SMELT WORKING GROUP

Monday, April 14, 2008

WEEKLY ADVICE TO THE SERVICE FOR DELTA SMELT

Recommendation:

Maintain the 7-day average combined OMR flow more positive than -2,000 cfs.

Basis for recommendation:

The recommendation is based on a review of active risk factors.

1. Size of spawning population. The 2007 Fall Midwater Trawl (FMWT) index of 28 (the second lowest on record) continued a record of declining abundance indices that started in about 2000, with two of the last three years setting new record lows. The persistence of such extremely low FMWT indices remains a very high degree of concern for the Working Group.

2. Water temperatures. Water temperatures at all three stations of record have exceeded 12°C for nearly seven weeks. Since April 19, 2008, temperatures have been continuously increasing and average three-station temperature was about 17.5 degrees Celsius. Of the three stations, Mossdale has the highest recorded temperatures with a high of about 19.5 degree Celsisus while Antioch and Rio Vista is about 17 degrees Celsius. Based upon temperatures and the presence of spent fish, the Working Group expects that peak spawning has been underway throughout the Delta for several weeks. The Working Group believes that larval fish are either already at risk of entrainment or may soon become vulnerable.

3. Recent salvage. Delta smelt was not salvaged during the past week. However, the Working Group finds that adult delta smelt salvage has been higher than we had expected this year, given the low FMWT index. The adult concern level (formerly known as "yellow light"), was reached on February 22nd. A total of 351 adult delta smelt have been salvaged this year. The Working Group remains concerned that a number of delta smelt spawners may remain in the south and central Delta areas and may be vulnerable to entrainment (see Exposure Risk discussion below).

4. CVP/SWR Larval Monitoring: A larva delta smelt was collected at CVP on April 10, 2008. The Working Group discussed the size range that is currently used for larvae in the larva monitoring reports and do not believe that a 20 mm size captures our concern. The need is to protect the current production of future spawners and the Working Group finds that differentiating between fish longer or shorter than 20 mm is arbitrary and misleading. Protection measures should target all delta smelt that are produced this spring and current protection measures should target all current size classes of young of the year delta smelt.

5. Spawning condition of salvaged adult delta smelt. The presence of a spent male delta smelt at the CVP/SWP salvage facilities on February 15, 2008, and a spent female on 2/17/08 indicates that at least some spawning started no later than mid-February. A delta smelt sampled at the fish salvage facilities between March 23 and March 27, 2008, was a spent male. The salvage of the spent male adds to previous salvage of spent delta smelt and fish with highly developed eggs, indicating that spawning has started in earnest.

6. Adult distribution from Fish Surveys. The fourth Spring Kodiak Trawl (SKT) was completed on April 7, 2008. A total of 23 adult delta smelt were collected at two stations (14 at station 719 and 9 at station 707) in the Sacramento River. Delta smelt was not collected in any of the south or central Delta trawls. Of the delta smelt collected, 19 were female delta smelt; 74 percent of which were classified as mature (13) or spent (1). None of the four males collected were classified as mature. The previous survey (Survey 3) SKT (3/10 – 3/14) caught delta smelt in the Cache Slough and Sacramento Deep water ship channel as well as in Suisun Bay and the central Delta (Bay Study caught one in the central Delta in early March). A total of 64 adult delta smelt were caught in the SKT survey 3, with 50 caught at Station 719, in the Sacramento ship channel). The total number of delta smelt caught in the SKT is a low number as compared with past years, which concerns the Working Group. The low number of delta smelt collected indicates that the SKT can not efficiently be used to determine distribution of the species.

7. Larval distribution from 20 mm Survey (20mm). The most recent 20 mm Survey (Survey 2) was conduced from April 1 to April 4, 2008. Twenty-five of the 47 stations sampled has been fully processed (i.e. samples from all three tows at one station has been inspected). These include all 800 number stations (Central Delta) and most 700 stations (Sacramento River). At least one tow has been processed for all the remaining 22 stations. Delta smelt were not identified in any of these samples. Processing of the remaining samples is expected to be completed by the end of next week. Two 20-mm surveys conducted previously (full Survey 1 and supplemental Survey 11) did not collect any larval delta smelt. DFG staff has posted the 20-mm survey results on the Web (http://www.delta.dfg.ca.gov/data/20mm/).

8. Hydrology and X2 Position. On our April 4, 2008, meeting, the Working Group identified a concern with Delta outflow and the position of X2. Consequently the Working Group made a non-Wanger advise to meet the Chipps Island equivalent outflow (11,400 cfs) as soon as possible. The group believes that increasing the flow of water through the Delta to the Bay facilitates movement of larvae and juvenile fish to their necessary nursery habitat.

Reclamation and DWR have increased releases and reduced pumping to meet the outflow conditions. Current daily outflow is about 12,000 cfs. The position of X2 has moved west over the last few days and is currently located at approximately 77 km. Reclamation needs to maintain this 3-day average outflow for another 10 days to meet the April X2 requirement. Lacking data indicating otherwise, larvae and juvenile delta smelt may be located at or just upstream of X2. Thus the westward location of X2 will decrease the risk of entrainment. At the same time the increased outflow increases the rate of larvae westward movement; thereby decreasing the duration of exposure risk.

9. Exposure Risk. As indicated above under #3, the SWG thinks it is possible that a significant fraction of this year's smelt population may be distributed in the central Delta where they are relatively more vulnerable to entrainment. Increased outflow and westward location of X2 may decrease to some extent the chance that delta smelt larvae and juveniles are located in the Delta. Nevertheless, based upon earlier PTM results (http://www.fws.gov/sacramento/), it is possible that substantially negative OMR flows over only a few days will result in high entrainment for delta smelt present in the San Joaquin River and other central Delta channels. Therefore the Working Group remains concerned that entrainment of larval and juvenile delta smelt spawned in the central Delta may represent a loss of a substantial percentage of this year's delta smelt production. The reasons for our concern are (1) the SKT is a poor tool for detecting very sparsely distributed fish, making inference about overall distribution risky; (2) nevertheless the SKT has detected at least one adult smelt in each of two central/eastern Delta locations; and (3) previous adult salvage despite reduced exports indicates that a substantial number of delta smelt have entered the south and central Delta to spawn, increasing the risk of larval and juvenile entrainment. Further, the Working Group is concerned that the lack of delta smelt larvae in the 20-mm survey indicates a low larvae production or survival, further emphasizing the importance of protecting this life stage. The Working Group therefore decided to maintain the recommendation to keep OMR at or above -2,000 cfs because the results since about 3/13 seem to show that reduced export is working by reducing salvage at the CVP/SWP facilities.

10. Particle tracking results. The Working Group believes the most efficient protective measure at this time is to prevent or minimize to the extent possible entrainment of fish into the Old River and Middle River. Particle tracking modeling suggests that at negative 1,500 cfs OMR flows, the 30-day entrainment risk would be essentially 0% for smelt larvae occurring at stations 809, 812 and 815, as well as locations in the Sacramento River. A -2,000 cfs OMR appears sufficient to protect larval delta smelt, given that the past week's survey results and salvage numbers indicate that southward transport of larval and adult delta smelt has been minimal under the conditions seen since about March 13. Particle tracking results can be viewed on the Fish and Wildlife Service website (http://www.fws.gov/sacramento/) by following the link for "Service Decisions" under Delta in the Spotlight.

11. non-Wanger Advice. The Working Group maintains its preference for continuing to meet the Water Quality Control Plan criteria through the Chipps Island equivalent outflow (11,400 cfs), recognizing that outflow will fall to its minimum requirement when the required 21 days X2 days at Chipps Island have been attained. The VAMP period is expected to start on or about April 22 with 31 days of low export pumping and augmented San Joaquin River inflow. The Smelt Working Group believes that having higher outflows coinciding with higher exports and lower outflows coinciding with lower exports represents the best balance of conditions to protect smelt larvae. .

Data Request for next week: No new PTM modeling has been requested for next week.

Next meeting: May 19, 2008 at 10:00 am via phone.

WEEKLY ADVICE FOR THE CALIFORNIA DEPARTMENT OF FISH AND GAME FOR LONGFIN SMELT

Monday, April 14, 2008

Recommendation:

Follow the Smelt Working Group's delta smelt recommendation to **maintain the 7-day average combined OMR flow more positive than -2000 cfs**.

Basis for recommendation:

Our concern level for **longfin smelt** remains high based upon:

(1) a record low 2007 longfin smelt Fall Midwater Trawl (FMWT) index (13) and a "low given the outflow conditions" FMWT index in 2006; and
(2) longfin smelt larvae and small juveniles have been regularly salvaged in small numbers recently at the Central Valley Project.
(3) modest densities of longfin smelt larvae remain vulnerable to entrainment in the long-term based upon current geographic distribution and previously run particle-tracking models. Larvae continue to be found in the lower San Joaquin and Sacramento rivers (20mm Survey April 1-4) and eight larvae total from the San Joaquin River in the central Delta (stations 809, 812, 815, 901 and 902), one from Potato Slough (919), and two from the south Delta adjacent to the export facilities (station 918).
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Our concern is tempered by:
(1) juvenile salvage numbers remained low even though salvage has been more consistent;
(2) distribution information from 1-4 April 20mm Survey, wherein most larval and juvenile longfin smelt were collected from the lower Sacramento (703) and San Joaquin rivers (804), or farther west, and most high density locations were well outside the Delta; and
(3) no new records of adult longfin smelt from the central or south Delta and only a single gravid longfin smelt from the April surveys reporting to date.

The Smelt Working Group longfin smelt recommendation is based on discussion of the preceding information and previously discussed results of particle tracking modeling, which suggested that at negative -2000 cfs OMR the 30-day entrainment risk would be essentially $\leq 2\%$ for smelt larvae occurring at stations 809, 812 and 815, as well as locations in the Sacramento River. Modeling indicated that longfin smelt larvae collected at 20mm station 902 (and probably 901) were substantially more vulnerable to entrainment than those at stations 809, 812 and 815. Few longfin smelt larvae were found at stations 901, 902 or farther south.

Discussion:

1. Size of spawning population. The 2007 FMWT longfin smelt index of 13 was the lowest on record and except for an increase in 2006 continues a record of very low abundance indices that

started in 2001. The persistence of such extremely low FMWT indices creates a very high degree of concern for the SWG.

2. Water temperatures. Water temperatures have been suitable for longfin smelt spawning since late November 2007 and larvae are present in the water column. Temperature has not been directly linked to the termination of longfin smelt spawning, but small larvae collected by larvae surveys drop sharply in April based on historical sampling. This suggests that spawning typically declines in March and seems to end in April when water temperatures surpass 15°C. We are at that point currently.

3. Recent salvage. No recent adult salvage, but starting April 11, regular low salvage of larval and juvenile longfin smelt occurred at the CVP. The small numbers and size of these larvae (15-38 mm) suggests that larvae did not hatch close by. The continued low salvage in early April indicates that recent pumping levels provided desired protection. Juvenile salvage typically does not peak until April or May; we anticipate an increase in salvage.

4. Adult distribution. There have been no recent adult catches at Chipps Island and only a single gravid adult from Grizzly Bay in early April from the Bay Study suggesting that few longfin smelt remain to spawn. Early April adult distribution information suggests that most adult longfin smelt were outside the Delta, and increased flows in the Sacramento River make it attractive to remaining spawners Current distribution and flow information suggests that most recent spawning has taken place outside the south Delta, and any remaining spawning is likely to take place in the Sacramento River.

5. Larva and juvenile distribution. The second full 20mm Survey for 2008 took place from April 1-4, and collected longfin smelt larvae in low numbers from several Cache Slough area locations, the lower Sacramento River near Sherman Lake and the lower San Joaquin River (809) and higher numbers farther west. Several larvae were collected in the central Delta (6 total across stations 809, 812, 815), one each at 901 and 902, one in the eastern Delta at 919 and two from the south Delta adjacent to the export facilities (station 918) (http://www.delta.dfg.ca.gov/data/20mm/CPUE_Map3.asp). Those larvae upstream of Three-Mile Slough in the Cache Slough area and at the central and eastern Delta stations remain potentially vulnerable to entrainment if exports are sufficient to draw them into the south Delta. This appeared very unlikely based on previously described PTM data used for the current recommendation (see below). Those few larvae in or near Old River (901, 902, 918) remain at a much higher risk of entrainment based on particle tracking.

6. Particle tracking results. Sixty-day PTM runs based on mid-March through mid-May hydrology (including expected VAMP-period conditions) indicated that particles in San Joaquin River stations 809, 812, and 815 were very unlikely to be entrained by south Delta pumping (i.e., $\leq$ 2 percent entrained) during a 31-day time-step at the recommended negative 2000 OMR flows. This OMR recommendation provides substantial protection of longfin smelt larvae and juveniles in the central and north Delta. Current limited longfin salvage supports this belief.