

Part Two: Slides Presented During Plenary Sessions

I. Update on Activities Related to the 2001 Forum

- A. *New Version of the Risk Communication Guidance.* Barbara Knuth, Cornell University
- B. *Update: Relationship of TMDLs to Fish Advisories.* Jim Pendergast, US EPA

II. Reports from the Weekend Sessions

- A. *Methylmercury Contamination in Fish: Human Exposures and Case Reports.* Henry A. Anderson, State of Wisconsin
- B. *Report on Mercury Advisory Worksheets.* Amy D. Kyle, University of California Berkeley

III. Advisories for Commercial Fish: Federal, State, and Tribal Approaches

- A. *FDA Consumer Advisory for Methylmercury.* Philip Spiller, US FDA
- B. *Sport and Commercial Seafood Wisconsin Integrated Public Health Message: Maximize Health Benefit, Minimize Risk, Coordinate Health Message.* Henry A. Anderson, State of Wisconsin
- C. *Context for Connecticut's Seafood Advisory.* Gary Ginsburg, State of Connecticut
- D. *Consumer Advisory for Commercial Fish.* Andy Smith, State of Maine.

IV. Hot Topics—Chemicals of Concern

A. Mercury

- *Methylmercury: Ongoing Research on Toxicology.* Kathryn R. Mahaffey, US EPA
- *Setting a Methylmercury Reference Dose (RfD) for Adults.* Alan H. Stern, State of New Jersey

B. Brominated Flame Retardants (Polybrominated Diphenyl Ethers or BDEs)

- *Occurrence of PBDE Flame Retardants in Fish.* Robert C. Hale, Virginia Institute of Marine Science
- *PBDEs: Toxicology and Human Exposure.* Linda S. Birnbaum, US EPA
- *Polybrominated Diphenyl Ethers (BDEs).* Khizar Wasti, State of Virginia

C. Dioxins and Coplanar PCBs

- *Emerging Science of the Dioxin Reassessment.* Dwain Winters, US EPA

D. Lead

- *Application of the Lead IEUBK Model to Assess Spokane River Fish Consumption Health Risks.* Lon Kissinger, US EPA Region 10.
- *Occurrence of Lead in Fish.* Robert Brodberg, State of California

E. Polycyclic Aromatic Hydrocarbons

- *Polycyclic Aromatic Hydrocarbons (PAHs) in Fish and Invertebrates.* Usha Varanasi, Northwest Fisheries Science Center, National Oceanic and Atmospheric Administration

V. Approaches to State and Tribal Advisories

- A. *Setting Statewide Advisories Based on Upper Percentile Lake Averages.* Eric Frohberg, State of Maine
- B. *Use of Maine's Statewide Advisory in a Tribal Setting.* Susan M. Peterson, Aroostook Band of Micmacs Environmental Laboratory
- C. *North Dakota's Fish Consumption Advisory: A Statewide Advisory Based on Average Concentrations.* Mike Ell, State of North Dakota

- D. *Advisories in Pennsylvania*. Bob Frey, State of Pennsylvania
- E. *Minnesota Statewide Fish Consumption Advice*. Pat McCann, State of Minnesota
- F. *Regional Fish Advisory for the Mississippi Delta*. Henry Folmar, State of Mississippi
- G. *Consumption Advisories Based on 8 Meals per Month*. Joseph Beaman, State of Maryland

VI. Approaches to Considering Benefits in Advisory Programs

- A. *Impacts of Fish Contamination in the Columbia River Basin*. Paul Lumley, Yakima Tribe
- B. *Dietary Benefits and Risks in Alaskan Villages*. Sue Unger, Aleutian-Pribilof Islands Association

VII. Current Science on the Benefits of Fish Consumption

- A. *Overview of Benefits of Fish Consumption*. Judy Sheeshka, University of Guelph
- B. *Use of Quality-adjusted Life Years to Assess Risks and Benefits of Fish Consumption*. Rafael Ponce, University of Washington

New Version of the Risk Communication Guidance

Barbara Knuth
Cornell University

What is changing?

Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume IV – Risk Communication

EPA 823-R-95-001
March 1995



Why Change the Guidance?

- Risk communication must be culturally appropriate.
- Involve the partners.
- Continually assess the partnership and message.
- Help the partners to take action.



The Development Team

- Technical contractor: Tetra Tech, Inc.
- Consultants:
 - John Hesse
 - Barbara Knuth
 - Amy Kyle
 - Judy Sheeshka
 - Patrick West
- Stakeholders:
 - Workgroup
 - General

Approach for Revised Guidance

- Risk communication modules that can be targeted for specific needs.
- Modules developed by state and culturally- diverse stakeholders, and nationally- recognized consultants.

Approach for Revised Guidance

- Acknowledge contamination is not “acceptable.”
- Encourage community involvement.
- Link to other phases of the risk analysis process.

Approach for Revised Guidance

- Continue to enhance the user-friendly set of risk communication outreach materials under development by the National Fish and Wildlife Contamination Program.
- Web-based to encourage “tailored” use of guidance appropriate to community needs.

Developing a Web-based Guidance

The stakeholders advised:

- Keep the concise risk communication framework.
- Add case studies to illustrate important points.
- Provide techniques for applying the framework to different situations.

Developing a Web-based Guidance

The stakeholders advised:

- Be realistic (funding, time, people).
- Link to tools and examples.
- Include fish consumption benefits.

Main Page

U.S. Environmental Protection Agency

Fish Advisories

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EPA Home > Water > Water Science > Fish Advisories > National Guidance > Risk Communication Guidance Document

Risk Communication Guidance Document

- **Section 1: Risk Communication as a Process of Empowering Communities to Deal with a Contaminated Environment**
- **Section 2: Working with Communities: Key Issues for Technical Assessment and Formulating Advice**
- **Section 3: Defining What the Risk Communication Program is Supposed to Achieve (if you don't know where you'd like to end up, any road will do ...)**
- **Section 4: Assessing the Community's Communication Needs updated**
- **Section 5: Deciding What You Want to Say and How to Say It: Designing and Implementing your Communication Strategy updated**
- **Section 6: How Do you Know If You're Heeded in the Right Direction? Evaluate!**

Section Home Page

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Section 5: Deciding What You Want to Say and How to Say It: Designing and Implementing your Communication Strategy

Introduction

The objectives of this section are to (1) describe various content, format, and dissemination tools that can be considered when designing a communications strategy, (2) provide examples of tools that have been used in health advisory programs nationally, and (3) discuss how to tailor, design, and implement an action plan for specific locales and communities. Also included is a discussion of the importance of incorporating information about healthy options to eating contaminated fish and weighing of health benefits from fish consumption versus the potential health risks.

Most states already have at least some fish consumption advisories in place. However, the messages may not be effectively reaching some high-risk populations (e.g., sensitive populations, substance abusers, tribal members, and non-English speaking groups) who may need them most. The majority of current advisories are developed in a single formal intended to apply to everyone who eats sport caught fish within a jurisdictional area. Evaluation of existing program effectiveness has shown that the best way to achieve behavioral changes related to safe fish consumption practices is to identify and work cooperatively with communication partners at the local level who are familiar and sensitive to the cultural needs of the at-risk populations in specific locales.

Each state/tribe should consider modifying their existing programs to include creative ways of working with and through local partner networks. Recognizing that risk communication resources are already inadequate in many jurisdictions, innovative funding mechanisms/partnerships to support advisory programs should be investigated.

As discussed in Section 3, the health advisory communicators must develop trust and credibility with representatives within local communities, and to include them as partners at all stages of the risk communication process including the establishment of program objectives, decisions on advisory content, selection of appropriate dissemination mechanisms, and construction of an action plan for each partner audience. To be successful, you, and your communication partners, must know and agree upon what you are trying to achieve and how you will do it.

- **What Might You Want to Say?** updated
- **How Might You Want to Say It?**
- **Pre-Launching the Communication Strategy: Get the Bugs Out Before You "Go Public"**
- **Implementing the Communication Strategy**
- **Modifying the Communication Strategy in an Ongoing Program**
- **Conclusion**

For more information on EPA's Fish and Wildlife Contamination Program, contact Jeffrey Pappas at UIC EPA, 1200 Pennsylvania Ave., NW (43087), Washington, DC 20460. e-mail: pappas.j@epa.gov

EPA Home | Fish and Wildlife Contamination Program

Last updated on Thursday, October 10th, 2002
URL: <http://www.epa.gov/nfwc/consumption/5.html>

Section Information Page

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SECTION 5: DECIDING WHAT YOU WANT TO SAY AND HOW TO SAY IT: DESIGNING AND IMPLEMENTING YOUR COMMUNICATION STRATEGY

What Might You Want to Say?

- General Issues
- Specific Content
- Considerations When Suggesting Alternatives to Eating Fish

General Issues

Advisories should present information in a form that is culturally appropriate and readily understood by the fisher and fish consumer. For certain cultures, a story telling approach may increase the success of the advisory. Some people want to know the source of contaminants and why it is being done to clean up the contamination. They may also want to know about the specific risks associated with exposure to the chemicals and what actions are made in estimating risks from eating the fish. In other cases, people just want to be told what fish are safe for them to eat. Local partners familiar with the characteristics of each population can best judge what message will be the most effective and the best way for it to be disseminated.

In this section, we will describe examples of text that have worked well in some existing programs and look risk communicators at the established local levels to a range of messages to be considered for differing audiences. It will identify the core consumption recommendations typically included in effective advisories and considered to be of importance in most cases. It provides alternatives for allowing the continued consumption of fish including alternative fish species or subspecies, and non-cooking preparation and cooking methods. Local partners should be involved in identifying culturally appropriate and practical recommendations.

Specific Content

B. Specific Content updated

1. Core Consumption Recommendations

Although a wide range of information may be desirable in individual situations, a fish consumption health advisory, in its most basic form, includes a core set of consumption recommendations. These recommendations typically provide the fish consumption limits derived through the risk assessment and risk management processes (insert links to EPA documents, volumes 3 and 4). A health advisory may be a one sentence warning conveying the most basic fish consumption advice (e.g., "Do not eat fish from Lake Superior"). In an advisory made with some risk communication considerations - eating the fish. The risk management approach chosen between the risk communication partners will determine what information is included in the core consumption recommendations.

Related Resources

- Related links will be listed here:
- 1
 - 2
 - 3
 - 4

Link to Information Box

For more information on creating consumption advisories, visit [www.fishconsumptionadvisories.com](#). For more on fish health, visit [www.fishbase.org](#). For an additional reader with varying fish consumption recommendations depending on the body of water, the fish species, the fish size, or the person to be eating the fish, the risk management approach chosen between the risk consumption partners will determine what distribution is included in the risk consumption recommendations.

You may view and download current fish consumption advisory documents and outreach materials from state and tribal agencies by clicking here ([National Risk Communication Conference, 2011](#)). Clicking from these documents are essential when information boxes become an example of reaching the diverse categories of information that communication partners may want to consider.

Fish consumption recommendations often include details such as:

- a. Various frequencies of consumption
 - intended consumption (no restrictions)
 - consumption limited to a certain number of meals over a specified time period (e.g., one meal per week)
 - consumption limited to a certain number of meals per year, or 10 meals over a two week vacation period each year), or
 - no consumption.
- b. Frequencies that vary for different audiences. Based on risk management goals, health advisory recommendations may be customized to provide more restrictive health advice to people at the greatest risk of adverse effects from contaminants. In such cases, fish consumption recommendations may differ for groups of people even though they are eating the same types of fish from the same bodies of water. The audience distinguished most frequently with separate lower recreational fish consumption advice includes women of childbearing age and children to 6 years of age or less.
- c. Frequencies that vary for water bodies. Agencies often may recommend fish consumption limits that vary based on the types and extent of chemical contamination within each waterbody. Recommendations may be customized to provide more restrictive health advice throughout the state. In some cases it may be impossible to monitor all of most waterbodies for contaminants. Numerous states (e.g., Connecticut, Florida, Indiana, Michigan, Maine, New Hampshire, New York, Ohio, Vermont) and others have responded by issuing a general statewide advisory in addition to its waterbody-specific fish consumption recommendations.
- d. Frequencies that vary by fish species and size. Depending on the extent of fish monitoring information available in the risk assessment process, agencies often may issue health advisories with consumption limits that limit the fish species and size. Instead of issuing an advisory such as "Do not eat any fish from Long Lake", advisories may restrict consumption of only selected species, or selected sizes within any species (e.g., "Do not eat rainbow trout greater than 26 inches in total length").

The rationale for issuing fish consumption recommendations specific to fish species and size is based on the differential rates of contaminant accumulation. In general, fish with faster tissue accretion rates accumulate more contaminants than longer fish, larger (older) fish contain more contaminants than smaller (younger) fish, and predatory fish accumulate more contaminants than prey species (see EPA Volume 3, Risk Management for a more detailed discussion).

For example showing various meal frequencies for different audiences, fish species and size, and different bodies of water ([2010 Wisconsin Fish Advisory Tables, page 10](#))

Another example: New York's General Advisory for Eating Sportfish (from NY Department of Health, 2008-2011) ([Health Advisory, Contaminants in Sportfish and Game, page 7](#))

2. Chemicals of concern and their effects

The reasons for recommended reductions on fish consumption may not be apparent to the potential fish consumer without some understanding of the contaminants causing the need for restrictions. An individual's exposure to recreational fish consumption recommendations may be enhanced by the potential health risks involved. For example, exposure of contaminants from one fish species to eat...

Information Box

General Advisory for Eating Sportfish

The general health advisory for sportfish is that you eat no more than one meal (one-half pound) per week of fish taken from the state's freshwaters and some marine waters at the mouth of the Hudson River. These include the New York waters of the Hudson River, Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill, Kill Van Kull, Harlem River and the East River to the Throgs Neck Bridge (see map on page 14). This general advisory is to protect against eating large amounts of fish that have not been tested or may contain unidentified contaminants. The general advisory does not apply to most marine waters.

Close Window

Advantages to Web Approach

- Guidance is more accessible to a wide range of fish consumption advisory programs and groups issuing or learning about consumption advisories.
- Guidance is less daunting – web pages to negotiate rather than a large book to read.

Advantages to Web Approach

- Materials may be developed for a specific type of partner audience; more “tailored” than a general process that leaves many decisions and few directly-related examples or tools.
- A living document modified and updated easily.

Advantages to Web Approach

- Customized population-specific modules.
- More choices of examples, tools, methods, and current information related to fish consumption advisories and specific partners.
- Supports early inclusion of partner audiences and communicators in the risk communication process.

Advantages to Web Approach

- Responsive to stakeholders who indicated a web-based approach has the potential to be more useful.
- Allows the format to become issue-oriented, based on the path a user takes, rather than process-oriented.

Possible Disadvantages of Web-based Approach

- The web-based guidance is accessible only to those with web access.
- The living document will need to be updated continually.

Next Steps

- Development team drafting all sections, links, information boxes, etc.
- Ongoing stakeholder work group review.
- General stakeholder comment, use, revisions.

Thanks to the Stakeholder Workgroup!

Janice Adair	Randall Manning
Rosetta Alcantra	Maria Maybee
Robert Brodberg	Dave McBride
Mike Callam	Pat McCann
Josee Cung	Ora Rawls
Henry Folmer	Roland Shanks
Kenny Foscue	Brian Toal
Eric Frohmberg	Luanne Williams
Jim Labelle	

Update: TMDLs and Fish Consumption Advisories

Jim Pendergast
USEPA Office of Water
Washington, DC

Topics Covered Today



- Methyl Mercury TMDLs
- Methyl Mercury Criterion and TMDLs
- Advisories and TMDLs
- New TMDL Rule

Methyl Mercury TMDLs

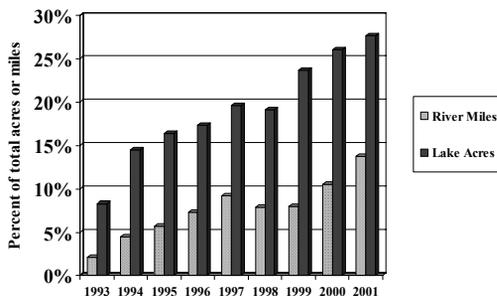


- What is the TMDL picture for mercury?
- What will it take to reduce mercury loadings?
- What is the news about alternatives to TMDLs?

Mercury in Watersheds

- In 1998, of 21,800 impaired waterbodies
 - ~4,000 listed for metals (including mercury)
 - ~1,100 listed specifically for mercury
 - ~8 states listed atmospheric deposition as source
 - ~650 segments impaired by atmospheric deposition
- As of 2001, 44 states have issued mercury fish consumption advisories

Percent of U.S. River Miles and Lake Acres Under Advisory: 1993-2001

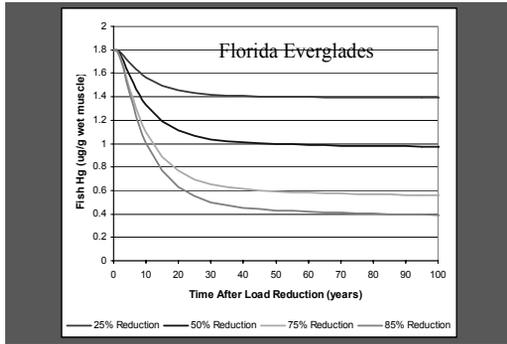


National Fish and Wildlife Contamination Program

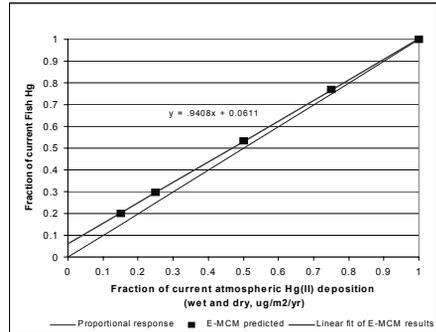
Mercury TMDL Issues

- Long timeframe to achieve water quality standards
- Regional/global scope of mercury deposition, as well as local scale deposition
- Dependence on non-water programs (e.g., air sources and contaminated sediments)
- Small loadings from water point sources compared to air sources

How Long to Recover?



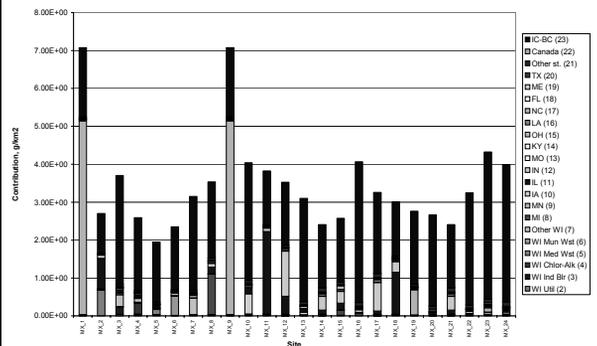
Florida Mercury TMDL Pilot: Mercury Loads vs. Levels in Fish



Needed vs Expected Reductions in Mercury Loads for GA TMDLs

Basin	Water Quality Target (ng/l)	% Reduction in Hg Loadings to Meet Target	% Reductions from Existing Clean Air Act Regulations
Alapaha	4.9	64	17-25
Ochlockonee	1.6	76	31-41
St. Mary's	1.9	56	1-6
Satilla	3.2	61	31-39
Suwanee	2.8	58	9-15
Withlacoochee	6.8	40	33-43
Ohoopce	3.5	24	42-54

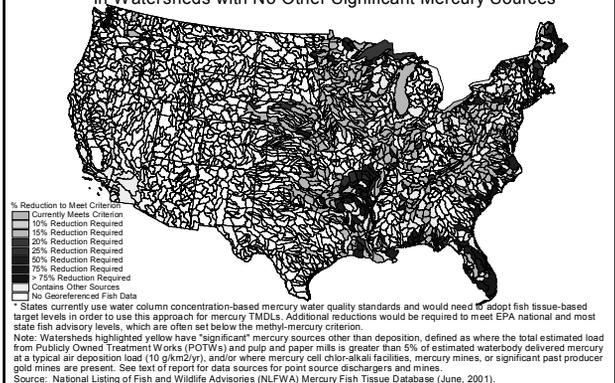
Contributions of Mercury Sources to wet deposition at locations of tag maxima, Hgt23 Run, 1998



New Approaches to Hg TMDLs

- **Abridged Approach: Mercury Maps**
 - Geographic information system containing fish-tissue and other data on a watershed-by-watershed basis
 - Screens watersheds on national scale by comparing fish Hg concentrations against new MeHg criterion
 - Links air deposition and fish tissue mercury through simple model (linear relationship)
- **Regional Approach: New England Pilot**
 - Will combine Mercury Maps and regional model
 - Goal is to evaluate regional approach, e.g., identify waters where existing controls are likely to achieve the criterion

Estimated Percent Reductions in Air Deposition Load Necessary to Meet New Methylmercury Criterion* In Watersheds with No Other Significant Mercury Sources



Quicksilver-TMDL Workgroup

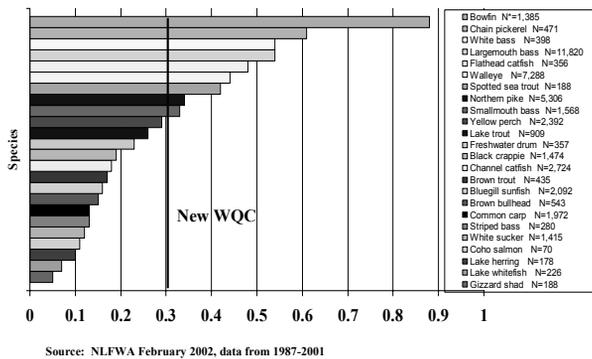
- State participants include WI (co-chair), ME, CT, CA, CO, FL, GA, IL, MN, OR
- Workgroup will focus on air deposition-dominated mercury TMDLs (mining issues later)
- Initial ideas include the following:
 - Develop separate category on 303(d) lists for waters impaired by pollutants from air deposition
 - Allow alternatives such as regional or screening TMDLs
 - Develop interim goals and indicators of progress

MeHg Criterion and TMDLs



- How will the new criterion affect TMDLs?
- What is the status of the implementation guidance?
- What will the implementation guidance include?

Mean Mercury Concentration in Tissues of Selected Fish Species (all sample types)



State WQS Adoption Expectation



- EPA not pushing states to adopt new criterion until implementation guidance published
 - technical issues
 - resource issues
- Some States interested in adopting new criterion now

MeHg Implementation Guidance: Key Elements and Issues

- Water Quality Standards, e.g.,
 - translating methyl Hg to total Hg
 - site specific criteria flexibility
 - expression of criterion (tissue or water)
 - variances and UAAs
- Defining impairment
 - trophic level averaging
 - size averaging
 - appropriate analytical methods
- Approaches to TMDLs
- Permitting, especially for small sources

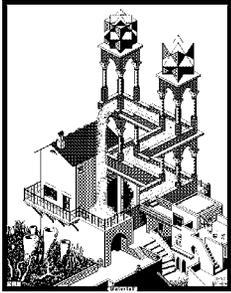
How Long to Finish?



- Oct: Revise draft
- Nov: Outreach discussions
Management review
- Dec: Draft for release

60 to 90 day comment period

Advisories and TMDLs



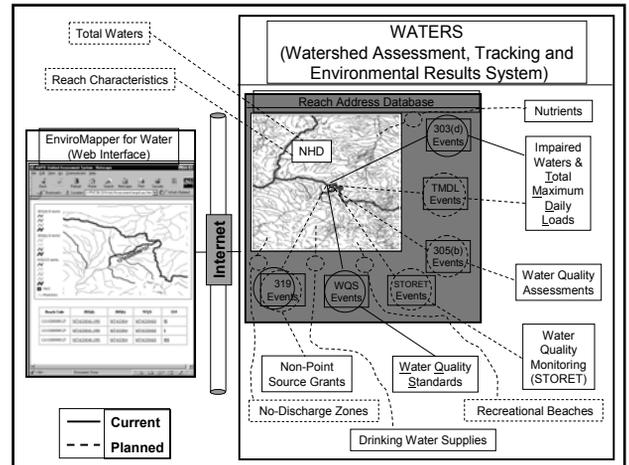
- What does the October 2000 guidance really say?
- What is EPA's vision on the relationship between water quality standards and advisories?

2000 Guidance

- Must list waters when risk-based fish advisories based on waterbody-specific data and same risk basis of QWS
 - same type of data collection
 - same threshold value
- Not required to list for fish advisories without waterbody-specific data
 - thus statewide advisories do not trigger listings
- Shows cross-walk between listings and National Shellfish Sanitation Program (NSSP) Growing Area Classifications

Advisories Are Not Always Impairments

- Impairments
 - Population are exposed at greater than acceptable risk
 - Considers mixture and range of species and ages
- Advisories
 - Individuals are exposed at greater than acceptable risk
 - Some waterbody specific; some regional or statewide
 - Some are size specific and some are species specific



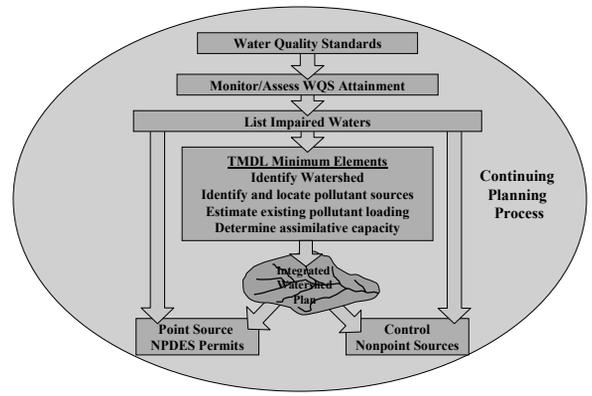
New TMDL Rule



Rule?

- What is it likely to include?
- When will it happen?

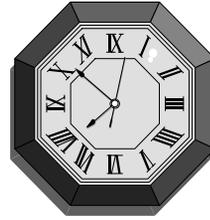
Clean Water Act Framework



TMDL Rule Objectives

- Achieve steady reasonable progress towards achieving water quality standards (WQS)
- Encourage planning and management on a watershed basis
- Support adaptive implementation, trading, and pre-TMDL voluntary efforts
- Enable States to do planning and implementation
- Improve accountability for results
- Improve monitoring and listing
- Leverage funding from non-EPA programs

TMDL Rule Timing



- Proposed rule in November 2002
- Final rule in Spring 2004 at the earliest
- Reality check -- This may change!!

Information Sources

- TMDL homepage -
<http://www.epa.gov/owow/tmdl>
 - EPA guidance and documents
 - Maps and information on impaired waters
 - Links to other TMDL websites
 - Regulations and supporting information
- Fish Advisory homepage -
<http://www.epa.gov/waterscience/fish>
 - National guidance
 - Listings of advisories

Methylmercury Contamination in Fish: Human Exposures and Case Reports

**Clarion and Radisson Hotels
Burlington, Vermont
October 19-20, 2002**



Sponsorship

- U.S. Environmental Protection Agency
- American Fisheries Society
- American Academy of Pediatrics
- American College of Obstetricians and Gynecologists
- Association of Occupational and Environmental Clinics
- Centers for Disease Control and Prevention (National Center on Birth Defects and Developmental Disabilities)

Steering Committee

- Kathryn Mahaffey, Ph.D. – Chair
- Henry Anderson, MD
- Sophie Balk, MD
- David Bellinger, Ph.D.
- Jeff Bigler
- Tom Burke, Ph.D.
- Ronald Dobbin, CIH, MSC-OH
- Betsy Fritz
- Catherine Joseph
- Donald Mattison, MD
- Michael Shannon, MD, MPH

Goals

- To inform participants on the distribution of blood methylmercury concentrations in the general population of the U.S.
- To evaluate cases of elevated methylmercury exposures
- To present expert advice on neuropsychological and/or neurological evaluation strategies to assess impact of elevated methylmercury exposures
- To develop a product providing information from this workshop

Selected Program Topics

- Developmental Health: Risks and Benefits
- Methylmercury Toxicity and Exposure – Toxicokinetics and Biomarkers
- Chelation: Metal Complexing and Metal Mobilization
- Medical Associations – Overviews and Approach
- Methylmercury Exposure Assessments – New Jersey / St. Lawrence River

Selected Program Topics (cont)

- Methylmercury Clinical Assessments – California / Boston / Wisconsin / New Jersey
- Biomonitoring and Population Data – German Methods and NHANES
- Neuropsychological and/or Neurological Evaluation Strategies
- Population Assessment Methods – questionnaires
- Risk Communication and Outreach – WI, ME

Goal #1 Key Points

To inform participants on the distribution of blood methylmercury concentrations in the general US pop

- National data available are NHANES
- 1999-2000 NHANES only covers women (16-49) and children (1-5) for mercury (e.g., blood, hair, urine)
- Blood mercury data indicate 7.8% women above 5.8 $\mu\text{g/L}$
- Fish consumption correlated well with blood mercury (<1 ml/wk = 2% and 1+ ml/wk = 15% above 5.8 $\mu\text{g/L}$)

Recommendations:

- Mercury should become core biomarker for all pops
- Correlate health status and NHANES biomarkers

Goal #2 Key Points

To evaluate cases of elevated methylmercury exposures

- Growing interest in biomonitoring for mercury
- Reports of fish consumption resulting in blood mercury > 50 $\mu\text{g/L}$
- New "at risk" pop recognized in high income consumers of fresh fish; subsistence individuals also reported

Recommendations:

- Clinical testing guidelines and treatment guidance needed (professional associations must endorse and promote)
- Targeted outreach needed for "at risk" pops

Goal #3 Key Points

To present expert advice on neuropsychological and/or neurological evaluation strategies to assess impact of elevated methylmercury exposures

- Adult low level mercury health effects are likely to impact the neurological system
- Pre-natal toxicity is predominately neurological
- No signature neurological effect pattern

Recommendations:

- Clinical neurological testing protocol must be developed for low level mercury exposures (professional associations must endorse and promote)

Next Steps

- Effective partnerships and consortium building (both governmental and non-governmental)
- More research and better understanding of cardiovascular effects in adult men (and women)
- Greater public and professional communication of mercury exposure hazards and prevention methods
- To integrate fish consumption advice = speak with a single voice (e.g., framework for national fish advisories)
- \$\$\$



Any Questions?

State and Tribal Mercury Advisories:

Results from worksheets

Amy D. Kyle, MPH PhD

Purpose of worksheet

- Look at starting point for state and tribal advisories
- Focus is on lowest mercury concentration used as basis for advisories in various categories
- Provides informative, if imperfect, point of comparison between states and tribes
- “Get some idea”

What we did

- Simple worksheet distributed by AFS through email in advance of meeting
- Worksheets also available at regional meetings
 - Some regional meetings discussed them and some didn't
- Results compiled from those returned
- 39 states and 4 tribes provided information

How to compare?

- Purpose was to gain an idea of what mercury concentrations in fish were leading to advisories
- This is imperfect because states and tribes don't always use the same mercury concentration in different advisories
- To try to gain comparability, asked for the **lowest** concentration of mercury for each of several types of advisories

Categories of advisories

- Used four basic categories of advisories:
 - **General Population – apply to everybody not otherwise mentioned**
 - advisories for NO consumption of fish
 - advisories for restricted consumption of fish
 - **Sensitive Populations – identified groups**
 - advisories for NO consumption of fish
 - advisories for restricted consumption of fish

Who responded?

- 39 states and 4 tribes
- States that responded have 81.3 of population of women of child-bearing age
- 34 states and four tribes reported issuing advisories recommending no consumption or restricted consumption for fish with mercury
 - at least one other is currently developing an advisory
 - one tribe uses state or federal advisories

General Population – no consumption of fish

- 15 states and three tribes report issuing at least one advisory of this type for mercury
- Mercury concentrations for these advisories range from 0.5 to 2.88 ppm
- The concentrations of mercury that trigger these advisories should be comparable
 - Because there is no advice regarding number of allowable meals or meal size

General population: restricted consumption

- 28 states and two tribes report issuing at least one advisory of this type
 - Applies to everyone not covered by a more specific advisory
- Mercury concentrations from 0.059 to 1 ppm
- Triggering concentrations of mercury will depend on advice offered (size and number of meals)
 - Allowable meals per year from 12 to 96
 - Meal size from 3 to 16 ounces

Mercury allowed in advisories for the general population

- Compare allowable total mercury per year
- Range is from 0.48 to 7.71 milligrams of mercury per year
 - Calculated by: number of meals x meal size = total fish consumed per year- converted to kilograms
 - ppm equals milligrams per kilogram
 - Multiply kilograms of fish consumed by allowable concentration = total milligrams

Sensitive Population: No Consumption

- **23 states** report issuing at least one advisory of this type
- Mercury concentrations from 0.25 to 1.5 ppm
- The concentrations of mercury that trigger these advisories should be comparable
 - Because there is no advice regarding number of allowable meals or meal size

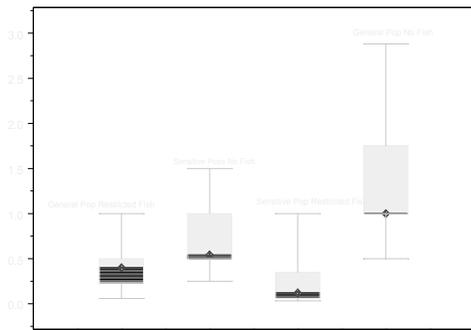
Sensitive Populations: restricted consumption

- 23 states and one tribe report issuing at least one advisory of this type
- Mercury concentrations from 0.032 to 0.5 ppm
- Triggering concentrations of mercury will depend on advice offered
 - Significant differences in advice regarding number and size of allowable meals
 - Allowable meals per year from 12 to 104

Mercury allowed in advisories for sensitive populations

- Compare allowable total mercury per year
- Range is from 1.37 to 47.4 milligrams of mercury per year
 - Calculated by: number of meals x meal size = total fish consumed per year- converted to kilograms
 - ppm equals milligrams per kilogram
 - Multiply kilograms of fish consumed by allowable concentration = total milligrams

Concentrations of Methyl Mercury that Trigger Fish Advisories



Limitations

- Asked only about “lowest” concentration: may or may not be a good representation of overall approach
- May be only a small percentage of advisories
- Advisories are often issued for more than one meal size; these results report for the largest one
- Can be multiple pollutants: mercury may be part of an advisory but not the primary driver

FDA Consumer Advisory for Methylmercury

Philip Spiller
Director, Office of Seafood
Center for Food Safety and Applied
Nutrition

- One FDA seafood advisory: MeHg
- Still a work in progress
- What our experience so far tells us about advisories generally
- Developing an advisory: first ID the major decisions that will have to be made, and that will be reflected in the advisory

- Federal advisory: national/uniform in scope
- FDA's mission: food in interstate commerce, not recreational/subsistence

Three Major Decisions

- Who is the advisory for? Everyone? "Target" population(s)?
- What outcome are we seeking in the target population?
- How to structure the advisory to achieve the desired outcome?

Targeting the Advisory: Background

- MeHg is a neurotoxin with effects at high doses.
- Primary exposure in U.S. is through fish
- Public Health questions involve determining exposure over time necessary to cause an effect

Targeting the Advisory: Adults?

- Threshold effects: 50 ppm
- Seychelles/Faroe Islands: 5-7 ppm
- United States: 0.2 ppm
- Few above the ADI

Targeting the Advisory: developing fetus

- Seychelles finds no effects
- Faroe Islands finds effects
- ATSDR relies on Seychelles
- EPA relies on Faroe Islands
- FDA issues advisory to protect fetus, as a matter of public health prudence.

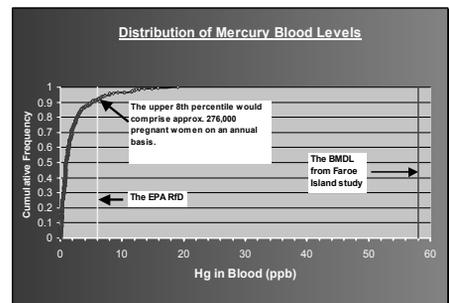
Outcome

- OPTION: keep exposure below highest no effect level from Seychelles and Faroe Islands
- That level of exposure is hard to reach, even without an advisory
- Over time, 98th percentile consumer must eat fish containing 5x the average amount of MeHg

Outcome

- OPTION: keep exposure below “worst case ADI-type level
- FDA’s ADI: adult/general pop.
- ATSDR’s MRL: fetus, less conservative
- EPA’s RfD: fetus, more conservative

U.S. Exposure vs. Risk Management Levels



Structure

- To achieve objective
- To minimize impact on majority in target population whose consumption is not an issue
- To retain benefits
- To keep it as simple as possible in order to encourage people to follow it

Structure

- Avoid “highest” species, which are named
- OK to eat up to 12 oz. per week of a variety of fish
- Check local advisories for recreational
- Subsistence fishermen check with local authorities

Conclusion

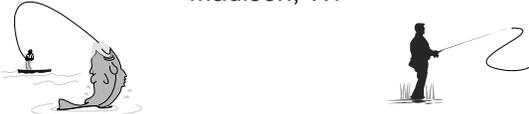
- MeHg is a neurotoxin that can be found in nearly all fish
- Public health issue is consumption over time
- Risk reduction can occur while still consuming fish
- Primary focus has been susceptible subpopulation

Conclusion

- Taking all that into account:
- Primary target: pregnant women and women of childbearing age who may become pregnant
- Outcome: keep exposure below all “tolerable daily intake” levels established for MeHg

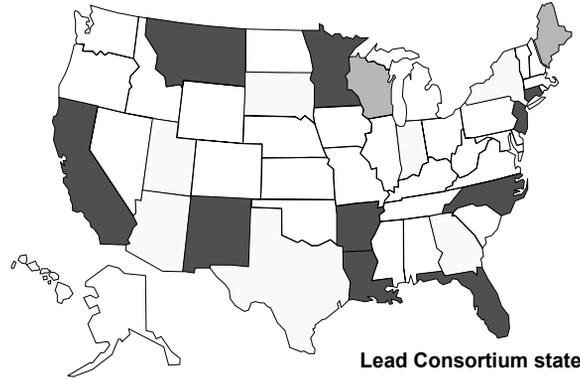
Sport Fish & Commercial Seafood
Wisconsin Integrated Public Health Message:
 Maximize Health Benefit, Minimize Risk,
 Coordinate Health Message

Henry A. Anderson, MD.
 Chief Medical Officer
 WI Division of Public Health
 Madison, WI

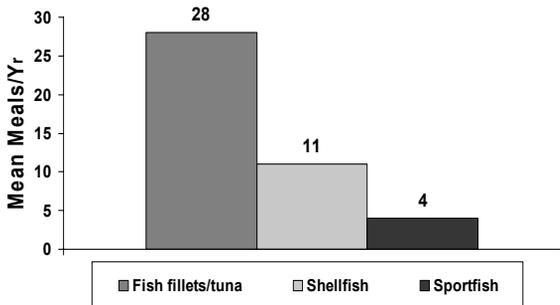


With assistance from Candy Schrank, WDNR
 and the WDPH fish advisory team, Wisconsin Maine Mercury consortium

12 State Mercury Survey (2001)



12 State Mercury Survey
 Average Number of Meals during Previous Year
 (All women N =3,015)



Consumption by Hair Mercury Intervals

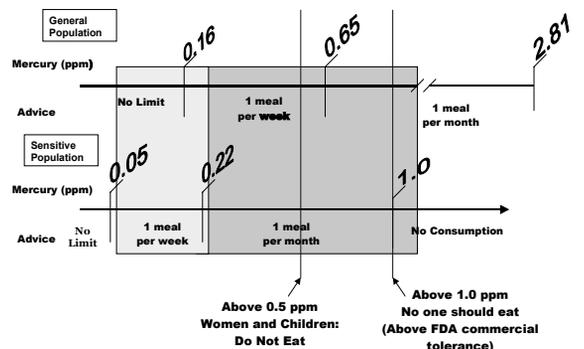
Interval* Mean	10th	25th	50th	75th	90th	100th
Total fish	10 meals/year	19 meals/year	33 meals/year	43 meals/year	52 meals/year	73 meals/year
Total Sport Fish	2 meals/year	4 meals/year	3 meals/year	7 meals/year	7 meals/year	9 meals/year
Hair mercury N= 410	0.05 ppm	0.12 ppm	0.2 ppm	0.43 ppm	.78 ppm	1.89 ppm

*Intervals = 0-10%, 11-25%, 26-50%, 51-75%, 76-90%, 91-100%

Wisconsin 2000
 1200 water segments tested
 340 with Hg advisories



Mercury Advisory Groupings
 Using EPA Reference Dose



2002 Wisconsin Mercury Fish Advisory

General Statewide Guidelines
most inland waters

and

Site Specific Consumption Advice (92)
where data indicates
more stringent advice is necessary

A Woman and Child's Guide to Eating Fish from Wisconsin (2002) (includes sport and commercial fish)

WEEKLY	1 meal per WEEK	of Canned Light Tuna** (6 oz. can = 1 meal)	AND	1 meal per WEEK	OF EITHER	Bluegill, sunfish, black crappie, white crappie, yellow perch, bullheads Any commercial fish (fish you buy in a store or restaurant)
	1 meal per MONTH		OR	Any sport fish species (sport fish are any fish you catch or are given, such as bass, walleye, northern, perch, or crappie). Sport fish are NOT fish you purchase in a store or restaurant.		
NEVER	NEVER EAT ANY SWORDFISH, SHARK, KING MACKEREL, OR TILEFISH					

Currently use FDA "never eat" list
Future years, review monitoring data, coordinate
advice on commercial fish with other states

Wisconsin 2002 Mercury Advisory includes Commercial Fish Advice

Commercial fish

People often ask about the levels of contaminants in fish bought in stores or restaurants. The Food and Drug Administration (FDA) sets tolerance levels for contaminants to regulate the interstate sale of fish. FDA and commercial fishers are responsible for ensuring the safety of commercially sold fish. FDA tolerance levels are based on a nation-wide average fish consumption rate and assume the fish come from a variety of waters. FDA acknowledges that their tolerance levels may not be appropriate for consumers who regularly eat locally caught fish.

Because fish bought in a store or restaurant do not come with labels that tell you the contaminant levels, or even

Most ocean fish are low in contaminants. However, some fish contain higher amounts of mercury.

The following guidelines for some popular species can be followed to allow you to enjoy commercial fish and at the same time reduce your risk to mercury:

Ocean Species	Women of child-bearing age and children under 15	Women beyond child-bearing age and men
Salmon, canned salmon, and shellfish	2-3 meals per week	Unlimited consumption
Cod, pollock, haddock, canned tuna (6 oz. can)	1 meal per week	Unlimited consumption
Tuna steaks, halibut, orange roughy	1 meal per month	1 meal per week
Shark, swordfish, king mackerel, tilefish	Do Not Eat	1 meal per month

where the fish came from, it is up to the consumer to ask about the source of the fish. Because there are few requirements for tracking fish once they leave the dock, it is not always possible to know the source of the fish you are buying. Therefore, if you enjoy frequent meals of commercially caught fish, it is

important to eat a variety of fish species to ensure that you are not getting a steady diet of fish that may have been taken from the same waters. If you regularly eat sport or commercial fish from a particular local water, you may want to inquire about consumption advice.

Choose Fish Low in Mercury!

Guidelines below are for fish from Wisconsin lakes, ponds, and rivers and for fish bought in restaurants and stores.

SPORT CAUGHT: Fish You Catch		COMMERCIAL: Fish You Buy	
BLUEGILL	WHITE CRAPPIE	ATLANTIC SALMON	SHELLFISH
YELLOW PERCH	BLACK CRAPPIE	FLATFISH & FLOUNDERS	COD, OCEAN PERCH & HADDOCK
SMALLMOUTH BASS	CATFISH	CANNED "LIGHT" TUNA	CANNED "WHITE" TUNA
LARGEMOUTH BASS	CARP	HALIBUT	TUNA
NORTHERN PIKE	WALLEYE	SWORDFISH	SHARK

2002 Wisconsin Woman and Child's Guide

Wisconsin Sport Fish Consumption Advisory Support Program

Joint Environment and Health Agency Program

Environment - Comprehensive sport fish monitoring species, size, location

Health - Human biomonitoring, health outcomes, advisory evaluation* **

*Funded by the Agency for Toxic Substances and Disease Registry Grant # H75/ATH598322

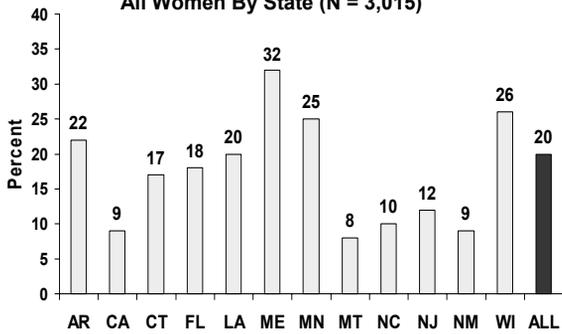
**Funded by the United States Environmental Protection Agency Cooperative Agreement # CR 826283-01-0

Wisconsin Sport Fish Monitoring Program

Year	Sites Sampled	Samples Collected
Prior to 1980	234	3,003
1980-1989	939	11,139
1990-1999	683	11,565
2000	96	806
Total	1,952	26,513

Mercury 12 State Survey Advisory Awareness among Women

All Women By State (N = 3,015)



Recommendations

Need increased commercial fish monitoring designed to assist in advisory placement

Need increased human biomonitoring

Need continued health effects research, especially potential cardiovascular effects

Come Fish In Wisconsin



*Catch and release

**Sport Fish & Commercial Seafood
Wisconsin Integrated Public Health Message:
Maximize Health Benefit, Minimize Risk,
Coordinate Health Message**

Any Questions?



Context for CT's Seafood Advisory

- Recreational Advisories since 1980s
- Major sampling for Hg in lakes: 1996-1997
- Resulted in statewide freshwater advisory
- 4 waterbodies particularly high: avg. bass conc. ≥ 1 ppm
- Natural question: commercial fish

Hg Exposure Potential from Seafood

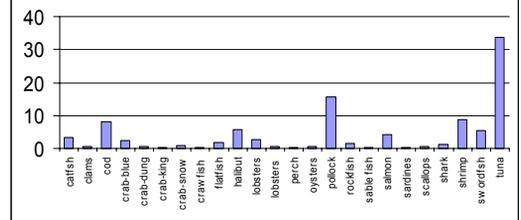
- Swordfish, shark ≥ 1 ppm
- Tuna steak $\approx 0.3 - 0.5$ ppm
- Canned tuna (Yess, 1993):
 - 0.1 ppm - chunk or chunk light
 - 0.3 ppm - chunk white or solid white
- Infrequent consumption of swordfish/shark (e.g., once per month) equals meHg RfD
- Frequent consumption of canned tuna (e.g., 2 or more times / week) \geq RfD

National Trends for Hair Hg Concentrations

- NHANES, 1999 - 702 women
 - 50th % = 0.2 ppm
 - 75th % = 0.5 ppm
 - 90th % = 1.4 ppm
- Simulation of seafood consumption
 - (Carrington and Bolger, 2002)
 - consumption rates and Hg concs for 24 commercial species
 - matched NHANES distribution for women

Percent Contribution of Seafood Species to Daily Hg Intake

(calculated from Carrington & Bolger, 2002)



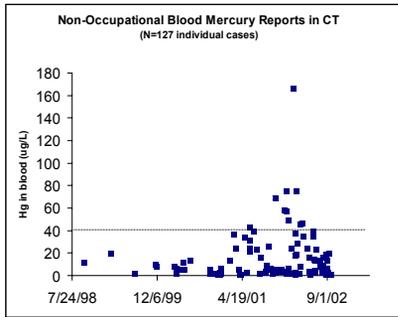
New Jersey Hg Biomonitoring in Pregnant Women (Stern et al., 2001)

- 189 women sampled
- average Hair Hg = 0.53 ppm
 - 9.5% between 1 and 2 ppm
 - 1.6% between 2 and 4 ppm
 - sporadic cases over 4 ppm
- calculated that 10-15% ingest $>$ RfD
- canned tuna most popular fish meal
 - 30 of 83 fish meals/year
- fish consumption patterns only weakly correlated with hair or blood Hg

CT Mercury Biomonitoring Data

(EPA Mercury Advisory Awareness Study, 2000)

- 17 women, 18-45 yrs old sampled
- mean hair Hg $+/-sd = 1.0+/- 0.8$ ppm
- percentiles: 50th - 0.86 ppm
 - 95th - 2.36 ppm
 - max detect - 2.54 ppm
- fish intake data sketchy but comm. fish much more common than sportfish
- anecdotal reports of elevated blood Hg in non-occupational settings



CTDPH Commerical Advisory

- Swordfish and shark:
 - Do not eat if in high risk group
 - Everyone else - 1 to 2 meals per month
- Canned tuna lumped with other commercial fish - 1-2 meals per week
- Choose species low in Hg and PCBs - e.g., haddock, cod, flounder, salmon

Commercial Advisory for PCBs?

- LIS striped bass & bluefish - elevated PCBs
 - 303 bass (1994): avg = 1.18 ppm
 - 57 bluefish (1998): avg for >25" = 1.26 ppm
- CTDPH has recreational but no commercial advisory for these species
 - uncommon in marketplace in CT
 - questions about sources if do occur in market
- Need data on bluefish and striped bass in marketplace