid-January and continuing into March as turbidity carried by unusually high San Joaquin River flows inundated the south Delta; and, (3) positive OMR flow conditions extending into April are anticipated to be very favorable for delta smelt larvae that hatch in the San Joaquin River and south Delta. These conditions help to alleviate some of the impact that could have been caused by the combination of negative OMR and high south Delta turbidity in January or that alternatively may have simply resulted from the sustained and unusually high and turbid San Joaquin River flow in January (see WY 2017 plots in attachment to this memo).

## **WY 2017 Conditions**

The first major storm event of the winter occurred in mid-December of 2016, at a time when OMR flows were in the -8,000 cfs range. December combined exports reached a peak of 10,880 cfs at the onset of the storm event around December 14 (see WY 2017 plots in attachment to this memo). These flows triggered the start of the spawning migration, during which some delta smelt ascended the San Joaquin River, where they have resided until recently getting ready to spawn. The high flow conditions that followed in January of 2017 were accompanied by combined export and turbidity conditions that frequently have been associated with salvage events in the past 25 years or so (see plots in attachment to this memo). The high Vernalis flows,

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<sup>2</sup> Salvage on February 24, 2017 at Skinner Fish Facility was reported as an expanded value of 3.5 due to timing of salvage operations. The 2008 BiOp uses whole numbers for incidental take, and therefore we have rounded the 3.5 expanded value to the next whole fish (i.e. 4).

<sup>3</sup> While OMR was within the range called for in the BiOp, because high turbidity came from the San Joaquin River, OMR flow which may under other circumstances be sufficient to minimize salvage seems less likely to minimize salvage in this type of hydrologic year.

export reductions, and positive OMR flows have likely increased the survival of delta smelt in the San Joaquin River and south Delta over 'typical' lower turbidity and negative OMR net flow conditions. The Service believes that these conditions have all led to the recent increase in salvage that has brought the CVP and SWP near their incidental take.

Beginning in early January 2017, Vernalis flows on the San Joaquin River began to rise in response to another large storm event, mirroring the early Vernalis flow pulse observed in 1997, 1998, 2006 and 2011. Turbidity transects conducted by DWR showed elevated turbidities spread throughout the south Delta that eventually well exceeded the range of 10-12 Nephelometric Turbidity Units (NTU), which is believed to be the threshold conducive for delta smelt dispersal. This storm-generated turbidity created a major opportunity for fish to follow migratory cues upstream, further increasing the number and distribution of smelt in the south Delta. OMR flows for the majority of January remained in the -5,000 cfs range under the RPAs implemented under both the 2008 BiOp and the 2009 National Marine Fisheries Service (NMFS) salmon biological opinion. By mid- February, OMR flows had turned positive and have remained above 10,000 cfs since February 19, but fish were already occupying the south Delta.

The projects began seeing regular occurrences of delta smelt salvage at their fish facilities beginning in February, with salvage increasing dramatically at the CVP in mid-March. High flows on the San Joaquin River have caused delta smelt to move out of the fast currents in the center of the channel and to the sides and/or bottom of the channels, where they have been able to reside due to the combination of factors mentioned above. In low flow years, adult smelt entering the south Delta are generally considered lost to the population due to poor habitat conditions and high entrainment risk to themselves and their larvae, but this year, the late-season salvage is thought to also be a product of good conditions that have allowed these fish to survive later in the year.

### **Abundance and Distribution**

High outflow during the adult migration season has historically shown a system-wide dispersal of adults that will spatially increase the distribution of spawners and subsequent hatched larvae. Survey data from the SKT and Enhanced Delta Smelt Monitoring (EDSM) has revealed a broad distribution of delta smelt spawners throughout the system in the Napa River, Suisun Marsh, in the San Joaquin River near Medford Island, and in the upper Sacramento River near Cache Slough since January. Based on historical survey observations of adults in spawning condition and first detections of larval delta smelt in the system, the best available information suggests that a portion of each year's cohort is spawned from habitats in these areas. To date, Smelt Larva Survey 6 collected one delta smelt larva in Grizzly Bay and 20-mm Survey 1 has collected several delta smelt larvae as well (one from Montezuma Slough, one near Collinsville, and several in the Sacramento Deepwater Shipping Channel). Larval fish emerging from these areas are anticipated to augment the abundance numbers going into next year, assuming the quality of downstream rearing conditions for larval and juvenile fish is high. With only the CVP facility exporting, and the high flows and positive OMR, the range of influence from the projects is subsequently reduced and is expected to only affect delta smelt already positioned in close proximity to the CVP.

RPA Action 3 is currently in effect and provides protections for larval and juvenile delta smelt once evidence of spawning is apparent. The Service's determination dated February 21, 2017 sets OMR flow to be no more negative than -5,000 cfs on a 14-day running average, with a simultaneous 5-day running average no more negative than -6,250 cfs (within 25%). Positive OMR flows are projected to remain above 9,000 cfs at least until mid-April according to the Near-Term Operations Plan provided. Larval delta smelt distributions can be reasonably reproduced using Particle Tracking Models of neutrally buoyant particles floating in Delta waterways. Historical modeling similar to anticipated flow conditions indicate that most larvae hatching in the south Delta would be moved by these high flows north into the San Joaquin River and then west toward the Sacramento-San Joaquin confluence or areas downstream of there, where they will rear in the summer. For these reasons, the loss of additional adults under the revised incidental take is expected to be minimal in that it will occur in a limited geographical range and will not translate into population level effects.

### **Incidental Take for WY 2017**

Of the wet years available in the historical dataset, WY 1997 presents conditions most analogous to the current water year, including a sustained period of high Vernalis flow that began early in the year, extremely positive OMR flows throughout February, and a significant spike in late-season CVP salvage. Conditions in WY 1997 were within the parameters of an RPA compliant year. Despite meeting the RPA OMR flow standards well into April, the cumulative adult salvage for WY 1997 was 236% of the incidental take number that would have been in place under the current incidental take calculation approach. A substantial portion of that salvage was observed in April and is an indicator that the adult salvage season in WY 2017 may similarly persist into April. For the purpose of this analysis, all salvage recorded until April 20, 1997 was assumed to be of adult delta smelt. Based on the best available information gleaned from a limited dataset on wet year types, the Service believes that the population did not sustain significant adverse effects in WY 1997 based on the significant jump in the subsequent FMWT index over its 1996 value. For these reasons, the Service is applying the observed CSI of 18.89 from WY 1997 to authorize additional anticipated take for adult delta smelt for the remainder of WY 2017. This results in an adjusted total adult take number of 151 for WY 2017.

There are several factors that make this year unique and appropriate for a focused review and evaluation for the revision of the adult incidental take number specific to the unusual conditions this year. To date, this is the wettest water year on record for the Delta, with precipitation levels at nearly 200% of seasonal average rainfall as of March 23. Several years of severe drought have depressed the abundance of the delta smelt to record lows, which has led to incidental take numbers that can be easily exceeded by a succession of small salvage events. However, wet and cool conditions are anticipated to create good spawning conditions for the species and at least during the past 25 years, abundance numbers have been observed to increase during years with high Delta outflows and cool water temperatures. The SWP is expected to remain offline until at least mid-April which will represent a substantial reduction in entrainment risk in the south Delta. Additionally, water demands are expected to remain low due to robust snowpack and reservoir storage conditions throughout most of the Bay-Delta watershed. Because the Near-Term Operations Plan is compliant with the RPA, and for the other reasons identified above, we believe the effects of the proposed operations of the CVP and SWP for the remainder of WY

2017, and its associated additional incidental take of adults will be minimal and not result in a substantial impact on this year's population of delta smelt. No additional adverse effects on delta smelt or its critical habitat beyond those analyzed in the 2008 BiOp are expected from the proposed operations.

The Near-Term Operations Plan provided jointly by Reclamation and DWR describes operations through mid- to late-April. This analysis addresses only the Near-Term Operations Plan provided. The Service requests that Reclamation provide notice if, for any reason, you anticipate a deviation from the projected operations described in the Near-Term Operations Plan, pursuant to 50 C.F.R. 402.16. Such deviations would include, but are not limited to, the reactivation of the SWP Banks Pumping Plant prior to the end of April, an anticipated increase in combined exports beyond 4,200 cfs, or a significant change in San Joaquin River flow at Vernalis (below 16,000 cfs) and/or OMR flows (net flow more negative than -1250 cfs). The Service will continue to monitor available data on Delta conditions, delta smelt survey data, fish salvage operations, and modeling results to determine if project operations are appropriately protective of all delta smelt life stages.

We thank you for your commitment to protecting the Bay Delta ecosystem. If you have any questions, please do not hesitate to call.

