SMELT WORKING GROUP

Monday, June 2, 2008

WEEKLY ADVICE TO THE SERVICE FOR DELTA SMELT

Recommendation for the week of June 2, 2008:

Maintain the 7-day average combined OMR flow more positive than -2,000 cfs unless 1) average salvage over any two consecutive days reaches or exceeds 40 delta smelt per thousand acre feet (TAF) exported (ds/TAF), 2) average salvage over a three day period reach or exceed 30 ds/TAF, or 3) the model-estimated daily OMR flow for any single day goes more negative than –2,500 cfs. If any of the above three conditions is met, then the Working Group recommends that the water export facilities immediately start operating to an OMR flow no more negative than -1,500 cfs. The Working Group would then meet to review any new data and discuss the recommendation.

Maintain the Agricultural Barriers flap gates open.

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 work group.

2. Water temperatures. Water temperatures of the three stations of record decreased substantially on May 22 and the three-station average temperature has stayed at or below 19 degrees Celsius. However, water temperature has increased at the Mossdale station since May 29 resulting in a three station average water temperature of about 19.5 on June 1. Average daily water temperatures measured at Rio Vista and Antioch still remained below 19 degrees C on June 1. The high water temperatures one week ago and the increase in water temperatures expected this week because of forecasted increase in air temperatures likely means that peak spawning has passed (field observations indicate that most spawning occurs from 12-18 degrees C). However, most spent females collected in the Spring Kodiak Survey #5 (May 5-9) and supplemental survey #15 (May 19 and 20) had a second or third stage-3 gamete development, indicating that spawning may have occurred last week and could still be occurring. Given that in-Delta temperatures are below the lethal temperature of 25 degrees C and young of the year (YOY) delta smelt are present in the system, the risk of entrainment remains a concern.

3. Recent salvage. Delta smelt salvage decreased during the last five-day period (May 26 through May 30: range 24 to 52, median 38) compared to the previous (May 21 through 25: range 8 to 100, median 78). However, a spike in salvage occurred again on June 1 with an expanded salvage at SWP of 132 delta smelt and at CVP of 28 delta smelt. Especially the daily salvage density spiked at the SWP fish facility with 20.7 delta smelt per thousand acre feet

exported (ds/TAF) on May 31 and 42.3 ds/TAF on June 1, 2008 (daily densities the previous five days ranged from 3.7 ds/TAF to 13.0 ds/TAF).

The number of delta smelt salvage for the past week (May 26 through June 1) was 753 bringing the years total to 1,560 delta smelt. Salvage seems to be increasing over this period even though pumping rates have remained steady. This supports the Working Group's continued concern that delta smelt are present in the south and central Delta and are at risk of entrainment at the pumps.

4. 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. Adult delta smelt are no longer being taken in salvage.

5. Adult distribution from Fish Surveys. Survey 5 of the SKT (5/5 – 5/9) caught delta smelt in the Sacramento Deep water ship channel (station 719), Cache Slough (station 716), and in Sacramento River by Sherman Island (station 706). A total of 16 adult delta smelt were caught in the SKT survey 5, with 9 caught at Station 719, in the Sacramento ship channel. Off the 14 females collected, 8 were spent and 6 were premature (stage 3) gonad development. However, of the 8 spent females, several were developing a second or third clutch of eggs. The two males collected were stage-3 and stage-4 (i.e. pre-spawn). Supplemental SKT Survey #15 (May 19 and 20) collected 4 adult delta smelt in the Sacramento Deep water ship channel (station 719). All four were females, of which two were characterized as spent and two were characterized as pre-spawn (stage 3). However, both spent females were developing new oocytes and the gonad were characterized as stage-3, pre-spawning. Taken together, this suggests that spawning may continue for a few more weeks. The total number of delta smelt caught in the SKT is a low number as compared with past years, which concerns the Working Group. .

6. Larval distribution from 20 mm Survey (20mm). The fifth 20 mm Survey was conduced from May 12 to May 16, 2008, and processing of the samples are now completed. Due to boat problems, a full survey was not completed for this survey. Twenty-eight stations were sampled. Delta smelt were found in samples for the Sacramento ship channel at station 719, in the San Joaquin River at stations 809 and 906; in Franks Tract/Old River at stations 901 and 902; and in Middle River at station 914.

The sixth 20-mm survey was conducted from May 27 through May 30. Thirty-two stations were sampled and at least one tow has been processed for 18 of the stations. Preliminary results shows that delta smelt young of the year were at least present in the Sacramento ship channel (station 710), in lower Sacramento River at station 706, in San Joaquin River at stations 809 and 812, and in Franks Tract/Old River at stations 901 and 902.

These catches show that delta smelt continue to be located within the zone of influence of the pumping facilities and could become entrained. DFG staff has posted the 20-mm survey results on the Web (http://www.delta.dfg.ca.gov/data/20mm/).

7. Agricultural Barriers. Under Judge Wanger's Order, the flap gates on the agricultural barriers are allowed to be closed after the VAMP period ends. The Working Group is concerned that the closure of the flap gates will negatively impact OMR flow and could reduce the ability of smelt to move out of the south and central delta.

8. Particle tracking results. The Working Group believes the most efficient protective measure at this time is to prevent or minimize as far as possible entrainment of fish into the Old River and Middle River. The Working Group reviewed model results for 6 PTM runs bracketing OMR from -1500 to -4000 cfs. Results suggest 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 would result in about 12% of particles at station 902 after 31 days and about 16.5% after 38 days. Particles at stations on the Sacramento side, where most larvae were collected by the 20-mm Survey, had less than a 1% risk of entrainment after 38 days. 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.

9. Exposure Risk. The Working Group remains concerned that with VAMP flows and export reductions ended, smelt may distributed in the central and south Delta will be relatively more vulnerable to entrainment. Expected reduction in San Joaquin River flows, low general outflows, and eastward location of X2 increases the chance that delta smelt larvae and juveniles are located in the Delta. Based upon 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) delta smelt have been caught in the south and central Delta in recent 20 mm surveys; (2) juvenile delta smelt have been caught at the facilities and salvage appears to be increasing; (3) temperatures remain below the lethal limit for delta smelt and based on salvage and monitoring results, significant numbers of delta smelt may remain in the zone of influence of the facilities. The Working Group recommends an OMR flow at or above -2,000 cfs on the factors above and that particle tracking seems to indicate most delta smelt in the south and central Delta would be protected by these flows. However, the Working Group is concerned about possible increase in salvage and change in factors that would increase movement of delta smelt into the south Delta. The Working Group therefore believes that a high salvage, measured as density of delta smelt per thousand acre feet exported, or a short term substantial increase in OMR flows towards the pumps would indicate that an OMR flow more positive than negative 1,500 cfs would be needed to protect delta smelt. Keeping the agricultural barriers' flap gates open would be expected to help maintain higher OMR flows to protect delta smelt.

Data Request for next week: No new PTM modeling has been requested for next week.
ADVICE FOR THE CALIFORNIA DEPARTMENT OF FISH AND GAME FOR LONGFIN SMELT

Monday, June 2, 2008

Recommendation for week of June 2:

Follow the Smelt Working Group's delta smelt recommendations to **maintain the 7-day average combined OMR flow more positive than -2000 cfs and maintain all agricultural barrier flap gates in an open position.** If age-0 longfin smelt distribution information shows an unexpectedly high number in the east or south Delta (>5 fish total spread across 3 or more locations) or salvage increases to over 40/day for either salvage facility, then the Smelt Work Group will be asked to convene.

Basis for recommendation:

Our concern level for **longfin smelt** has diminished based upon:

(1) limited numbers of age-0 longfin smelt in the central and south Delta collected by the most recent 20mm Survey (a single fish at station 910 based on partial sample processing);
(2) previously warm south Delta temperatures surpassing the 21.5 degrees C limit that appears to influence longfin smelt migration; and
(3) only sporadic, very low salvage of age-0 longfin smelt (< 4 to 8 per day) by either facility since May 19, 2008.

Our concern would increase if:
(1) additional processing of the 20mm Survey samples or future sampling indicated an unexpectedly high number (>5 fish total spread across 3 or more locations) of longfin smelt east or south of Jersey Point; or
(2) longfin smelt salvage increased to 40/day for either salvage facility.

The Smelt Working Group longfin smelt recommendation is based on discussion of the preceding information.

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 temperature has not been directly linked to longfin smelt distribution, but temperatures > 21.5°C seem to influence their distribution or survival; once temperatures surpass that level longfin smelt are seldom present at the location subsequently. Temperature at or above 21.5°C occurred throughout the Delta on May 19.

3. Recent salvage. We speculate the May 13-16 SWP salvage increase may have resulted from high water temperatures and possibly a change in wind direction changing behavior or distribution of longfin smelt already within Clifton Court leading to increased vulnerability to

being drawn into the intake channel leading to the pumps and sampled at the fish salvage facilities. Since May 19 only one or two longfin smelt have been collected daily (salvage 4-8 fish based on expansion), so recent pumping levels provided desired protection.

4. Adult distribution. No longer a factor.

5. Larva and juvenile distribution. The most recent 20mm Survey, May 27-30, did not sample all locations (Napa River stations were omitted) and processing of samples (3 tows per station) is still ongoing at this time; no samples from locations west of the confluence were processed prior to this recommendation. Based upon at least partial and in some cases complete sample identification from south Delta and San Joaquin River stations downstream to 809, longfin smelt larvae and juveniles were only collected at a single location (910). Some longfin smelt larvae/juveniles remain in the Sacramento River in the vicinity of Three Mile Slough and additional fish were caught near Antioch. Based on information from the previous 20mm survey, most of the longfin smelt will be at or just above the confluence and might be drawn into the Delta if pumping increased suddenly to high levels (http://www.delta.dfg.ca.gov/data/20mm/CPUE_Map3.asp). Those larvae upstream of Three-Mile Slough and at the San Joaquin River 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 output used for the previous recommendation (see below).

6. Particle tracking results. PTM runs based on VAMP hydrology and various post-VAMP OMR scenarios 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 or 38-day interval at the recommended negative 2000 OMR flows. This OMR recommendation continues substantial protection of longfin smelt larvae and juveniles in the western and north Delta.