San Francisco Estuary Institute

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RMP Fish Committee Meeting
San Francisco Estuary Institute
Meeting Minutes
November 9, 2005

In attendance at the meeting: Andy Jahn (Consultant), Reber Brown (HML-DTSC), Pete LaCivita (USACOE), Jeff Schinske (RTC-SFSU), Karen Taberski (Regional Board), Russell Fairey (MLML), Marco Sigala (MLML), Kathy Hieb (CDFG), Eric Dunlavey (City of San Jose), Jessie Denver (City of San Jose), Fred Hetzel (Regional Board), Dan Watson (City of San Jose), Margy Gasell (OEHHA), Laura Taggart (City of San Francisco), Jessica Kaslow (DHS/EHIB), Sarah Cohen (RTC-SFSU), Mike Connor (SFEI), Jay Davis (SFEI), Jennifer Hunt (SFEI), Ben Greenfield (SFEI), and Meg Sedlak (SFEI)

I. Introductions
Ben Greenfield called the meeting to order and introductions were made.

II. Background and history of RMP fish sampling program
a. Jay Davis gave a brief history of the RMP fish program. Prior to 1994 there was no systematic sampling of fish for contaminants. In 1994 BPTCP analysis of sport fish found that concentrations of PCBs and Hg were high enough for OEHHA to implement an interim consumption advisory. In 1996 the Fish Workgroup was established and 1997 was the first RMP monitoring effort. The 7 current Status and Trends sport fish species have been continuously sampled since the 1994 study. Fish are sampled on a three year cycle. In addition DHS/SFEI collaborated on a fish consumption study and a report was issued in 1999. All fish monitoring reports can be found at the SFEI web site www.sfei.org.

III. Contaminant studies in SF Bay sport fish, 2003
a. Jennifer Hunt gave an overview of the 2003 fish monitoring effort.
i. 7 fish species analyzed for PCBs, Hg, legacy pesticides and PBDEs. 5 individual leopard and 3 smoothhound sharks analyzed for arsenic. 9 individual leopards and 9 smoothhound sharks analyzed for methyl mercury.
ii. Legacy pesticide exceedances were rare in 2003. All S&T fish were below chlordane screening value (SV) of 30 ng/g ww. Only 1 white sturgeon sample from the South Bay exceeded the DDT SV (100 ng/g ww). 45% of white croaker and 50% of white sturgeon exceeded the dieldrin SV (2 ng/g ww).
iii. 69% of Status and Trend (S&T) samples exceeded the Hg SV (0.2 ug/g ww). 86% of S&T samples exceeded Aroclor SV (10 ng/g ww).

iv. Quantitative measurements of PBDEs in sport fish. Highest concentrations in shiner surfrperch, striped bass, white sturgeon and white croaker. PBDE 47 was the dominant congener found – this is consistent with the literature.
v. A pilot study screened additional, popular sport fish to determine if contaminants are at levels of concern. Anchovy, brown rockfish, black surfperch, Chinook salmon, walleye surfperch, brown smoothhound shark were analyzed for PCBs and Hg. Additional 3 small fish (anchovy, herring, sardine) were monitored for PBDEs. Very small sample size – results only a preliminary indication of contaminant levels.
    1. 38% of pilot study fish exceeded the aroclor SV (10 ng/g ww). 43% exceeded the Hg SV (0.2 ng/g ww).
vi. Trends
    1. Statistically significant declines in DDT lipid weight seen in leopard shark, shiner surfperch, white croaker since 1994.
    2. Statistically significant declines in chlordanes lipid weight seen in leopard shark, striped bass, white croaker since 1994.
    3. No long-term temporal trends seen in PCBs lipid or wet weight.
    4. No long-term temporal trends seen in Hg in striped bass – corrected for length.
    5. No trends seen in Se in white sturgeon.

IV. Power analysis to evaluate future monitoring design
a. Andy Jahn completed a power analysis to provide a statistical basis for determining future RMP fish sampling frequency
    i. 1994 PCB sums were generally different from subsequent years – did not use 1994 in analysis.
    ii. Used analysis of variance (ANOVA) to account for spatial pattern, and determine at what power and when trends could be seen.
    iii. For PCBs in shiner surfperch, there was a site-year interaction. Concentrations highly elevated in Oakland Harbor in 1997, because 1997 samples were captured in different location (San Leandro Bay). Power analysis using five simulated data sets suggested low power (40% chance to detect 20% downward trend) and high probability of Type II error (false positive) using current surfperch data set, sampling every 3 years for 12 years. **Andy's recommendations:** Either higher sample size every 3 years (e.g., N = 20 to 25 each period) or bank funds for around 10 years and then collect one mega sample (N = 80), to determine the degree of decline (but not the trajectory).
    iv. For PCBs in white croaker, 15% of the variance is accounted for by site. Have an 80% chance to see a 20% change in PCB concentrations at n=40. **Andy's recommendations:** Increase sample size to n = 40. The number of samples can be spread out over a number of years at a frequency to be determined. Andy also recommended that it may be better to wait a while, in view of the long time scale of the expected recovery, than to continue to add data describing the present status.
    v. For Hg in striped bass, location did not contribute a significant amount of the variance. **Andy's recommendations:** Have a 99% power to see a 20% decline at n=88 or at 80% power, n=40. Worthwhile sampling in 20 years – location not important.
    vi. For Hg in white croaker, power to see a 20 or 50% reduction is >99% at n=12. **Andy's recommendation:** This would likely be a good species for early detection of a long-term trend. Specifically, he suggested substantially increasing

sample size at three locations in the next few years, then sampling again after a ten-year wait.

vii. For Hg in leopard shark, year did not contribute a significant amount to the variance. No trend seen. Good power to observe a future trend.

V. Committee recommendations for 2006 and beyond

a. Agency needs

i. OEHHA (Margy Gassel)

1. Probably don't need any more data on status and trends species for consumption advisories.
2. Hg and PCBs are driving the advice. Therefore, focus on priority species for these contaminants (surfperch, croaker, striped bass)
3. Contaminant information needed for other sport fish species including higher sample size for 2003 pilot study fish.

ii. Regional Board (Karen Taberski and Fred Hetzel)

1. Confirming DDT declines could affect the status of TMDL. CEP/SFEI Conceptual Model/Impairment Assessment for legacy pesticides was generally inconclusive for TMDL listing. Thus, more legacy pesticide fish data would be good.
2. The Board needs to determine a time estimate for when the mean/median will be below the SV.
3. A recent Regional Board meeting discussed RMP fish sampling priorities – recommended no change to the monitoring design. On the verge of determining if legacy pesticides are still a concern.
4. Only have 1 year of PBDE data – need to continue monitoring.
5. Dieldrin is still on the Regional Board's radar.
6. Focus on fish where the concentrations are high.

iii. City of San Jose (Dan Watson)

1. There will be a lot of physical perturbation occurring in the Bay – South Bay salt pond restoration. Sparser sampling cycle could result in missing some of the changes in contaminants. Therefore, recommended continuation of current sampling frequency.

iv. USACOE (Pete LaCivita)

1. For Hg, recommends increasing sample size to be able to see long-term trends – can go out in a few more years and sample and see a trend if n is large enough.

b. Long-term trends

i. Large fish don't need to be sampled as frequently – could spend additional money on ramping up sampling of small fish

ii. White croaker – recommend sampling in areas where the fish are. Croaker more concentrated in the Central Bay throughout the year. Lower numbers in San Pablo and South. Field crew shouldn't kill themselves trying to get croaker in San Pablo and South Bay.

iii. Striped bass show very different behavior regarding migration patterns in the Bay, ocean and Delta. We have otoliths saved that we could look at salinity changes as a predictor of where particular fish are spending most of their time.

c. Other design change suggestions

i. Andy Jahn: always collect replicate composites per site even if the number of individuals per composite varies. This balances the design and allows for continued removal of spatial variation, with concomitant increase in power.

ii. Margy Gassel: Collect additional status data on 2003 special-study species (e.g., Anchovy, brown rockfish, black surfperch, Chinook salmon, walleye surfperch, brown smoothhound shark, herring, sardine).
iii. Sampling of fish that are prey for wildlife.
iv. Andy Jahn: consider waiting about 10 years and then collecting several good years of data to see trends
v. Kathy Hieb: Drop CA Halibut from trend analysis (hard to catch)
vi. Sample at frequent intervals for short-lived species; less frequent intervals for longer-lived species.
vii. Jay Davis: Consider analyzing striped bass samples collected by CBDA Fish Mercury Project for PCBs (leverage field collection from this project)
viii. Consider analyzing Hg on less frequent time scale, due to slow change expected
ix. Bob Spies: Focus on crucial species and contaminants, and focus trend estimation on what it would likely require to change a health advisory

d. Future power analysis
i. Pay more attention to striped bass.
ii. Conduct more formal simulations of sampling frequency (more replication)
iii. Increase leopard shark sample numbers.
iv. Look at length/year variance in striped bass, add in 1970-1972 Hg data.
v. Look at PCBs in striped bass.
vi. Data should be analyzed on a bay wide basis. There is a scaling problem - need to determine how much each Bay segment represents.
vii. conduct analysis on lipid-adjusted values

e. The Committee did recommend sampling in 2006.
i. Get better handle on pesticides and PBDEs
ii. Collect continued baseline in anticipation of substantial perturbations (e.g., ecosystem restoration)
iii. Get more data for other fish species
iv. Nevertheless, need to step back and look at need for more fish monitoring vs. other programs in the RMP.

VI. Presentation of other SF Bay fish research/monitoring activities

a. Reber Brown – shared data from upcoming Chemosphere article, comparing SF Bay fish contamination to other regions. Article indicated that more urbanized regions (SF Bay, S California harbors) elevated in PBDEs, coplanar PCBs, and dioxins. Handouts on results distributed. Contact Reber for reprints.
b. Laura Taggart – City of San Francisco has significant data on outfall effects in treatment vs. reference stations. Data collected since 1992 on concentrations in muscle, liver, and other tissue. Compounds analysed include 13 trace metals, 45 congeners, 20 PAHs and 3 DDTs.
c. Jeff Schinske – RMP collaboration between him, Sarah Cohen (SFSU – Tiburon), Robert Spies, and RMP. They are using genetic techniques to detect evolved fish resistance to PCBs, focused on the AHR gene. These are evolved genetic changes, rather than DNA damage, and may result in reduced fitness to handle other stressors.
d. Jessica Kaslow – CDHS EHIB has a variety of educational materials to distribute regarding risks of consuming contaminated seafood. Jessica distributed relevant literature.
e. Additional committee members are encouraged to present their activities at the next meeting.

VII. Suggestions for future data analysis

a. Look more closely at Se:
    i. Se/size relationship
    ii. spatial relationship in Se data
    iii. Robin Stewart may have some other Se sturgeon data
b. Look at shark histopathology that Corinne Davis of Stanford did – compare to contaminant concentrations.
c. Determine if the 1994 sum of PCBs uses the same congeners as the other sampling years

VIII. Action items for committee:
a. Peer review on draft report. Review received by December 1 will be incorporated.
b. Additional comments on program design are invited prior to December 19 meeting.

IX. The Next committee meeting was scheduled for December 19, from 10am-3pm