

EPA's 2014 Flame Retardant Assessments - A Case For Using Tribal-Relevant Exposure as a Default

Barton, D.C.; National Tribal Toxics Council and Columbia River Inter-Tribal Fish Commission

In March 2013, EPA announced plans to conduct risk assessments of four flame retardant chemicals that are used in commerce and have persistent, bioaccumulative, and toxic (PBT) properties. Tribal members are disproportionately at risk to PBTs through cultural, ceremonial, and subsistence practices and lifelong exposure from place based communities. However, tribes have a unique political and legal status that sets them apart from other subpopulations and warrants particular consideration in risk and exposure assessments. This presentation will summarize an assessment where tribal exposure was not evaluated and will suggest that future assessments of PBT chemicals explicitly consider tribal risks.

EPA's 2010 exposure assessment of polybrominated diphenyl ethers (PBDE) thoroughly reviews: its widespread dispersion; biomonitoring of human blood and breast milk; and, concentrations in, water, soil, and indoor air. The report quantifies central tendency intake estimates and body burdens and deduces that household dust is the major source of exposure for the US general population. During analysis of highly exposed subpopulations and those with high body burdens, modeling exercises were not able to adequately explain the highest concentrations found. An evaluation of the assumptions that were used in this exposure assessment serves as an example of how a focus on central tendency exposures by federal risk assessors, overlooks reasonable risks to fish consuming tribal populations and thus misses the identification of significant exposure pathways and the need to establish corrective regulatory controls to better protect the health of tribal members as well as the general population.

EPA's assessment presents a thorough review of reported PBDE concentrations in fish tissue from a wide variety of sources. The review finds that concentration of PBDEs in fish from open water environments are much higher (10-1000 ppb) than farmed fish or fish obtained from marketplaces (1-5 ppb). Faced with choosing a nationally representative number, the authors used a sampling of fish from supermarkets in Dallas, TX for the dose assessment of exposure from fish (0.32 ppb for finfish and 5.7 ppb for shellfish) and used a fish consumption rate of 11.6 grams/day for finfish and 3.8 grams/day for shellfish. Tribal exposure to PBDEs are substantially underestimated using these assumptions. Fish consumption rates in the Pacific Northwest can be orders of magnitude higher than the general population, and fish is generally harvested from open water environments.

While significant information was gleaned from EPA's central tendency exposure assessment to PBDEs, such as the threat from household dust, overlooking exposure to tribal populations resulted in a lost opportunity to develop the technical case for instituting more stringent controls on release of PBDEs into the environment. As EPA moves to revise policies that address issues of environmental justice, consideration ought to be given to fully incorporating the impact of tribal exposures into study designs for the upcoming assessment of flame retardants in 2014.



*EPA's 2014 Flame Retardants Assessments –
A Case for Using Tribal Exposure as a Default*

Dianne Barton

CRITFC Water Quality Coordinator and National Tribal Toxics Council Chair

Salish Kootenai College – Tribal Environmental Health Summit

June 24, 2014

Columbia River Inter-Tribal Fish Commission



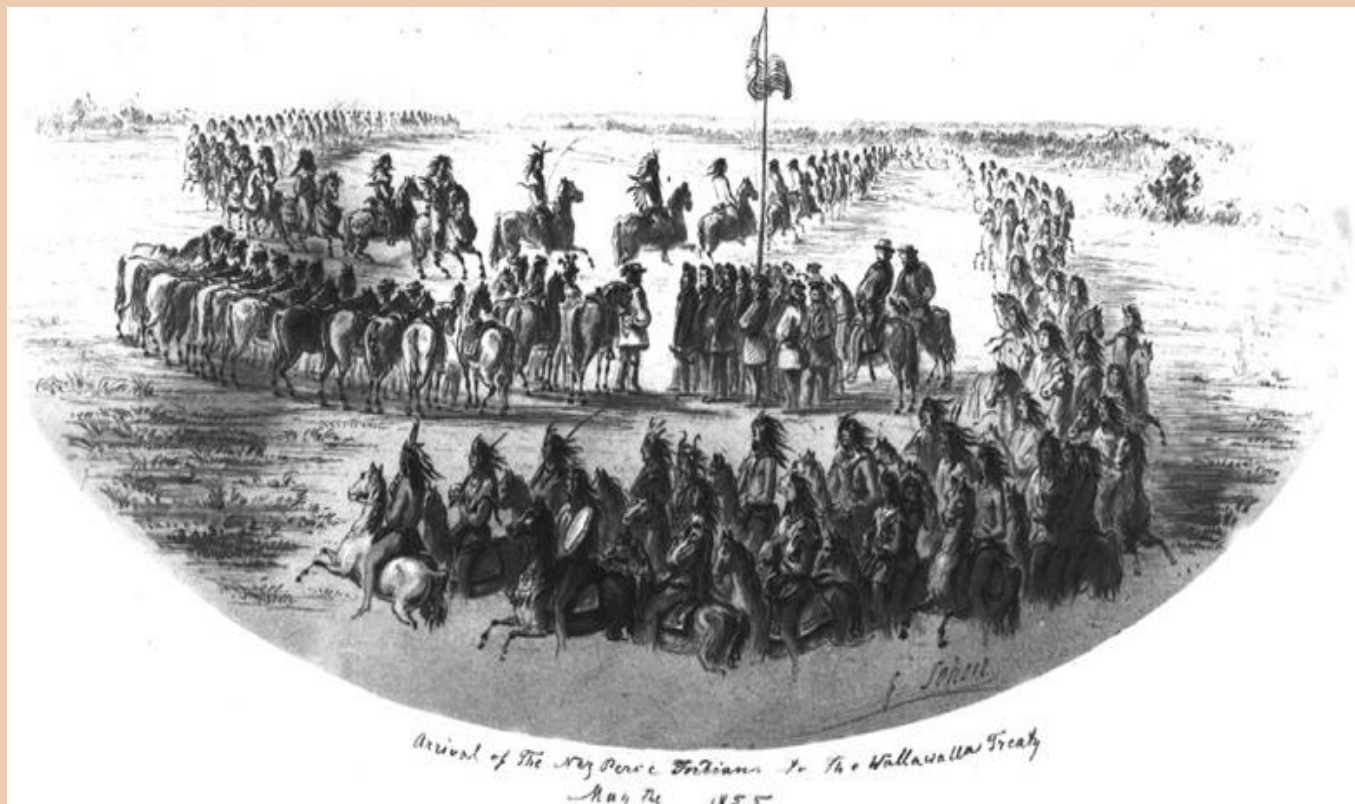
CRITFC's Four Tribes' Ceded Lands

Combined, the land comprising this ceded area is:

- 66,591 square miles
- More than 25% of the entire Columbia Basin
- 55% of the rivers and streams that are still accessible to salmon
- Includes almost all of the salmon habitat above Bonneville Dam



Ensuring Tribal Fish Consumption is Protected



“...the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them: together with the privilege of hunting, gathering roots and berries....”

—1855 Treaty with the Yakima

Contaminated Fish were Not Part of the Deal!

What/Who is the NTTC?

- An EPA Tribal Partnership group established in January 2012 that works with EPA Office of Chemical Safety and Pollution Prevention – Office of Pollution Prevention and Toxics (TSCA Programs)
- Advance tribal toxics management policies and programs consistent with the needs and interests of tribes, Alaska Natives, and Native Hawaiians.



Key NTTC Issues

Toxic Chemicals and Pollution Prevention

- **OPPT Risk and Exposure Assessments**
- **TSCA Reform**
- **Outreach on Green Chemistry to Tribal Enterprises and Governments**
- **Improving Consultation on Toxics**





EPA TSCA Work Plan Chemicals

- Assessments planned for 2014 – EPA will take a chemical structure and use related approach for these flame retardant chemical groups
 - **TBB** and **TBPH** *brominated phthalates* group. (two confidential chemicals are listed)
 - **TCEP** is a member of the *chlorinated members of the halogenated phosphate esters* group.
 - **HBCD** is a member of the *cyclic aliphatic bromides* group.
- Being used in commerce and have persistent, bioaccumulative and toxic (PBT) properties
- Ecological and human health assessments



First Foods



Berries

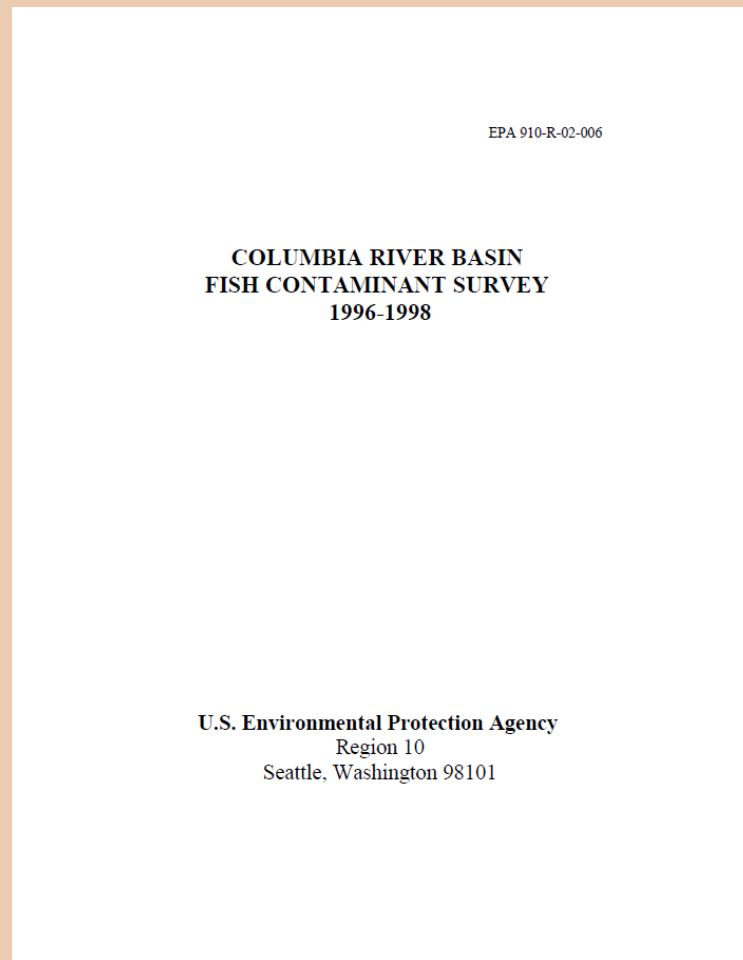
Salmon

Water

Game

Roots





2002 EPA/CRITFC Fish Contaminant Study

Fish taken from 24 Tribal fishing sites in Columbia River Basin - 1996 - 1997

- **Anadromous:** Fall/spring chinook, steelhead trout, smelt and Pacific lamprey
- **Resident:** rainbow trout, mountain whitefish, white sturgeon, walleye, large scale sucker, bridgelip sucker

92 pollutants detected in fish

PCBs, dioxins, furans, arsenic, mercury, and DDE, a breakdown product of DDT

2009 State of the River Report for Toxics

a summary of current information about four of the most widespread toxic contaminants found in the

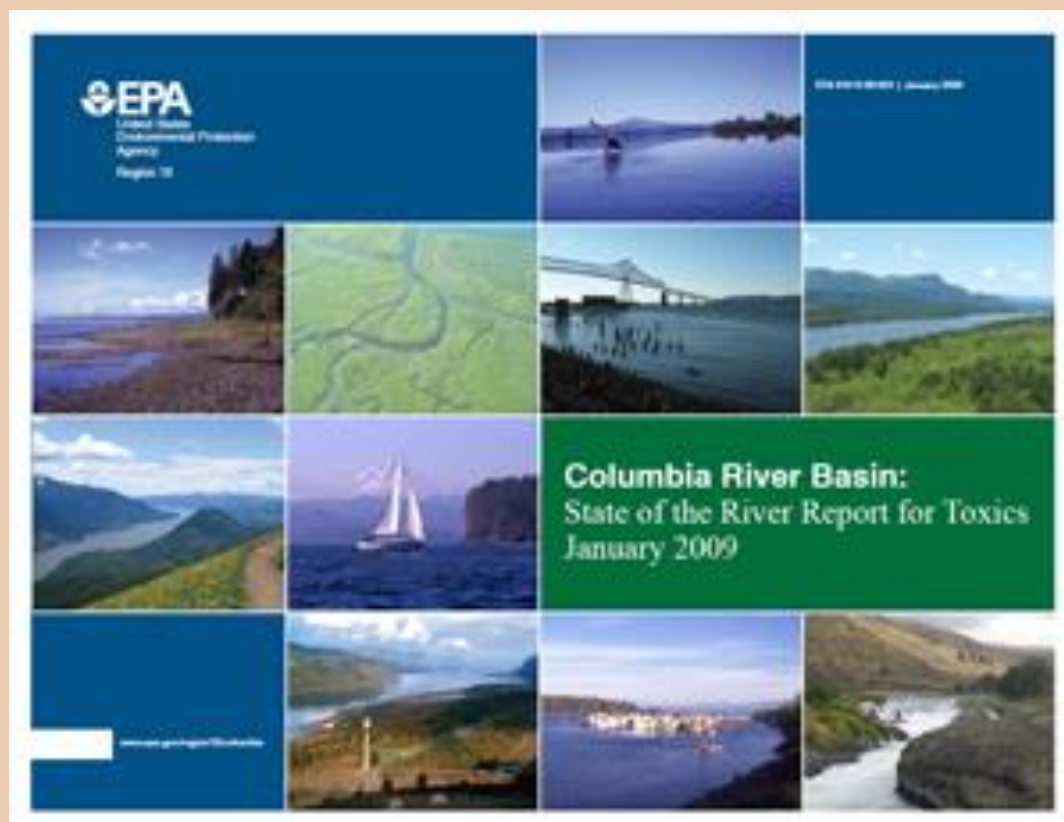
Columbia River Basin:

Mercury – a cause of fish consumption advisories

DDT and its breakdown products – banned but persistent

PCBs – banned but persistent

PBDE flame retardants – EPA does not currently regulate



USGS Investigations Report 2012 – Reconnaissance of Contaminants in Selected Wastewater Treatment-Plant Effluent and Stormwater Runoff Entering the Columbia River



- WWTP effluent and stormwater from urban areas is delivered directly to the Columbia River
- WWTP effluent and stormwater-runoff in nine cities in Oregon and Washington were analyzed for contaminants in samples collected in 2008 and 2010.

Prepared in cooperation with the Columbia River Inter-Tribal Fish Commission and the Lower Columbia Estuary Partnership

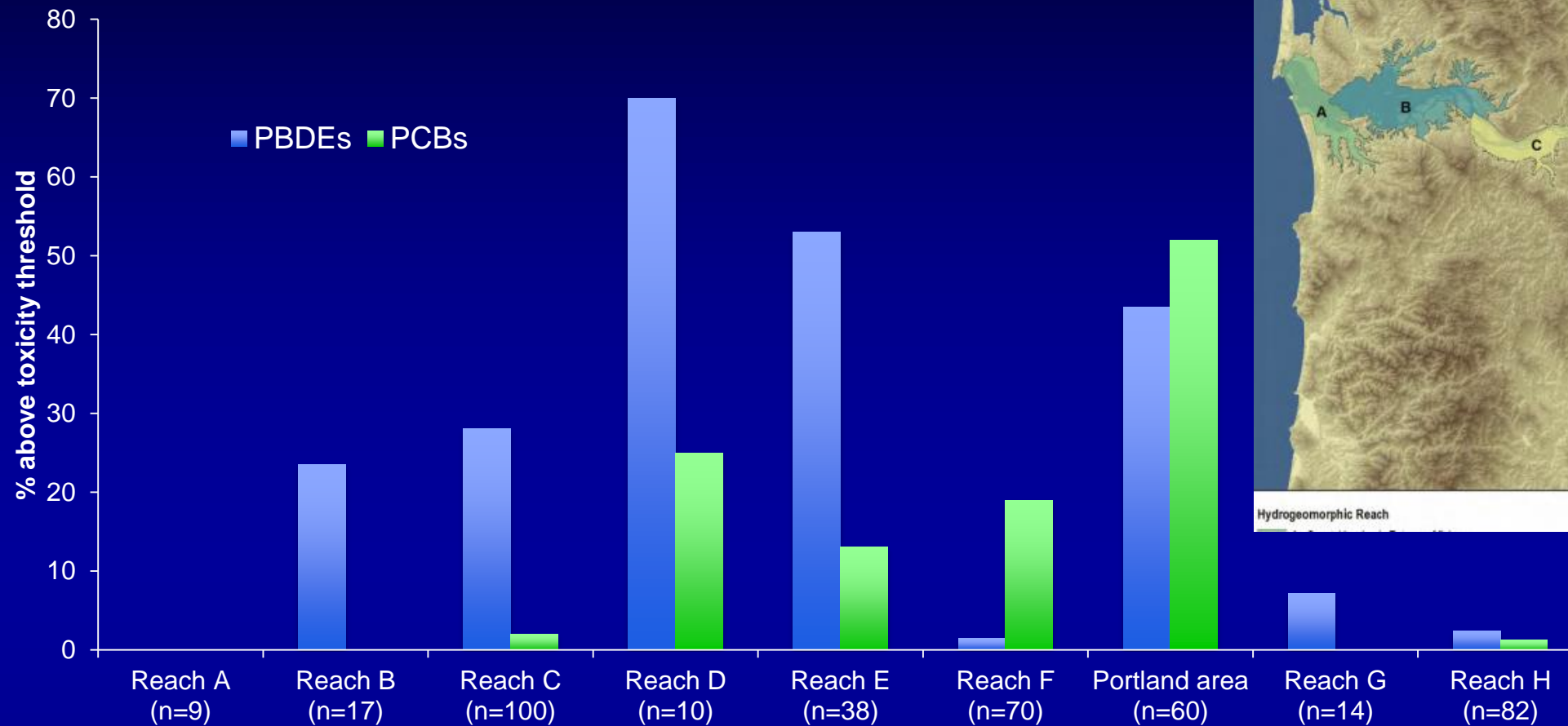


Reconnaissance Study Findings

- Flame retardants and steroids were consistently detected in WWTP effluents
- Fourteen pharmaceuticals were analyzed for and all but two were detected in at least one city
- Estrogenicity levels measured in the study were well above levels that have been shown to cause effects in aquatic biota
- Detections for several pesticides and PCBs in stormwater from some sites exceeded chronic freshwater quality criteria



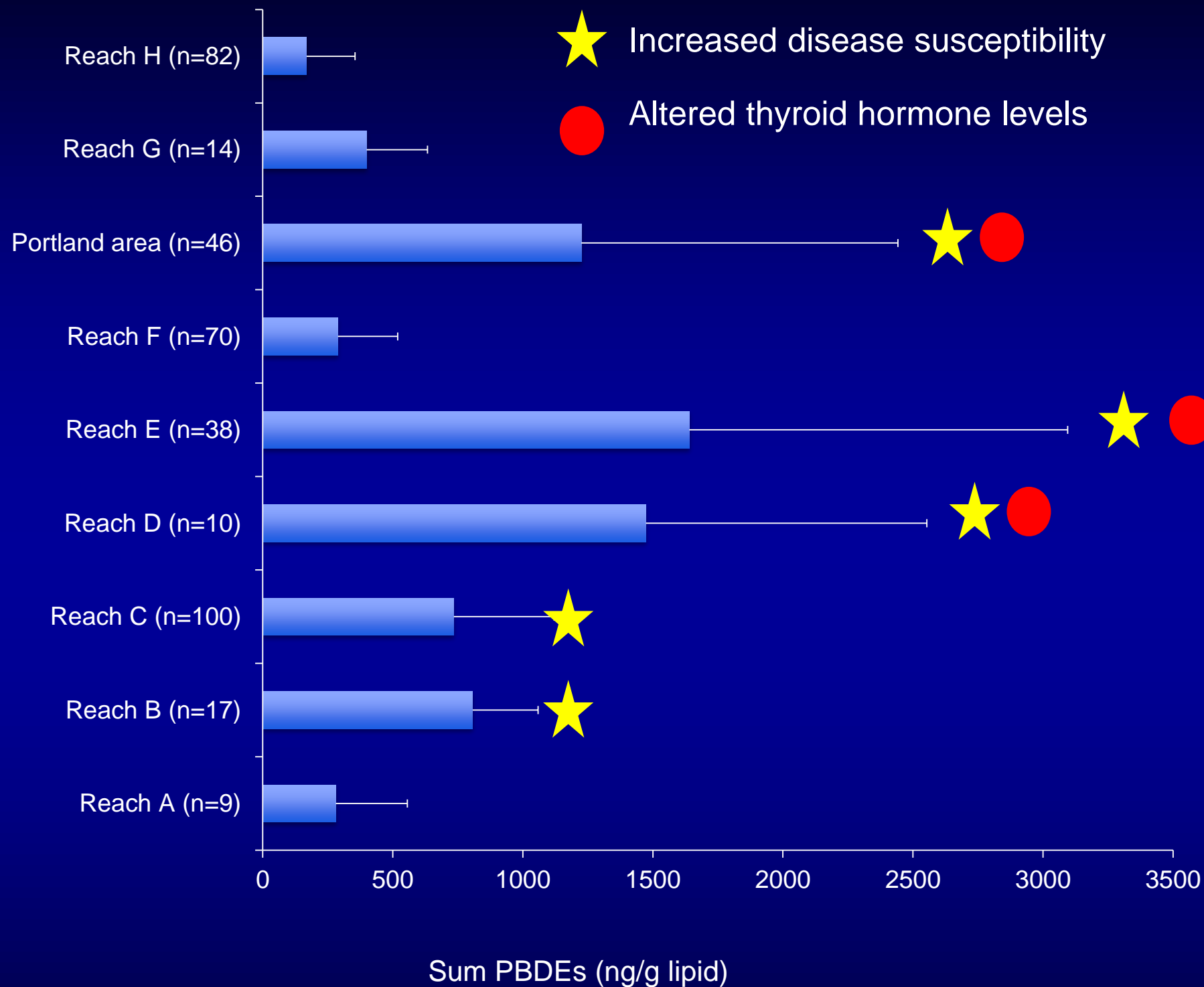
Percentages of juvenile chinook salmon samples from different reaches of the Lower Columbia River with PBDE or PCB concentration above estimated toxicity thresholds*



Concentrations of PCBs and PBDEs in a number of juvenile fall chinook salmon from the Lower Columbia River are higher enough to potentially affect their health and survival

*Data from Lower Columbia River Ecosystem Monitoring Project

PBDEs in juvenile chinook salmon¹



Concentrations of PBDEs in some juvenile salmon from the Lower Columbia are comparable to those associated with reduced disease resistance and/or altered thyroid hormone levels in salmon exposed to PBDEs in the lab²

Exposure and risks are greatest in fish collected around Portland and in Reaches D and E

¹Data were collected by NOAA Fisheries, as part of the Lower Columbia River Ecosystem Monitoring Project.

²Arkoosh et al. 2010 Aquat. Tox 98:51-59; Arkoosh et al. 2013. Report to EPA.

Toxic Effects of PCBs and PBDEs in fish

- Changes in thyroid function
- Reduced disease resistance
- Impaired growth and metabolism
- Reproductive and developmental toxicity



A fish consumption survey was completed by CRITFC/EPA in 1994

“The rates of tribal members consumption across gender, age groups, persons who live on versus off-reservation, fish consumers only, seasons, nursing mothers, fishers, and non-fishers range from 6 to 11 times higher than the national estimate used by USEPA.”

(quote from CRITFC, 1994)



EPA 2010 Exposure Assessment

EPA/600/R-08/086F
May 2010

An Exposure Assessment of Polybrominated Diphenyl Ethers

■ National Center for Environmental Assessment
Office of Research and Development
U.S. Environmental Protection Agency
Washington, DC

- Comprehensive assessment of the exposure of Americans to this class of persistent organic pollutants
- Widespread dispersion in human blood and breast milk
- Cite concerns about liver toxicity, thyroid toxicity, developmental and reproductive toxicity, and developmental neurotoxicity



Factors for EPA's PBDE dose estimate

Tribal Tendency

- Fish in the wild were found to have substantially higher tissue levels than farm-raised or store-bought fish
 - 45 – 148 ng/g Great Lakes
 - 35 ng/g (mean) to 1059 ng/g (max) Washington State
 - 8 – 88 ng/g marine off FL
- Fish consumption rate
 - 175 g/day – Oregon State
 - 389 g/day – Umatilla
 - 865 g/day – Spokane Tribe

Central Tendency

- Representative food profiles including fish were taken from a retail market place in Texas
 - .32ng/g - finfish
 - 5.7 ng/g – shellfish
- Fish consumption rate
 - 11.6 g/day finfish
 - 3.8 g/day shellfish
- Doses via food/water ingestion were considered “reasonably certain”



High-End Exposure

- “unusually high exposures at the high end of the general population”
- 95th percentile 291 ng/g versus mean 31 ng/g (lwt) in adult – “even the highest dust concentrations might not be able to explain”
- “suggests the possibility that there are other exposures not identified in this assessment”



Fishermen

- Fish from open aquatic settings like rivers and lakes were well above 10 ng/g
- Sweedish fishermen reported at 5 times higher body burdens than nonconsumers
- New York anglers fishing Lake Ontario – statistically significant correlation of body burden to fish consumption frequency
- Great Lakes anglers – statistically significant relationship to years of sportfish consumption



Key Observations

- Predominance of the Dust Pathways
- Order of magnitude variation between the mean and 95th percentile
- Lack of Exposure from Food –
 - Despite literature reports food exposure dominates in Europe and Asia
 - No Tribal Exposure



PBDE Action Plan

- In 2010 initiated draft rulemaking to add PBDE to TSCA section 5(b)(4) Chemicals of Concern – withdrawn in 2013 in lieu of starting a Work Plan and no action by the White House
- Propose a Significant New Use Rule (SNUR) requiring notice prior to manufacture or import for any use not ongoing after 12/13
- Encourage voluntary phase out with all sales to cease by 12/13 and to encourage importers to join the initiative
 - Press announcement of DfE alternatives 6/14 for penta-PBDE
- Proposed a test rule requiring development of information necessary to determine effects of manufacturing processes if 12/13 deadline is not met



Lost Opportunity for Corrective Action

- No water quality regulations or criteria
- No required monitoring for permitting
- No basis for fish consumption advisories
- No regulations or best practices for disposal of flame retardant bearing household products
- State regulations stepping in for weak federal rules (Chemical Safety Improvement Act 1009 – preemption threat)



Future EPA Risk/Exposure Assessments

- Flame retardant chemical groups
 - **TBB** and **TBPH** *brominated phthalates* group; **TCEP** *chlorinated members of the halogenated phosphate esters* group; **HBCD** *cyclic aliphatic bromides* group.
- No monitoring data from first foods
- Tribal exposure should be considered for all persistent, bioaccumulative toxic chemicals
- Tribes need technical capability to adequately address the threat to health from weak regulations
 - Funding for analysis of contaminant levels in first foods



“The tribes believe that the long-term solution to this problem isn’t keeping people from eating contaminated fish, it’s keeping fish from being contaminated in the first place.”

— *Joel Moffett, CRITFC
Chairman*



The Tribal Way of Life is Not a
Relic of the Past



Tribal Environmental Health Summit
“Building Collaborative Community Networks”
Salish Kootenai College
June 23 - 24, 2014

MEETING AGENDA

Monday, June 23, 2014

- 5:00 – 6:30 Dinner at the KwaTaqNuk (room TBD)
7:00 – 8:30 Cruise of Flathead Lake on KwaTaqNuk’s “Shaddow”

Tuesday, June 24, 2014

- 8:30 – 9:00 Official welcome, SKC President Depoe and CSKT Tribal Chairman Durgalo
 Blessing by elder
 Honor drum song
- 9:00 – 10:30 **Session 1:** SKC EPA Center of Expertise/SKC/NAU NIH NARCH
 Moderator: Doug Stevens
- 1) *Overview*
 Doug Stevens, Salish Kootenai College
 - 2) *Micmac Pilot Studies*
 Trey Saddler (student, SKC)
 - 3) *Micmac/Maliseet future studies*
 Fred Corey, Director, Micmac Environmental Lab, Micmac Tribe, ME
 Doug Stevens, SKC
 - 4) *Navajo Pilot and Future Studies*
 Jani Ingram, Northern Arizona University, AZ
- 10:30 – 10:50 **Morning Break**
- 10:50 – 12:50 **Session 2:** Models of Tribal Community Engaged Research
 Moderator: Symma Finn, NIEHS
- 1) *Digital Storytelling/Risk Messaging*
 Annie Belcourt, University Montana, Missoula, MT
 - 2) *Tribal Water Monitoring*
 John Doyle, Little Big Horn College, MT
 - 3) *Evolution of a Robust Tribal-University Research Partnership to Investigate Tribal Exposures and Build Scientific Capacity*
 Barbara Harper, Oregon State University/Confederated Tribes of the Umatilla Reservation, OR
 - 4) *Indigenous Community Health Indicators for Use in Evaluating Non-Physical Aspects of Health and Wellbeing*
 Jamie Donatuto & Larry Campbell. Swinomish Tribe, WA

- 12:50 – 1:40 **Lunch**
- 1:40 – 3:40 **Session 3:** Exposure Case Studies in Tribal Environmental Health
Moderator: Caren Robinson, OCSPP, EPA
- 1) *A Community-Based Approach to Chemical Exposures at the Aamjiwnaang First Nation,*
Diana Cryderman, Bay Mills Community College, MI
 - 2) *Fish Consumption and Risk Awareness among Tribal Childbearing Age Women,*
Sandra Kuntz, Montana State University, MT
 - 3) *Tar Creek Legacy: Lowering Lead Levels in Children*
Rebecca Jim, LEAD Agency, OK
 - 4) *EPA's 2014 Flame Retardant Assessments - A Case For Using Tribal-Relevant Exposure as a Default*
Dianne Barton, National Tribal Toxics Council/Columbia River Intertribal Fish Commission, OR
- 3:40 – 4:00 **Afternoon Break**
- 4:00 – 5:20 **Session 4:** Discussions and Feedback
Moderator: TBD
- 1) Linda Birnbaum, Director, National Institute of Environmental Health Sciences
 - 2) Louise Wise, Deputy Assistant Administrator, Office of Chemical Safety and Pollution Prevention, US Environmental Protection
 - 3) Mose Herne, Acting Deputy Director, Division of Behavioral Health, Indian Health Services
 - 4) Moderated discussion on key issues, collaboration, capacity and training needs
- 5:20 **Closing Remarks** – Doug Stevens
- 5:30 **Adjourn**