

Comparative Analysis of State Fish Consumption Advisories Targeting Sensitive Populations

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Comparative Analysis of State Fish Consumption Advisories Targeting Sensitive Populations

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Introduction

- Fish consumption advisories are issued to warn the public of possible toxicological threats from consuming certain fish species
- While developing fetuses and children are particularly susceptible to toxicants in fish, fish also contain valuable nutrients. Hence, formulating advice for sensitive populations poses challenges.
- In July of 2007, the U.S. Environmental Protection Agency (EPA) made available online the 2005/2006 National Listing of Fish Advisories (NLFA), which reflects potential chemical risks only.



Introduction

- The NLFA database includes all available information describing state-, tribal-, and federally-issued fish consumption advisories in the United States for the 50 States, the District of Columbia, and four U.S. Territories, and in Canada for the 12 provinces and territories. The database contains information provided to EPA by the states, tribes, territories and Canada.
- We used the NLFA database contacts page to access state fish consumption advisory Web sites to assess.

Map of the United States showing the number of advisories by state. The map uses different shading patterns to indicate the scope of advisories: solid gray for specific waterbodies only, cross-hatch for statewide lakes only, diagonal lines for statewide rivers and lakes, thick black outline for statewide coastal advisories, and dark gray for statewide marine fish advisories. States with no advisories are white. The number of advisories for each state is printed on the map. A legend at the bottom explains the shading patterns. A table at the bottom right lists the number of advisories for Alaska (AS = 1), Guam (GU = 2), Virgin Islands (VI = 0), and Puerto Rico (PR = 0).

State	Number of Advisories
Alaska	0
Alabama	21
Arizona	14
Arkansas	3
California	64
Colorado	0
Connecticut	20
Delaware	42
District of Columbia	1
Florida	281
Georgia	138
Hawaii	3
Idaho	2
Illinois	49
Indiana	16
Iowa	7
Kansas	9
Kentucky	11
Louisiana	22
Maine	19 ^f
Massachusetts	166
Michigan	408 ^c
Minnesota	1,072 ^b
Mississippi	16
Missouri	40
Montana	5
Nebraska	4 ^a
Nevada	17
New Hampshire	9
New Jersey	111
New Mexico	28
New York	153 ^e
North Carolina	66
North Dakota	27
Ohio	79
Oklahoma	6
Oregon	36
Rhode Island	23
South Carolina	10
South Dakota	11
Texas	21
Utah	11
Vermont	12
Virginia	52
Washington	17
West Virginia	21
Wisconsin	179 ^d
Wyoming	7
Virgin Islands	0
Puerto Rico	0

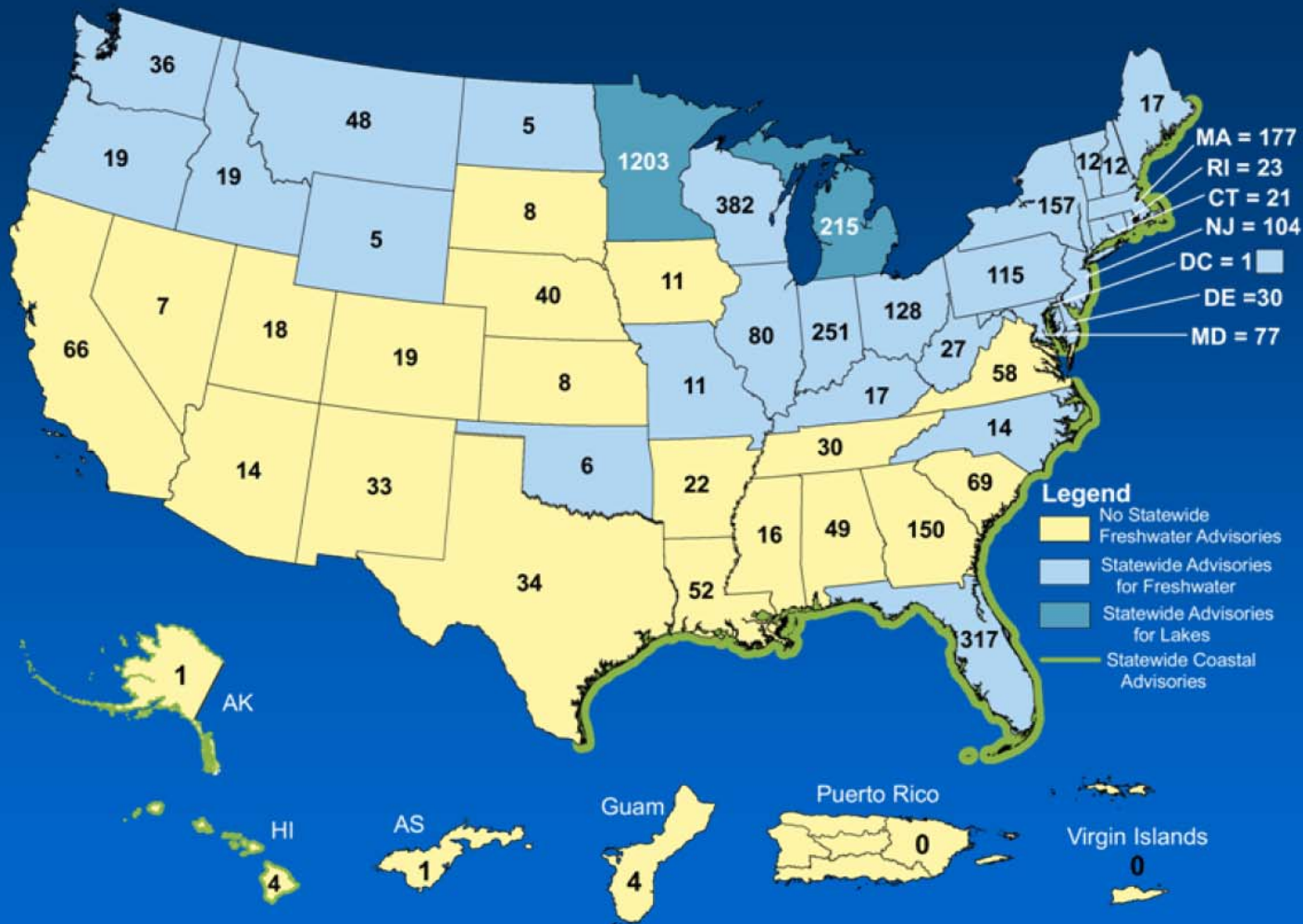
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2008 Biennial National Listing of Fish Advisories

- In Sept. 2009, EPA released the 2008 Biennial National Listing of Fish Advisories
- In 2008, all states had fish consumption advisories (4,249 total) in effect
- 5 bioaccumulative contaminants (mercury, PCBs, chlordane, dioxin, and DDT) are responsible for 97% of advisories
- 45% of the nation's total lake acreage and 39% of the nation's total river miles are under advisory



Total Number of Fish Consumption Advisories – 2008



NOTE: This map depicts the number of fish advisories issued by the states as of December 2008. Because only selected waterbodies are monitored, this map does not reflect the full extent of chemical contamination of fish tissues in each state or territory.



National Fish and Wildlife Contamination Program

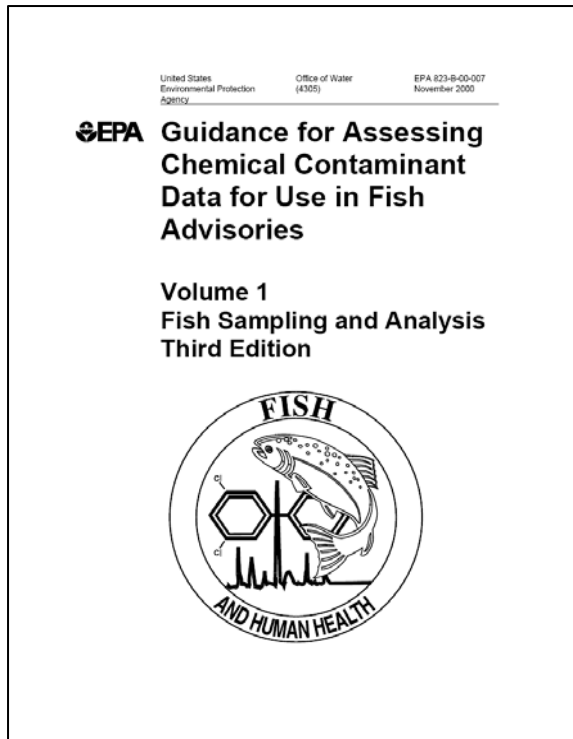
Source: 2008 National Listing of Fish Advisories

Source: National Maps and Graphics: 2008 Biennial National Listing of Fish Advisories

<http://www.epa.gov/waterscience/fish/advisories/>

Risk Management Basis for State Fish Advisories

- Advisories are considered voluntary recommendations regarding fish consumption and are not subject to regulation. States have primacy in protecting the public's health from fish caught in state local waters (Cunningham, Smith et al. 1994)
- EPA had issued guidance from the Office of Water to states on assessing chemical contaminant data for use in fish advisories, but this does not constitute a regulatory requirement for states.



4 volumes of EPA guidance to states:

- o Volume 1: Fish Sampling and Analysis, 3rd Edition
- o Volume 2: Risk Assessment and Fish Consumption Limits, Third Edition
- o Volume 3: Risk Management
- o Volume 4: Risk Communication

Source:

<http://www.epa.gov/waterscience/fish/technical/guidance.html>

Risk Management Basis for Federal Fish Advisories

In 2004 EPA and FDA issued a joint national fish consumption advisory.

Below are the **agency's relevant missions** as described in their Memorandum of Understanding regarding environmental contaminants in fish and shellfish and the safety of fish and shellfish for U.S. consumers:

FDA mission:

- Promote and protect the public's health by ensuring that the nation's food supply, including commercial fish and shellfish, is:
 - Safe,
 - Sanitary,
 - Wholesome, and
 - Properly labeled



EPA's mission:

- Protect human health and the environment

EPA Office of Water's goals:

- Restore and maintain water quality
- Protect human health and ecosystems
- Provide the public with information on how best to reduce their water-related risks, including risks pertaining to the consumption of non-commercial fish and shellfish

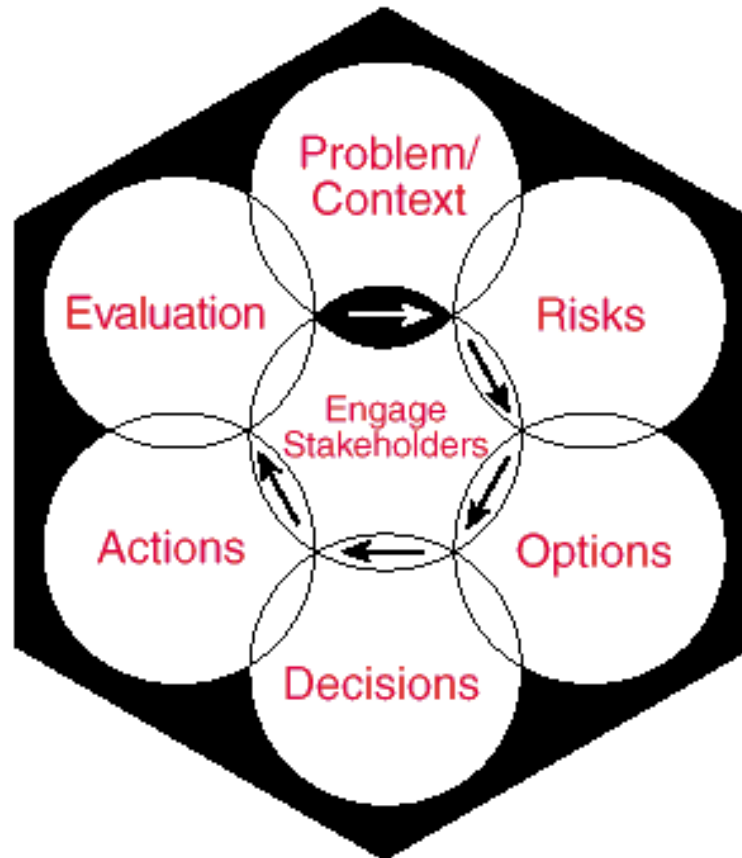


What did the 2004 Joint EPA/FDA Fish Consumption Advisory Target?

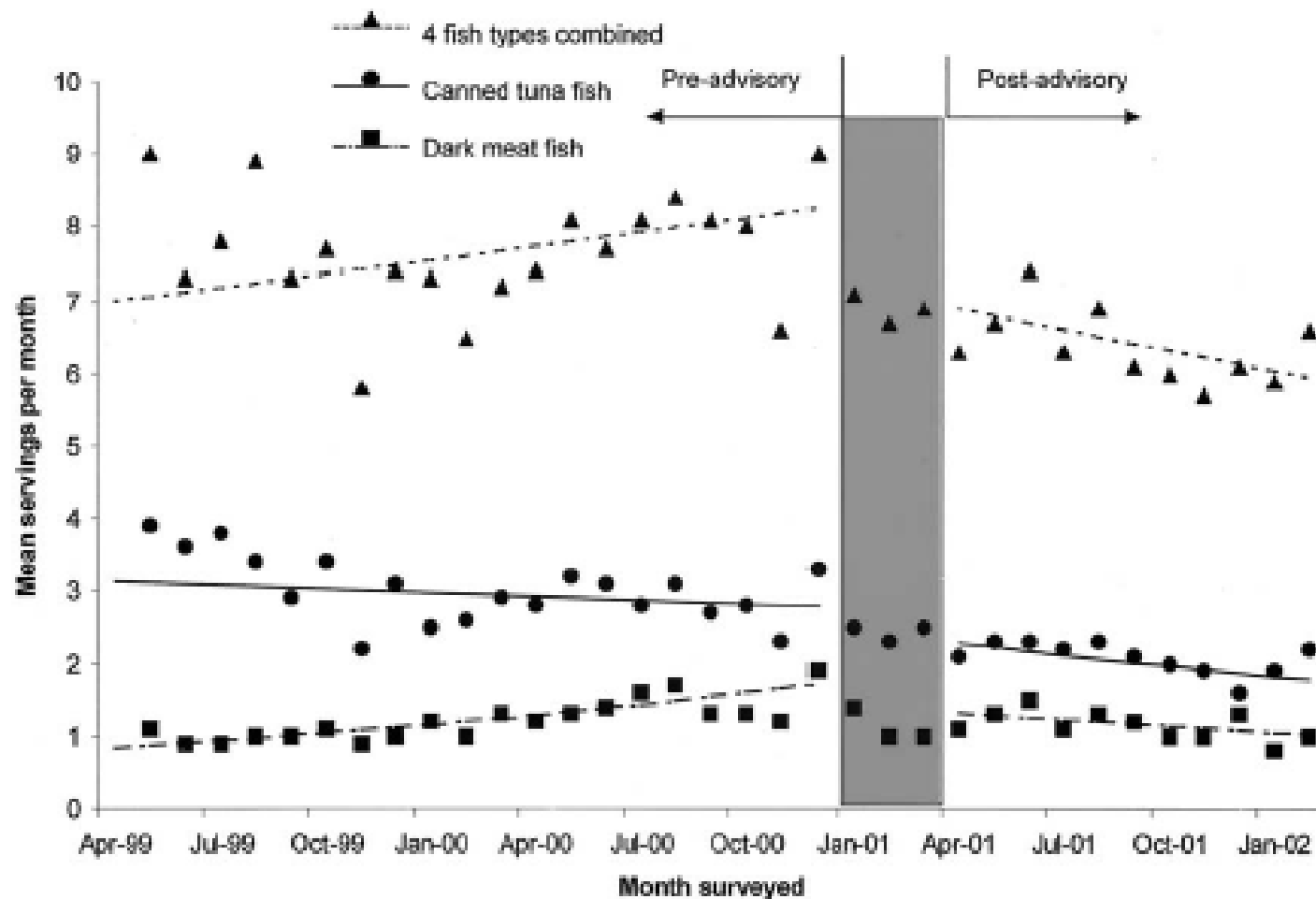
- Best science
- Development of Pub Hlth messages considering both risks and benefits
- Promoted Uniformity
- Encouraged environmental monitoring
- Sensitive populations



President's Commission 1997 – Risk Management in Context



Introduction



Oken, E., et al., Decline in fish consumption among pregnant women after a national mercury advisory. *Obstetrics and Gynecology*, 2003. **102**(2): p. 346-351.



Introduction

- No study has comprehensively assessed the health messages contained in fish consumption advisories issued by states.
- In this analysis, we assessed health messages contained in advisories that sensitive groups might access through the NLFA.
- This analysis did not assess actual choices made by sensitive populations.
- However, a recent study by Tsuchiya et al has studied fish consumption choices made by local Japanese and Korean women of childbearing age:

Tsuchiya, A., J. Hardy, et al. (2008). "Fish intake guidelines: incorporating n-3 fatty acid intake and contaminant exposure in the Korean and Japanese communities." American Journal of Clinical Nutrition 87(6): 1867-1875.



Objective

- Viewed comprehensively across states, do fish consumption advisories, which we recognize arise from a regulatory context, also address the public health questions that sensitive populations face?
- Specifically, do advisories sufficiently convey risk and benefit information on potential fish species eaten to provide context for the advice offered? Do they provide clarity for these complex risk issues?

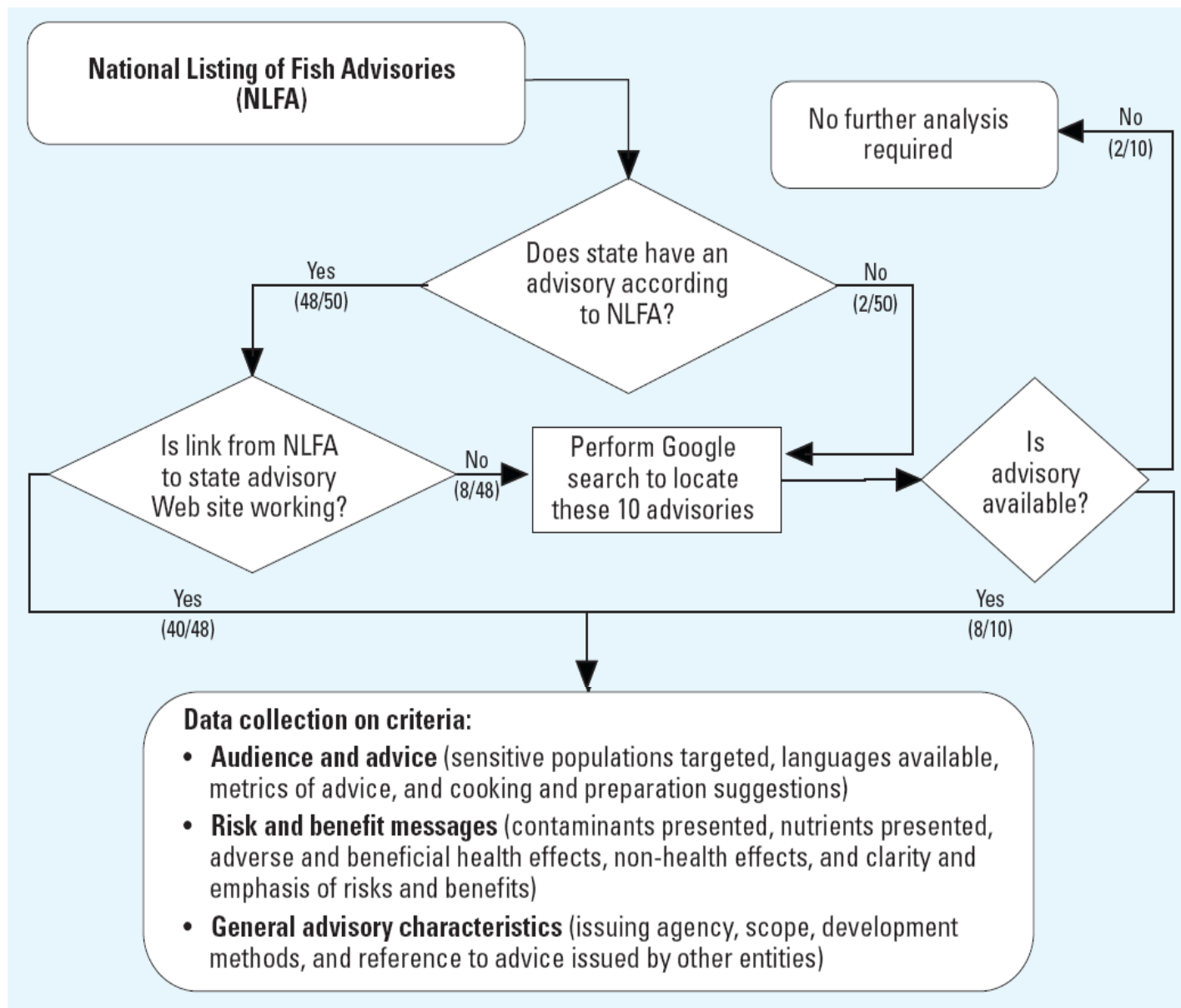


Figure 1. Flow diagram for the comparative analysis of the 48 state fish consumption advisory Web sites assessed.



Audience and Advice

Sensitive Populations Targeted

- All Web sites contained at least some advice for sensitive populations.
- All but Hawaii and Nevada offered advice that was either more strict or more cautiously worded for sensitive populations than for the general population.
- Seventeen Web sites contained specific brochures or Web pages aimed exclusively at sensitive populations, whereas the rest of the Web sites intermingled advice aimed at sensitive populations with content aimed at members of the general population.

Audience and Advice

Languages Available

Table 1. Audience and advice attributes of the 48 state fish consumption advisory Web sites assessed.

Attribute	No. (%)
Sensitive populations targeted	
Pregnant women	43 (89.6)
Women of childbearing age	28 (58.3)
Women planning to <u>become</u> pregnant	20 (41.7)
Women who might become pregnant	27 (56.3)
Children	48 (100.0)
High-end fish consumers	6 (12.5)
People with certain health conditions	3 (6.3)
Languages available	
Spanish	18 (37.5)
Vietnamese	5 (10.4)
Chinese	4 (8.3)
Korean	3 (6.3)
Hmong	3 (6.3)
Russian	3 (6.3)
Khmer	2 (4.2)
Laotian	2 (4.2)
Cambodian	2 (4.2)
Serbo-Croatian	1 (2.1)
French	1 (2.1)
Haitian Creole	1 (2.1)
Portuguese	1 (2.1)



Audience and Advice

Metrics of Advice: Meal Frequency and Size

- All states, except Nebraska, offered meal frequency advice, given in terms of meals per week, month, year, or a combination thereof.
- Most states gave advice based on fish length (inches), and some based advice on the size of fish caught.

Cooking and Preparation Suggestions

- 56% of advisories gave advice about preparing and cooking fish, such as removing skin and trimming away fat before cooking.



Risk and Benefit Messages *Contaminants Presented*

- Twenty-six chemical contaminants were responsible for advisories issued by states.
- Only 6 advisories addressed single contaminants, while the remainder, 42, based advice on 2 to 12 contaminants.
- In 9 of these 42 multiple-contaminant advisories, the consumption advice was contaminant-specific
- In all but 7 of the 29 cases where advisories did contain advice integrated across contaminants, no explanation was given regarding how the integrated advice was developed.

Risk and Benefit Messages

Nutrients Presented

Table 2. Contaminants, nutrients, and non-health effects presented in the 48 state fish consumption advisory Web sites assessed.

Attribute	No. (%)
Nutritional aspects addressed	
Protein source	37 (77.1)
Omega-3 fatty acid source ^c	22 (45.8)
Vitamin source	16 (33.3)
Mineral source	16 (33.3)
Nutritious/source of nutrients	12 (25.0)
Low in cholesterol	5 (10.4)
Low in calories	3 (6.3)
Low in sodium	2 (4.2)
Low in fat	23 (47.9)
Low in saturated fat specifically	16 (33.3)
References other protein sources	11 (22.9)
Non-health benefits addressed	
Recreation source	17 (35.4)
Provide food/supports a subsistence lifestyle	6 (12.5)
Cultural, spiritual, or traditional relevance	2 (4.2)
Economic importance	4 (8.3)

Risk and Benefit Messages

Beneficial Health Effects

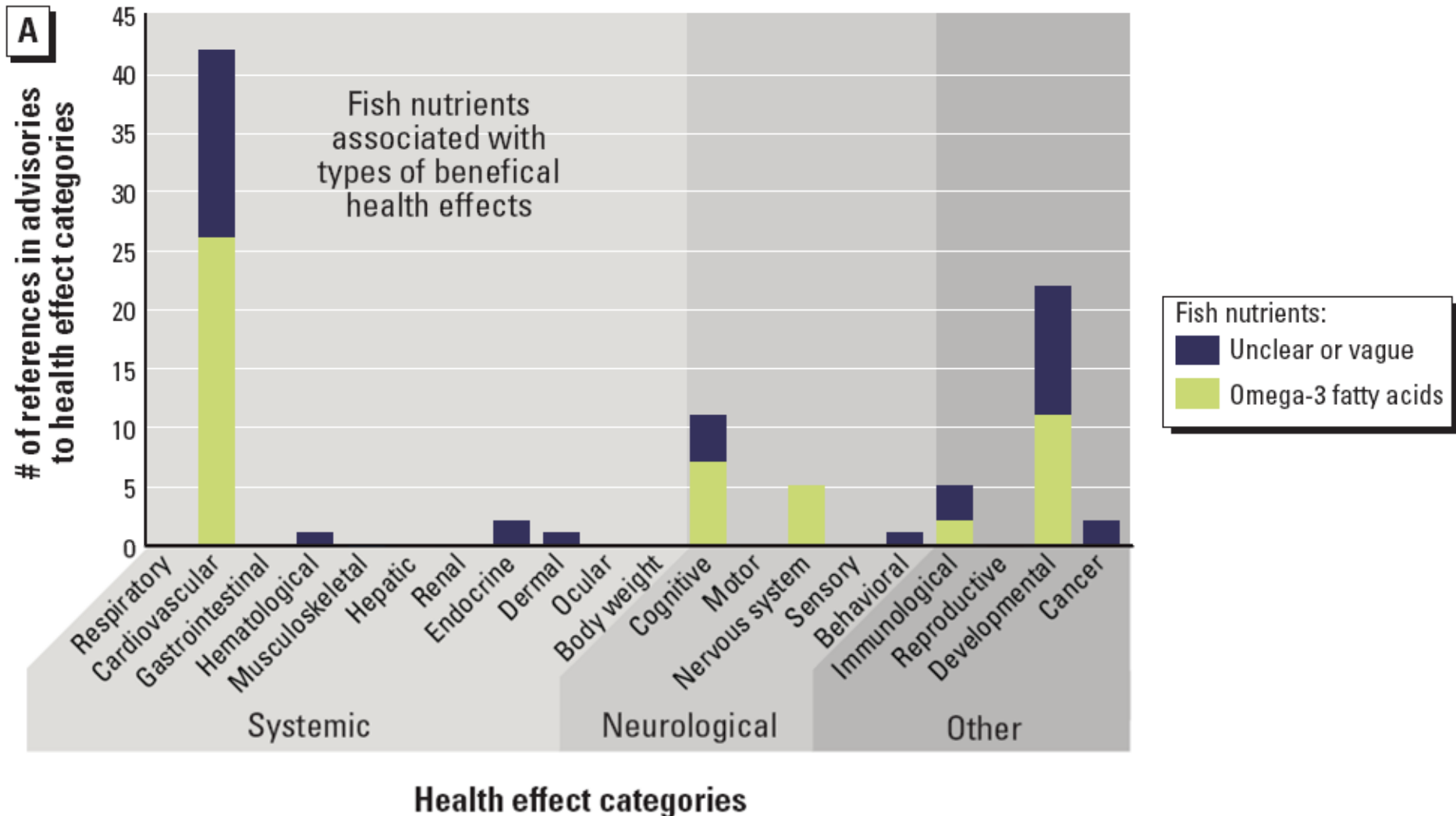


Figure 2A: References to beneficial health effects in advisories

Risk and Benefit Messages

Adverse Health Effects

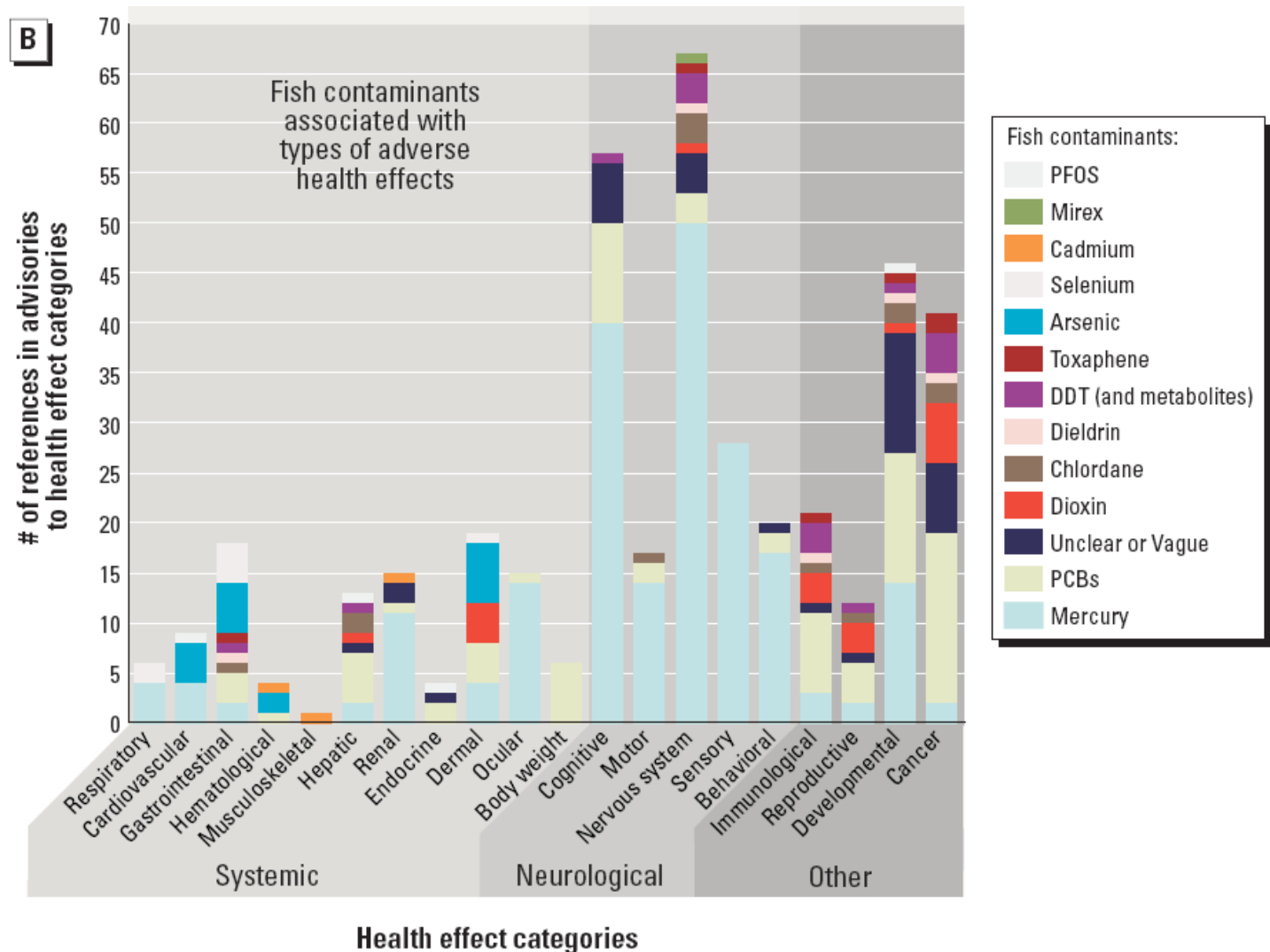


Figure 2B: References to adverse health effects in advisories



Risk and Benefit Messages

Clarity of risks

- 31% of advisory Web sites addressed risks posed by specific contaminants and explained potential adverse health effects in a clear and sufficient manner to sensitive populations.
- The following statement exemplifies clear and sufficiently explained risks: "too much mercury can affect your baby's brain and how your baby learns, moves and behaves."
- Few of the 42 advisories that addressed multiple contaminants explained the relationship between risks posed and advice in a clear and sufficient manner



Risk and Benefit Messages

Clarity of benefits

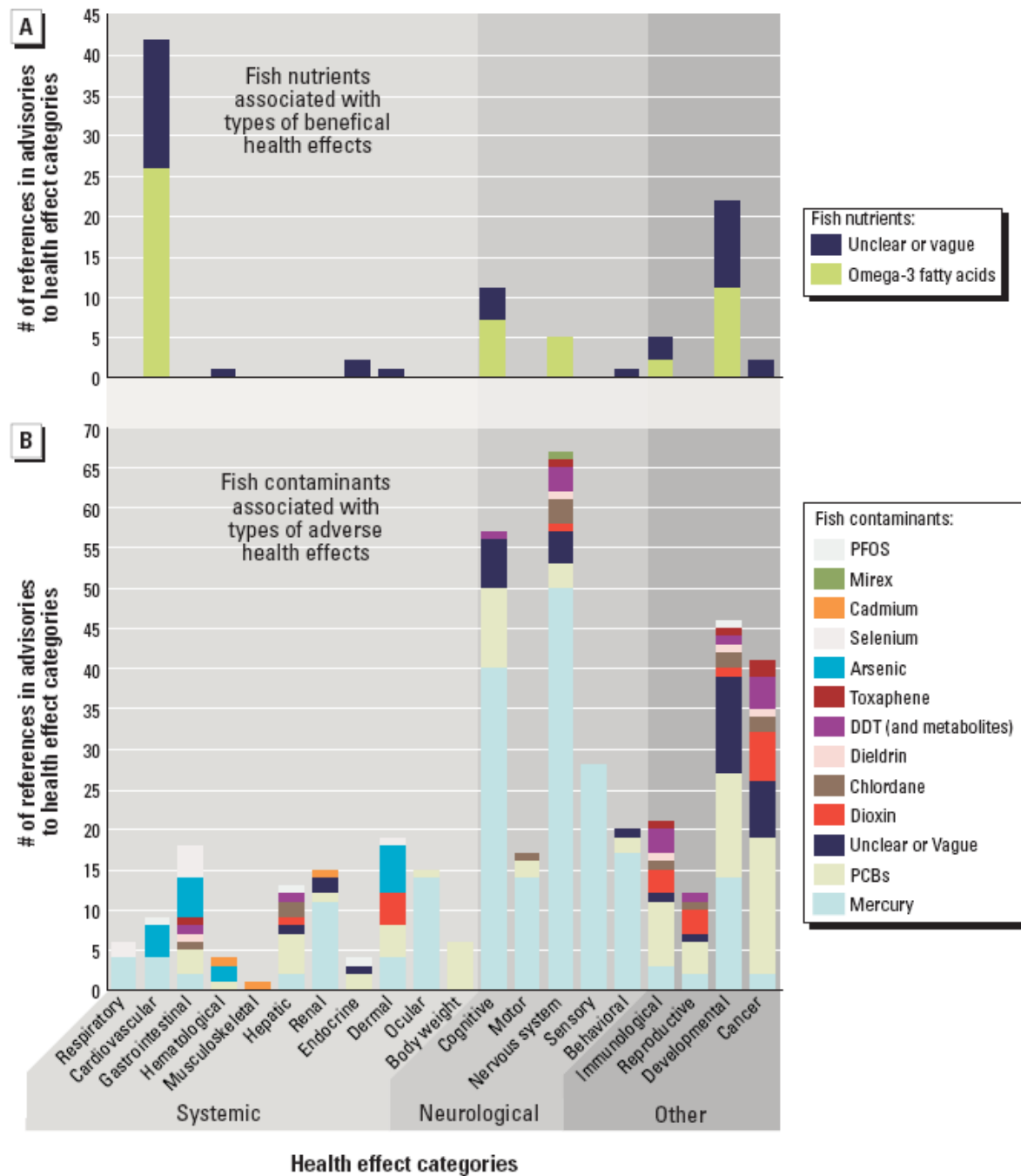
- 27% of advisory Web sites addressed benefits posed by specific contaminants and explained potential beneficial health effects in a clear and sufficient manner to sensitive populations.
- An example of explaining health benefits in a clear and sufficient manner is as follows: “Omega-3 fatty acids are important during fetal brain and eye development. Omega-3 fatty acids also help to prevent heart disease in adults”



Risk and Benefit Messages

Emphasis of risks and benefits

- In approximately 75% of advisories, both risks and benefits were emphasized, but risks were emphasized more than benefits.
- In the remaining cases, only risks were emphasized.





General Advisory Characteristics

Selected results

- Health agencies, environmental agencies, or a combination of multiple agencies working in concert were responsible for the vast majority of advisories issued by states.
- 28 Web sites referenced, at least to some extent, the methods used to develop advice. Among these, 23 used what appear to be risk-based approaches
- Numerous advisories recommended that sensitive populations consult their health care providers regarding fish consumption.



Discussion

- Results suggest that the message is uneven and that advisories may inadvertently cast a dim light on all fish consumption.
- It is not the intention of this analysis to fault state fish consumption advisories for presenting an uneven message.
- If these state advisories are a source of decision-making information for sensitive populations, then measures to improve message clarity would be valuable.



Conclusion

- This study suggests that important lessons learned can be gained from evaluation of available state fish consumption advisories.
- Means to enhance coordination across agencies include the development of workshops or online forums to encourage collaboration and discussion to share lessons learned and move towards harmonizing approaches.
- An additional way to help provide a more complete picture of risks and benefits is to develop standard metrics for describing the risks and benefits.

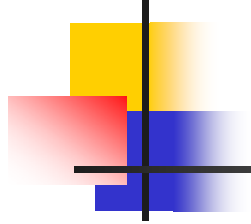


Acknowledgements

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Article published Dec. 2008:

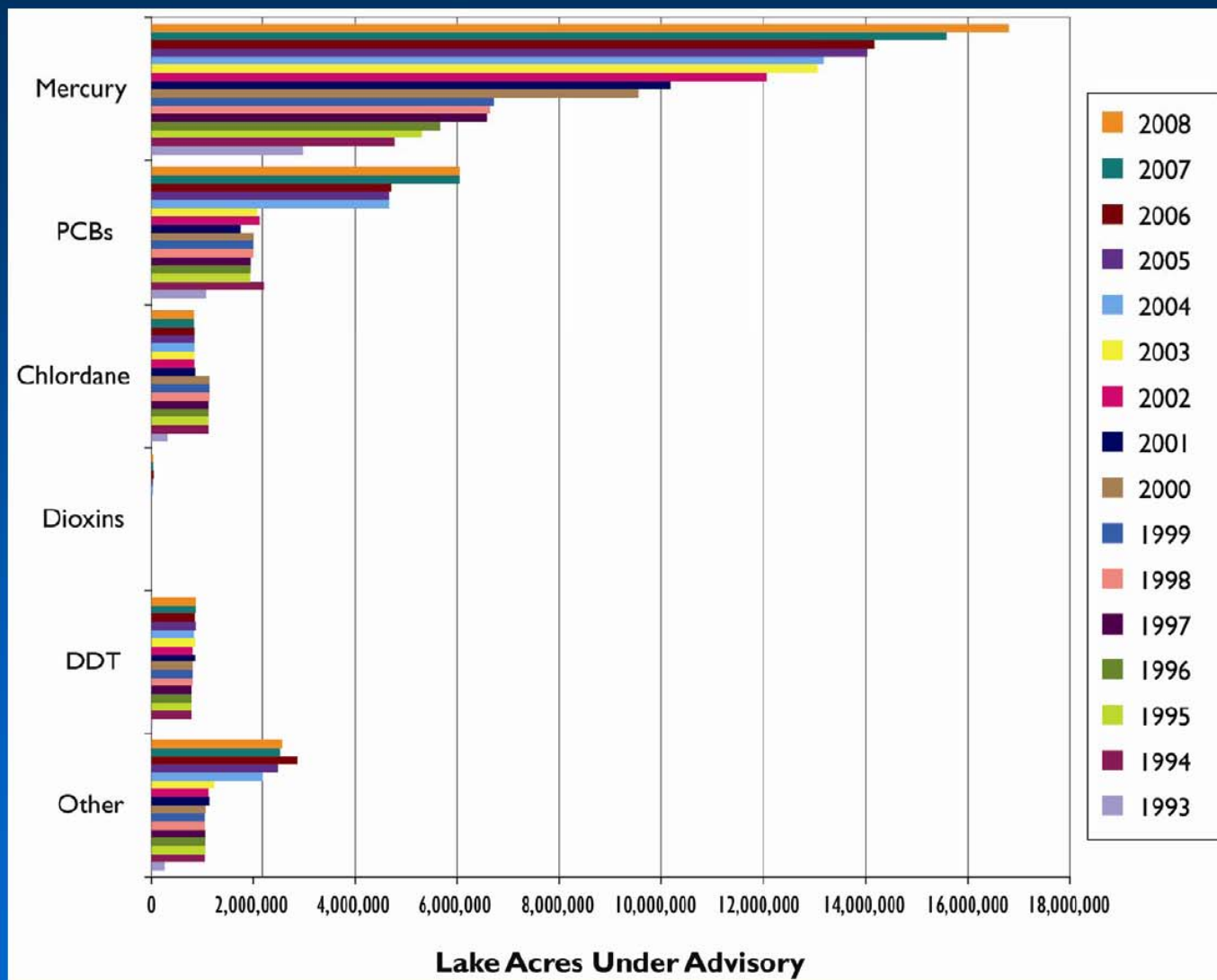
Scherer AC, Tsuchiya A, Younglove LR, Burbacher TM, Faustman EM. 2008. A Comparative Analysis of State Fish Consumption Advisories Targeting Sensitive Populations. *Environ Health Perspect* 116(12): 1598-1606.



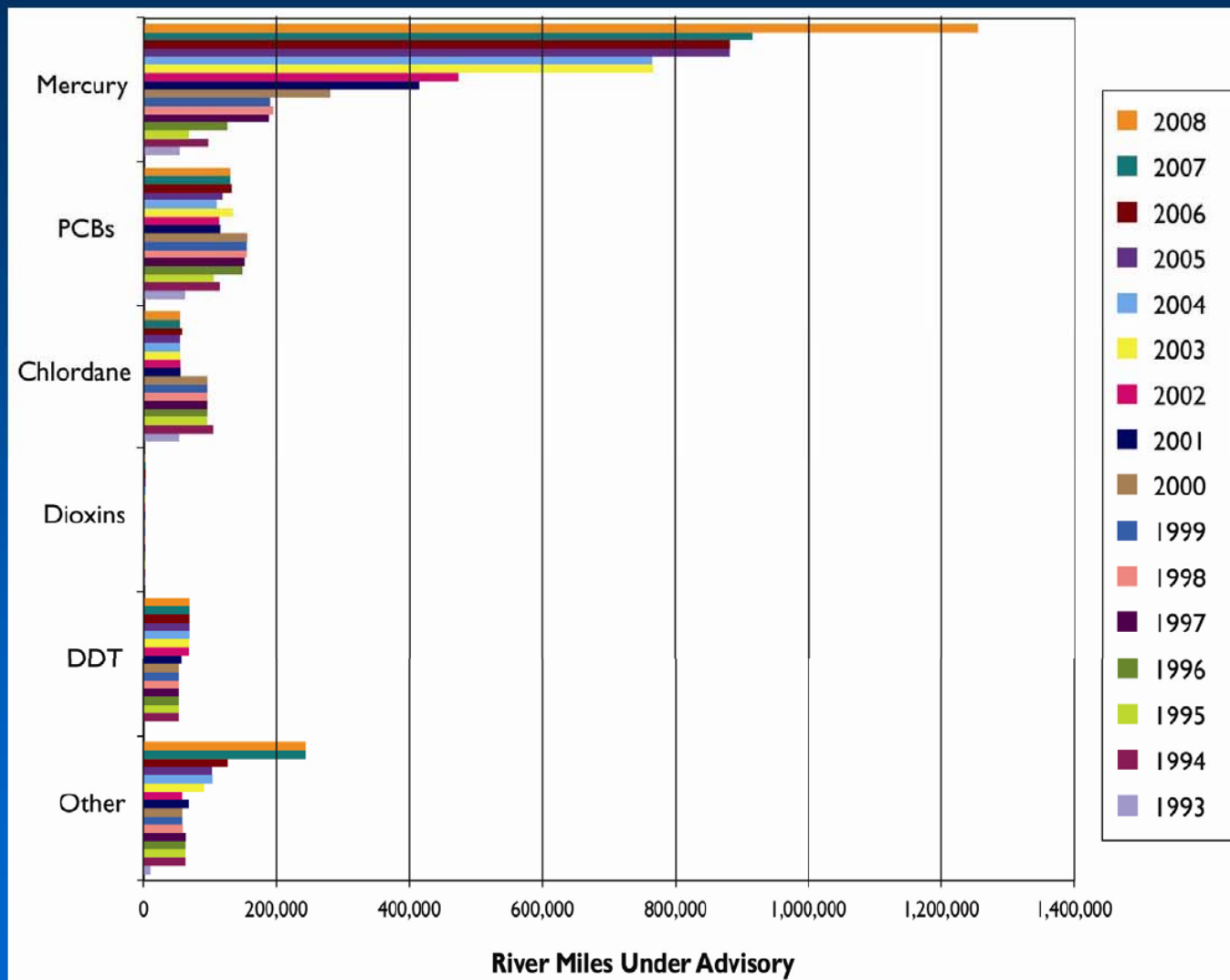
Thank you.

Questions?

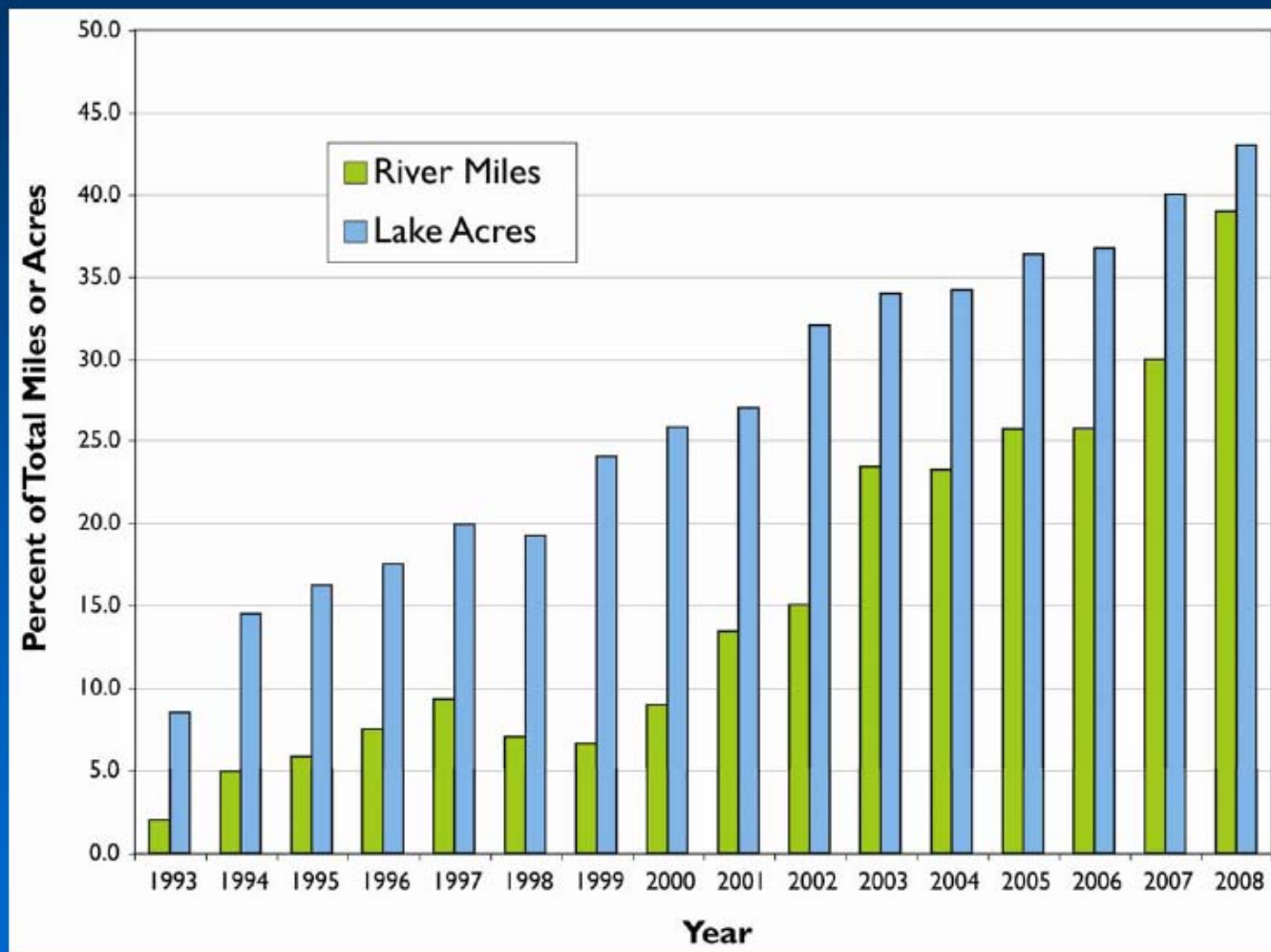
Number of Lake Acres Under Advisory for Various Pollutants, 1993-2008



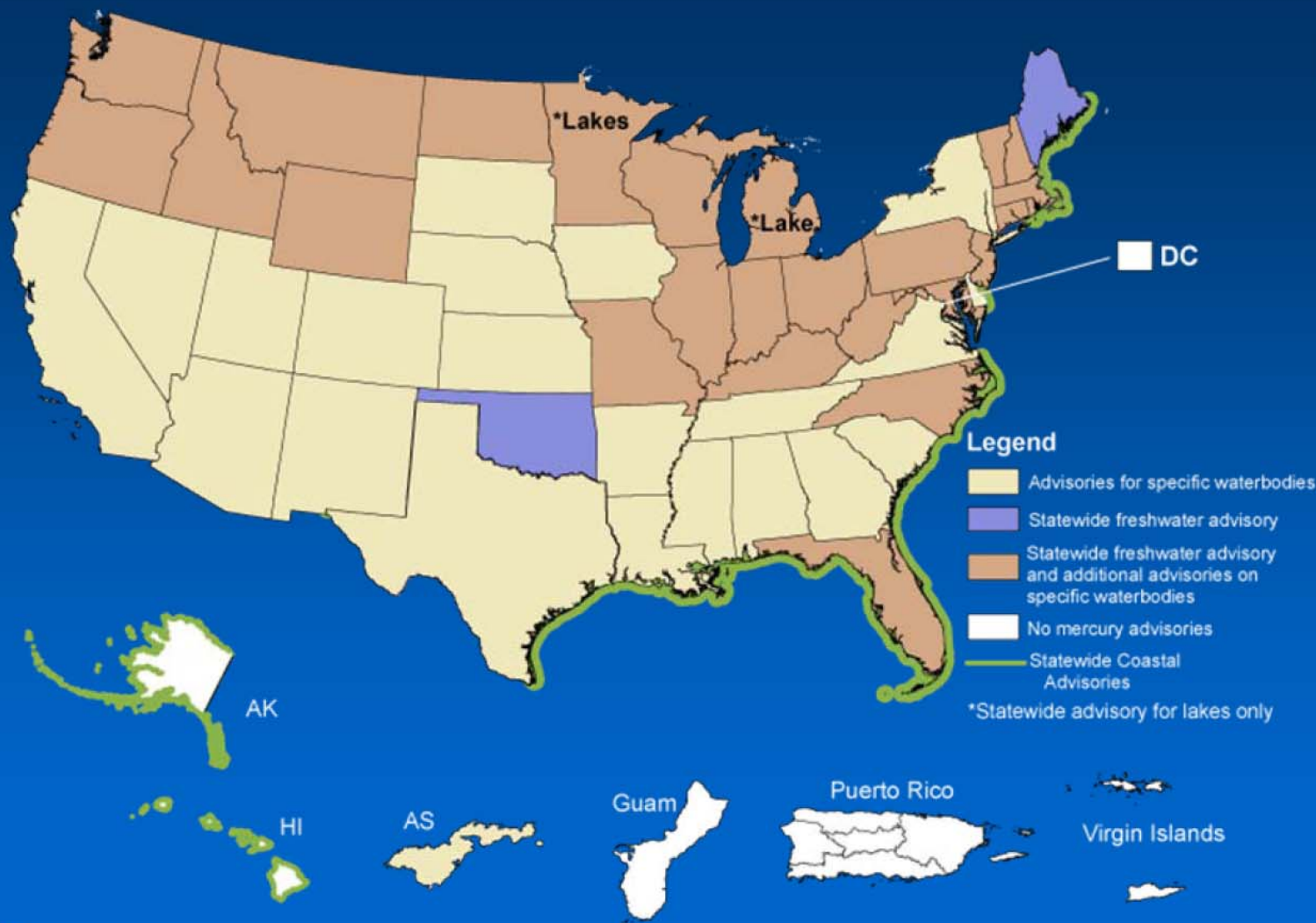
Number of River Miles Under Advisory for Various Pollutants, 1993-2008



Percentage of River Miles and Lake Acres Under Advisory, 1993-2008

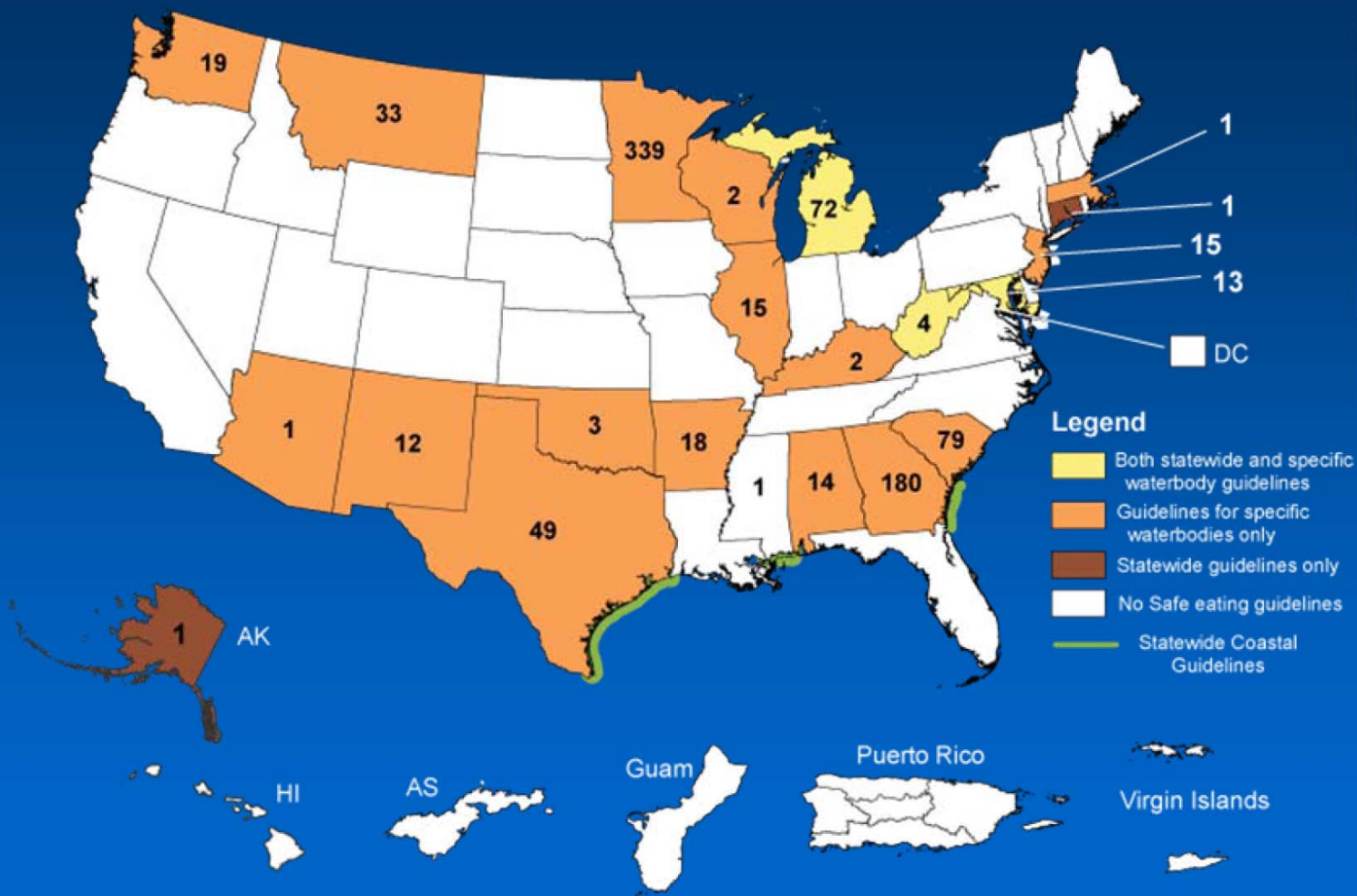


Fish Consumption Advisories for Mercury



NOTE: This map depicts the presence and type of fish advisories issued by the states for mercury as of December 2008. Because only selected waterbodies are monitored, this map does not reflect the full extent of chemical contamination of fish tissues in each state or territory.

Number of Safe Eating Guidelines by State (2008)



- Safe eating guidelines are issued to inform the public that certain species of fish from specific waterbodies have been tested and have been shown to contain low levels of contaminants. Guidelines can also be issued for all waterbodies in a state.
- Safe eating guideline data should not be used for:
 - Characterizing geographic distribution of chemical contaminants
 - Making interstate or international comparisons.
- Safe eating guidelines in the NLFA database are updated as new information is provided to USEPA's National Fish Contamination Program.

Understanding Risks

- Hazard identification
 - Dose-response assessment
 - Exposure assessment
 - Risk Characterization
-
- Risk Management
 - Risk Communications

Translation

- Is there a potential problem?
 - What is the problem?
 - Who has the problem?
 - How bad is the problem?
-
- What should we do about it?
 - Who do we tell and what do we say?

Washington State Healthy Fish Guide

**SAFE TO EAT
2-3 MEALS
PER WEEK**



OR

**SAFE TO EAT
1 MEAL
PER WEEK**



**AVOID
DUE TO MERCURY**



Follow this advice to reduce your exposure to mercury, PCBs, and other toxics:

♥ Anchovies
Butterfish
Catfish
Clams
Cod *(Pacific) (Atlantic)*
Crab *(Blue, King, Snow)*
(US, CAN) (imported King)
Crab-Imitation
Crayfish *(imported farmed)*
Flounder/Sole
(Pacific) (Atlantic)
♥ Herring
♥ Mackerel *(canned)*
♥ Oysters
Pollock/Fish sticks

♥ Salmon *(fresh, canned)*
♥ Chinook *(King)*
(coastal, AK)
♥ Chum *(Keta)*
♥ Coho *(Silver)*
♥ Farmed ★
♥ Pink *(Humpty)*
♥ Sockeye *(Red)*
♥ Sardines
Scallops
Shrimp/Prawns
(US, CAN) (imported)
Squid/Calamari
Tilapia *(US, Central/South America) (China, Taiwan)*
♥ Trout
Tuna *(canned light)*

♥ Black sea bass
Chilean sea bass
♥ Chinook salmon
(Puget Sound)
Croaker
Halibut *(Pacific) (Atlantic)*
Lobster *(US, CAN)*
(imported Spiny Caribbean)

Mahi mahi
(imported longline)
Monkfish
Rockfish/Red snapper
(trawl-caught)
♥ Sablefish/Black cod
♥ Tuna, Albacore
(fresh, canned white)
(WA, OR, CA troll/pole)
(longline - except Hawaii)



A seafood serving or "meal"
is about the size and thickness
of your hand, or 1 oz. for
every 20 lbs. of body weight.

160 lb. Adult = 8 oz. 80 lb. Child = 4 oz.

**Women who are or may become
PREGNANT, NURSING MOTHERS,
and CHILDREN should NOT eat:**

Mackerel *(King)*
Marlin *(imported)*
Shark
Swordfish *(imported)*
Tilefish *(Gulf of Mexico,
South Atlantic)*

Tuna Steak
Bluefin
Bigeye
(imported longline)
Yellowfin
(imported longline)

♥ Highest in healthy omega-3 fatty acids

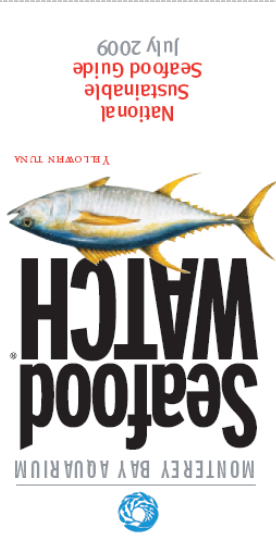

ORANGE TEXT: Overfished, farmed, or caught using
methods harmful to marine life and/or environment

★ For environmental and health information, visit
www.doh.wa.gov/fish/farmedsalmon

Washington State Healthy Fish Guide

- WA State Department of Health's advice is to "Eat Fish, Be Smart, Choose Wisely"
- The Fish Guide gives advice about which fish to eat and which fish to avoid based:
 - Primarily on **human health** impacts from
 - Contaminants (mercury, PCBs)
 - Nutrients (Omega-3 fatty acids), and
 - Also on **ecological health** impacts from
 - Overfishing,
 - Harvest methods, etc

Monterey Bay Aquarium National Sustainable Seafood Pocket Guide

BEST CHOICES	GOOD ALTERNATIVES	AVOID	Support Ocean-Friendly Seafood
<p>Arctic Char (farmed) Barramundi (US farmed) Catfish (US farmed) Clams (farmed) Cobia (US farmed) Cod: Pacific (Alaska longline)⁺ Crab: Dungeness, Stone Halibut: Pacific⁺ Lobster: Spiny (US) Mussels (farmed) Oysters (farmed) Pollock (Alaska wild)⁺ Salmon (Alaska wild)⁺ Scallops: Bay (farmed) Striped Bass (farmed or wild)⁺ Tilapia (US farmed) Trout: Rainbow (farmed) Tuna: Albacore (troll/pole, US⁺ or British Columbia) Tuna: Skipjack (troll/pole)</p>	<p>Caviar, Sturgeon (US farmed) Clams (wild) Cod: Pacific (US trawled) Crab: Blue*, King (US), Snow Crab: Imitation/Surimi Flounders, Soles (Pacific) Herring: Atlantic Lobster: American/Maine Mahi mahi/Dolphinfish (US) Oysters (wild)* Scallops: Sea (wild) Shrimp (US, Canada) Squid Swai, Basa (farmed) Swordfish (US)* Tilapia (Central America, farmed) Tuna: Bigeye, Yellowfin (troll/pole) Tuna: Canned Skipjack and Albacore* Yellowtail (US farmed)</p>	<p>Caviar, Sturgeon* (imported wild) Chilean Seabass/Toothfish* Cobia (imported farmed) Cod: Atlantic, imported Pacific Flounders, Halibut, Soles (Atlantic) Groupers* Lobster: Spiny (Caribbean) Mahi mahi/Dolphinfish (imported) Marlin: Blue*, Striped* Monkfish Orange Roughy* Salmon (farmed, including Atlantic)* Sharks* Shrimp (imported) Snapper: Red Swordfish (imported)* Tilapia (Asia farmed) Tuna: Albacore, Bigeye, Yellowfin (longline)* Tuna: Bluefin*, Tongol, Canned (except Albacore and Skipjack) Yellowtail (imported, farmed)</p>	<p>Best Choices are abundant, well-managed and caught or farmed in environmentally friendly ways.</p> <p>Good Alternatives are an option, but there are concerns with how they're caught or farmed – or with the health of their habitat due to other human impacts.</p> <p>Avoid for now as these items are caught or farmed in ways that harm other marine life or the environment.</p> <p>Key * Limit consumption due to concerns about mercury or other contaminants. Visit www.edf.org/seafood ⁺ Some or all of this fishery is certified as sustainable to the Marine Stewardship Council standard. Visit www.msc.org</p> <p>Seafood may appear in more than one column</p>
	<p>Learn More</p> <p>Our recommendations are researched by Monterey Bay Aquarium scientists. For more information about your favorite seafoods, including items not listed here, visit www.seafoodwatch.org. Pocket guides are updated twice yearly. Get current information on your mobile device, on our website or by adding our free app to your iPhone.</p>  <p>MONTEREY BAY AQUARIUM</p> <p><small>The seafood recommendations in this guide are credited to the Monterey Bay Aquarium Foundation ©2009. All rights reserved. Printed on recycled paper.</small></p>	<p>You Can Make A Difference</p> <p>Support ocean-friendly seafood in three easy steps:</p> <ol style="list-style-type: none"> 1. Purchase seafood from the green list or, if unavailable, the yellow list. Or look for the Marine Stewardship Council blue eco-label in stores and restaurants. 2. When you buy seafood, ask where your seafood comes from and whether it was farmed or wild-caught. 3. Tell your friends about Seafood Watch. The more people that ask for ocean-friendly seafood, the better! 	<p>Why Do Your Seafood Choices Matter?</p> <p>Worldwide, the demand for seafood is increasing. Yet fish we enjoy eating are over-fished and, in the U.S., we import 80% of our seafood to meet the demand. Destructive fishing and fish farming practices only add to the problem.</p> <p>By purchasing fish caught or farmed using environmentally friendly practices, you're supporting healthy, abundant oceans.</p> <p><small>Continuant information provided by: ENVIRONMENTAL DEFENSE FUND</small></p>

Monterey Bay Aquarium National Sustainable Seafood Pocket Guide: Side 1

Why Do Your Seafood Choices Matter?

Worldwide, the demand for seafood is increasing. Yet many populations of the large fish we enjoy eating are over-fished and, in the U.S., we import 80% of our seafood to meet the demand. Destructive fishing and fish farming practices only add to the problem.

By purchasing fish caught or farmed using environmentally friendly practices, you're supporting healthy, abundant oceans.

Contaminant information provided by:
ENVIRONMENTAL DEFENSE FUND

You Can Make A Difference

Support ocean-friendly seafood in three easy steps:

1. Purchase seafood from the green list or, if unavailable, the yellow list. Or look for the Marine Stewardship Council  blue eco-label in stores and restaurants.
2. When you buy seafood, ask where your seafood comes from and whether it was farmed or wild-caught.
3. Tell your friends about Seafood Watch. The more people that ask for ocean-friendly seafood, the better!

Learn More

Our recommendations are researched by Monterey Bay Aquarium scientists. For more information about your favorite seafoods, including items not listed here, visit www.seafoodwatch.org.

Pocket guides are updated twice yearly. Get current information on your mobile device, on our website or by adding our free app to your iPhone.



**MONTEREY BAY
AQUARIUM**

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MONTEREY BAY AQUARIUM

Seafood WATCH[®]



YELLOWFIN TUNA

**National
Sustainable
Seafood Guide**
July 2009

Monterey Bay Aquarium National Sustainable Seafood Pocket Guide: Side 2

BEST CHOICES

Arctic Char (farmed)
 Barramundi (US farmed)
 Catfish (US farmed)
 Clams (farmed)
 Cobia (US farmed)
 Cod: Pacific (Alaska longline)⁺
 Crab: Dungeness, Stone
 Halibut: Pacific⁺
 Lobster: Spiny (US)
 Mussels (farmed)
 Oysters (farmed)
 Pollock (Alaska wild)⁺
 Salmon (Alaska wild)⁺
 Scallops: Bay (farmed)
 Striped Bass (farmed or wild*)
 Tilapia (US farmed)
 Trout: Rainbow (farmed)
 Tuna: Albacore (troll/pole, US⁺ or British Columbia)
 Tuna: Skipjack (troll/pole)

GOOD ALTERNATIVES

Caviar, Sturgeon (US farmed)
 Clams (wild)
 Cod: Pacific (US trawled)
 Crab: Blue*, King (US), Snow
 Crab: Imitation/Surimi
 Flounders, Soles (Pacific)
 Herring: Atlantic
 Lobster: American/Maine
 Mahi mahi/Dolphinfish (US)
 Oysters (wild)*
 Scallops: Sea (wild)
 Shrimp (US, Canada)
 Squid
 Swai, Basa (farmed)
 Swordfish (US)*
 Tilapia (Central America, farmed)
 Tuna: Bigeye, Yellowfin (troll/pole)
 Tuna: Canned Skipjack and Albacore*
 Yellowtail (US farmed)

AVOID

Caviar, Sturgeon* (imported wild)
 Chilean Seabass/Toothfish*
 Cobia (imported farmed)
 Cod: Atlantic, imported Pacific
 Flounders, Halibut, Soles (Atlantic)
 Groupers*
 Lobster: Spiny (Caribbean)
 Mahi mahi/Dolphinfish (imported)
 Marlin: Blue*, Striped*
 Monkfish
 Orange Roughy*
 Salmon (farmed, including Atlantic)*
 Sharks*
 Shrimp (imported)
 Snapper: Red
 Swordfish (imported)*
 Tilapia (Asia farmed)
 Tuna: Albacore, Bigeye, Yellowfin (longline)*
 Tuna: Bluefin*, Tongol, Canned (except Albacore and Skipjack)
 Yellowtail (imported, farmed)

Support Ocean-Friendly Seafood

Best Choices are abundant, well-managed and caught or farmed in environmentally friendly ways.

Good Alternatives are an option, but there are concerns with how they're caught or farmed – or with the health of their habitat due to other human impacts.

Avoid for now as these items are caught or farmed in ways that harm other marine life or the environment.

Key

* Limit consumption due to concerns about mercury or other contaminants. Visit www.edf.org/seafood

⁺ Some or all of this fishery is certified as sustainable to the Marine Stewardship Council standard. Visit www.msc.org

Seafood may appear in more than one column

Sustainable seafood pocket guides are also available for sushi and the following regions:



Sushi Sustainable Seafood Pocket Guide

BEST CHOICES

Amaebi/Spot prawn (BC)
 Awabi/Abalone (US farmed)
 Gindara/Sablefish/Black cod (AK⁺, BC)
 Ikura/Salmon roe (AK wild)⁺
 Iwana/Arctic char (farmed)
 Iwashi/Pacific sardines (US)
 Izumidai/Tilapia (US farmed)
 Kaki/Oysters (farmed)
 Kanikama/Surimi/Imitation crab (AK pollock)⁺
 Katsuo/Bonito/Skipjack tuna (troll/pole)
 Masago/Smelt roe (Iceland)
 Mirugai/Giant clam/Geoduck (wild)
 Muurugai/Mussels (farmed)
 Sake/Salmon (AK wild)⁺
 Sawara/Spanish mackerel (US)^{*}
 Shiro Maguro/Albacore tuna (troll/pole, BC or US)⁺
 Suzuki/Striped bass (farmed or wild)^{*}
 Uni/Sea urchin roe (Canada)

GOOD ALTERNATIVES

Amaebi/Spot prawn (US)
 Ebi/Shrimp (US, Canada)
 Gindara/Sablefish/Black cod (CA, OR or WA)
 Hirame/Karei/Flounders, Soles (Pacific)
 Hotate/Sea scallops (wild)
 Izumidai/Tilapia (Central America farmed)
 Kani/Crab: Blue^{*}, King (US), Snow
 Kanikama/Surimi/Imitation crab (except AK pollock)⁺
 Kampachi/Yellowtail (US farmed)
 Maguro/Tuna: Bigeye, Yellowfin (troll/pole)
 Masago/Smelt roe (Canada)
 Sake/Salmon (WA wild)^{*}
 Shiro Maguro/Albacore tuna (Hawaii)⁺^{*}
 Squid
 Tai/Red porgy (US)
 Toro/Tuna: Bigeye, Yellowfin (troll/pole)
 Uni/Sea urchin roe (CA)

AVOID

Ankimo/Monkfish liver
 Ankoh/Monkfish
 Ebi/Shrimp (imported)
 Hamachi/Hiramasu/Yellowtail (imported, farmed)
 Hirame/Karei/Flounders, Soles, Halibut (Atlantic)
 Hon Maguro/Bluefin tuna^{*}
 Izumidai/Tilapia (Asia farmed)
 Kani/Crab: King (imported)
 Maguro/Tuna: Bigeye⁺^{*}, Yellowfin⁺^{*}
 Sake/Salmon (farmed, including Atlantic)^{*}
 Shiro Maguro/Albacore tuna⁺^{*} (imported)
 Tai/Red snapper
 Tako/Octopus
 Toro/Tuna: Bigeye⁺^{*}, Bluefin^{*}, Yellowfin⁺^{*}
 Unagi/Freshwater eel
 Uni/Sea urchin roe (Maine)

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Key

AK = Alaska BC = British Columbia
 CA = California OR = Oregon
 WA = Washington

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⁺ Indicates longline-caught

Seafood may appear in more than one column

West Coast Sustainable Seafood Pocket Guide

BEST CHOICES

Abalone (US farmed)
 Arctic Char (farmed)
 Barramundi (US farmed)
 Catfish (US farmed)
 Clams, Mussels, Oysters (farmed)
 Cobia (US farmed)
 Cod: Pacific (Alaska longline)⁺
 Crab: Dungeness
 Halibut: Pacific⁺
 Lobster: Spiny (US)
 Pollock (Alaska wild)⁺
 Rockfish: Black (CA, OR)
 Sablefish/Black Cod (Alaska⁺, BC)
 Salmon (Alaska wild)⁺
 Sardines: Pacific (US)
 Scallops: Bay (farmed)
 Shrimp: Pink (OR)⁺
 Striped Bass (farmed or wild*)
 Tilapia (US farmed)
 Trout: Rainbow (farmed)
 Tuna: Albacore (troll/pole, US⁺ or BC)
 Tuna: Skipjack (troll/pole)
 White Seabass

GOOD ALTERNATIVES

Caviar, Sturgeon (US farmed)
 Clams, Oysters* (wild)
 Cod: Atlantic (US trawled)
 Crab: King (US), Snow, Imitation
 Flounders, Soles (Pacific)
 Halibut: California
 Lingcod*
 Lobster: American/Maine
 Mahi mahi/Dolphinfish (US)
 Rockfish (Alaska or BC, hook & line)
 Sablefish/Black Cod (CA, OR, WA)
 Salmon (WA wild)*
 Sanddabs: Pacific
 Scallops: Sea (wild)
 Shrimp (US, Canada)
 Spot Prawn (US)
 Squid
 Swai, Basa (farmed)
 Swordfish (US)*
 Tilapia (Central America farmed)
 Tuna: Bigeye, Yellowfin (troll/pole)
 Tuna: Canned Skipjack and Albacore*
 Yellowtail (US farmed)

AVOID

Caviar, Sturgeon* (imported wild)
 Chilean Seabass/Toothfish*
 Cod: Atlantic, imported Pacific
 Cobia (imported farmed)
 Crab: King (imported)
 Dogfish (US)*
 Grenadier/Pacific Roughy
 Lobster: Spiny (Caribbean)
 Mahi mahi/Dolphinfish (imported)
 Marlin: Blue*, Striped*
 Monkfish
 Orange Roughy*
 Rockfish (trawled)*
 Salmon (farmed, including Atlantic)*
 Sharks*
 Shrimp (imported)
 Swordfish (imported)*
 Tilapia (Asia farmed)
 Tuna: Albacore, Bigeye, Yellowfin (longline)*
 Tuna: Bluefin*, Tongol, Canned (except Albacore and Skipjack)
 Yellowtail (imported, farmed)

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Seafood may appear in more than one column

Tribal Rights and Fish Consumption Workshop

On August 12-13, 2009 the University of Washington hosted the “Tribal Rights and Fish Consumption Workshop: Issues and Opportunities for the Pacific Northwest.”

Products include: An online fish consumption resources page containing articles, reports, contacts, select presentations, and links to other conferences relevant to workshop themes.

Web site: <http://depts.washington.edu/tribalws/index.php>



Participants listen to a presentation. Photo courtesy Sarah Fisher

The workshop successfully brought together 64 people including:

- 27 participants representing 14 tribes,
- 14 academicians,
- 14 government agency representatives,
- 6 members of the private sector, and
- 3 environmental advocates

Sept. 2009: EPA Announced 6 Essential Principles for Reform of Chemicals Management Legislation

Principle No. 1: Chemicals Should be Reviewed Against Safety Standards that are Based on Sound Science and Reflect Risk-based Criteria Protective of Human Health and the Environment.

Principle No. 2: Manufacturers Should Provide EPA with the Necessary Information to Conclude That New and Existing Chemicals are Safe and Do Not Endanger Public Health or the Environment.

Principle No. 3: Risk Management Decisions Should Take into Account Sensitive Subpopulations, Cost, Availability of Substitutes and Other Relevant Considerations.

Principle No. 4: Manufacturers and EPA Should Assess and Act on Priority Chemicals, Both Existing and New, in a Timely Manner.

Principle No. 5: Green Chemistry Should Be Encouraged and Provisions Assuring Transparency and Public Access to Information Should Be Strengthened.

Principle No. 6: EPA Should Be Given a Sustained Source of Funding for Implementation.

Example of fish benefits described in a community recipe book



Fish are lowfat and high in protein.



Shellfish contain zinc and magnesium, which we all need to stay healthy.



Eating fish and shellfish helps keep our hearts healthy and reduces risk of heart attack.



Shellfish are very low in fat and high in protein.



Fishing and collecting shellfish are fun, low cost family activites.



Issues to consider

- Benefits of fish
- Health risk
- Degree of threat
- Affected population
- Habits
- Behavior
- Cultural practices
- Economics
- Legal

Seafood (finfish and shellfish) consumption is diverse

Mackerel さば 고등어



Flounder ひらめ/かれい 가자미



Pike Mackerelさんま 꽁치



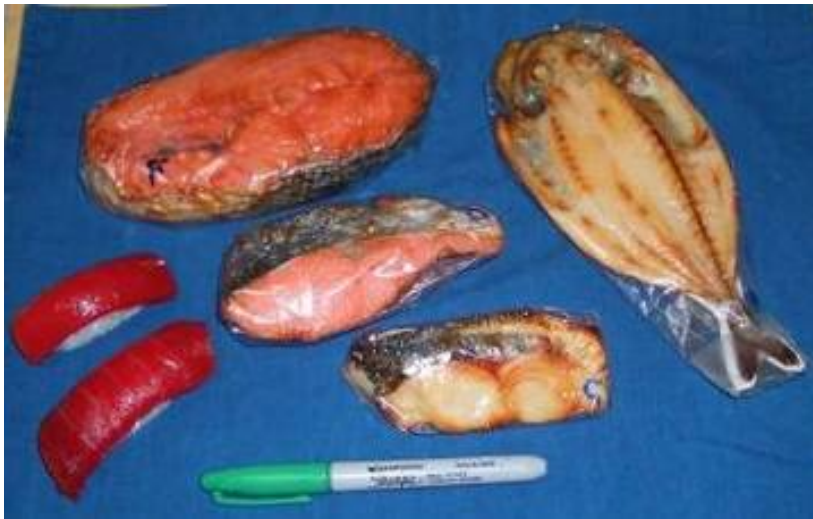
Salmon さけ 연어



Eel うなぎ 뱀장어



Carp こい 잉어





Benefits of Fish and Shellfish

■ Fish and Your Heart

- Omega-3 fatty acids are polyunsaturated fatty acids found in all seafood, including shellfish, oysters and shrimp.
- These fatty acids may help protect against heart disease, including lowering the risk for heart attacks and sudden cardiac arrest due to an irregular heartbeat.
- Studies show the protective effects of omega-3s can be achieved by eating fresh water fish and seafood twice a week. (Information About Omega-3s Courtesy of the American Dietetic Association.)



More Fish Benefits

- **Protecting Against Stroke**

- Strokes and heart attacks can occur due to blood clots, and blood clots are caused when platelets (a part of blood) clump.
- Fish, like aspirin, keep platelets from clumping and, therefore, help prevent clots.

- **Fish are Important**

- In Washington State, fish and shellfish are important sources of nutrition and catching, preparing and eating fish are important cultural and family practices.



Contamination

■ Variety of contaminants

■ Microorganisms

- Bacteria (Vibrio)
- Algal toxins (PSP & Domoic Acid)-mostly shellfish

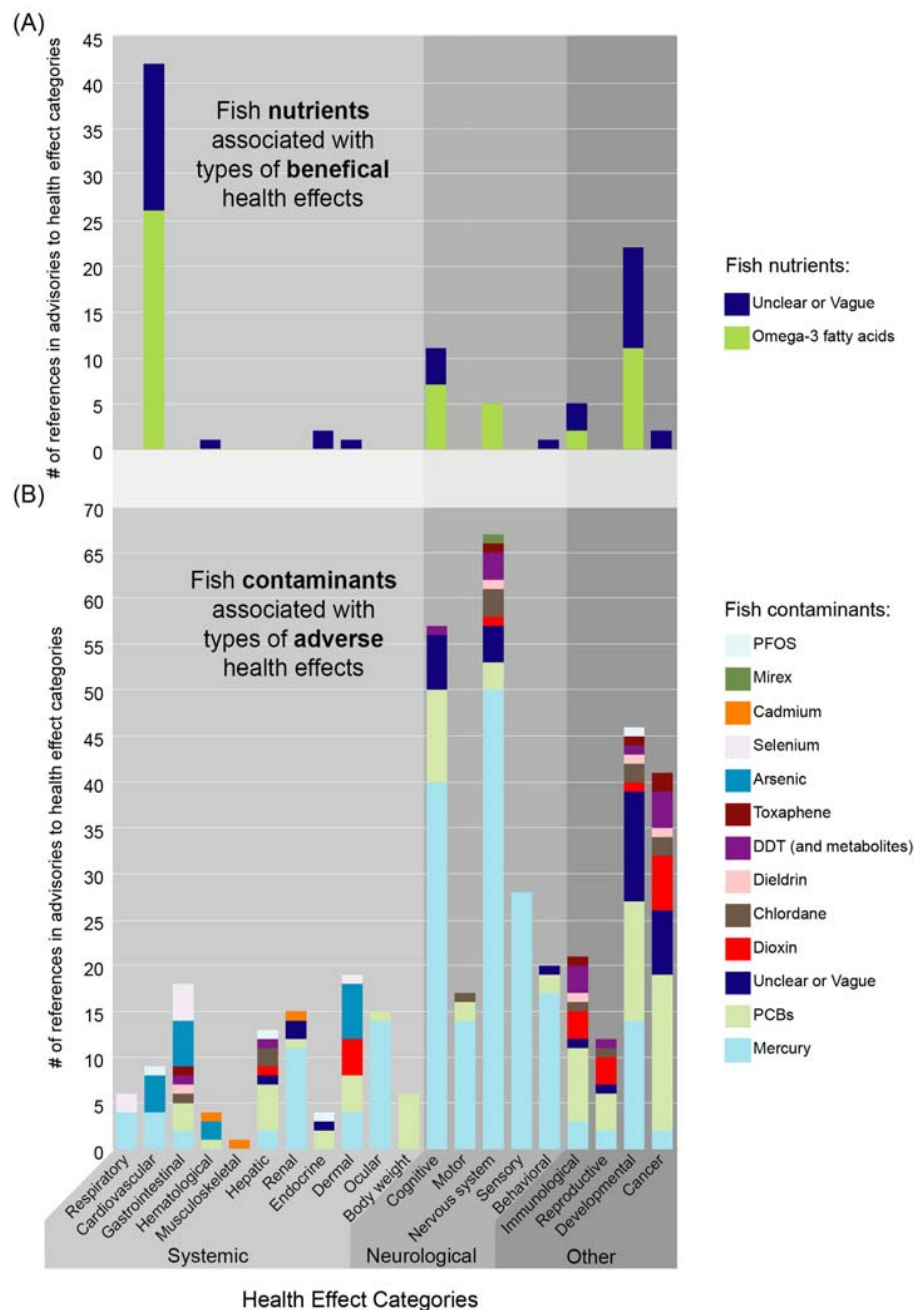
■ Viruses

- Very little is known about these contaminants

■ Persistent bioaccumulative toxins

- Mercury, PCBs, dioxins, DDT
- More of a problem in older, larger fish that bioaccumulate them

Figure (A) Fish nutrients associated with beneficial health effects and (B) fish contaminants associated with adverse health effects in state fish consumption advisories.



Results: Risk and Benefit Messages

- This figure illustrates references to types of beneficial and adverse health effects in advisories and with which fish nutrients (A) and contaminants (B), respectively, they are associated.
- There were over 4.5 times more references to adverse health effects compared to beneficial health effects associated with fish consumption.
- References to adverse non-neurological systemic effects were associated with a variety of contaminants, whereas the far numerous references to adverse neurological effects specifically were primarily associated with mercury in fish, and to a lesser extent with 7 other specific contaminants (B).
- Adverse developmental effects were mostly associated with mercury, PCBs, and unspecified (unclear or vague) contaminant exposure.
- References to beneficial health effects (A) were made with respect to Omega-3 fatty acids in fish or to unspecified (unclear or vague) fish nutrients only.
- References to cardiovascular benefits dominated, followed by developmental and then cognitive benefits.



Fish Advisories in the United States, 2009

- In Sept. 2009, EPA released the 2008 Biennial National Listing of Fish Advisories
- In 2008, all states had fish consumption advisories (4,249 total) in effect
- 5 bioaccumulative contaminants (mercury, PCBs, chlordane, dioxin, and DDT) are responsible for 97% of advisories
- 45% of the nation's total lake acreage and 39% of the nation's total river miles are under advisory



Fish advisory issues

- Pollutants
 - Five persistent bioaccumulative toxins responsible for 97% of advisories:
 - PCBs, methyl mercury, chlordane, dioxin, DDT (EPA, 2009)
 - Sample, sample, sample
 - Analytical issues
 - PCB and dioxin congeners



Fish advisory issues

- Consumption patterns
 - Who's eating what and how much
 - High-end consumers



Fish advisory issues

- Statewide versus water body specific
 - Should we wait for data?
 - Will we ever get it?
 - Can we extrapolate?
 - Regional deposition of contaminants
 - No source for mercury
 - Lakes with no data may be perceived as “clean”
 - 37 advisories total in WA (EPA, 2007)



Fish advisory issues

- Evaluation
 - Is it working?
 - Not much data
 - comprehension
 - behavior change



Who issues fish advisories?

- State and local health departments
 - WA State Dept. of Health
 - Commercial and recreational
- Food and Drug Administration and Environmental Protection Agency
- Many other agencies involved
 - WA Dept. of Ecology, USGS, WA F&W
 - Mostly sampling but also outreach/education



Fish advisory issues

- Outreach/education
 - What are our best methods?
 - Signs
 - General or specific
 - Internet
 - Fact sheets
 - Community meetings
 - Duwamish
 - Physicians