Health Advisory and Safe Eating Guidelines for Fish from Coastal Waters of Southern California: Ventura Harbor to San Mateo Point

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Fish Consumption Recommendations to Reduce Exposure to Mercury, DDTs, and PCBs

For Both Zones

- Barracuda: 2 - 4 meals per month
- Pacific (chub) mackerel: 4 meals per month
- Top smelt: 4 meals per month
- Bonito: 4 meals per month
- Rockfishes: 1 - 2 meals per month
- Surf perches: 1 - 2 meals per month
- Sculpin (scorpionfish): 1 - 2 meals per month
- Black croaker: 1 - 2 meals per month
- Queenfish: 1 - 2 meals per month
- Kelp bass (calico bass): 1 - 2 meals per month
- White croaker (kingfish, tomcod): 1 - 2 meals per month
- Corbina: 1 - 2 meals per month

- Red Zone
  - Do Not Eat!
  - 2 meals per month

- Yellow Zone
  - 4 meals per month

Note

Do not eat these fish more than 4 times per month. This meal limit applies to combinations of different fish. For example, if you have eaten 2 meals of bonito and 2 meals of queenfish this month, do not eat more of the fish shown above.

These recommendations are based on the State’s Consumption Advisories for DDTs and PCBs and national guidelines for mercury.

Fish Contamination Zones

Santa Monica Bay

- Pt. Dume
- Malibu
- Santa Monica
- Marina del Rey
- Redondo Beach
- Palos Verdes Peninsula
- L.A./Long Beach Harbor
- Long Beach
- Huntington Beach
- Newport Beach
- Dana Point
- Pier J and Belmont Pier
- Horseshoe Kelp
- Short Bank
- Palos Verdes Pt.
- Pt. Vicente
- San Pedro/White Point
- Cabrillo Pier

Higher DDTs/PCBs

Lower DDTs/PCBs

Graphics courtesy of Cabrillo Marine Aquarium, NOAA and Montrose Basin’s Restoration Program.
Artist: Evie Templeton; Technical advisor: M. James Allen (SCCWRP).
Topics for Today

- MSRP/USEPA fish collection and analysis
- Risk-based criteria for determining the safety of fish consumption
- Benefits of fish consumption
- Data evaluation
- Chemicals of concern
- Species of concern
- Health advisory and safe eating guidelines
107+ miles of coastline
emphasis on PVS area
24 segments
7 sampling sites to evaluate catchban area
1373 fish analyzed
22 species or species groups
How do we evaluate chemical risk?

- Review human and animal studies
- Determine exposure level that is the lowest associated with adverse effects
- Uncertainty factors ($\geq 10x$)
- Develop reference dose (RfD) or cancer slope factor (CSF)
- Protect most sensitive population
Advisory Tissue Levels for Chemicals based on Cancer or Non-Cancer Risk (ppb)

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Three servings/week</th>
<th>Two servings/week</th>
<th>One serving/week</th>
<th>No Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical A</td>
<td>≤x</td>
<td>&gt;x-y</td>
<td>&gt;y-z</td>
<td>&gt;z</td>
</tr>
</tbody>
</table>

Non-cancer risk: maintain average exposure at RfD
Cancer risk: not to exceed 1 in 10,000
(average ~ 1 in 100,000)
**Advisory Tissue Levels for PCBs, DDTs, and Hg based on Cancer or Non-Cancer Risk (ppb)**

<table>
<thead>
<tr>
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<th>Three servings/week</th>
<th>Two servings/week</th>
<th>One serving/week</th>
<th>No Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCBs</td>
<td>≤21</td>
<td>&gt;21-42</td>
<td>&gt;42-120</td>
<td>&gt;120</td>
</tr>
<tr>
<td>DDTs</td>
<td>≤520</td>
<td>&gt;520-1,000</td>
<td>&gt;1,000-2,100</td>
<td>&gt;2,100</td>
</tr>
<tr>
<td>Mercury (sensitive)</td>
<td>≤70</td>
<td>&gt;70-150</td>
<td>&gt;150-440</td>
<td>&gt;440</td>
</tr>
<tr>
<td>Mercury (non-sensitive)</td>
<td>≤220</td>
<td>&gt;220-440</td>
<td>&gt;440-1,310</td>
<td>&gt;1,310</td>
</tr>
</tbody>
</table>
FISH FACTS

Nutrients in Fish

- Fish provide a good source of protein and other essential nutrients
- Major source of “good fats” – omega-3 fatty acids (fish oil)
- Studies show significant health benefits from eating fish and fish oil
Health Benefits
Associated with Fish or Fish Oil for Adults

- Studies suggest that increased fish consumption is associated with:
  - Lower risk of heart attacks
  - Lower risk of death from heart attacks
  - Lower risk of the most common type of stroke
  - Lower risk of developing Alzheimer's
  - Lower risk of age-related blindness
Health Benefits
Associated with Fish or Fish Oil
for Women and Young Children

- Transferred to fetus and nursing infants
- Studies suggest that eating fish results in:
  - Less risk of prematurity
  - Babies sleep better
  - Improved brain and motor function
  - Fatty acid is part of the eye, promotes infant vision
Data Evaluation

- 5 chemicals analyzed – mercury, PCBs, DDTs, chlordane, and dieldrin

- Examined results for each chemical for each species at each segment

- Each species was evaluated to determine what advice would be given at each segment for each chemical, based on the ATLs
Data Evaluation

- Special attention was paid to species that exceeded the “do not consume” threshold for any chemical at any segment.

- The “risk driver” for each species at each segment was identified.
Data Evaluation

- Species with highly variable contaminant levels within or among segments were evaluated for effects of site, fat content of fish or length.

- Did different advice for the same species at different segments seem justified?

- What about risk communication?
Data Evaluation

After examining all data in this manner, fish were placed into one of two categories:

- Species for which different consumption advice would be recommended for different segments
- Species for which uniform consumption advice would be recommended for the entire area, within a population group
Chemicals of Concern

- Chlordane and dieldrin below levels of concern
- DDTs low (for human health) except in one or two species around the PV shelf
- Mercury low to moderate except in two species for the sensitive population
- PCBs low to high depending on site and species
MERCURY FACTS

- Fish are the major source of exposure
- Almost all fish contain mercury
- Most mercury in fish is “methylmercury” (MeHg)
- Methylmercury is more toxic than mercury
Methylmercury Health Effects in Adults

- Target organ - Brain
- Mercury poisoning in Japan and Iraq (1950s – 1970s)
- Early signs & symptoms
  - Numbness and tingling of the mouth, hands and feet
How can children be affected by methylmercury?

Passes to baby through the placenta
Methylmercury
Health Effects
in the Fetus and Children

- Nervous system is most sensitive
  - During development
  - Continues through teenage years
  - Subtle effects on attention, memory, learning
  - Not everyone is affected
PCB and DDT Facts

- PCBs are a large group of industrial chemicals used in electrical transformers and as lubricants; DDT is an insecticide used to control malaria
- Banned for most uses in the U.S. in the 1970s, but can still be found in fish, meat, and dairy
- Do not break down easily
- Discharged into the LA sewer system for many years
PCB and DDT Health Effects

- PCBs and DDTs both affect the brain; PCBs can cause eye discharge and distorted nail growth at higher doses.
- May affect the development of the nervous system in the fetus or children.
- Probably cause cancer in humans.
Species of concern

- White croaker
- Topsmelt
- Barred sand bass
- Barracuda
- Black croaker
Advisory Zones

1) Ventura Harbor to Santa Monica Pier

2) Santa Monica Beach South of Santa Monica Pier to Seal Beach Pier

3) South of Seal Beach Pier to San Mateo Point
Map of yellow and red zones for fish caught from Ventura Harbor to San Mateo Point
A guide to eating fish caught from Ventura Harbor to San Mateo Point
Women 18 - 45, especially those who are pregnant or breastfeeding, and children 1 - 17

<table>
<thead>
<tr>
<th>Yellow Zone (see map)</th>
<th>Red Zone (see map)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jacksmelt</strong></td>
<td>Safe to eat 4 servings per week OR Safe to eat 4 servings per week</td>
</tr>
<tr>
<td><strong>Corbina</strong></td>
<td>2 servings per week OR 2 servings per week</td>
</tr>
<tr>
<td><strong>Pacific chub mackerel</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Yellowfin croaker</strong></td>
<td>1 serving per week OR 1 serving per week</td>
</tr>
<tr>
<td><strong>Queenfish</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Surfperches</strong></td>
<td>1 serving per week OR 1 serving per week</td>
</tr>
<tr>
<td><strong>Opaleye</strong></td>
<td>2 servings per week OR 2 servings per week</td>
</tr>
<tr>
<td><strong>California halibut</strong></td>
<td>2 servings per week OR DO NOT EAT</td>
</tr>
<tr>
<td><strong>California scorpionfish (Sculpin)</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Sargo</strong></td>
<td>1 serving per week OR 1 serving per week</td>
</tr>
<tr>
<td><strong>Rockfishes</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Kelp bass (Calico bass)</strong></td>
<td>2 servings per week OR DO NOT EAT</td>
</tr>
<tr>
<td><strong>Sardines</strong></td>
<td>1 serving per week OR 1 serving per week</td>
</tr>
<tr>
<td><strong>Shovelnose guitarfish</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Topsmelt</strong></td>
<td>2 servings per week OR DO NOT EAT</td>
</tr>
<tr>
<td><strong>Barred sand bass</strong></td>
<td>1 serving per week OR 1 serving per week</td>
</tr>
<tr>
<td><strong>White croaker (Kingfish or Tomcod)</strong></td>
<td>OR OR</td>
</tr>
<tr>
<td><strong>Barracuda</strong></td>
<td>DO NOT EAT OR DO NOT EAT</td>
</tr>
<tr>
<td><strong>Black croaker</strong></td>
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*For example:* If you eat 1 serving of Kelp bass, do not eat any more fish until the next week.
A guide to eating fish caught from Ventura Harbor to San Mateo Point
Women over 45 years and men over 17 years

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<td>Safe to eat 7 servings per week</td>
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<tr>
<td>Jacksmelt</td>
<td>OR</td>
</tr>
<tr>
<td>Pacific chub mackerel</td>
<td>4 servings per week</td>
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<td>OR</td>
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<tr>
<td>California halibut</td>
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For example: If you eat 1 serving of Kelp bass, do not eat any more fish until the next week.
Summary

- 22 Species or groups analyzed across 170+ coastal miles
- Advice was not developed for 2 species because of low sample size (white seabass and California sheephead)
- 9 species have advice that is population specific
- 3 species have separate advice for different zones
- No consumption in red zone for white croaker, barred sand bass, and topsmelt