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Water Quality Criteria Developments in the Northwest

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NCASI West Coast Regional Meeting

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Oregon Freshwater Metals Criteria

History and Future Deadlines

- **2004:** Oregon adopted EPA's guideline aquatic life criteria
- **2012:** NMFS "jeopardy" opinion on freshwater criteria for aluminum, ammonia, cadmium (acute), and copper
- **2013:** EPA disapproved these and several other criteria
- **2014-15:** Oregon submitted, and EPA approved, new criteria to address the disapproval except for aluminum, cadmium and copper
- **Apr. 2016:** EPA proposed Oregon criteria for cadmium and copper
- **Aug. 2016:** Oregon DEQ proposed copper criteria
- **Jan. 16, 2017:** Court-ordered deadline for EPA to promulgate cadmium and copper criteria or approve Oregon's
- **Dec. 15, 2017:** Court-ordered deadline for EPA to propose aluminum criteria for Oregon
- **Sept. 28, 2018:** Court-ordered deadline for EPA to promulgate aluminum criteria or approve Oregon's

COPPER BIOTIC LIGAND MODEL

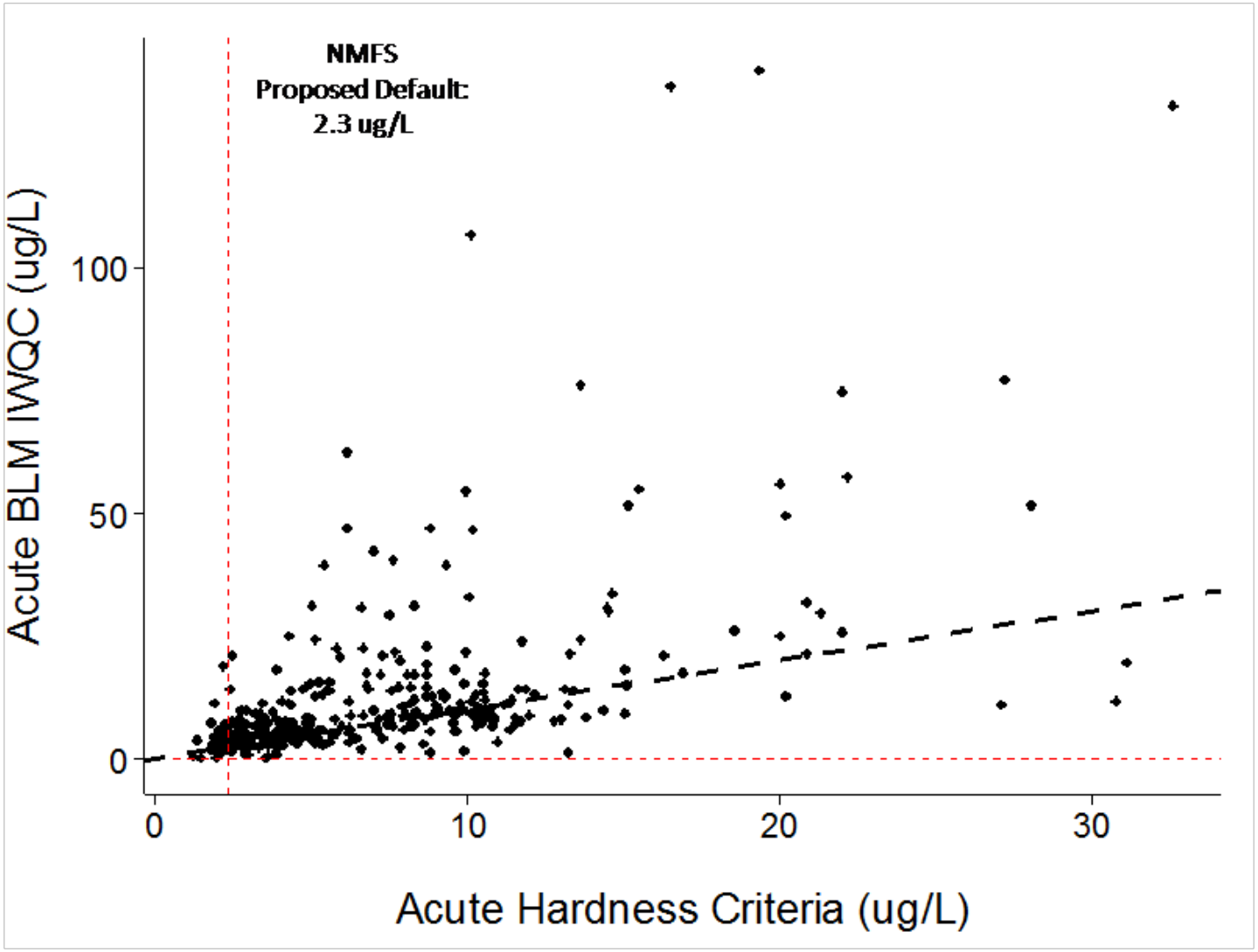
- EPA's current guideline aquatic life criteria for copper are based on a biotic ligand model (BLM)
- The copper BLM calculates acute and chronic freshwater copper criteria using
  - dissolved organic carbon (DOC)
  - pH
  - temperature
  - calcium, magnesium, sodium, potassium, sulfate, chloride, alkalinity
  - sulfide (not functional)
  - humic acid percentage (assumed 10%)

Copper BLM Default Criteria and Comparison with Hardness-Based Criteria

- 2012 NMFS biological opinion included "reasonable and prudent alternative" copper criteria "using" the BLM:
  - **2.3 µg/L** (acute)
  - **1.45 µg/L** (chronic)
- Comparison with currently effective hardness-based copper criteria in Oregon:

Hardness (mg/L)	25	100	400
Acute (µg/L)	4.8	18	65
Chronic (µg/L)	3.6	12	39

Acute Copper BLM Criteria Using Oregon Water Quality Data



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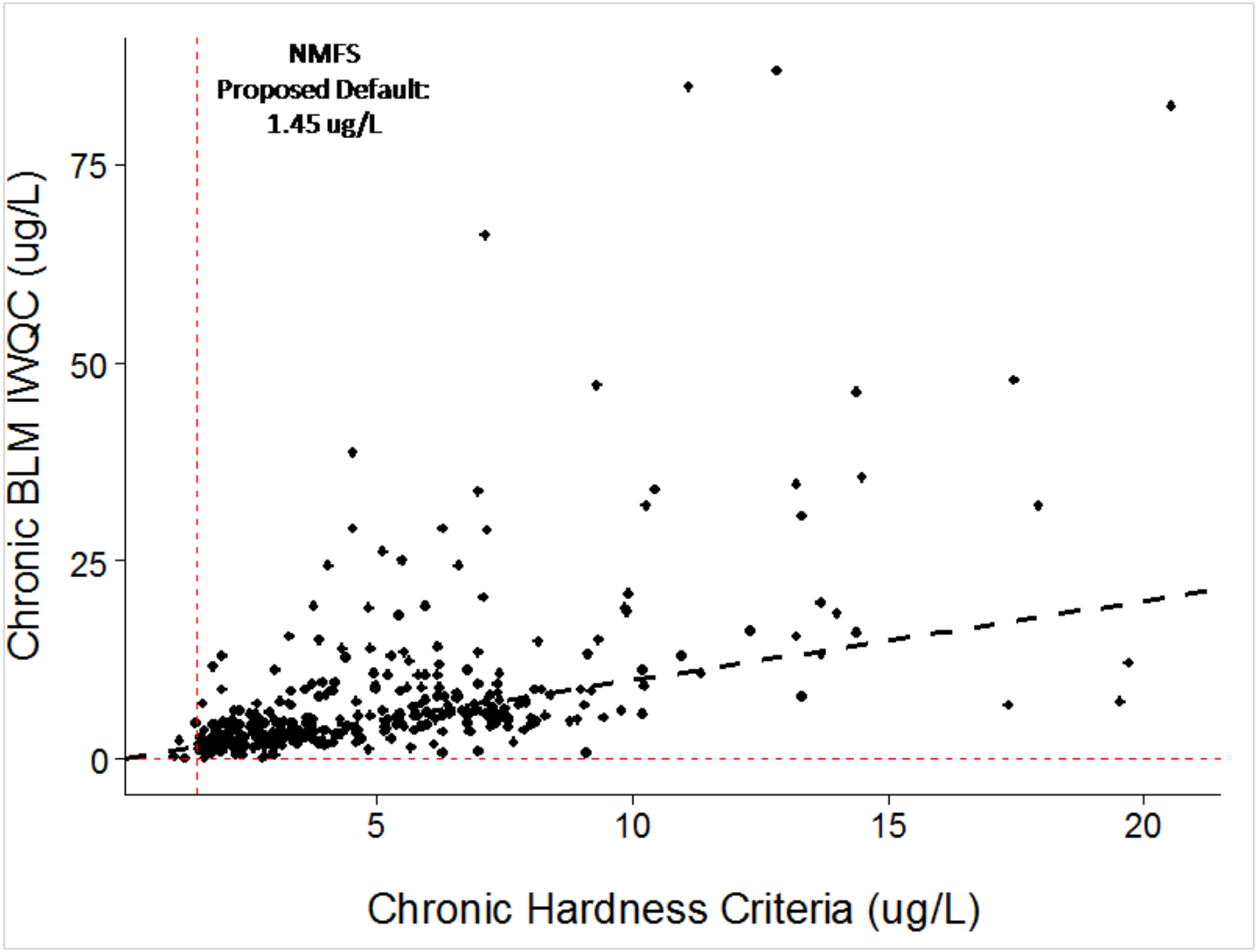
Chronic Copper BLM Criteria Using Oregon Water Quality Data



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EPA's Proposed Oregon Copper Criteria

- Treats the BLM as a methodology for deriving site-specific criteria, rather than as dynamic criteria
- "Final" criteria may be no greater than the 10th percentile of individual BLM values for a site
- 10th percentile ecoregion default values used if insufficient ambient data for input parameters other than temperature and pH
- Acute criterion is expressed as a one-hour average; chronic criterion is expressed as a four-day average

DEQ's Proposed Copper Criteria

- Treats the BLM as a method for deriving dynamic, instantaneous water quality criteria
- Includes equations for substituting:
  - total recoverable concentration measurements for dissolved concentrations of input parameters
  - specific conductance for geochemical ions
- If insufficient DOC or geochemical ion data, default "action values" based on 25th percentile values from waterbody, subbasin or region
- Acute criterion is expressed as a ***24-hour*** average; chronic criterion is expressed as a 96-hour average

Oregon Bacteria Criteria

New Oregon Bacteria Criteria

- Since 2004, EPA bacteria (Enterococci) criteria have applied to Oregon coastal waters (as well as Oregon fecal coliform criteria)
- On August 17, 2016, Oregon adopted revised coastal bacteria criteria to be consistent with 2012 EPA guidance
  - Revisions were needed to maintain federal funding for Oregon beach monitoring
  - Revisions include mapping of uses to facilitate application of the criteria
  - Monthly averaging periods for NPDES permits

Use	Bacteria	Org./100 ml	Org./100 ml
Freshwater Recreation	*E. Coli*	126 (90-day geometric mean)	406 (single sample)
Coastal Recreation	Enterococci	35 (90-day geometric mean)	≤10% samples > 130
Shellfish Harvesting	Fecal Coliforms	14 (median)	≤10% samples > 43

Oregon Temperature Criteria and TMDL Litigation

TEMPERATURE CRITERIA

- "Biologically based" numeric criteria (as a 7-day average of daily maxima)
  - 20.0 °C (migration corridor with sufficient coldwater refugia (*e.g.*, Columbia River, lower Willamette River); Lahontan cutthroat or redband trout)
  - 18.0 °C (salmon and trout rearing)
  - 16.0 °C (core cold water habitat)
  - 13.0 °C (salmon and steelhead spawning)
  - 12.0 °C (bull trout)
- Prohibitions on warming certain waters by more than 0.3 °C
  - Natural lakes, oceans and bays, "cold water"
- Natural temperature is the criterion if it exceeds an otherwise applicable numeric criterion **(now disapproved)**
- Human use allowance "above the applicable criteria" when criteria not met:
  - Pre-TMDL: 0.3 °C for each NPDES source after allowed mixing with 25% of stream flow
  - Post-TMDL : 0.3 °C for all human sources combined

Temperature Litigation and Related Decisions

- **2012:** Court invalidated EPA's approval of Oregon's natural conditions temperature criterion; remanded ESA biological opinions on Oregon's temperature criteria
- **2013:** EPA disapproved temperature natural conditions criterion and Oregon's general natural conditions criterion
- **2015:** NMFS jeopardy opinion on the 20.0 °C migration criterion (cold water refugia in Columbia, Willamette; smoltification temps. in John Day R.) (response: identification of refugia and evaluation of 14.0 °C smoltification criterion)
- **Pending:** Federal court challenge to almost every Oregon temperature TMDL, all of which are based to some extent on the now disapproved natural conditions criterion
- **Pending:** Notice of intent to sue EPA for failing to establish Columbia and Lower Snake temperature TMDLs
- **Planning:** DEQ plans to revise the temperature standards to address the disapproval of the natural conditions criterion, but it is not clear when or how

Challenge to EPA's Approvals of Oregon's Temperature TMDLs

- Federal district court litigation challenging EPA's approvals of almost all Oregon temperature TMDLs and the Willamette Mercury TMDL
- Challenge largely based on the temperature TMDLs' reliance on the now disapproved natural conditions criteria
- Other issues:
  - failure to address ***all*** water quality standards, including narrative criteria
  - failure to consult under ESA
- Oral argument scheduled Oct. 5, 2016

Washington

Washington Water Quality Standards Litigation

- Wide-ranging challenge to EPA's approvals of miscellaneous standards, but principal arguments are:
  - Failure to consult or reinitiate consultation under the ESA
  - Failure to approve or disapprove miscellaneous standards, including short-term modification and compliance schedule provisions
  - Wrongful approval of natural conditions criteria
- District court has dismissed several claims on statute of limitations grounds but rejected argument that EPA was not required to consult under the ESA when approving state water quality standards
- Remaining claims are pending

HUMAN HEALTH CRITERIA

- In 1992 EPA established human health criteria for Washington; criteria are based on a fish consumption rate of 6.5 grams per day (g/d)
- Oregon's 2011 adoption of much more stringent criteria based on a rate of 175 g/d put pressure on Washington and EPA to update the criteria
- In Sept. 2015, EPA proposed criteria based on 175 g/d and an excess cancer risk factor of 1 in 1,000,000, as well as stringent criteria for arsenic, mercury, and PCBs
- On Aug. 1, 2016, the Washington Dept. of Ecology adopted revised criteria based on 175 g/d and excess cancer risk factor of 1 in 100,000, but:
  - No revisions to criteria for PCBs and mercury
  - An arsenic criterion of 10 µg/L, based on the Safe Drinking Water Act maximum contaminant level
- A federal court has ordered EPA, by Nov. 15, 2016, to either approve Ecology's revisions or "sign a final rulemaking," which could include promulgating EPA's proposed criteria

CRITERIA COMPARISONS

	EPA 1992 (NTR)	EPA Sept. 2015	Ecology 2016	Oregon 2011
Fish Consumption Rate	6.5 g/d	175 g/d	175 g/d	175 g/d
Excess Cancer Risk	1×10^{-6}	1×10^{-6}	1×10^{-6}	1×10^{-6} (arsenic: 1×10^{-4})
Arsenic	0.018 µg/L (inorganic)	0.0045 µg/L (freshwater) (inorganic)	10 µg/L (total arsenic)	2.1 µg/L (freshwater) (inorganic)
Mercury	0.14 µg/L	0.033 mg/kg (fish tissue) (methylmercury)	0.14 µg/L (NTR)	0.040 mg/kg (fish tissue) (methylmercury)
PCBs	0.00017 µg/L	0.0000073 µg/L	0.00017 µg/L (NTR)	0.0000064 µg/L
Dioxin (2378-TCDD)	0.000000013 µg/L	0.00000000058 µg/L	0.000000064 µg/L	0.00000000051 µg/L

QUESTIONS?

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