

DEPARTMENT OF  
**ECOLOGY**  
State of Washington

## Technical Workshops on Fish Consumption Rates:

### Fish Consumption Rates & the WA Sediment Management Standards Rule

Welcome to the webinar! Please stand by while we wait for others to join.

While waiting...

Be sure to enter your audio PIN so that you may ask questions during the Q&A.

Experiencing technical difficulties? Please call Emily at 206-743-4454.

**Martha Hankins & Craig McCormack**

**Toxics Cleanup Program**

May 7, 2012 Ellensburg

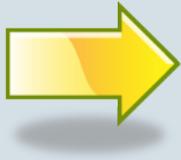
May 8, 2012 Tacoma

May 15, 2012 Spokane

# Webinar Logistics

- ▶ Raising your hand
  - ▶ Please test the hand raise function.
- ▶ Asking questions during Q&A
  - ▶ We will field questions only during the Q&A slides – please hold your comments and questions until this time.
- ▶ Participation
  - ▶ You may either raise your hand, or type in your question. Comments and questions will be fielded in the order received, with priority given to in-person participants.
  - ▶ Comments may also be sent to [fishconsumption@ecy.wa.gov](mailto:fishconsumption@ecy.wa.gov).

# Agenda



1. Overview & Context
2. How & where Fish Consumption Rates fit into the Sediment Management Standards
3. Fish and Fish Consumers in Washington
4. Issues & Proposed Solutions

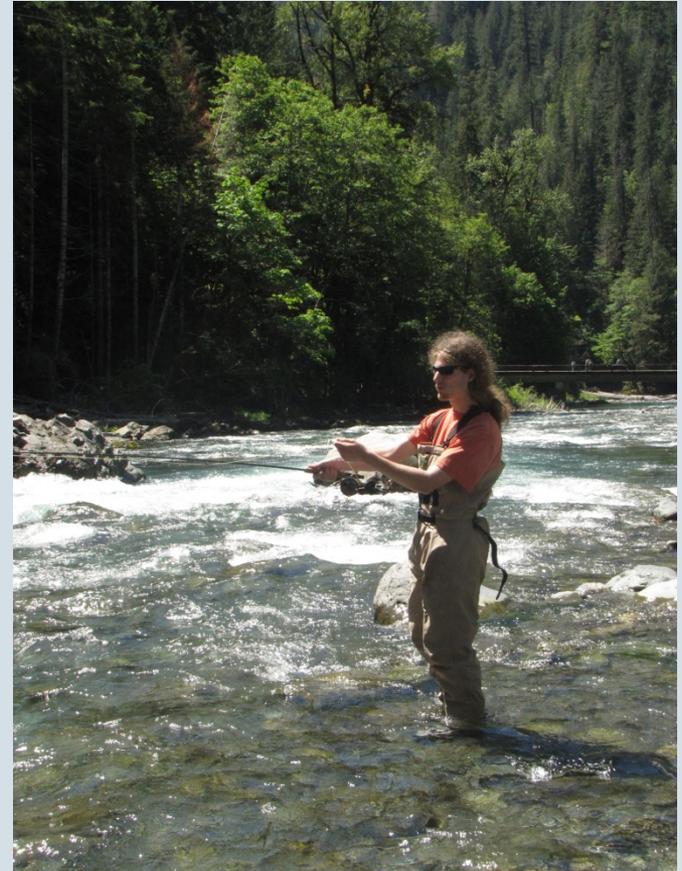
# Why Fish Consumption Rates?

- Fish is an important part of a health diet
- Lots of people in Washington eat fish
- Washington has considerable fish resources
- Some pollutants can bioaccumulate in fish



# Why is Ecology Looking at Fish Consumption Rates?

- Fish consumption is an exposure pathway to environmental contaminants
- To protect people who eat fish and shellfish from Washington waters



# FCRs Currently in Washington Regulations

Model Toxics Control Act  
Cleanup Regulation  
54 grams per day

Water Quality Standards  
for Surface Waters  
6.5 grams per day



Commencement Bay, Tacoma

Currently used in  
WA Standards



Oregon – 175 g/d



8 oz serving

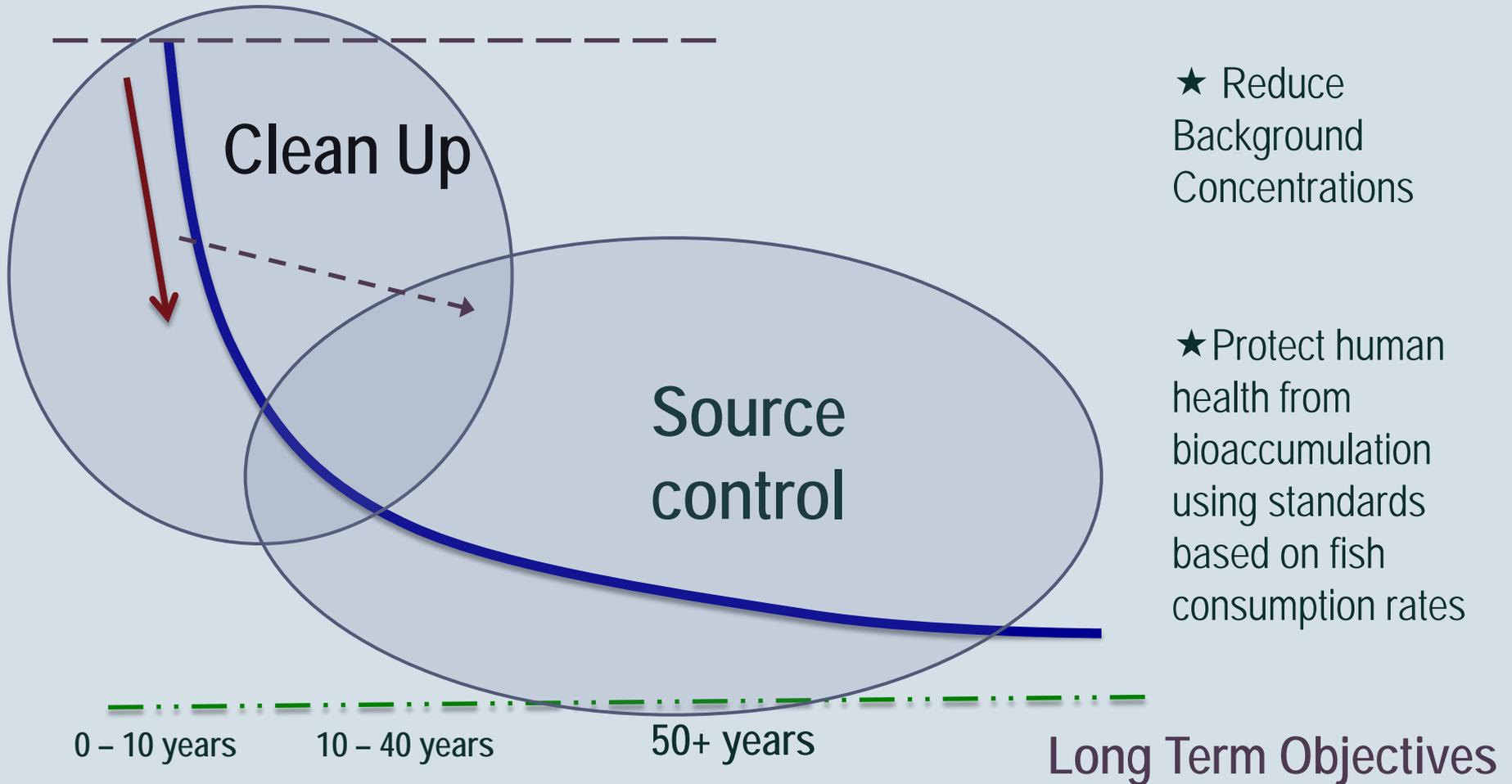


# Why is this Important?

Fish consumption rates drive:

- Cleanup standards
- Water quality standards
  - Water quality standards drive pollution discharge limits

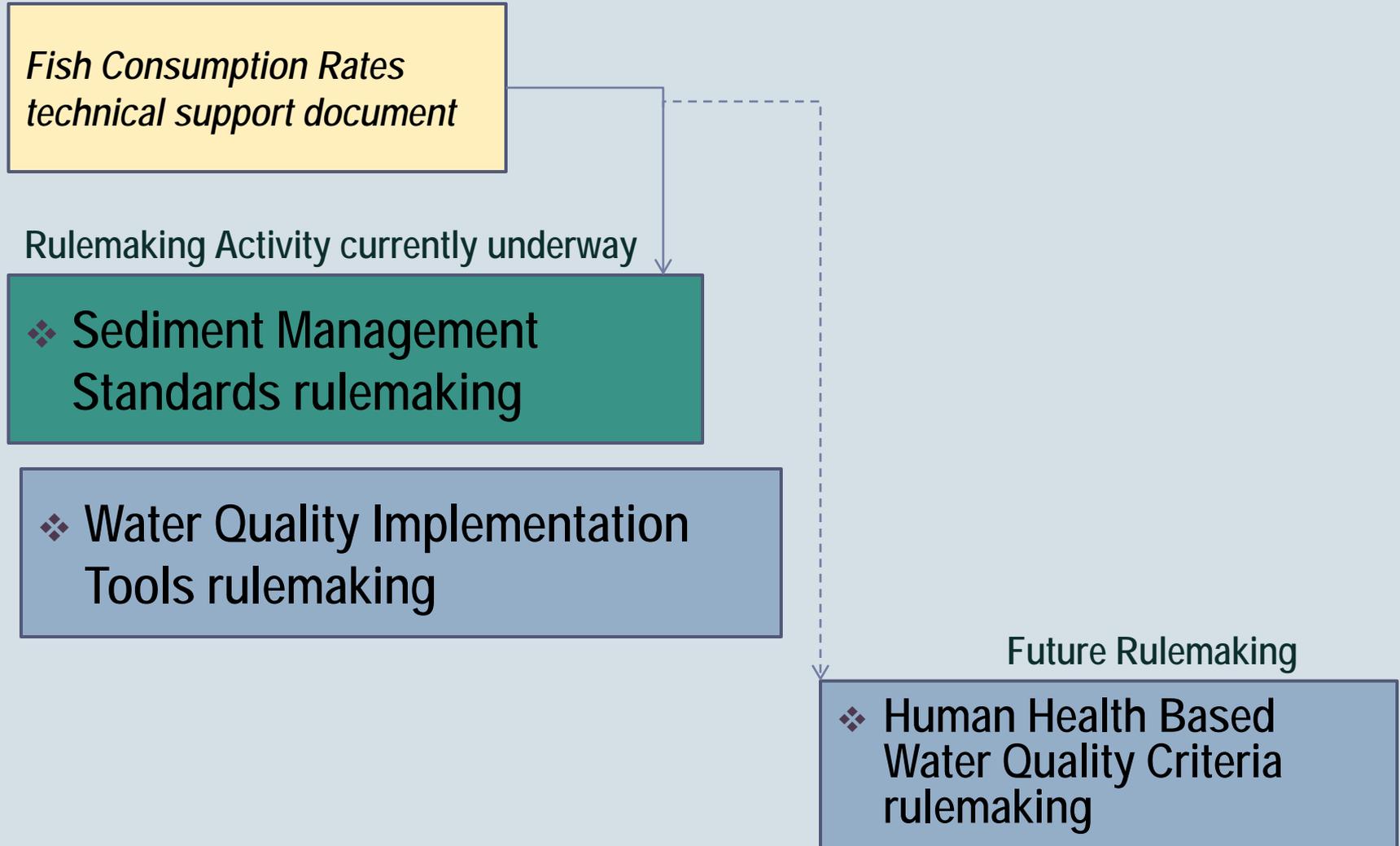
# Reduce Concentrations Over Time, Making Real and Measurable Progress



# Ecology has Separate but Coordinated Processes

July 2012

Dec 2012



*Preventing exposures to toxics is the smartest, cheapest and healthiest way to protect people and the environment*



*The more we learn about toxic chemicals, the more we realize that they are everywhere.*

**>> Toxic Threats**

**FOCUS ON:**

- Reducing Toxic Threats
- Managing Our Water
- Facing Climate Change
- Our Living Shorelines
- Saving Puget Sound

**MORE ECOLOGY TOPICS:**

- Message from the Director
- Protecting Our Quality of Life
- Columbia River Water Management
- Hanford & nuclear waste
- Spokane River Basin

[ecy.wa.gov](http://ecy.wa.gov)

ECOLOGY

- > Mob
- > Gen
- > Bus
- > Gov
- > Edu
- > Scie

**Toxics Cleanup Program**

**TOXICS CLEANUP**

- MTCA Annual Report
- Cleanup Site Search
- Complex Sites
- Site Lists & Data
- Aquatic Lands Cleanup



*Cleanup of the Spokane River provides a safer environment for children, adults and wildlife.*



**Reducing Toxics in Fish, Sediments & Water**

**REDUCING TOXICS IN FISH, SEDIMENTS & WATER**

- Public Involvement
- Sediment Standards Rulemaking
- Water Quality Standards Rulemaking
- What you can do



# What about Fish Advisories?

Department of Health:

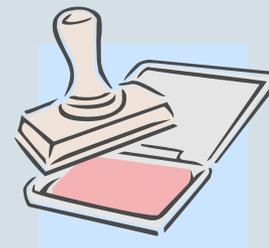
“Given what is currently being measured, how much fish can a person safely consume?”

**REACTIVE**

Ecology:

“What do we want to set as environmental goals – so we won’t need fish advisories?”

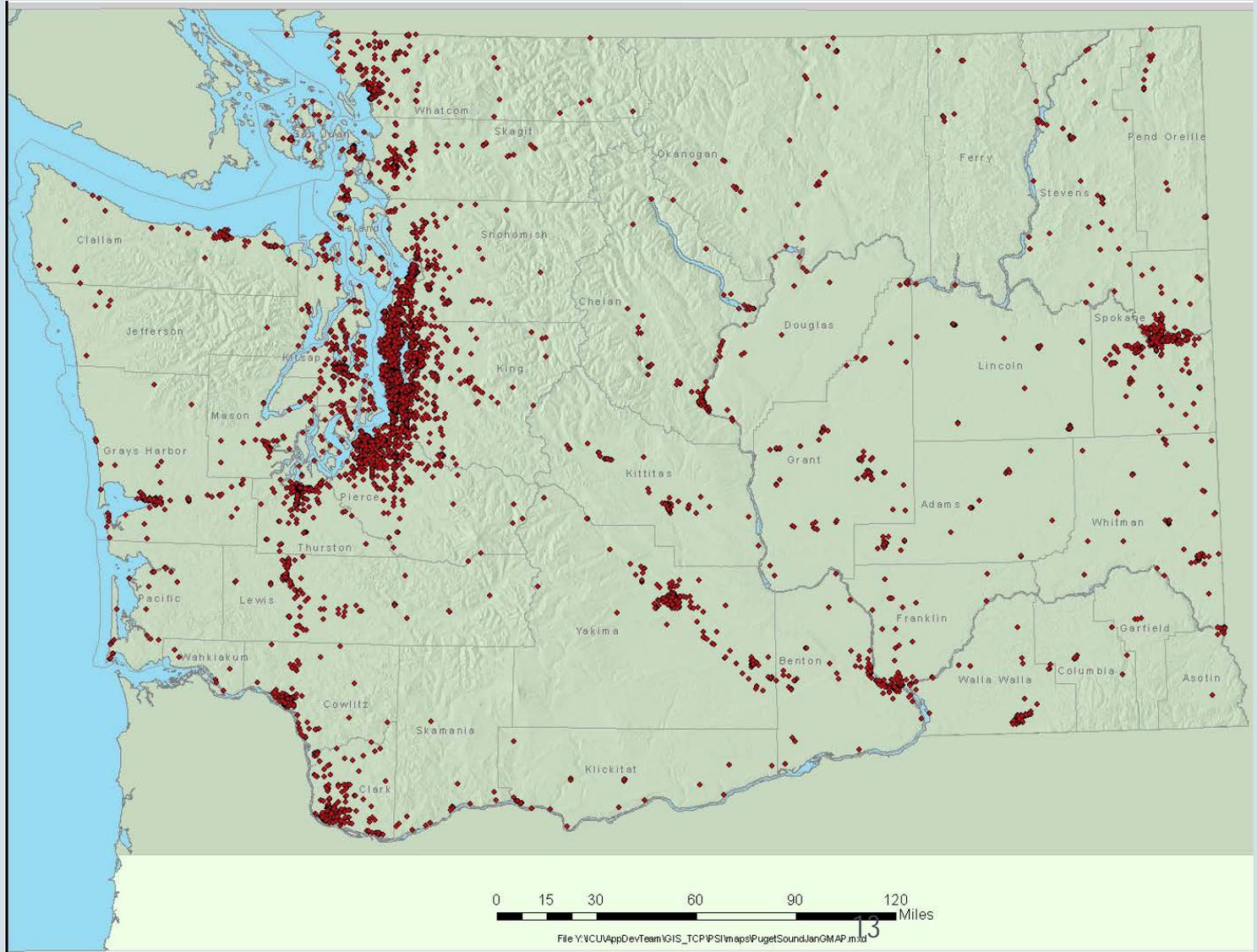
**PREVENTATIVE**



# Cleanups Taking Place Throughout Washington

Over 11,000  
contaminated  
sites in  
Washington

Over 150 with  
contaminated  
sediments



# These are tough issues

- ▶ How do we move toward updating human health-based water quality criteria?
  - ▶ How to provide appropriate levels of regulatory predictability
  - ▶ Implementation tools as a first step
  - ▶ How to improve source control
  - ▶ The importance of public input
  - ▶ Making significant progress toward long term objectives
  - ▶ Integrated toxics reduction strategy
  - ▶ Updating information as we go along

# Rule Making is Governed by the Administrative Procedures Act (Chapter 34.05 RCW)

## Each Rulemaking goes through this Process

- Agency announces rulemaking
  - Work with interested parties

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  - Agency proposes draft rule language
  - Economic analysis, public comments
  - Agency adjusts based on feedback

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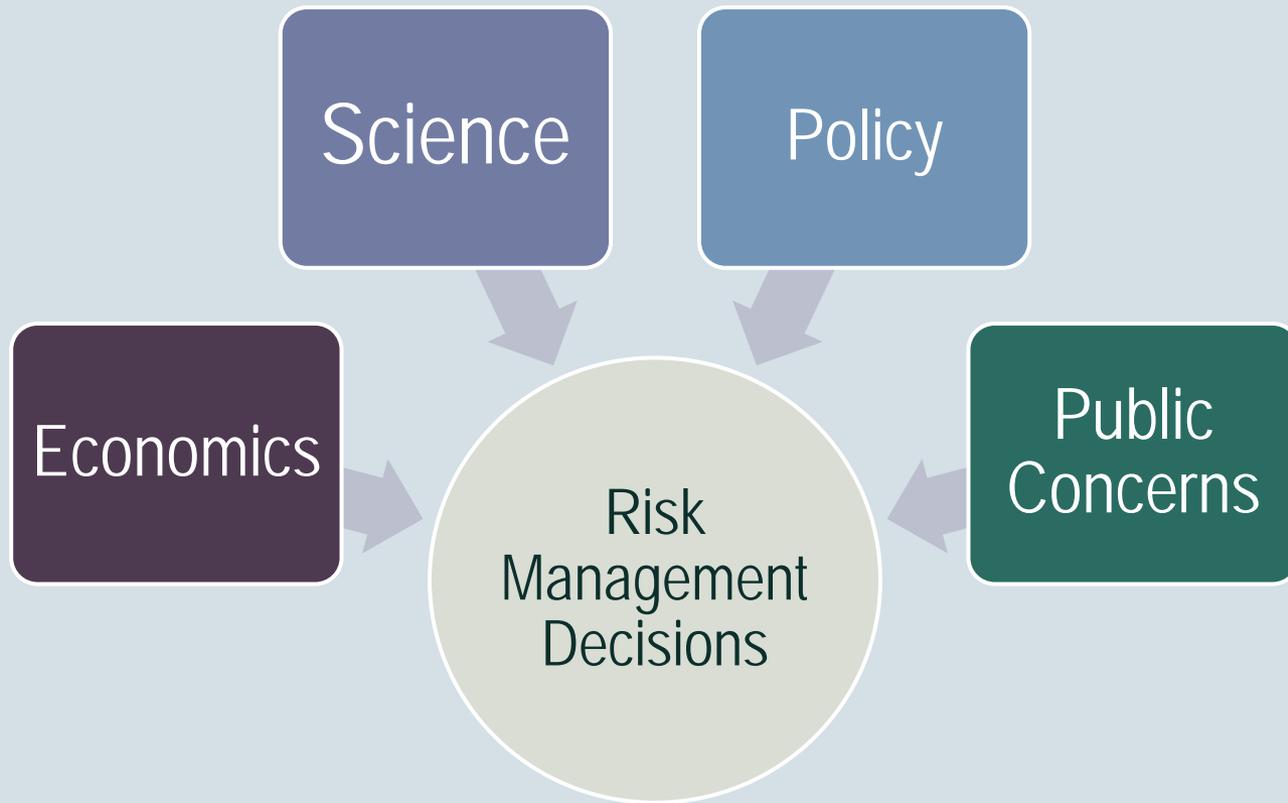
  - Agency adopts rule
- ▶ CR-101  
(Announcement)
  - ▶ CR-102  
(Proposal)
  - ▶ CR-103  
(Adoption)

# Multiple Priorities

- ▶ Tribes
- ▶ Local governments
- ▶ Businesses
- ▶ Shellfish industry
- ▶ Recreational fishing
- ▶ Tourist industry
- ▶ Citizens groups

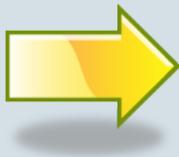


# Decisions on Fish Consumption Rates will take into Account Multiple Factors



# Questions?

1. Overview & Context

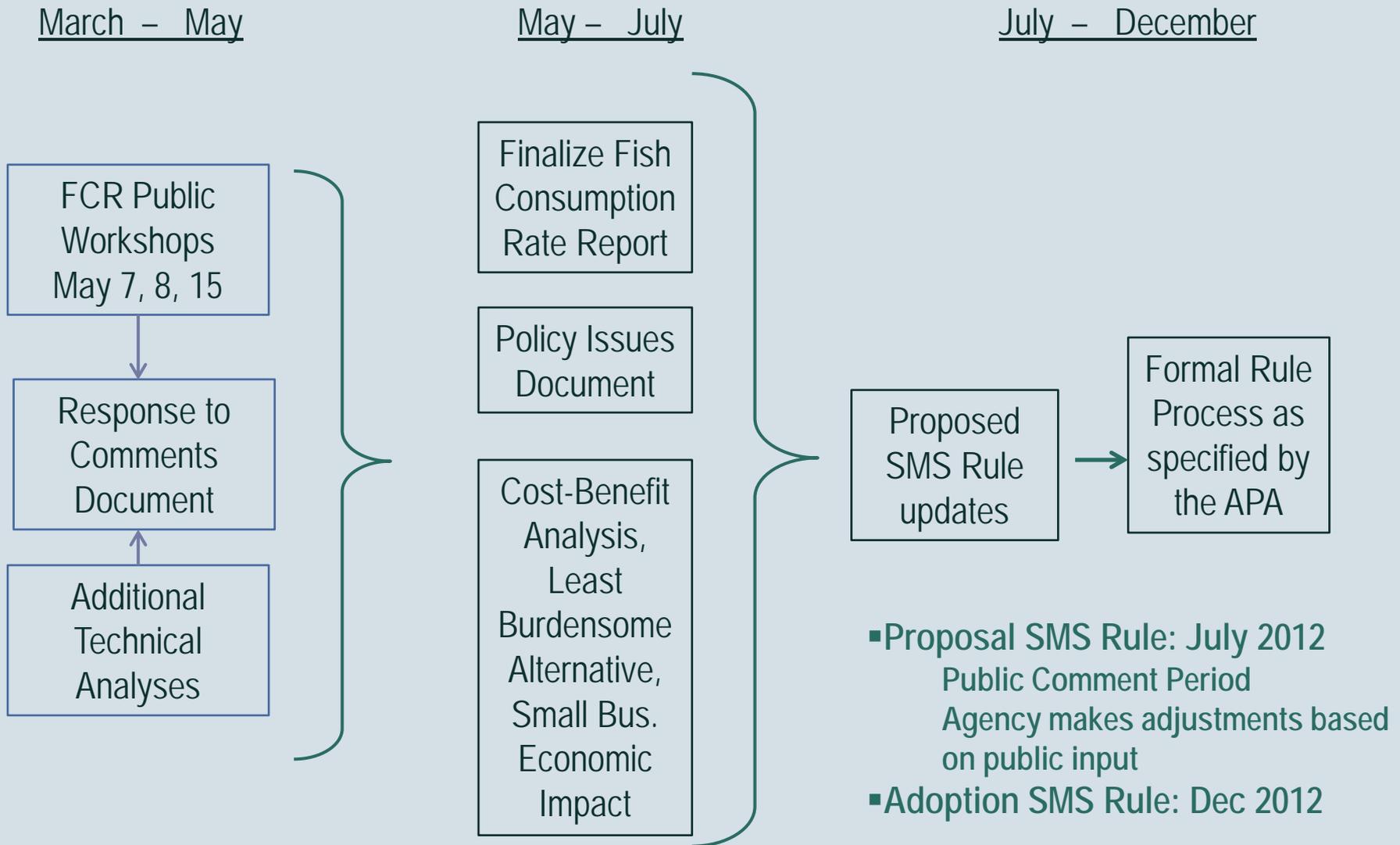


2. How & where Fish Consumption Rates fit into the Sediment Management Standards

3. Fish and Fish Consumers in Washington

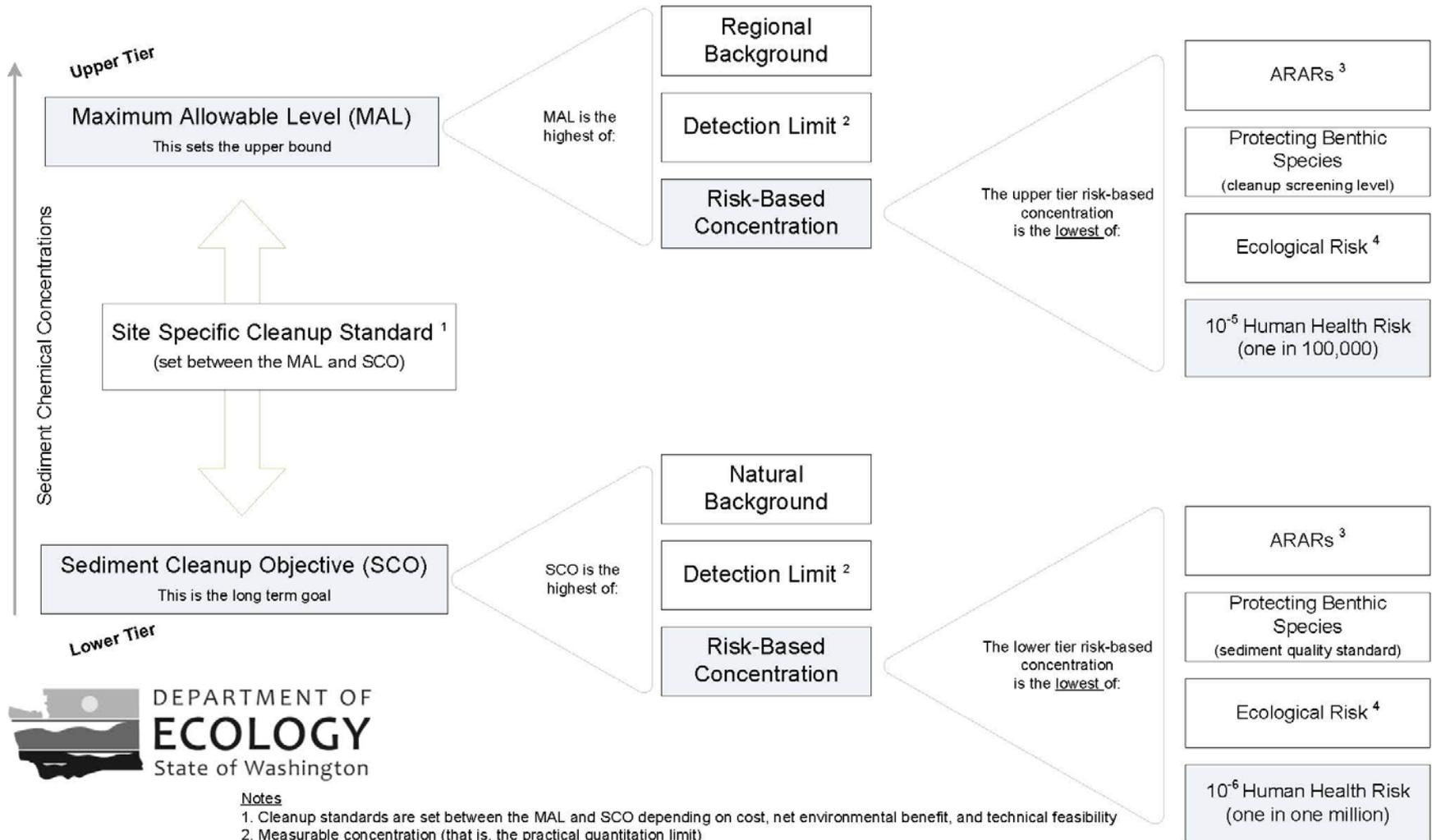
4. Issues & Proposed Solutions

# Sediment Management Standards Rule Timeline



# How Fish Consumption Rates fit into the Sediment Management Standards (SMS) Framework

Fish consumption rates are used to calculate risk-based concentrations protective of human health. This diagram shows the two-tiered SMS framework for setting site specific cleanup standards. What's new? Ecology is proposing to (1) add protecting human health based on fish consumption rates to the SMS; (2) allow using regional background in the upper tier; (3) add an ecological risk narrative; and (4) add freshwater sediment standards protective of benthic species.



**Notes**

1. Cleanup standards are set between the MAL and SCO depending on cost, net environmental benefit, and technical feasibility
2. Measurable concentration (that is, the practical quantitation limit)
3. ARARs = All Applicable or Relevant and Appropriate Requirements (i.e., other laws that may apply)
4. Ecological Risk = Protecting higher trophic levels from persistent bioaccumulative toxic chemicals

This diagram is for discussion purposes only

# Calculating Risk Based Concentrations

$$\text{RBC} = \text{Risk} * \text{Toxicity} * \text{Exposure}$$

- ▶ Ecology currently is not planning to put the equations for calculating risk-based sediment concentrations in rule
- ▶ Guidance is being developed

# An Example of Calculating Risk-Based Sediment Concentrations

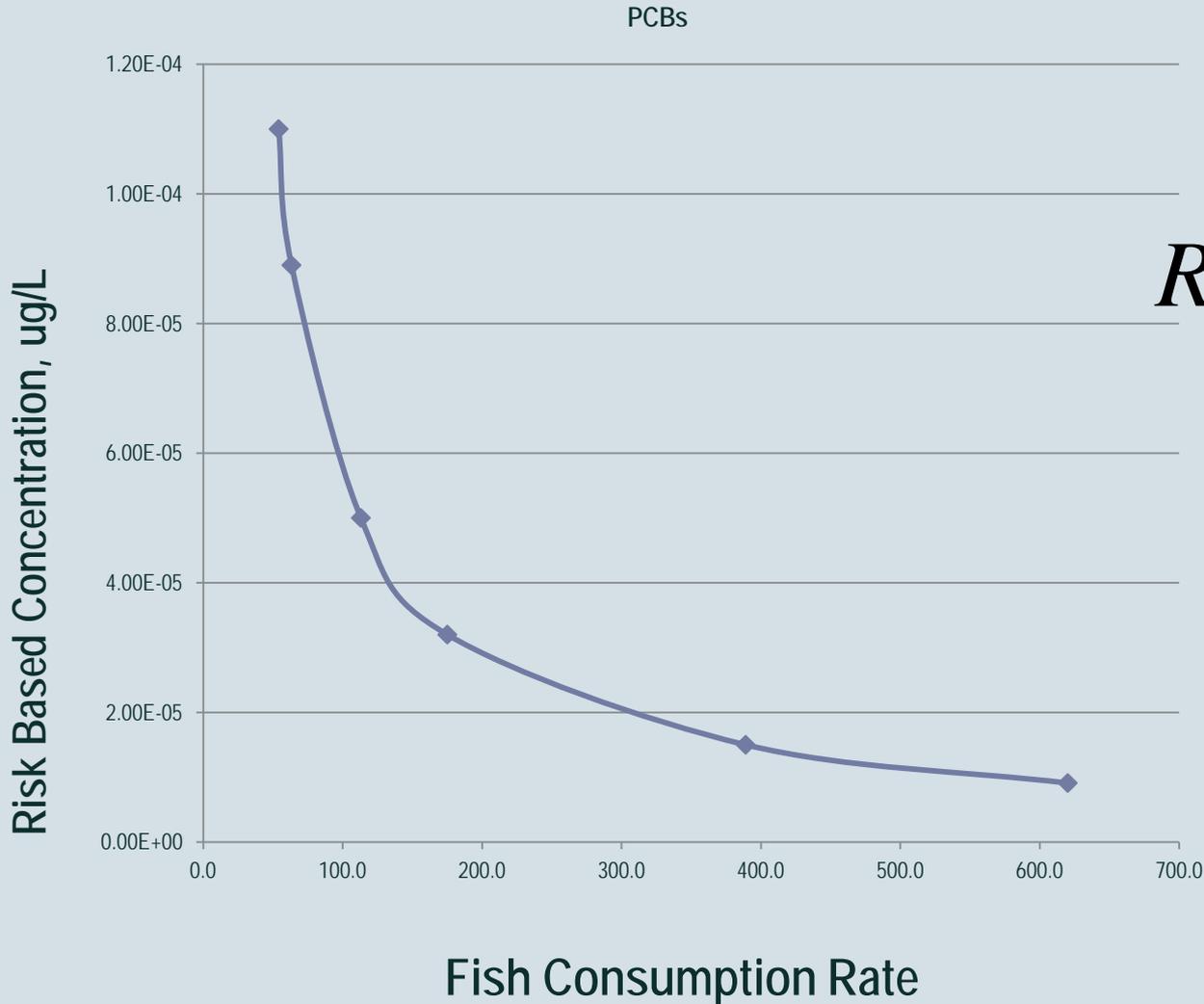
$$\text{Risk Based Concentration} = \frac{\text{Risk} * \text{ABW} * \text{AT} * \text{foc}}{\text{CPF} * \text{BSAF} * \text{SL} * \text{FCR} * \text{FDF} * \text{SUF} * \text{EF} * \text{ED}}$$

- Risk = Acceptable cancer risk level
- ABW = Average Body weight
- AT = Averaging time
- foc = fraction of organic carbon in sediment
- CPF = Carcinogenic Potency Factor, aka slope factor
- BSAF = biota sediment accumulation factor, chemical specific
- FCR = Fish consumption rate**
- SL = Fish/Shellfish lipid fraction
- FDF = Fish Diet Fraction
- EF = Exposure frequency
- ED = Exposure duration
- SUF = Site use factor

Guidance is being developed

As Fish Consumption Rates  $\uparrow$  Risk Based Concentrations  $\downarrow$   
(lower = harder to meet)

# Cleanup Levels Fall as FCRs Increase



$$RBC \propto \frac{1}{FCR}$$

At some point the calculated Risk-Based Concentration will fall below measured background concentrations

# Questions?

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# Questions about Fish Consumption Rates?

- ▶ How much fish and shellfish do people in Washington eat?
- ▶ What populations are we considering?
- ▶ What data is available?
- ▶ Is the fish people eat locally harvested?
- ▶ Does it even make sense to have a single statewide default fish consumption rate?

# Technical Support Document

- Ecology staff worked collaboratively with Natural Resources staff from several tribes, scientists at DOH, EPA, OR DEQ, UW School of Public Health, OFM
- Considerable Internal Peer Review
- Focus questions to DOH, EPA Region 10 and HQ, UW Dept of Biostatistics, OR DEQ, WDFW
- Public comments period Sept 2011 – Jan 2012, included significant technical and scientific review

# The Report Reviews Information Relevant to Washington

- Washington fish and shellfish resources
  - Fish-Consuming populations
  - Data and methodologies
  - Data applicable to Washington
  - Regional specific fish dietary information
- ▶ Preliminary recommendation of a range for default fish consumption rates

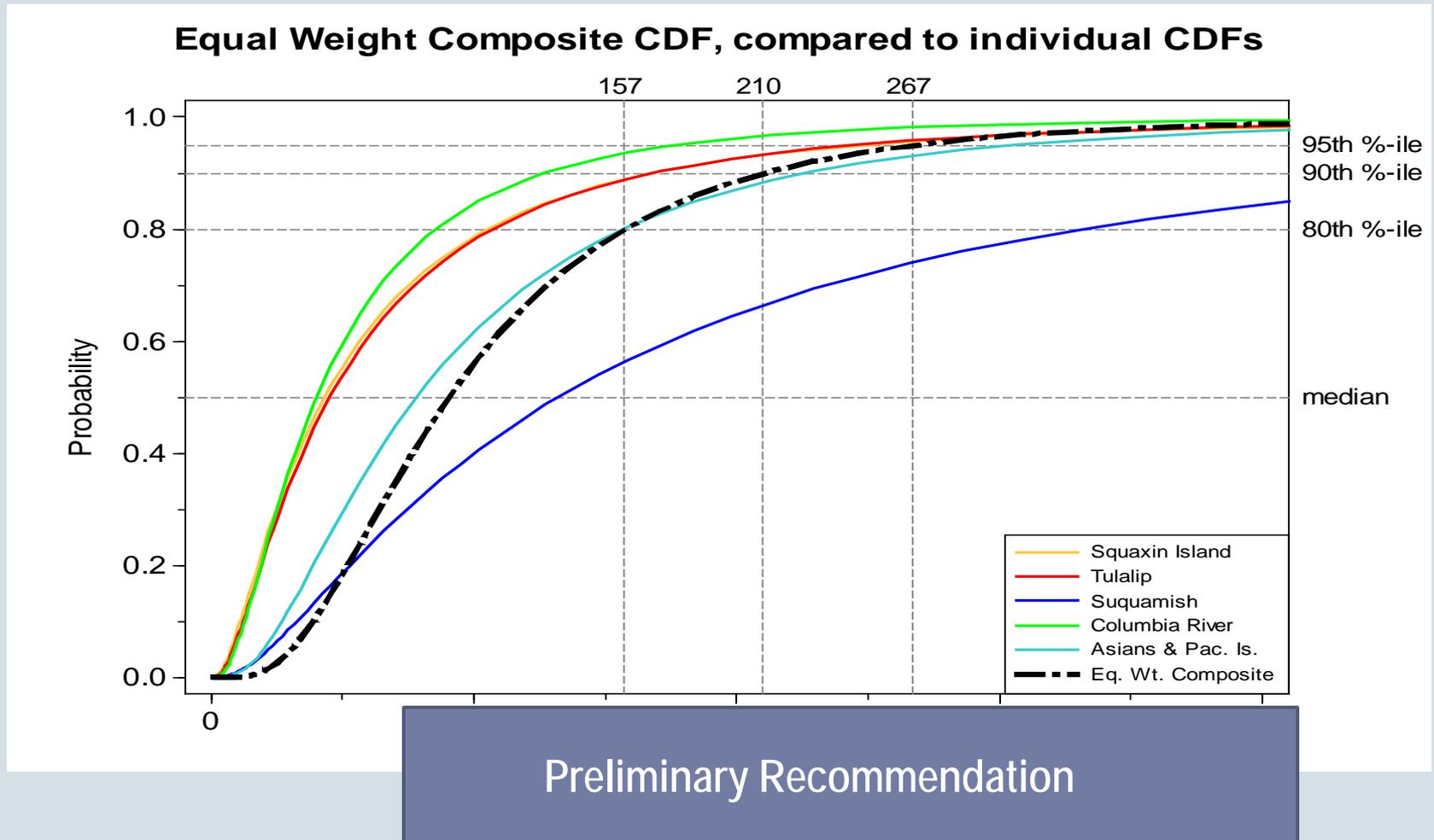
## Regional Data about NW Fish Consumers

Fish Consumption Rate, grams / day	Median	90 <sup>th</sup> percentile	95 <sup>th</sup> percentile
Columbia River Tribes, 1994	40	113	176
Tulalip Tribe, 1996	45	186	244
Squaxin Island Tribe, 1996	43	193	247
Suquamish Tribe, 2000	132	489	797
Asian & Pacific Islanders, 1999	78	236	306

## National Data about Fish Consumers

U.S. EPA *Estimated Per Capita Fish Consumption in the United States*  
EPA-821-C-003, 2002

# The Reasonable Maximum Exposure is the High End of the Exposure Distribution (Regional Data)

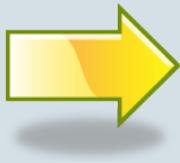


# Over 300 Comments - on Process, Policy, Science

- ▶ Clarify the population of concern: is it the high end of the general population or the high end of high fish consuming populations
- ▶ Statistical treatment of data (using short term studies to estimate long term behavior, treatment of outliers)
- ▶ Relative risk and the health benefits of fish and shellfish
- ▶ Source of the fish
- ▶ Tribal concern about suppression effects
- ▶ Factors to consider when setting site specific cleanup standards
- ▶ Economic implications

# Questions?

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# Issues, Additional Analyses, & Response to Comments

A number of issues were raised by public comments:

- ▶ A single rate or multiple rates
- ▶ Reasonable Maximum Exposure
- ▶ Defining the population of concern
- ▶ What data to use & how to treat the data
- ▶ Using consumer only or *per capita* data
- ▶ Percentiles to base a range on
- ▶ How to account for salmonids
- ▶ Whether to only include locally harvested fish and shellfish

# A Single Rate or Multiple Rates: how to recognize regional variations

Current Thinking: A single default FCR included in the SMS plus flexibility so that site-specific cleanup decisions can account for regional differences

- ▶ Rationale
  - ▶ Provides consistency & predictability for sediment cleanup
  - ▶ A single default FCR will be based on regional specific fish dietary information
  - ▶ Recognizes variations across state
  - ▶ Maintains regulatory flexibility

# Reasonable Maximum Exposure (RME)

Current Thinking: Base SMS cleanup standards on the MTCA definition of an RME which is defined by tribal exposure

- ▶ Rationale:
  - ▶ Tribal exposure scenarios are protective of the most exposed – those who consume fish/shellfish from Washington waters as large portions of their diet
  - ▶ Regional specific fish dietary information of Tribal populations documents consumption of large amounts of seafood

## Reasonable Maximum Exposure (RME) – rationale continued

- ▶ Most of the seafood consumed by Tribal populations comes from Washington State waters
- ▶ Tribal RME scenarios are consistent with federal regulatory policies and procedures
- ▶ Sediment risk-based cleanup concentrations health protective of high fish consuming populations are likely to be protective of recreational anglers and general population fish consumers

# Population to Protect

Current Thinking: Choice of a default FCR for use in SMS should be health protective of Washington fish consumers

## ▶ Rationale:

- ▶ Consistent with current MTCA regulatory policies/procedures
- ▶ Sediment risk-based cleanup concentrations are designed to be protective of those who consume seafood
- ▶ Must be at least as protective as federal requirements (Superfund & EPA Region-10) that acknowledge tribal exposure scenarios in establishing an RME when based on fish consumption

# Fish Dietary Data to Use

Current Thinking: Continue to use regional specific fish dietary information however focus on tribal data

## ▶ Rationale:

- ▶ Ecology reviewed available fish dietary information for the general U.S. population, Pacific NW fish consuming population groups, & recreational anglers
- ▶ National fish dietary information provides supporting information
- ▶ Differences and limitations in dietary survey design, methodology and execution need to be addressed
- ▶ Consultation with regional, national, academic experts

# Percentile

Current Thinking: Default rate used to estimate RME should be between the 80<sup>th</sup> and 95<sup>th</sup> percentiles from the seafood dietary exposure distribution

## ▶ Rationale:

- ▶ State & federal exposure assessment methodologies consider central tendency and upper bound estimates in RME parameters
- ▶ Accounts for variability & uncertainty in estimating seafood consumption
- ▶ Supports risk-based sediment cleanup concentrations that are a product of a combination of central and upper bound estimates

# Salmon

Current Thinking: Salmon should be included in the default fish consumption rate; however sediment cleanup decisions need added flexibility

## ▶ Rationale:

- ▶ Data shows that salmon are consumed more than any other finfish
- ▶ Cultural and economic importance for the Pacific Northwest
- ▶ Resident Puget Sound salmon are locally harvested and consumed
- ▶ Salmon contaminant body burden assumed not just from open marine waters but are associated with contaminated rivers of origin, urban estuarine environments, and PS urbanized embayments
- ▶ Ecology considering how to account for the residency time of salmon in a contaminated sediment area
  - ▶ Consideration of a Site Use Factor

# Source of Fish

Evolving Thinking: All sources of seafood should (probably) be considered to establish a default fish consumption rate estimate

## ▶ Rationale:

- ▶ The regional specific dietary surveys are based primarily on locally harvested & consumed seafood
- ▶ Members of fish consuming populations, by tradition and practice, consume large amounts of locally harvested seafood
- ▶ When local seafood resources are available they will be preferred
- ▶ Ecology thinking is evolving, and we are evaluating the information to respond to comments regarding locally harvested versus non-locally harvested seafood. This is work-in-progress with results from our analysis pending in mid-May.

# Analyses in response to comments – SMS proposal will be influenced by outcome

- Treatment of outliers in the regional specific surveys
- Methodology for deriving a FCR rate range and rate
- Methodology for analyzing national general population data  
*Estimated Per Capita Fish Consumption in the United States (EPA 2002)*
  - Whether consider consumer only or *per capita* data
  - Statistical methods of correcting data to more correctly estimate long term consumption rates from short term dietary data

# Questions?



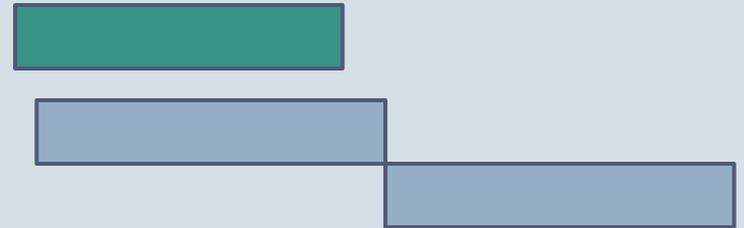
# Conclusions & Next Steps for SMS

## Ecology is:

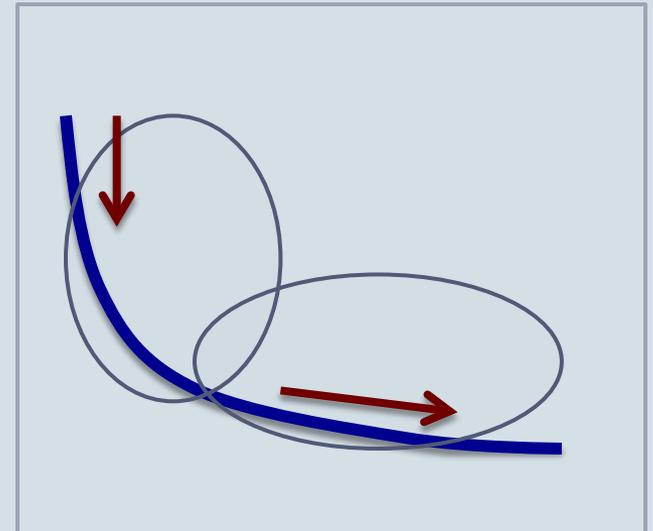
- ▶ Responding to comments
- ▶ **Welcoming feedback** on the entire regulatory package – late July
  - ▶ Economic analyses, technical and policy analyses related to SMS
- ▶ **Inviting input** on the proposed Sediment Management Standards (which will include fish consumption rate for use in sediment cleanup)
  - ▶ Formal public comment period starting late July
  - ▶ Public hearings will held throughout the state (tentatively
    - ▶ Bellingham, Seattle, Olympia, Vancouver, Spokane, Richland, Yakima, possibly others

# Separate, Coordinated

- ▶ Sediment Management Standards
- ▶ & Water Quality Standards



- ▶ **The long term objective**
  - reducing toxics in the environment –
  - means working together



# Contact Info

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## Web info

[www.ecy.wa.gov](http://www.ecy.wa.gov)

Fish consumption rates info and to sign up for related email lists

<http://www.ecy.wa.gov/toxics/fish.html>

# For more information

- ▶ On sediment management standards
- ▶ <http://www.ecy.wa.gov/programs/tcp/regs/2011-SMS/2011-SMS-hp.html>
- ▶ On water quality standards
- ▶ <http://www.ecy.wa.gov/programs/wq/swqs/index.html>
- ▶ On fish consumption rates
- ▶ <http://www.ecy.wa.gov/toxics/fish.html>
- ▶ Sign up for email updates
- ▶ <http://www.ecy.wa.gov/toxics/fish.html>  
(scroll to lower right column)