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

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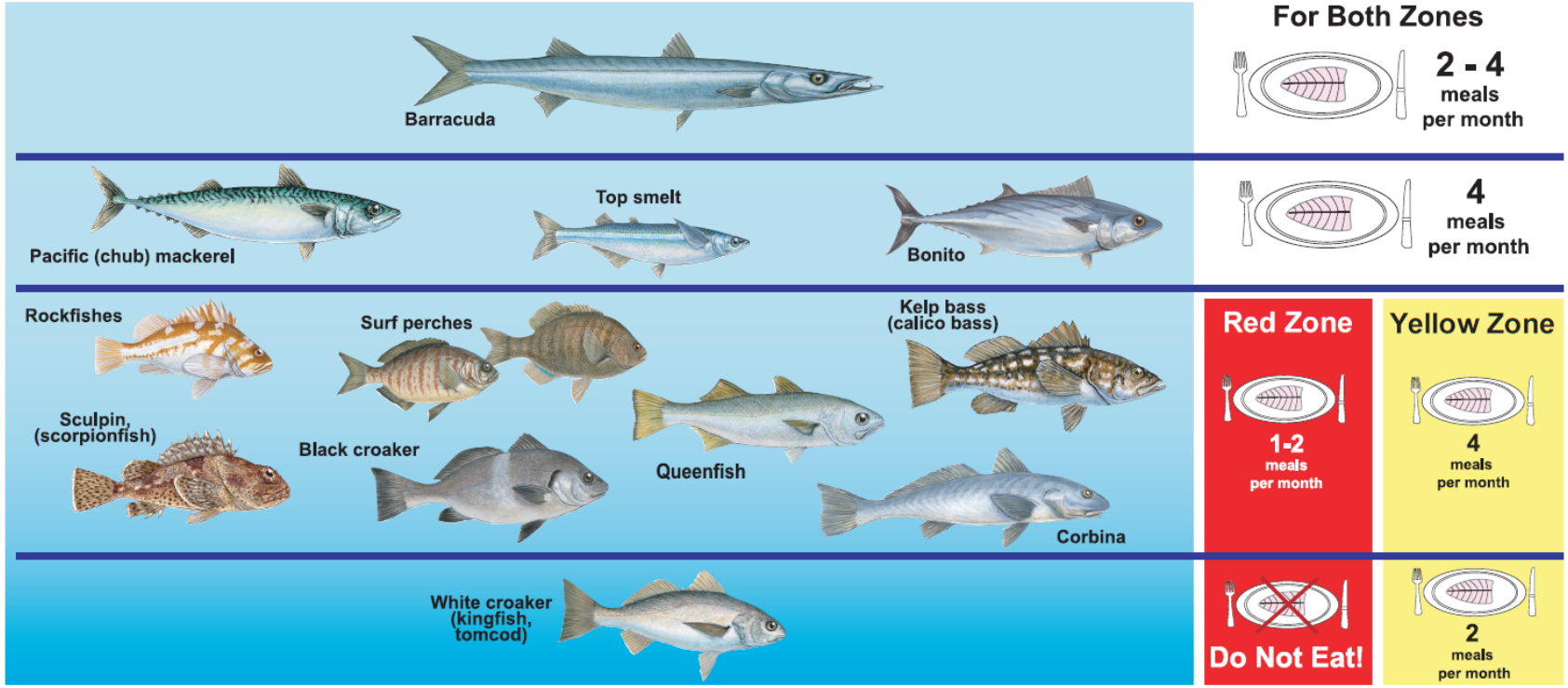
Fish Consumption Recommendations to Reduce Exposure to Mercury, DDTs, and PCBs

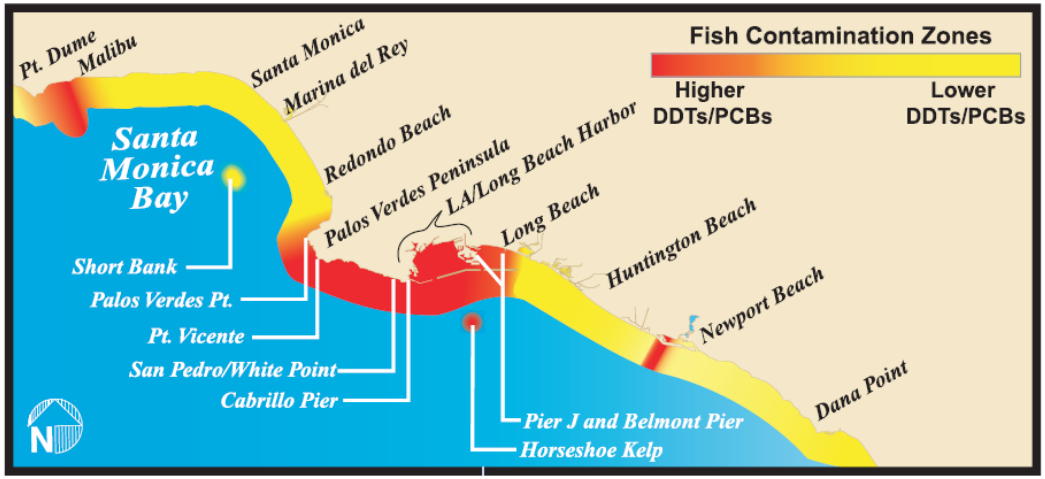


Graphics courtesy of Cabrillo Marine Aquarium, NOAA and Montrose Settlements Restoration Program. Artist: Evie Templeton. Technical advisor: M. James Allen (SCCWRP).

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.



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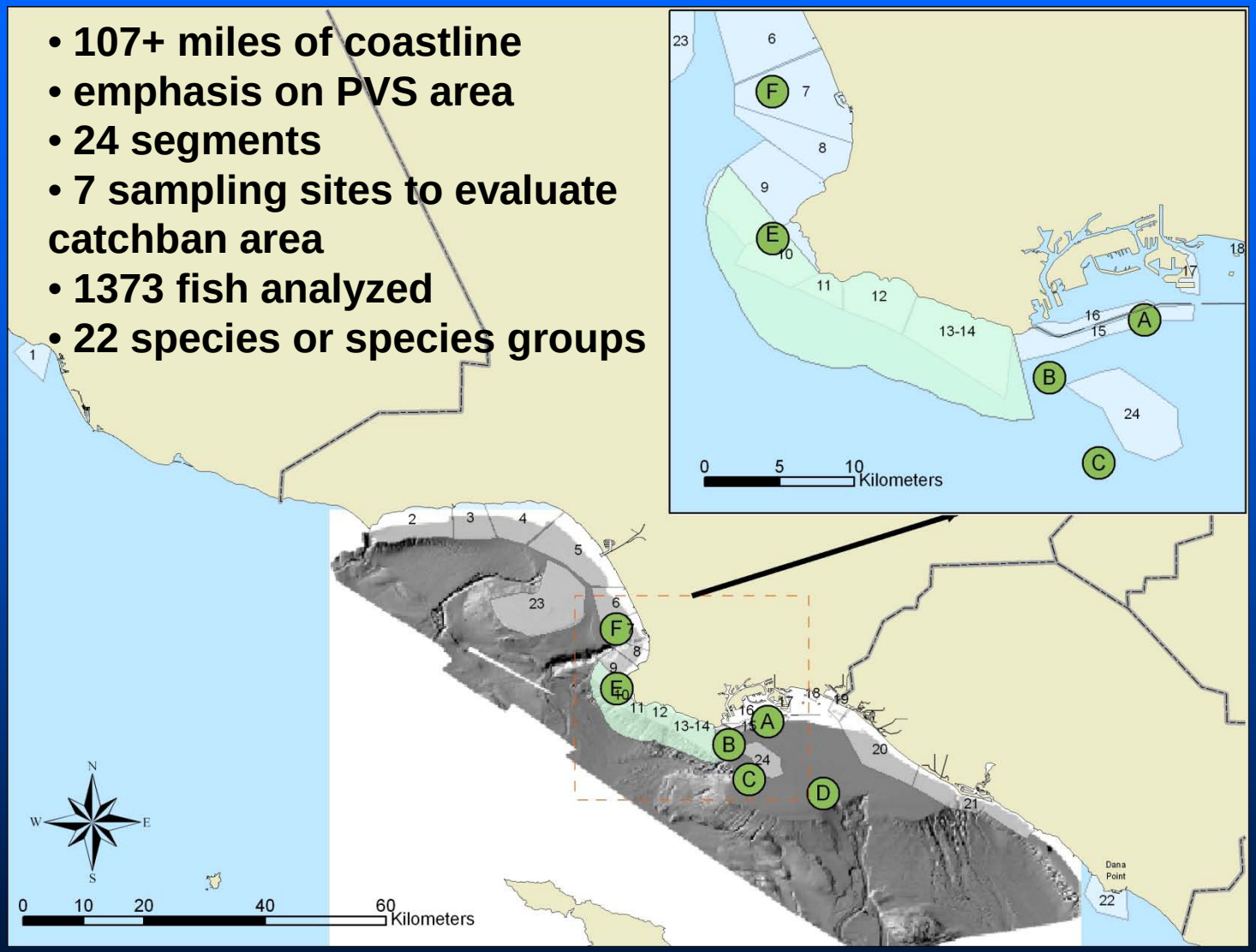
Topics for Today

- 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

MSRP/EPA Fish Sampling Design

- 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 (≥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)				
Contaminant	Three servings/ week	Two servings/ week	One serving/ week	No Consumption
Chemical A	≤x	>x-y	>y-z	>z

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)

Contaminant	Three servings/ week	Two servings/ week	One serving/ week	No Consumption
PCBs	≤21	>21-42	>42-120	>120
DDTs	≤520	>520-1,000	>1,000-2,100	>2,100
Mercury (sensitive)	≤70	>70-150	>150-440	>440
Mercury (non-sensitive)	≤220	>220-440	>440-1,310	>1,310

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

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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 place 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

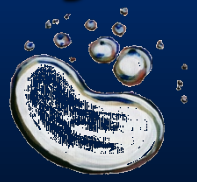
Chemicals of Concern

- 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



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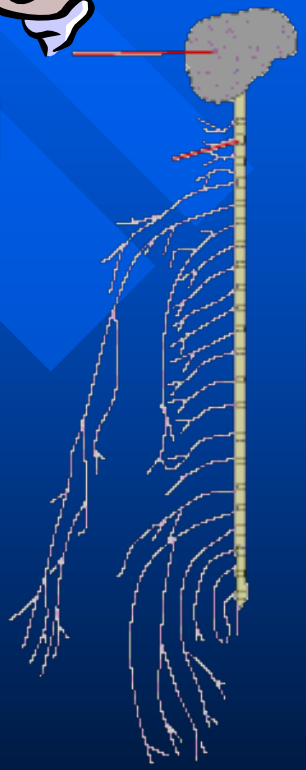
Methylmercury Health Effects In Adults

- Target organ - Brain
- Mercury poisoning in Japan and Iraq (1950s – 1970s)
- Early signs & symptoms
  - Numbness and tingling of the mouth, hands and feet



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How can children be affected by methylmercury?

MeHg

Passes to baby through the placenta

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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

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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

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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

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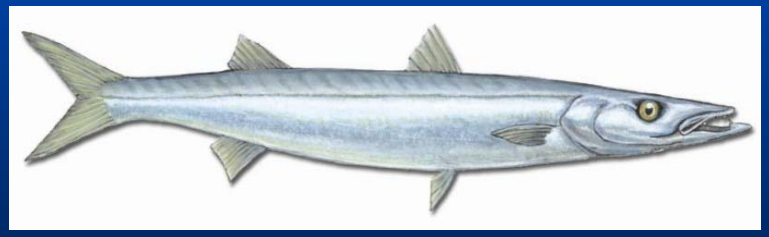
Species of concern

- 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

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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

	Yellow Zone (see map)	Red Zone (see map)
Jacksmelt	Safe to eat 4 servings per week	Safe to eat 4 servings per week
	OR	OR
Corbina, Pacific chub mackerel, Yellowfin croaker, Queenfish, Surfperches, Opaleye	2 servings per week	2 servings per week
	OR	OR
California halibut, Sargo, Rockfishes, Kelp bass (Calico bass), California scorpionfish (Sculpin), Sardines, Shovelnose guitarfish	1 serving per week	1 serving per week
	OR	
Topsmelt	2 servings per week	DO NOT EAT
	OR	
Barred sand bass, White croaker (Kingfish or Tomcod)	1 serving per week	DO NOT EAT
Barracuda, Black croaker	DO NOT EAT	DO NOT EAT

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

	Yellow Zone (see map)	Red Zone (see map)
Jacksmelt	Safe to eat 7 servings per week	Safe to eat 7 servings per week
	OR	OR
Pacific chub mackerel	4 servings per week	4 servings per week
	OR	OR
California halibut, Queenfish, Surfperches, Opaleye, Rockfishes, Corbina, Yellowfin croaker, Shovelnose guitarfish	2 servings per week	2 serving per week
	OR	OR
Sardines, Black croaker, Sargo, Barracuda, California scorpionfish (Sculpin), Kelp bass (Calico bass)	1 serving per week	1 serving per week
	OR	
Barred sand bass, Topsmelt, White croaker (Kingfish or Tomcod)	2 servings per week	DO NOT EAT

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