Contaminants in San Francisco Bay Sport Fish 2006 Results

November 5, 2008
2006 Status & Trends

• Main Indicator Species

- Organics – white croaker & shiner surfperch
  ✓ PCBs – PBDEs – Dioxins – Legacy Pesticides

- Mercury – striped bass & white sturgeon

- Otolith results
2006 Additional Species

• Screening level look at additional sport fish species
  - Anchovy, barred surfperch, black surfperch, brown rockfish, Chinook salmon, rubberlip surfperch, walleye surfperch
  - Analyzed PCBs, Hg and PBDEs
Screening Values

- PCBs - TMDL Tissue Target - 10 ppb ww
- Dioxins - TMDL Tissue Target - 0.14 ppt ww
- Mercury - TMDL Tissue Target 0.2 ppm ww
- DDT, Chlordane, and Dieldrin - OEHHA values
- PBDEs - No state screening value
## Many Species Still Exceeding Targets

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Mercury*</th>
<th>Total Aroclors*</th>
<th>Dioxins</th>
<th>Total DDT</th>
<th>Total Chlordanes</th>
<th>Dieldrin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening Value</td>
<td>0.20 ppm ww</td>
<td>10 ppb ww</td>
<td>0.14 ppt ww</td>
<td>100 ppb ww</td>
<td>30 ppb ww</td>
<td>2 ppb ww</td>
</tr>
<tr>
<td>Shiner Surfperch</td>
<td>NM</td>
<td>15/15</td>
<td>NA</td>
<td>0/15</td>
<td>0/15</td>
<td>4/15</td>
</tr>
<tr>
<td>White Croaker</td>
<td>NM</td>
<td>9/9</td>
<td>9/9</td>
<td>3/9</td>
<td>1/9</td>
<td>4/9</td>
</tr>
<tr>
<td>White Sturgeon</td>
<td>3/4</td>
<td>4/4</td>
<td>NA</td>
<td>0/4</td>
<td>0/4</td>
<td>1/4</td>
</tr>
<tr>
<td>All Species (Including Special Study Species)</td>
<td>8/25</td>
<td>42/49</td>
<td>37/9</td>
<td>3/28</td>
<td>1/28</td>
<td>9/28</td>
</tr>
</tbody>
</table>

% of Species Above SV

<table>
<thead>
<tr>
<th>Mercury*</th>
<th>Total Aroclors*</th>
<th>Dioxins</th>
<th>Total DDT</th>
<th>Total Chlordanes</th>
<th>Dieldrin</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>86</td>
<td>100</td>
<td>11</td>
<td>4</td>
<td>32</td>
</tr>
</tbody>
</table>
100% Croaker Exceeding PCB TMDL Target

98% reduction in average concentrations to reach target

1994
1997
2000
2003
2006

Sum of Aroclors ppb wet weight

TMDL Tissue Target

White Croaker
100% Shiner Exceeding PCB TMDL Target

94% reduction in average concentrations to reach target

Shiner Surfperch

Sum of Aroclors (ppb wet weight)
Shiner Perch PCBs highest in Oakland (1997–2006)

Shiner Perch

Sum of Aroclors (ppb wet weight)

0 200 400 600 800 1000

Oakland  SFWaterfront  South Bay  Berkeley  San Pablo Bay

A  B  B  C  D
Long Term PCB Levels

Shiner Surfperch

White Croaker
Striped Bass Above Hg TMDL Target
**Good News!**

Many Bay Species Below Hg TMDL Target
Total Dioxin Toxicity Not Changing
Sum of Dioxin, Furan, and dioxin-like PCB TEQs

White Croaker Total TEQ (ND=1/2 MDL)

PCBs Dominate Dioxin-Like Toxicity

TEQ Percentage 2003 & 2006

- Non-ortho PCBs: 38%
- Dioxins: 13%
- Furans: 12%
- Mono-ortho PCBs: 37%
2006 Dieldrin and DDTs

Dieldrin Concentration (ppb)

DDT Concentration (ppb)
2006 DDT Concentrations Higher

Shiner Surfperch

White Croaker
What Can Otoliths Tell Us About Life History?
Bass Can Reside in One Location...
...or Reside in Multiple Locations
Negative Relationship of Hg and Otolith Strontium Ratio

\[ y = -60.8x + 43 \]
\[ r^2 = 0.13; p = 0.0005 \]
Acknowledgements

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