Information to Support the Morning Discussion on Rule Alternatives

Public Workshop, Lacey WA

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Human Health Criteria and Implementation Tools Rule-makings

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Today's Presentation

Purpose: background material to support this morning's presentation.

Focus 1 A more comprehensive discussion of the policy options that were considered-

<u>Including</u> a short summary of Ecology's preliminary look at **"salmon adjustment factors"** to explore how some non-Clean Water Act (CWA) sources of contamination could be removed from the criteria calculation.

Focus 2 **Total PCBs, mercury, and inorganic arsenic**:

more discussion on possible criteria development options and implementation summary.

General Information

Please ask questions, give comments, etc., as we go along. Our facilitator will provide time for this.

This discussion will refer to issues and material presented and discussed at Implementation Tools Workshops, Policy Forums, and Delegates' Table meetings that have occurred over the past two years.

The issues and material surrounding this rule-making are very complex, but I've tries to simplify for this presentation.

Abbreviations used in this presentation:

HHC = Human health criteria for surface waters
WQS = Surface Water Quality Standards (WAC 173-201A)
NTR = 1992 National Toxics Rule (40CFR131)
CWA = Clean Water Act
RfD = Reference dose
RSC = Relative source contribution
FTR = Fish Tissue Residue
Hg = Mercury
WDOH = Washington Department of Health
FA = Fish advisory
FCR TSD = Wa. Dept. of Ecology, 2013. *Fish Consumption Rates Technical Support Document, A Review of Data and Information about Fish Consumption in Washington, Version 2.0, Final.* January 2013, Pub. No. 12-09-058
CR = Columbia River
PS = Puget Sound
HQ = Hazard quotient
EPA = U.S. Environmental Protection Agency

The next set of slides will walk through seven of the policy and risk management issues discussed this morning. The slides will also present some of the options Ecology developed to help get to the **three alternatives** presented this morning.

Green headings in the following slides indicate the policy determinations that were used in the alternatives presented today.

Green = Go

Policy/Risk Management Issues

1. Which chemicals to develop (calculate) and adopt numeric human health criteria for?

2. Calculation approach: Deterministic or probabilistic?

3. Criteria statewide or broken out by geographic region?

4. "Scope of the CWA" decisions
   a. How are salmon accounted for?
   b. Should criteria account for other sources of contaminants: Relative Source Contribution

5. What level(s) of risk or hazard?
   Risk level for carcinogens
   Hazard Quotient for non-carcinogens

6. What focus population and statistic is the state risk level or hazard quotient applied to? – This discussion is merged with the FCR discussion.

7. What values should be used for other inputs to the criteria equations?
   Fish consumption rate
   Drinking water intake
   Body weight
   Toxicity values

We will follow the numbering on this slide as we discuss specific issues.

Issue 1

Which Chemicals to Develop (Calculate) and Adopt Numeric Human Health Criteria For?

Option 1 of 3
All CWA 307(a) priority toxic pollutants that EPA has developed national recommended human health (HH) criteria for, *as necessary to support uses where such pollutants are discharged or are present in the affected waters and could reasonably be expected to interfere with designated uses.* Include narrative statement for non-priority toxic pollutants

- Directly reflects statutory requirement to adopt standards based on demonstrated need to control problem pollutants
- EPA recommends that a State use this option to meet the statutory requirement.
- Directly reflects all the Act's requirements and is flexible, resulting in adoption of numeric water quality standards as needed.
- Use of narrative statement for unnamed chemicals presents challenges.
- Option with the fewest chemicals.

Issue 1

Which Chemicals to Develop (Calculate) and Adopt Numeric Human Health Criteria For?

Option 2 of 3
All CWA 307(a) priority toxic pollutants that EPA has developed national recommended HH criteria for, *regardless of whether the pollutants are known to be present*. Include narrative statement for non-priority toxic pollutants
• Ensures that States will satisfy statute. • Within a State's legal authority under the CWA to adopt broad water quality standards. • This option is a comprehensive approach to satisfy the statutory requirements because it would include all of the *priority toxic pollutants* for which EPA has prepared section 304(a) criteria guidance for. • Simple, straightforward implementation. • Option with the “traditional” list of chemicals.

Issue 1

Which Chemicals to Develop (Calculate) and Adopt Numeric Human Health Criteria For?

Option 3 of 3
All pollutants that EPA has developed national recommended HH criteria for. Include narrative statement for non-priority toxic pollutants
• Within a State's legal authority under the CWA to adopt broad water quality standards. • This option is the most comprehensive approach to satisfy the statutory requirements because it would include *all of the pollutants* for which EPA has prepared national recommended HH criteria guidance for. • State can go beyond section 307(a) toxics list, as desired. • Makes maximum use of EPA science and national recommendations. • Option with the broadest list of chemicals.

Issue 2

Which Calculation Approach: Deterministic or Probabilistic?

Option 1	Option 2
Deterministic	Probabilistic
This is the commonly used approach.	No CWA-approved criteria from this method at this point (Florida is working on this).

<u>Quick review from Policy Forum 6:</u>
The deterministic approach is the default calculation approach used by EPA and states, and is familiar. A single value is used to represent each input to the HHC equations. Tends to focus attention on specific equation inputs as opposed to overall levels of protection conferred by the equation.

The probabilistic approach accounts for the full distribution of the data available for specific parameters (e.g., body weight or fish consumption rate). This approach can increase the certainty that the HHC values are more closely linked to the specified risk level and the population it is specifically applied to.

Issue 3

Human Health Criteria:

One Statewide Set, or Broken Out by Geographic Region?

Option 1	Option 2	Option 3
Statewide	Regional: Puget Sound and non-Puget Sound	Other geographic breakdown
• Simple to understand. • Consistent with NTR criteria. • Easier to administer.	• Reflects differences in fish and shellfish consumption patterns across WA. • More administrative challenges.	• Other alternatives exist, such as using the Cascades as a delineation. • Even greater administrative challenges.

Issue 4 Scope of Clean Water Act?

Policy choices related to this discussion focus on:

1. The **sources of pollutants** (whether the pollutants are under the state's ability to regulate under the CWA) and
2. The **sources of fish and shellfish** (within or outside of the state's jurisdiction).

These issues include:

<u>Salmon treatment</u>

- Salmon 100% in the FCR
- Salmon 100% out of the FCR
- Salmon FCR adjusted to omit non-CWA sources

<u>Other sources of contaminants</u> – Relative Source Contribution

Issue 4a Scope of Clean Water Act - How Are Salmon Accounted For in Criteria Calculation?

Option 1	Option 2	Option 3
Salmon 100% in	Salmon 100% out	Adjustment factor approach: Salmon intake adjusted to omit "oceanic background" for contaminants and/or for catch site
• Assumes all contaminants in salmon are from CWA-regulated sources in WA • Assumes salmon from any geographic area reflect CWA designated uses in WA.	• This option is not used because studies indicate Puget Sound and Columbia River impact levels of contaminants in salmon.	• Eliminates some (but not all) non-CWA and non-WA sources from the salmon estimate.

Issue 4a Why Were Adjustment Factors Developed?

The draft salmon adjustment factors were developed to address "scope of the CWA" concerns, including:

- Contaminants that accumulate from sources not under CWA regulatory control
- Contaminants from outside the state's geographic jurisdiction
- Fish and shellfish outside of WA's jurisdiction (from areas where the state's CWA designated uses are not applied)

The CWA does not provide tools to address the contaminants associated with these situations.

The draft adjustment factors are able to address some of the CWA concerns.

Draft adjustment factors developed by Dave Serdar, Ecology WQP

Issue 4a

What is the adjustment factor?

The adjustment factor is the percent of PCBs assumed to be accumulated in WA waters.

This assumes that PCB accumulation, above background levels, is:

- due to proximity to population centers, a reasonable assumption supported by evidence provided elsewhere; and,
- from Washington sources.

This approach cannot distinguish between CWA and non-CWA sources into Washington waters.

Issue 4a

What do studies tell us?

Data from WDFW, NOAA, USFWS and others suggest that approximately three-quarters of the PCB burdens in WA Chinook are acquired in locations other than 'background' .

The background areas include the open Pacific or coastal areas north of central BC; marginally influenced by development).

The burden (i.e. mass) acquired in the 'non-background' locations is highest for resident Puget Sound Chinook (100%) and less for non-resident Puget Sound and Columbia River Chinook (50 – 80%).

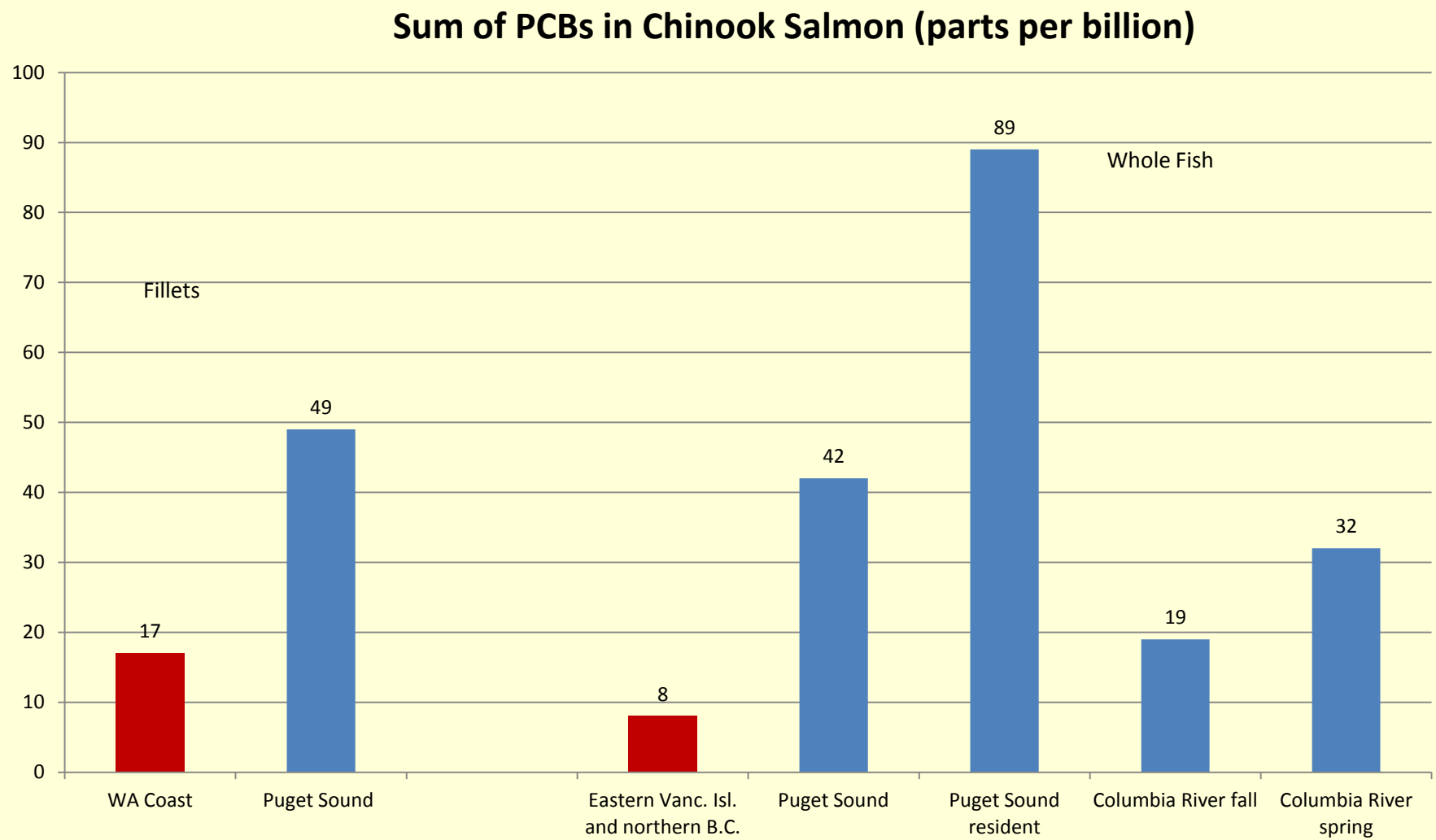
There are not as much data for other species or for other chemicals.

Sources:

Missildine, B.R., Peters, R.J., Chin-Leo, G. and Houck, D. 2005. Polychlorinated biphenyl concentrations in adult Chinook salmon (*Oncorhynchus tshawytscha*) returning to coastal and Puget Sound Hatcheries of Washington State. Environmental Science and Technology. 29:6944-6951.

O'Neill, S.M., G.M. Ylitalo, J.E. West, J. Bolton, C.A. Sloan, and M.M. Krahn. 2006. Regional patterns of persistent organic pollutants in five Pacific salmon species (*Oncorhynchus spp*) and their contributions to contaminant levels in northern and southern resident killer whales (*Orcinus orca*). Proceedings of the Southern Resident Killer Whale Symposium, April 3-5, 2006, Seattle, WA.

This graph shows the levels of **total PCBs** in background (red) and Puget Sound and Columbia River (blue) Chinook salmon.



Sources:
Missildine et al, 2005
O'Neill et al. 2006.

Issue 4a

The Use of Draft Adjustment Factors Was Explored Using Information from the FCR Technical Support Document.

- Adjustment factors were applied to the salmon component of the FCR surveys to see how this could affect the FCRs.
- Information from the 3 Puget Sound tribes and the 4 Columbia River tribes whose surveys were summarized in the 2013 Ecology FCR Technical Support Document was used to explore how the adjustment factors could influence the FCR.
- **These studies were chosen to explore this approach because the anadromous fish component is clearly indicated in the surveys and clearly summarized in the FCR TSD.**
- All sources of fish and shellfish were included when doing this preliminary analysis.

Issue 4a

An example of the type of information used – except the information used in this exploration was also broken out between "salmon" and "other fish and shellfish".

The summary table below includes all fish and shellfish. That includes local and non-local, and salmon. This table also shows consumers-only information.

(Table after Ecology FCR TSD.)

Table 1. Summary of Fish Consumption Data, All Finfish and Shellfish (g/day)

Population	Source of Fish	Number of Adults Surveyed	Mean	Percentiles		
				50th	90th	95th
General population (consumers only)	All sources: EPA method	2,853	56	38	128	168
	All sources: NCI method	6,465	19	13	43	57
Columbia River Tribes	All sources	464	63	41	130	194
	Columbia River	–	56	36	114	171
Tulalip Tribes	All sources	73	82	45	193	268
	Puget Sound	71	60	30	139	237
Squaxin Island Tribe	All sources	117	84	45	206	280
	Puget Sound	–	56	30	139	189
Suquamish Tribe	All sources	92	214	132	489	797
	Puget Sound	91	165	58	397	767
Recreational Fishers (compilation of multiple studies)	Marine waters, WA State	–	11–53	1.0–21	13–246	
	Freshwater, WA State	–	6.0–22	–	42–67	

Sources: Adapted from Polissar et al., 2012, Table E-1. Data for recreational fishers is from Table 3, Technical Issue Paper: *Recreational Fish Consumption Rates* (Ecology, 2012). General population data are for consumers only, as opposed to per capita. See Chapters 4 and 6.

Issue 4a

The salmon adjustment factors, (which would reduce the FCRs)**, were not used to support any of the three alternatives presented this morning.**

Why?

The adjustment factors had an overall effect on the choice of the three preliminary alternatives that was considered to be minimal.

Example:

The difference between a FCR of 125 g/day (preliminary Puget Sound average without using adjustment factors) and 105 g/day (preliminary Puget Sound average using adjustment factors) is small, and would not result in large changes to the criteria.

Issue 4b Should Clean Water Act Criteria Account for Sources of Contaminants Not Regulated Under the CWA?

The Relative Source Contribution (RSC) – what is it?

- The RSC is part of the equation for the **non-carcinogens**
- The RSC is the input to the criterion equation that accounts for exposure from "other" non-CWA sources of a pollutant (such as air, treated drinking water, and food).
- Use of the RSC is part of the EPA 2000 guidance (although not fully included in their recommended national criteria yet).

How does the RSC work for HHC calculation?

- In the simplest language, the calculated criterion is apportioned the amount of allowable exposure to a chemical that has not been used up by other sources.

Issue 4b Relative Source Contribution (RSC) Options

Option 1	Option 2	Option 3
Use a RSC of 1 for all noncarcinogens	Use the EPA 2000 guidance approach : 20% default, no greater then 80% if data-driven, or , subtraction method.	Use the RSCs for 17 chemicals, and use 1 for other chemicals.
• The current approach incorporated into the NTR. • Straightforward. • This choice does not assume non-CWA sources of contaminants can be addressed using HHC.	• Consistent with recent EPA guidance. • Assumes non-CWA sources of contaminants can be addressed using HHC.	• This reflects EPA's current national recommended criteria list. • Assumes non-CWA sources of contaminants can be addressed using HHC.

Issue 4b

Preliminary decision on RSC: Use Option 1

Continue to set the relative source contribution at 1, meaning that all sources are assumed to come from drinking untreated surface water and locally caught fish/shellfish.

Given the very limited CWA ability to control sources outside the jurisdiction of the Clean Water Act, Ecology thinks this is a prudent decision.

Issue 5 What Level(s) of Risk or Hazard?

The risk level applies to **carcinogens**

Terminology review: What do 10^{-6} and 10^{-5} mean?

10^{-6} means there is an additional lifetime risk of one occurrence of cancer, in one million people, at the given exposure assumptions (this is compared to an unexposed population).

10^{-5} means there is an additional lifetime risk of one occurrence of cancer, in one hundred thousand people, at the given exposure assumptions (this is compared to an unexposed population).

What are the exposure assumptions?

For Washington's NTR HHC, the exposure assumptions are:

- Daily exposure over 70 years
- Fish consumption rate of currently 6.5 g/day
- 2 liters/day of untreated surface waters
- 154 lb. body weight.

Issue 5 Risk Level and Hazard Quotient Options

Option 1	Option 2	Option 3
10^{-6} state default risk level for all carcinogens. Hazard quotient for noncarcinogens remains at 1.	10^{-6} state default risk level for HHC carcinogens, unless specifically defined otherwise in the WQS. Hazard quotient for noncarcinogens remains at 1	10^{-5} state default risk level for HHC carcinogens, specifically defined otherwise in the WQS. Hazard quotient for noncarcinogens remains at 1.
• 10^{-6} is the current state risk level. • HQ = 1 is the same for all the options.	• Reflects the default of 10^{-6}. • Adds language allowing other risk levels or approaches as defined in WQS. • Well within EPA's HHC guidance levels for risk for all exposed populations.	• 10^{-5} adopted by many other states and given CWA approval by EPA. • Adds language allowing other risk levels or approaches as defined in WQS. • Well within EPA's HHC guidance levels for risk for all exposed populations.

Issue 5

Does Being Under the NTR Affect Whether Washington Could Change the Risk Level?

Washington is currently under the federal National Toxics Rule (NTR) for HHC.

Those criteria are set to a 10^{-6} risk level to apply to the arithmetic mean (average) of the general population.

If desired, can Washington change to a different risk level?

Here is what the NTR says about EPA's process of reviewing changes in risk level for those states being removed from the NTR:

"…when a State adopts a human health criterion for a carcinogen at a 10^{-5} risk level where the Agency has promulgated at a 10^{-6} risk level … the Agency believes it would be appropriate to withdraw the Federal criterion without notice and comment because the Agency has considered in this rule that criteria based on either 10^{-5} or 10^{-6} risk levels meet the requirements of the Act."

From: National Toxics Rule, *Federal Register*, Volume: 57, Issue: 246, Page: 60848 (57 FR 60848), Tuesday, December 22, 1992. Section E.3.

Issue 5

EPA 2000 guidance on risk levels for HHC:

"EPA believes that both 10^{-6} or 10^{-5} may be acceptable for the general population and that highly exposed populations should not exceed a 10^{-4} risk level."

"The choice of an acceptable cancer risk by a State or Tribe is a risk management decision."

Hazard Quotient for non-carcinogens

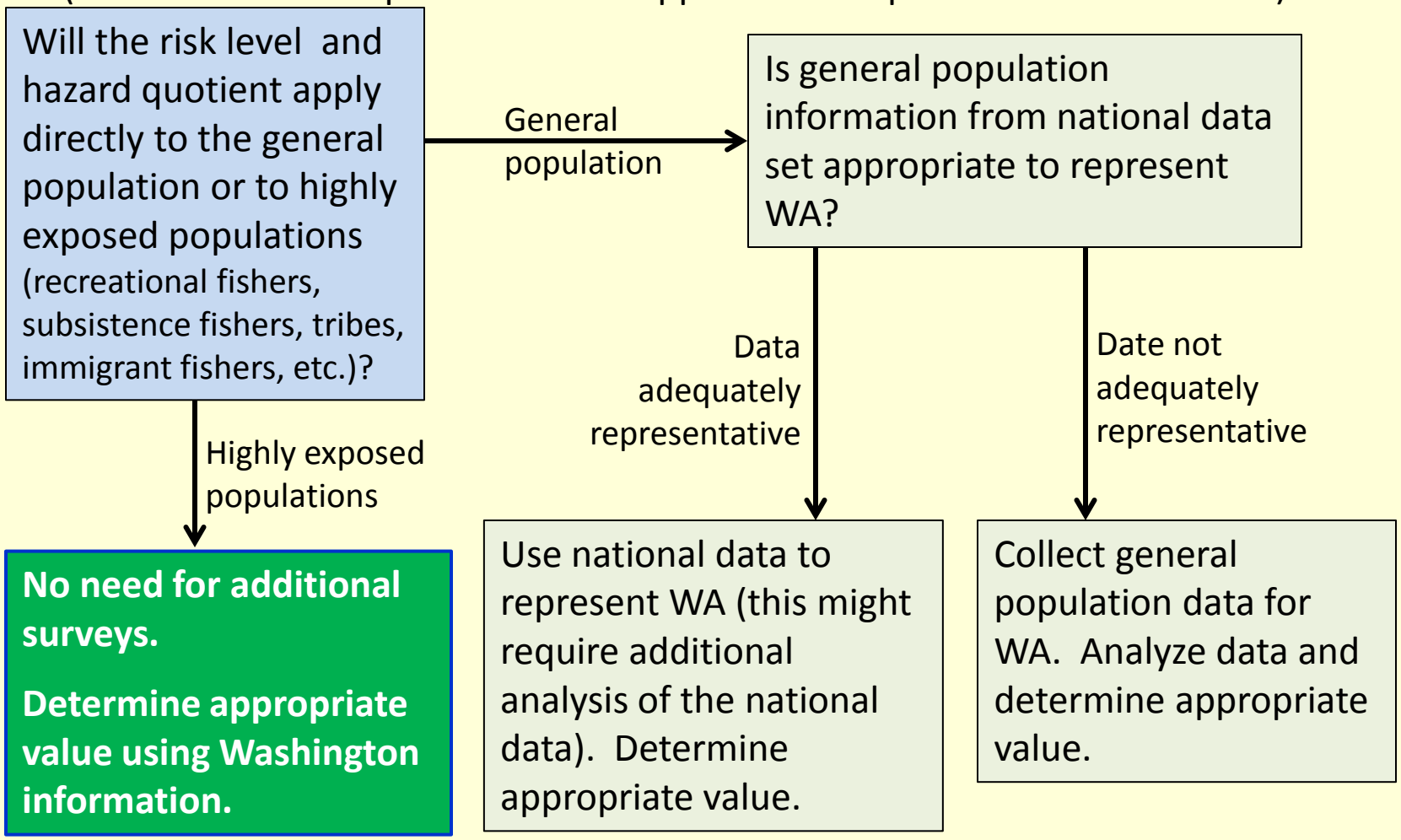
A HQ = 1 represents a risk level where non-cancer effects should not be present at specified exposure assumptions.

Ecology has made the policy choice to use a HQ =1 and to not pursue other choices.

Issue 6 What Focus Population and Statistic is the State Risk Level or Hazard Quotient Applied to For Calculation Purposes?

Generalized considerations are in the flowchart below.

(Note: This line of questions more applicable to a probabilistic calculation)



Issue 6 What Focus Population Are the State's Risk Level and Hazard Quotient Directly Applied To?

Option 1	Option 2
General population	Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc…
• The current default approach. • Consistent with EPA national recommended criteria. • Depends on use of national dataset. • Very low criteria concentrations.	• Highly exposed populations the focus of state risk level and HQ . • Provides a very high level of protection. • WA-specific studies available to support this approach. • Very low criteria concentrations.

Issue 6 What is Important About This Risk Management Decision?

Most states follow EPA guidance and base the state's default risk level on a general population, and then ensure that highly exposed populations do not exceed EPA's upper levels of allowed risk.

Washington is making the preliminary decision to base the risk level and HQ on highly exposed populations which include recreational fishers, subsistence fishers, tribes, immigrant fishers, etc…

This is an important change in focus from where the NTR and the state's current risk level are applied.

Issue 6

Important considerations as we continue discussing populations and FCRs:

Because the preliminary preferred approach to criteria calculation is **deterministic**, the discussion of the focus population is being merged with the discussion on FCRs.

Ecology acknowledges that other inputs in the criteria equations provide additional sources of protection, and that the FCR does not in itself define the total level of protection/risk conferred by the criteria.

With the caveat above, the FCR, as discussed subsequently in this presentation, will be used to represent the focus population that a risk level and HQ are directly applied to.

Issue 7 What Values Should Be Used for Other Inputs to the Criteria Equations?

Body weight

Use the EPA default average adult body weight of 70 kg (**154 lbs**.).

Drinking water intake

Use the EPA default 86th percentile drinking water rate of **2 L/day** for ingestion of untreated surface waters.

Toxicity Values

Use the most recent EPA IRIS values for cancer and non-cancer effects.

Fish consumption rate – *we will discuss in more detail*

Several choices presented based on (1) WA surveys and (2) salmon treatment.

Issue 7 FCR

Alternative Preliminary FCR Based on WA Surveys, With Preliminary Adjustment Factor Applied to Salmon

Option 1
Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc… Arithmetic mean of highly exposed individuals surveyed in tribal surveys, split out into PS and non-PS, consumers only, **preliminary adjustment factor applied** to salmon
• Preliminary Puget Sound average FCR = 108 rounded to **110 g/day** • Preliminary non-Puget Sound average FCR = **est. 56 g/day.** • These values are consumers only, so an added level of protection over the "non consumers + consumers" approach used by EPA is provided. • Assumes tribal survey information is representative of other highly exposed populations: recreational fishers, subsistence fishers, immigrant fishers, etc…

Issue 7 FCR Option Based on WA Surveys With 100% of All Anadromous Included

Option 2
Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc… Arithmetic mean of highly exposed populations surveyed in tribal surveys, split out into PS and non-PS.
• Preliminary Puget Sound average FCR = 127 rounded to 125 g/day • Preliminary non-Puget Sound average FCR = est. 63 g/day. • These values are consumers only, so an added level of protection over the "non consumers + consumers" approach used by EPA is provided. • This is a clear risk management decision to directly apply state risk level and HQ to highly exposed populations.

Issue 7 FCR Option Based on WA Surveys With 100% of All Anadromous Included

Option 3 (Alternative 3)
Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc… Arithmetic mean of highly exposed populations surveyed in tribal surveys in PS.
• Preliminary average FCR = 127 rounded to 125 g/day. • Applies higher value statewide. • These values are consumers only, so an added level of protection over the "non consumers + consumers" approach used by EPA is provided. • This is a clear risk management decision to directly apply state risk level and HQ to highly exposed populations.

Issue 7 FCR Option Based on WA Surveys With 100% of All Anadromous Included

Option 4 (Alternative 1)
Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc… **225 g/day**
• FCR higher than PS and CR survey averages. • FCR encompasses upper percentiles from marine and freshwater recreational surveys. • Includes 100% salmon. • Well within EPA national guidance for highly exposed populations. • This is a clear risk management decision to directly apply state risk level and HQ to highly exposed populations.

Issue 7 FCR Option Based on Other Factors

Option 5 (Alternative 2)
Highly exposed populations: recreational fishers, subsistence fishers, tribes, immigrant fishers, etc… **175 g/day**
• Many tribes, and others, across WA endorse this value as an interim FCR for HHC calculation. • Adopted by Oregon • This is a clear risk management decision to directly apply state risk level and HQ to highly exposed populations.

Issue 7 How Do These FCR Options Compare With National Values and With Each Other?

Option #	FCR value(s) (g/day)	Comment
NA	6.5	Older national average - current FCR for WA in National Toxics Rule
	7.5	New national average - based on general population (from EPA 2000 guidance)
	17.5	New national recommendation, disapproved in OR and ID. Incorporated into EPA national recommended criteria. (from EPA 2000 guidance)
	142	New EPA estimate of average subsistence rate and the FCR recommended for subsistence populations. (from EPA 2000 guidance)
1	105.7 PS, 56 non-PS	Arithmetic mean of tribal surveys, **split out into PS and non-PS,** surveys were consumers only, preliminary adjustment factor applied to salmon.
2	125 PS, 63 non-PS	Arithmetic mean of tribal surveys, split out into PS and non-PS, surveys were consumers only. Salmon 100% in
3	**125**	Arithmetic mean tribal surveys in PS.
4	**225**	Encompasses PS and CR survey means – and - upper percentiles from marine and freshwater recreational surveys. Salmon 100% in.
5	**175**	"Endorsed" value as an interim FCR, adopted by Oregon

This concludes the part of the presentation on "policy options."

A discussion on total PCBs, mercury, and inorganic arsenic will follow.

HHC Preliminary Alternatives And Implementation Directions for Total PCBs, Mercury, And Total Arsenic

The following slides describe preliminary alternative approaches for criteria calculation for total PCBs, mercury, and inorganic arsenic.

Also included: Simplified summary of implementation approaches to facilitate source controls and toxics reductions.

Variances

- As discussed during the implementation tools talk, this rule-making will detail the "recipe" for granting a variance.
- Variances need to be adopted into the WQS.
- EPA will need to review future specific variances, and CWA approval is not certain.
- Another alternative is for EPA to grant the state the ability to issue variances.

Total PCBs:
Summary

All criteria derivation options result in very low concentrations that might not be achievable in all areas.

Preliminary approach is to depend on the implementation tools to provide a driver for source controls and to ensure compliance for dischargers implementing source controls.

Approaches for new or expanding discharges have not been resolved. (See Policy Forum 2 and 3 scenario discussions.)

	Criteria derivation options			
	1	2	3	Other
Total PCBs	Two sets of criteria broken out geographically: Puget Sound and non-Puget Sound. Risk Level = 10-5, apply to highly exposed populations.	Statewide criteria. Risk Level = 10-5, apply to highly exposed populations.	Statewide. **Non-cancer driven**. HQ = 1, apply to highly exposed populations. (This is a non-cancer based approach. This would be consistent with the non-cancer based approach used by WDOH in developing fish advisories.	Other combinations of criteria calculations approaches exist that include combinations of valid policy options.

Total PCBs: *Implementation*

Paths to permit limit development:

1. Traditional permit limit development using priority pollutant scan information and reasonable potential determination including mixing zones.
2. Impaired waters listings, TMDLs, and allocations.

Additional Paths to compliance and source control (if needed and applicable):

- **Compliance schedules** as discussed
- **Variances** for: individual dischargers, multiple dischargers, waterbodies, possibly **statewide**.

  Statewide variance for PCBs: data will need additional review to determine whether a statewide variance might be appropriate for PCBs

- Also - designated use modification is an option available under federal regulations.

Ability to use variances and/or use changes is uncertain.

Mercury and Methylmercury:
Summary

All criteria derivation options result in very low concentrations and will challenge Washington.

Very low concentrations that might not be achievable in all areas.

Possible path: postpone development of these criteria and adopt only after:

- A solid implementation plan with wide buy-in and commitments is developed
- EPA approval is likely.

Approaches for new or expanding discharges have not been resolved. (See Policy Forum 2 and 3 scenario discussions.)

Chemical/ group	Criteria derivation options		
	1	2	3
Methyl-mercury	Criteria broken out geographically: Puget Sound and non-Puget Sound.	Statewide	Postpone development of the methylmercury criteria . **Adopt new criteria when a solid implementation plan is ready, including how to develop permit limits** Set out a timeline to get this work accomplished.
Mercury	NA	NA	Adopt updated criteria for mercury using new IRIS RfD FCR– **or** – depend on stringent aquatic life-based criteria to provide protection and stay under NTR.

Mercury and Methylmercury: *Implementation*

Paths to permit limit development:

1. Traditional permit limit development using priority pollutant scan information and reasonable potential determination including mixing zones.
2. Impaired waters listings, TMDLs, and allocations.

Additional Paths to compliance and source control (if needed and applicable):

- **Compliance schedules** as discussed
- **Variances** for: individual dischargers, multiple dischargers, waterbodies, possibly **statewide**.

Statewide variance for methylmercury: data will need additional review to determine whether a statewide variance might be appropriate for methylmercury.

- Also - designated use modification is an option available under federal regulations.

Ability to use variances and/or use changes is uncertain.

Inorganic arsenic:
Summary

This chemical is naturally present in Washington's geology, surface waters, and ground waters.

Risk-based criteria are below natural condition concentrations in surface waters.

Freshwaters: Arsenic is not highly bioaccumulative in freshwater organisms, so using the Safe Drinking Water Act MCL makes sense. Most western states have taken this approach to address natural conditions.

Marine and estuarine waters: Ecology is exploring criteria options based on both natural conditions and on risk. Additional review of information on this chemical will occur.

Approaches for new or expanding discharges have not been resolved. (See Policy Forum 2 and 3 scenario discussions.)

	Criteria derivation options	
	1	2
Inorganic arsenic	**Freshwaters** Criterion for "water + organisms" → 10 ppb = SDWA MCL **Estuarine and marine** Criterion for "organisms only" → oceanic natural background-based value = approx. 1.0 to 1.5 ppb **-or-** "Oregon approach"	"Oregon approach" Risk Level = 10^{-4} Bioaccumulation factor = revised to reflect local species. Risk level applied to highly exposed populations.

Inorganic Arsenic: *Implementation*

Paths to permit limit development:

1. Traditional permit limit development using priority pollutant scan information and reasonable potential determination including mixing zones.
2. Impaired waters listings, TMDLs, and allocations.

Additional Paths to compliance and source control (if needed and applicable):

- **Compliance schedules** as discussed
- **Variances** for: individual dischargers, multiple dischargers, waterbodies, possibly statewide.
- Also - designated use modification is an option available under federal regulations.

Ability to use variances and/or use changes is uncertain.

Questions/Comments/Discussion