



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pacific Southwest Region
2800 Cottage Way, Room W-2606
Sacramento, California 95825-1846

In reply refer to: R8

JAN 30 2019

MEMORANDUM

TO: Regional Director, U.S. Bureau of Reclamation, Mid-Pacific Region,
Sacramento, California

FROM: Regional Director, U.S. Fish and Wildlife Service, Pacific Southwest Region,
Sacramento, California

SUBJECT: Revised Incidental Take Methodology for the Coordinated Long-Term Operation
of the CVP and SWP

This memorandum modifies the Incidental Take Statement (ITS) of the U.S. Fish and Wildlife Service's (Service) December 15, 2008 Biological Opinion on the *Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP)* (2008 BiOp) (Service File No. 81420-2008-F-1482-5). The 2008 BiOp addresses the effects of the Coordinated Long-Term Operation of the CVP and SWP on the federally threatened delta smelt (*Hypomesus transpacificus*). The coordinated operation is addressed in this memorandum in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*).

In January 2018, the Service committed to reviewing the ITS for the 2008 BiOp and identifying a revised approach to appropriately quantify incidental take. The ITS utilized the Fall Midwater Trawl (FMWT) Index to scale the anticipated level of incidental take to observed salvage, thus linking each year's incidental take to the FMWT Index. It has become clear over the past several years that surveys are reaching their detection limits given the declining population of delta smelt, and in 2018, the FMWT Index was zero, indicating that the FMWT Index may no longer provide an accurate predictor of incidental take. The Service has reviewed the current methodology and believes that the approach outlined in this memo is consistent with the assumptions regarding the anticipated level of take quantified in the 2008 BiOp, and the recognition that neither the FMWT Index, nor salvage counts, are appropriate for establishing incidental take under current conditions.

This memo provides background on the ITS in the 2008 BiOp, reviews the analytical approach to estimating incidental take in the 2008 BiOp, explains the surrogate approach for estimating incidental take from the Service's regulations, and explains how the surrogate approach would be applied to the 2008 BiOp. The memo then defines the operational conditions under which incidental take would be allowable under the modified take statement and provides clear standards for determining when reinitiation is required due to the anticipated level of incidental take being exceeded. The memo closes with the modified Incidental Take Statement.

This change to the methodology for calculating incidental take of delta smelt only affects the ITS in the 2008 BiOp. It does not alter Reclamation's obligation to implement any other portion of the 2008 BiOp, including the Project Description, as modified by the Reasonable and Prudent Alternative (RPA). This change does not modify the Effects Analysis in the 2008 BiOp. The method for calculating incidental take will be revisited as part of the reinitiation of consultation on the 2008 BiOp, which is currently ongoing.

Background

During the period of implementation of the 2008 BiOp and its RPA, the Service has modified the approach to quantifying incidental take when appropriate approaches have been identified that more accurately assess the amount of take anticipated by CVP and SWP operations. As described in the ITS of the 2008 BiOp, the amount or extent of incidental take has been based on a ratio of a Cumulative Salvage Index (CSI) and the prior year's FMWT index. This method was based on the best available information at that time. The 2008 incidental take calculation was modified in a January 9, 2015 memo to Reclamation using an alternative CSI as proposed by Reclamation. It was further modified in a memo dated December 23, 2015 to derive the current CSI of 7.98. However, the continued decline of delta smelt and increased difficulty detecting them in sampling has increased the uncertainty in use of survey data, such as the FMWT Index, to quantify incidental take, which in turn may at times unnecessarily limit CVP/SWP operational flexibility.

In 2015, the Service and the National Marine Fisheries Service (NMFS) jointly issued a final rule amending the incidental take provisions for section 7 of the ESA (80 FR 26832-26845). The final rule states that the use of surrogates for individual animals "may be the most reasonable and meaningful measure of assessing take of listed species". Surrogates can include habitat, ecological conditions, or similar affected species. This approach recognizes that it is not always practicable to determine the exact number of individuals that may be taken in the course of an otherwise lawful activity and that using a surrogate is acceptable when there is a causal link between the surrogate and the individual animals subject to be taken. The final rule also describes that monitoring of federal actions must occur to ensure that impacts do not exceed what was analyzed in the Biological Opinion and included in the ITS. The amended ESA implementing regulations at 50 CFR Part 402.14(i)(1)(i) allow use of surrogates provided that the ITS describes the causal link between the surrogate and take of listed species, explains why it is not practical to express the amount of take or to monitor take in terms of individuals, and sets a clear standard for determining when the amount or extent of anticipated take has been exceeded.

2008 BiOp Incidental Take Estimates

The ITS in the 2008 BiOp describes the incidental take of adult and larval to juvenile delta smelt in terms of numbers of individuals lost as indicated by the number estimated to be 'salvaged' at the fish collection facilities in front of the Banks and Jones pumping plants. The ITS assumes implementation of the Project Description, including the RPA. Part of the RPA is intended to reduce entrainment of delta smelt into the southern Delta, where they are susceptible to elevated mortality from various sources including predation in front of the CVP intakes, predation in

Clifton Court Forebay, injury or mortality during the fish salvage process, or removal from the system by the Jones and Banks pumping plants. The RPA reduces entrainment risk by reducing the level of net negative flow in Old and Middle rivers (OMR)¹ in certain months of the year. OMR flow is set during these times of year following an assessment of real time conditions and entrainment risk.

In the 2008 BiOp ITS, the Service identified a concern level for adult delta smelt salvage that we estimated represented about a 4% loss of the adult population. The BiOp sets the concern level in the ITS as 75% of the total calculated incidental take. This corresponds to a total incidental take estimate of 5.3% of the adult population annually, which is lower than the take we estimated would occur based on the original proposed action without implementation of the RPA (~ 10-12% loss on average based on Figure E-5 of the 2008 BiOp).

For the purposes of this memorandum, the Service has used new analytical approaches to estimate proportions of the adult delta smelt population that would be entrained under varying OMR flow and Secchi depth conditions (Appendix A). Secchi depth is a measure of water transparency and is inversely related to turbidity; in other words, when Secchi disk depths are higher, the water is more transparent, which means the turbidity of the water is lower. Nearly all adult delta smelt that have been salvaged in the past 25 years have been observed in winter of each water year. The analysis in Appendix A used full averages of OMR flow and Secchi disk depths over this period. The Secchi disk depth data come from fish surveys and were used as an indicator of system-wide turbidity.

In circumstances when average Secchi disk depths in the Delta average 53 cm or higher (i.e., when turbidity is lower), our analysis demonstrated there is no relationship between OMR flow and the proportion of the delta smelt population entrained; the predicted loss simply hovers around 1%-2% regardless of OMR. When Secchi disk depths are lower, in this example, averaging less than or equal to 42 cm (i.e., when turbidity is higher), a relationship between OMR and the proportion of delta smelt entrained emerges. Under the more turbid condition where Delta-wide Secchi disk depth averages 42 cm or less, our analysis suggests that a sustained net OMR flow of -5000 cubic feet per second (cfs) would result in a proportional entrainment of approximately 3% of the population, with a confidence interval ranging from about 1% to 7%.

To summarize, the Service estimated that implementation of the 2008 BiOp including the RPA would result in adult delta smelt loss of approximately 5.3%. The analysis described above indicates that over the course of a winter season, if turbidity is not broadly distributed in the Delta then regardless of what the winter average OMR flow had been, the loss of delta smelt would be about 1%-2%, which is lower than the RPA anticipated. As detailed in the 2008 BiOp and reviewed briefly above, under more turbid conditions in the Delta, the risk of transporting elevated turbidity into Old and Middle rivers increases and estimated losses increase as OMR flow becomes more negative. Under this condition, the analysis suggests that the multi-month average OMR flow would need to be no more negative than -5,000 cfs to keep the confidence interval of the estimated loss bracketing 5.3%. Therefore, this analysis gives the Service high

¹ OMR flow is determined using the OMR Index proposed by Reclamation and approved by the Service for use in implementing the 2008 BiOp.

confidence that adult delta smelt loss is lower when OMR flow is -5000 cfs or more positive during the months of adult dispersal and spawning, but it also gives us high confidence that OMR flow more negative than -5,000 cfs may not cause effects beyond those analyzed in 2008 so long as turbid water ($\leq 42\text{cm}$ Secchi disk averages) is not broadly distributed throughout the Delta.

There is currently no way to manage system-wide turbidity. However, during the past ten years of implementing the 2008 BiOp, the Service and its partners have successfully minimized incidental take by using OMR flow adjustments made over shorter periods of time (days to weeks) to keep turbid water from reaching the fish facilities and increasing the risk of delta smelt entrainment. The incidental take method described below relies on this shared learning experience by continuing to rely on the use of gauged turbidity measurements in Old River and the Lower San Joaquin River.

As described in the 2008 BiOp, the loss of young-of-the-year delta smelt to entrainment has historically been less affected by turbidity and more affected by hydrodynamics than the loss of adults. For the combined larval and juvenile life stages, Figure E-7 of the 2008 BiOp (and its supporting equations) indicate that at a sustained net OMR flow of -5000 cfs, we expected larval-juvenile loss to vary between about 15% to 35% of the population over the range of the D-1641 spring X2 standard (65-81 km). During our implementation of Action 3 of the RPA, which requires OMR to be no more negative than -5000 cfs, the salvage of young-of-the-year fish has never approached the calculated incidental take. However, during April and May, the RPA from the 2009 National Marine Fisheries Service BiOp (NMFS RPA) for salmonid fishes also includes criteria that generally result in substantially more positive OMR flow and have incidentally provided beneficial hydrodynamic conditions for delta smelt. This has resulted in the estimated proportion of the larval and juvenile population lost to entrainment being less than anticipated every year since 2009.

Approach to Incidental Take using a Surrogate

As described above, the use of a surrogate to specify the amount or extent of anticipated incidental take for a listed species requires three things: a description of the causal link between the surrogate and take of the listed species, an explanation of why it is not practical to express the amount of take or to monitor it in terms of individuals, and a clear standard for determining when the anticipated level of incidental take has been exceeded. First, we explained in the 2008 BiOp and briefly in the previous section how hydrodynamics influence the take of delta smelt at the CVP/SWP fish collection facilities. These descriptions provide our understanding of the causal link between the surrogate proposed below and the take of individual delta smelt. Second, we have determined that generating a method to quantify incidental take using individual delta smelt is unreliable. The fundamental reason is that declining abundance, improved water operations decision-making, and declining turbidity in the Delta have interacted to decrease the reliability of both indices (CSI and FMWT) previously used to generate the incidental take multiplier. Third, the clear standard for when the anticipated level of incidental take has been exceeded is addressed below.

The Service views an appropriate incidental take surrogate for individual delta smelt to be the

ecological condition created by less negative OMR flow that reduces entrainment of delta smelt into the South Delta. As described above, when turbidity is high, OMR flow of approximately -5000 cfs, or more positive as necessary, creates an appropriate ecological condition. When turbidity conditions are low, there is no relationship between OMR flow and the proportion of the delta smelt population entrained. The risk of high entrainment will continue to be minimized via the active real time management of OMR flow and turbidity in the south Delta. It has been demonstrated that implementation of OMR flow of no more negative than -5000 cfs, particularly in conjunction with NMFS RPA actions has reduced the entrainment of delta smelt (Appendix B). However, this newer information shows that there are situations in which the management of OMR flow does not demonstrably affect delta smelt entrainment. This latter condition provides circumstances in which the Service believes that operational flexibility to allow for OMR flow more negative than -5000 cfs for short periods can be implemented without generating entrainment losses higher than those the Service analyzed in its 2008 BiOp.

Take Considered Incidental to Project Operations

The following describes the environmental and operational conditions under which the amount or extent of the anticipated level of take would be commensurate with the level of loss of the adult and young-of-the-year populations identified in the 2008 BiOp, and thus considered to be exempt from take prohibitions in the ESA, even if delta smelt are salvaged. These environmental conditions do not change Reclamation's obligation to comply with the 2008 BiOp, including the RPA, and any Service determinations to modify OMR flow.

- Reduced entrainment risk by reduction in negative OMR flow during the first flush period. If the Service determines that a first flush is underway pursuant to the criteria in the RPA, OMR flow shall be no more negative than -2000 cfs for 14 days. The more positive OMR flow will minimize incidental take due to entrainment during the adult delta smelt dispersal period.
- Reduced entrainment risk by reduction in negative OMR flow when turbidity is high. Once the Service has determined that RPA Action 2 has been triggered, if the 3-day daily average turbidity at Bacon Island, Prisoners Point and Holland Cut is equal to or higher than 12.0 Nephelometric Turbidity Units (NTU)² at all three stations, then the minimum (most negative) allowable OMR flow as measured by the OMR Index shall be -5,000 cfs³.
- When the Service has determined that RPA Action 2 has been triggered, and the 3-day daily average turbidity at Bacon Island, Prisoners Point and Holland Cut is less than 12.0 NTU at all three stations, then OMR flow may be more negative than -5000 cfs to allow for higher exports during excess conditions created by storms if it results in no additional adverse effects on delta smelt beyond the range of the effects anticipated to delta smelt for the duration of the 2008 BiOp. Reduced entrainment risk by reduction in negative OMR flow during young-of-year life stage. Once the Service has determined that RPA Action 3 has been triggered, OMR flow should be no more negative than -5000 cfs. During this period, OMR flow maybe be more negative than -5000 cfs to allow for higher

² If any station becomes inoperable, the remaining stations will be used to determine the average turbidity.

³ The OMR flow determination process described in the 2008 BiOp remains in place. Thus, it is possible that less negative OMR flows may need to be operated to at times.

exports during excess conditions created by storms if it results in no additional adverse effects on delta smelt beyond the range of the effects anticipated to delta smelt for the duration of the 2008 BiOp.

Implementation of these operational criteria for entrainment reduction create the ecological conditions that result in an anticipated level of incidental take commensurate with the amount or extent of take associated with the effects analyzed in the 2008 BiOp, including the RPA actions, making this description of Delta flows and turbidity an appropriate surrogate for incidental take.

Incidental Take Statement

The Incidental Take Statement in the 2008 BiOp described the form of take anticipated to be kill, capture (via salvage), wound, harm, and harass. We anticipate the same forms of take will occur under this revised approach, with the exception of harass.⁴

The amount or extent of take will be all delta smelt entrained as a result of implementation of CVP and SWP operations described in the 2008 BiOp within the criteria listed above.

Reinitiation Criteria

The amount or extent of the anticipated level of incidental take of delta smelt will be considered to have been exceeded if:

- RPA Action 1 has been triggered and is being operated to, and the 14-day average OMR Index becomes more negative than the OMR flow levels described in RPA Action 1;
- RPA Action 2 has been triggered and the 14-day average OMR Index becomes more negative than -5,000 cfs⁵ three days after 3-day daily average turbidity at Bacon Island, Prisoners Point and Holland Cut has reached or exceeded 12.0 NTU at all three stations, until such time as the 3-day daily average turbidity at the three stations drops back below 12.0 NTU; or
- RPA Action 3 has been triggered and is being operated to, and the 14-day average OMR index becomes more negative than -5,000 cfs⁶. The 14-day average OMR index values referenced above will be calculated pursuant to WIIN Act Section 4003(d).

If one or more of these triggers are met, Reclamation would be required to reinitiate consultation pursuant to 50 CFR 402.16(a).

Monitoring, including the Enhanced Delta Smelt Monitoring, will continue to occur. Sampling at the fish facilities will continue and be reported to the Service and the Smelt Working Group. Implementation of the operations pursuant to the 2008 BiOp will continue to be closely

4 The Service no longer considers harass as an appropriate form of incidental take. See April 26, 2018 Memo from Principal Deputy Director.

5 The OMR flow determination process described in the BiOp remains in place. Thus, it is possible that less negative OMR flow may need to be operated to at times.

6 The OMR flow determination process described in the BiOp remains in place. Thus, it is possible that less negative OMR flow may need to be operated to at times.

coordinated amongst the Service, Reclamation, and other agencies to ensure avoidance of additional adverse effects.

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