SMELT WORKING GROUP

Monday, May 19, 2008

WEEKLY ADVICE TO THE SERVICE FOR DELTA SMELT

Recommendation for weeks of May 19 and May 26:

Maintain the 7-day average combined OMR flow more positive than -2,000 cfs and maintain the Agricultural Barriers flap gates open.

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 work group.

2. Water temperatures. Water temperatures of the three stations of record average 22 degrees C, which likely means that peak spawning has passed (field observations indicate that most spawning occurs from 12-18 degrees C). However, Spring Kodiak Survey #5 (May 5-9) collected six female delta smelt with stage-3 gamete development, indicating that spawning 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 has increased during the past week. Expanded salvage at the CVP was 24 on 5/12, 3 on 5/14, 4 on 5/15 and 72 on 5/18. Expanded salvage at the SWP was 10 on 5/15, 40 on 5/16 and 8 on 5/17. The total delta smelt salvage for the past week was 161 and a total of 578 delta smelt have been salvaged this year. 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 4 of the SKT (4/7 – 4/11) caught delta smelt in Horseshoe Bend and the Sacramento Deep water ship channel. A total of 23 adult delta smelt

were caught in the SKT survey 4, with 14 caught at Station 719, in the Sacramento ship channel. SKT Survey #5 (May 5-9) collected 16 adult delta smelt at 4 stations on the Sacramento River side (705, 706, 716 and 719). Of these, 14 delta smelt were females, 8 of which were spent and 6 were stage-3, pre-spawning. The two males collected were stage-3 and stage-4. 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 most recent 20 mm Survey (Survey 5) was conduced from May 12 to May 16, 2008. Due to boat problems, a full survey was not completed for this survey. Twenty-eight stations were sampled; however, processing of all the samples is not yet complete. The samples for the central and south delta were processed and show delta smelt in the Sacramento ship channel at station 719 as well in the central delta at stations 809, 901, 902, 906, and 914. 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 30% 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. As indicated above under #3, the Working Group remains concerned that with VAMP flows and export reductions ending, smelt may be distributed in the central and south Delta where they are relatively more vulnerable to entrainment. Low 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. Keeping the agricultural barriers' flap gates open would be expected to help maintain these 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, May 19, 2008

Recommendation for weeks of May 19 and May 26:

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**.

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) in May, longfin smelt juveniles were regularly salvaged in small numbers by both facilities even though export levels were very low and more recently (May 14-16) in relatively high numbers (daily salvage >100) at the SWP.
(3) small densities of larval/juvenile longfin smelt remain vulnerable to entrainment in the long-term based upon current geographic distribution and particle-tracking models. Larvae/juveniles continue to be found in the lower San Joaquin and south Delta (20mm Survey May 12-16, identification partially complete) and two larvae and a juvenile from the San Joaquin River (station 809) and one larvae from Franks Tract (station 901). Additional 20mm sampling locations to the north and west of station 809 remain to be processed.
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Our concern is tempered by:
(1) recent rapidly increasing south Delta water temperatures that could trigger juvenile emigration;
(2) distribution information from April 28-May 2 20mm Survey, that showed most larval and juvenile longfin smelt were collected from the lower Sacramento (707) and San Joaquin rivers (804), or farther west; and
(3) longfin smelt spawning should be complete for the season and there is no evidence of recently hatched larvae in the San Joaquin River or south Delta..

The Smelt Working Group longfin smelt recommendation is based on discussion of the preceding information and recent results of particle tracking modeling, which suggested that at negative -2000 cfs OMR the 38-day entrainment risk would be essentially < 2% for smelt larvae occurring at stations 707 and 809 and essentially zero for those at stations 711. Modeling indicated that longfin smelt larvae collected at 20mm station 902 (surrogate for 901) were substantially more vulnerable (15% probability of entrainment in 38 days).

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 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. Juvenile longfin smelt densities in the Delta also decline rapidly as water temperatures surpass 21.5°C. Presumably this decline represents emigration from the Delta to downstream bays.

3. Recent salvage. No recent adult salvage, but starting April 11 and continuing through May 12, regular low salvage of larval and juvenile longfin smelt occurred at the CVP; SWP juvenile salvage started in mid-April and continued through the present including a short, sharp increase May 13-16. The small numbers and the size of these larvae (15-38 mm) compared to typical size at hatching (5-8 mm, Moyle 2002) suggests that larvae did not hatch close by. The generally low salvage in late April and May was expected based on higher San Joaquin River flows and lower exports associated with VAMP. 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. Otherwise, recent pumping levels provided desired protection. Juvenile longfin smelt salvage typically peaks in April or May.

4. Adult distribution. No longer a factor.

5. Larva and juvenile distribution. The most recent 20mm Survey, May 12-16, did not sample all locations (Napa River stations were omitted) and processing of samples (3 tows per station) is still ongoing at this time. 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 collected in low numbers at only two locations (809 and 901). Some longfin smelt larvae/juveniles remain upstream in the Sacramento River: almost complete identification of samples from four of seven Cache Slough area locations produced only two juveniles at station 719 in the Sacramento Deepwater Ship Channel. 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 in late May (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 San Joaquin River and Franks Tract 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 output used for the current recommendation (see below). Those few larvae in or near Old River (901, 809) remain at a much higher risk of entrainment based on particle tracking.

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., ≤ 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.