

Idaho Department of Environmental Quality

Revision of Idaho's
Human Health Criteria for Arsenic
Docket No. 58-0102-1801
July 15, 2020

Jason Pappani

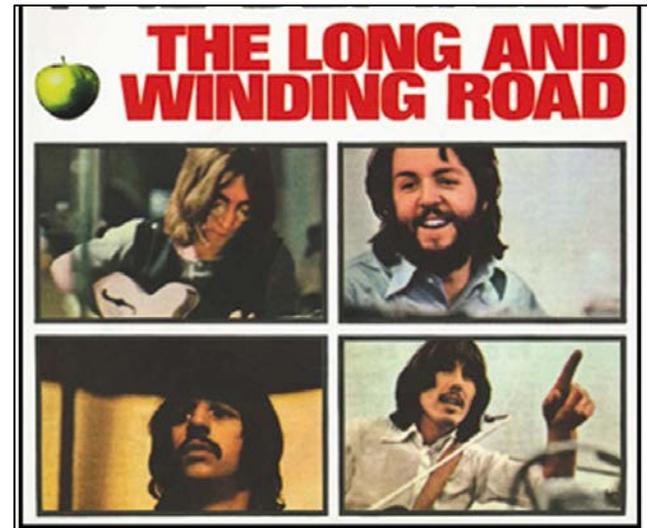


Outline

- Rulemaking
- Monitoring
- Human Health Criteria Calculation
- Comparison to Ambient As Concentrations
- Implementation considerations

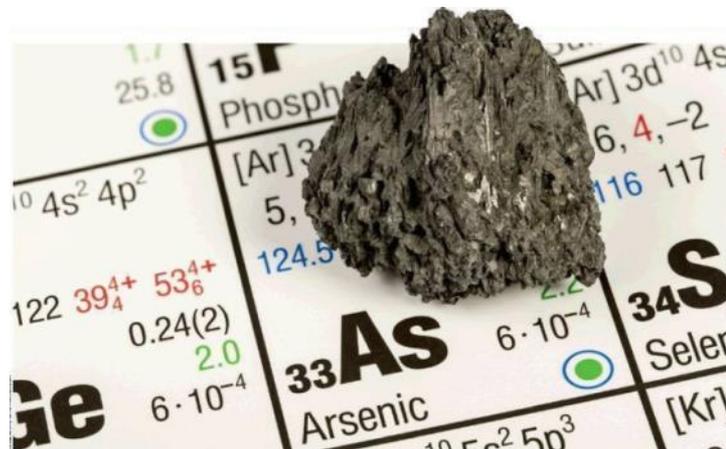


1992	1995	1999	2010	2016	2018	2023
National Toxics Rule	Idaho Revises	Idaho Adopts MCL	Idaho Revises to new MCL	EPA reconsiders, disapproves	Idaho initiates rulemaking, EPA and NWEA modify consent decree	New state or Federal Criteria



Rulemaking Review

- Previous Meetings
 - April 19, 2018
 - May 23, 2018
 - June 27, 2018
 - July 13, 2019
 - November 20, 2019
 - April 15, 2020



Monitoring

- Targeted Ambient in Water
- Probabilistic Arsenic Accumulation in Fish



Monitoring for 2020

- Initially planned for continued fish tissue and monthly targeted monitoring
- Eliminated fish tissue reduced targeted to quarterly



Monitoring for 2020

AST016	Monthly	Quarterly
Average ($\mu\text{g/L}$)	13.52	12.76
Range ($\mu\text{g/L}$)	6.93 – 19.80	9.38 – 16.30

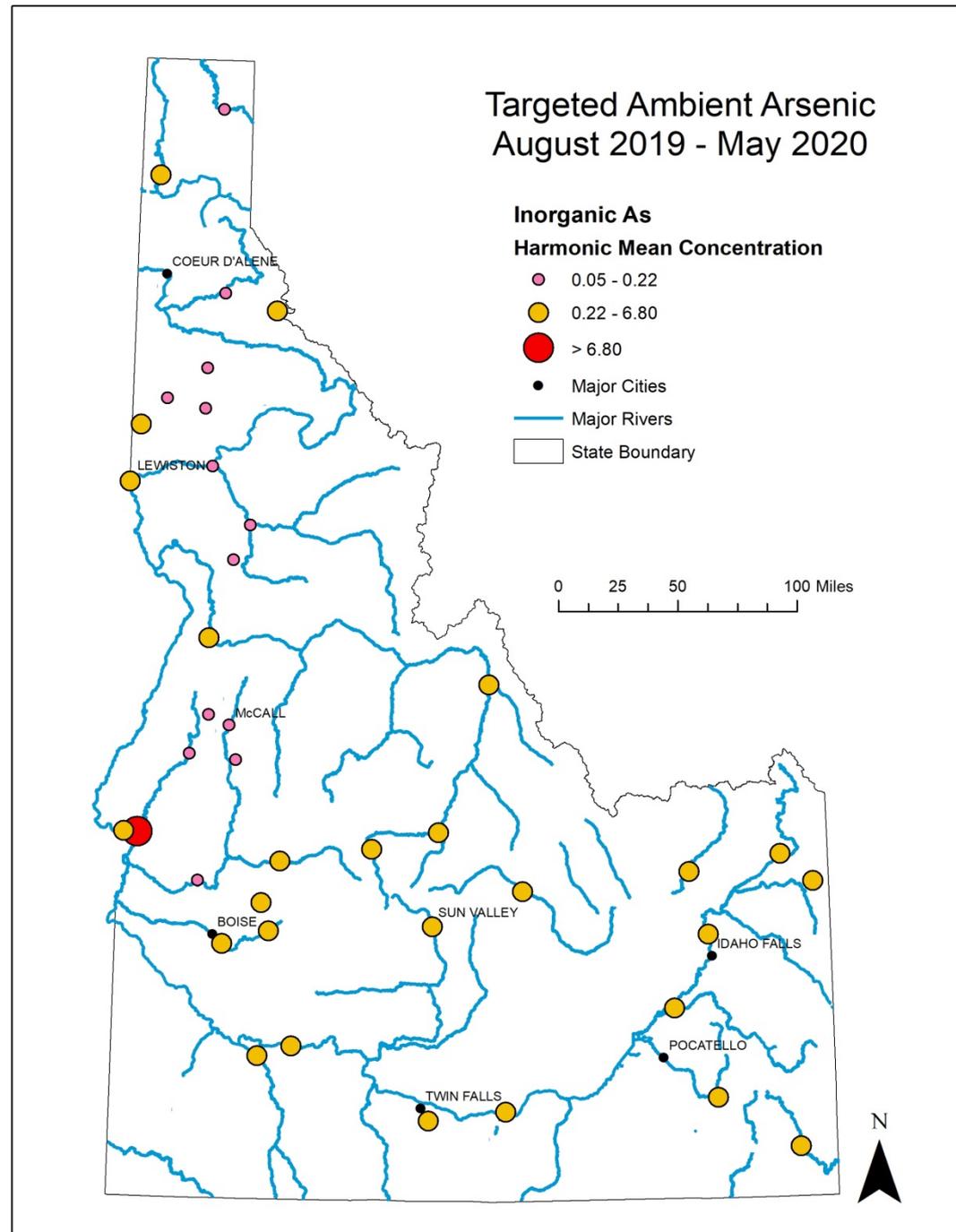
AST003	Monthly	Quarterly
Average ($\mu\text{g/L}$)	0.68	0.84
Range ($\mu\text{g/L}$)	0.27 – 1.67	0.29 – 1.67



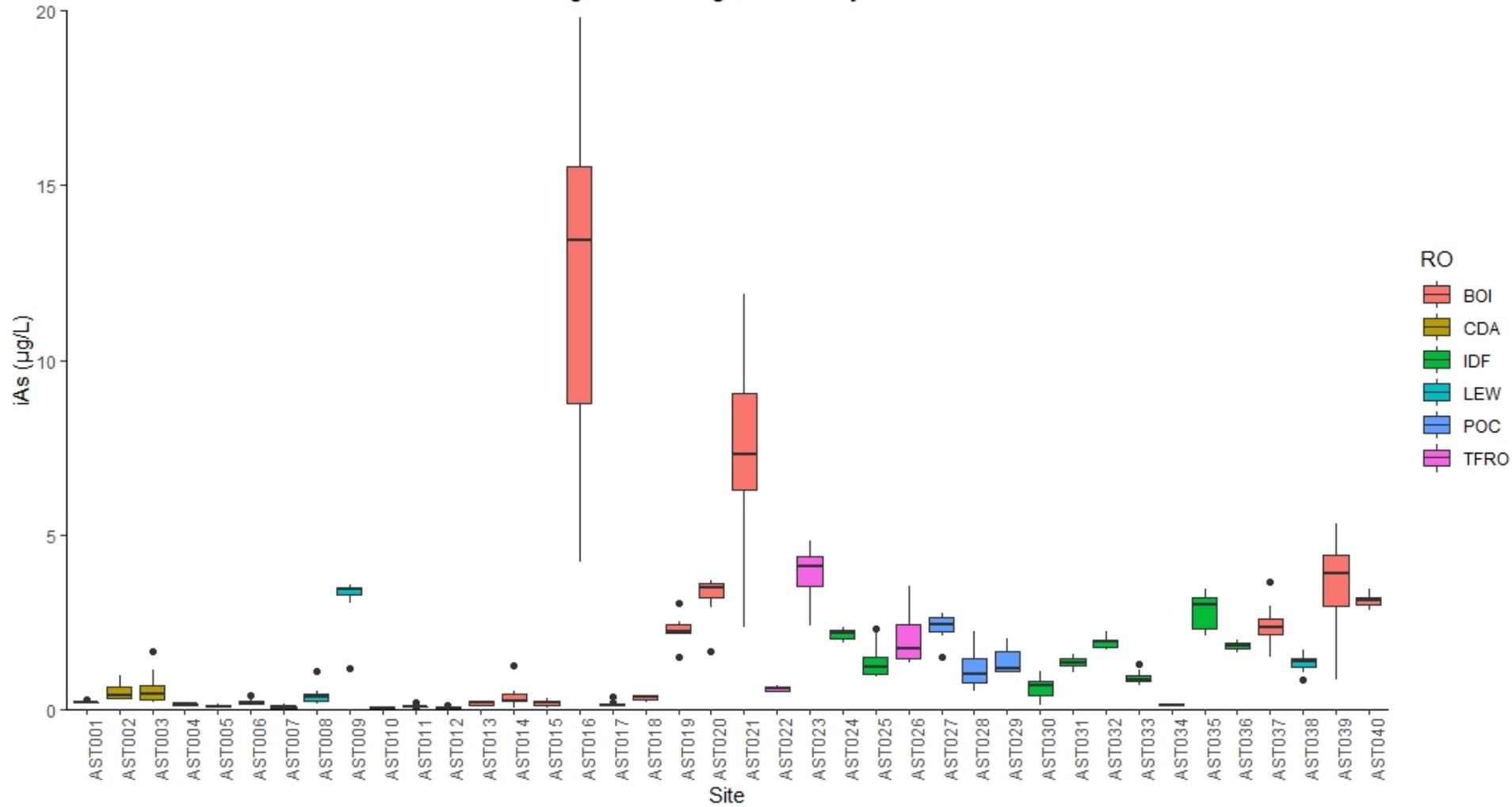
Monitoring Results - Targeted

Harmonic Mean Concentration

$$H = \frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \dots + \frac{1}{x_n}}$$

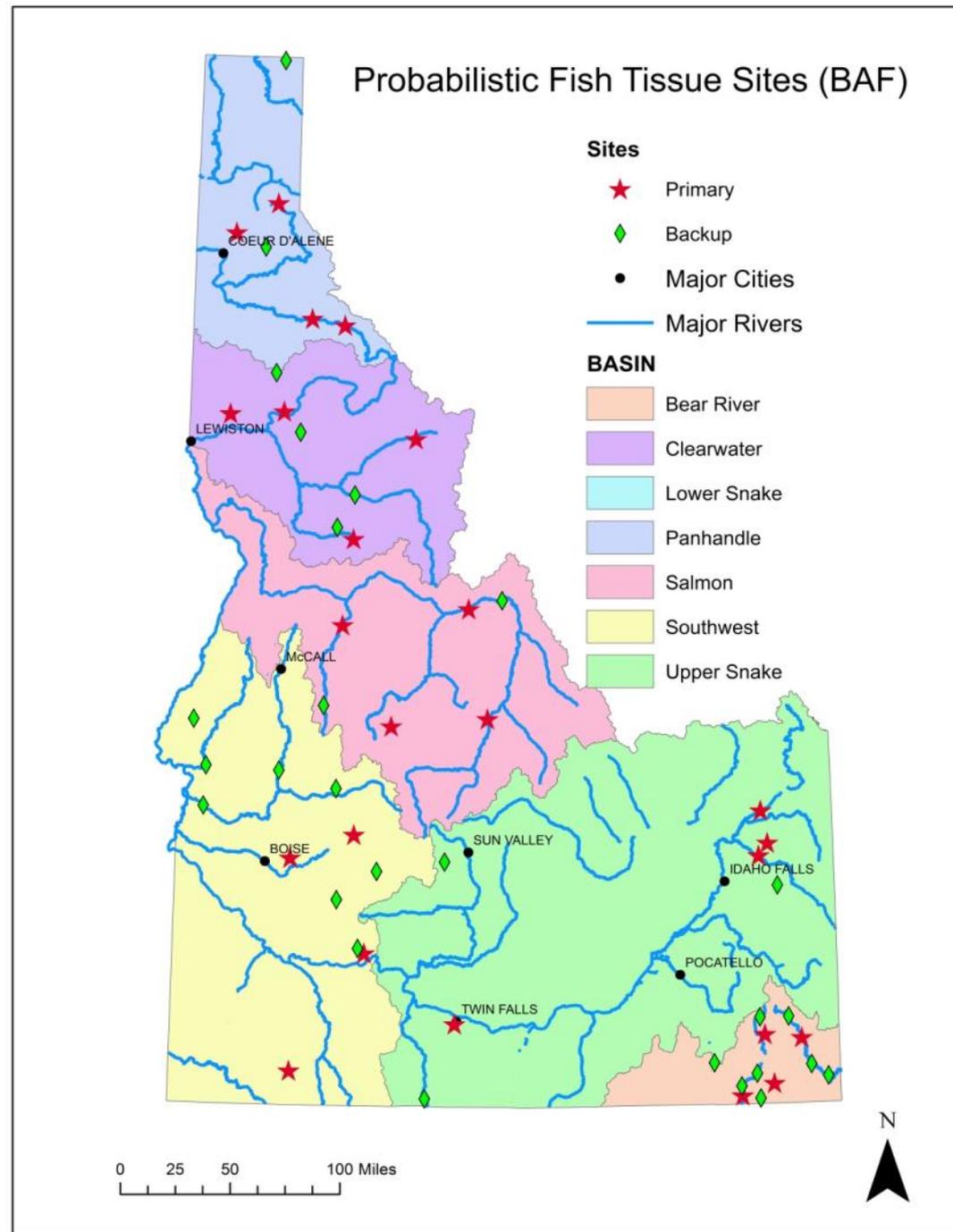


Inorganic As, Aug 2019 - May 2020



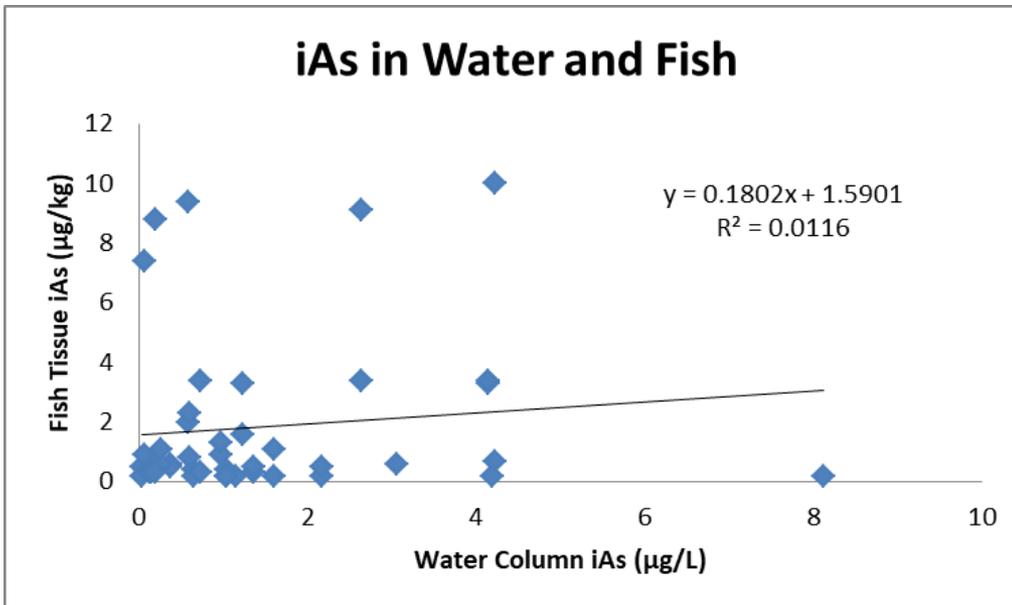
Probabilistic As Accumulation

- 24 Sites
- Arsenic in fish and water



Bioaccumulation Factor for Inorganic As

- Geometric Mean BAF = 1.18 L/kg



Review of HHC Calculation

$$AWQC = RSD \times \left(\frac{BW}{DI + (FI \times BAF)} \right)$$

$$RSD = \frac{\text{Cancer Risk Factor } (1 \times 10^{-5})}{\text{Cancer Potency Factor}}$$

BW = Body Weight; 80 kg

DW = Drinking Water Intake; 2.4 L/day

FI = Fish Intake; 0.0665 kg/day



Preliminary Calculation of HHC

$$F \text{ only} = \left(\frac{(1 \times 10^{-5})}{1.5 \text{ (mg/kg day)}^{-1}} \right) \times \left(\frac{80 \text{ kg}}{(0.0665 \text{ kg/day} \times 1.18 \text{ L/kg})} \right)$$

$$F + W = \left(\frac{(1 \times 10^{-5})}{1.5 \text{ (mg/kg day)}^{-1}} \right) \times \left(\frac{80 \text{ kg}}{2.4 \text{ L} + (0.0665 \text{ kg/day} \times 1.18 \text{ L/kg})} \right)$$

$$\mathbf{RSD} = \frac{\text{Cancer Risk Factor}}{\text{Cancer Potency Factor}}$$

BW = Body Weight; 80 kg

DW = Drinking Water Intake; 2.4 L/day

FI = Fish Intake; 0.0665 kg/day



Preliminary Calculation of HHC

Fish Only = 6.80 $\mu\text{g/L}$
(recreation use)



Fish + Water = 0.22 $\mu\text{g/L}$
(domestic water supply)



+

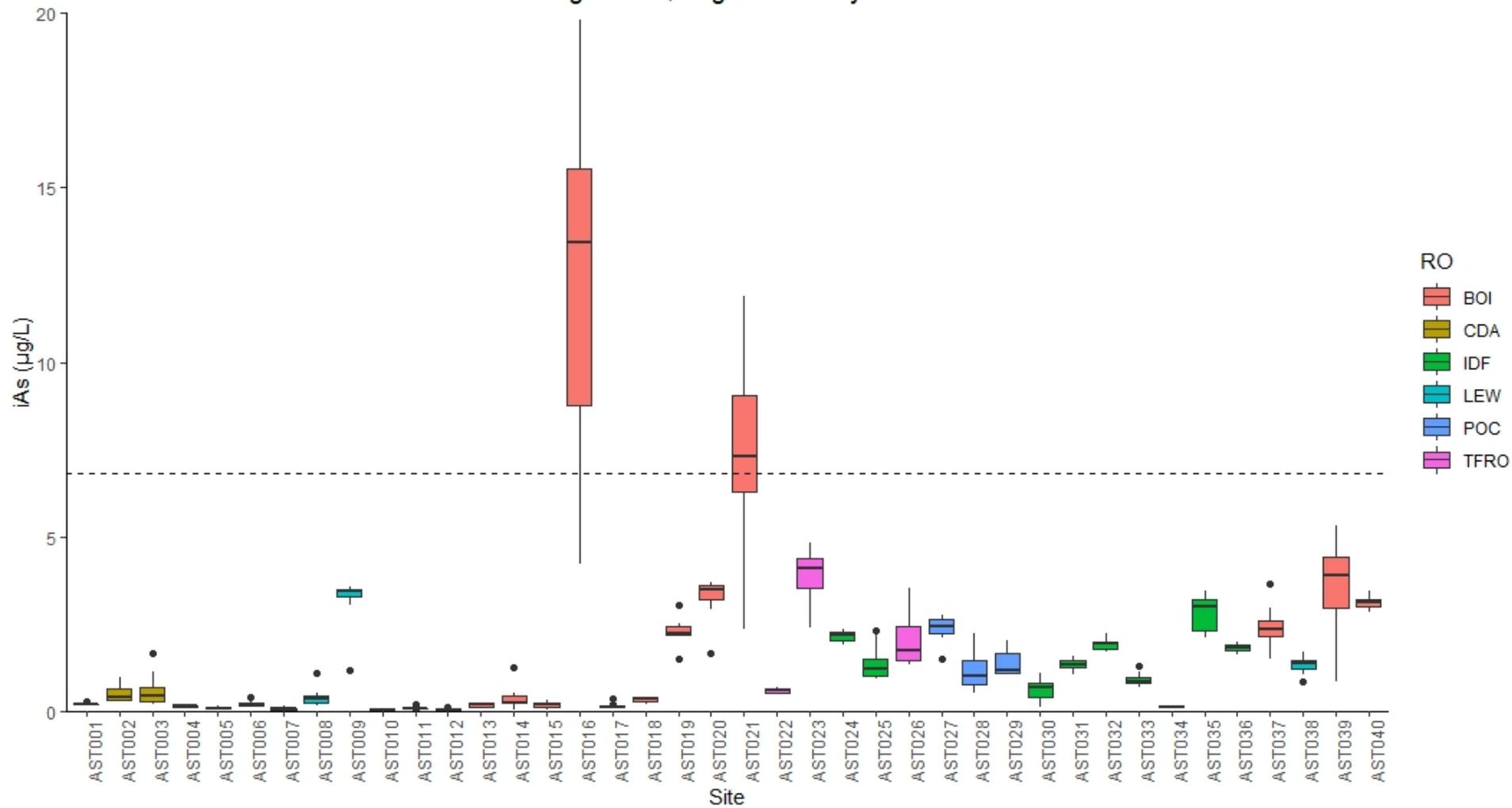


Ambient As Concentrations

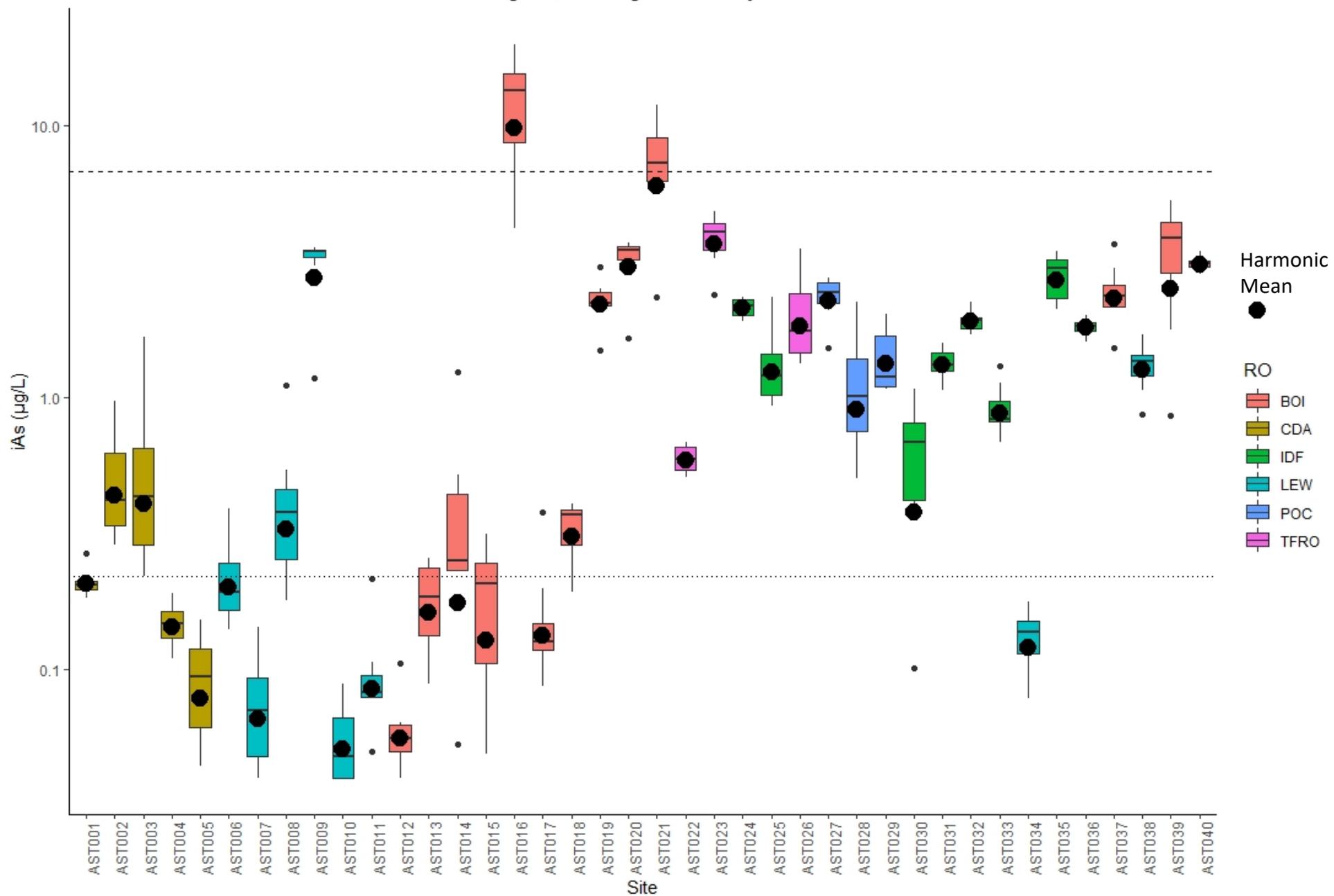
- How do the calculated criteria compare to ambient concentrations?



Inorganic As, Aug 2019 - May 2020

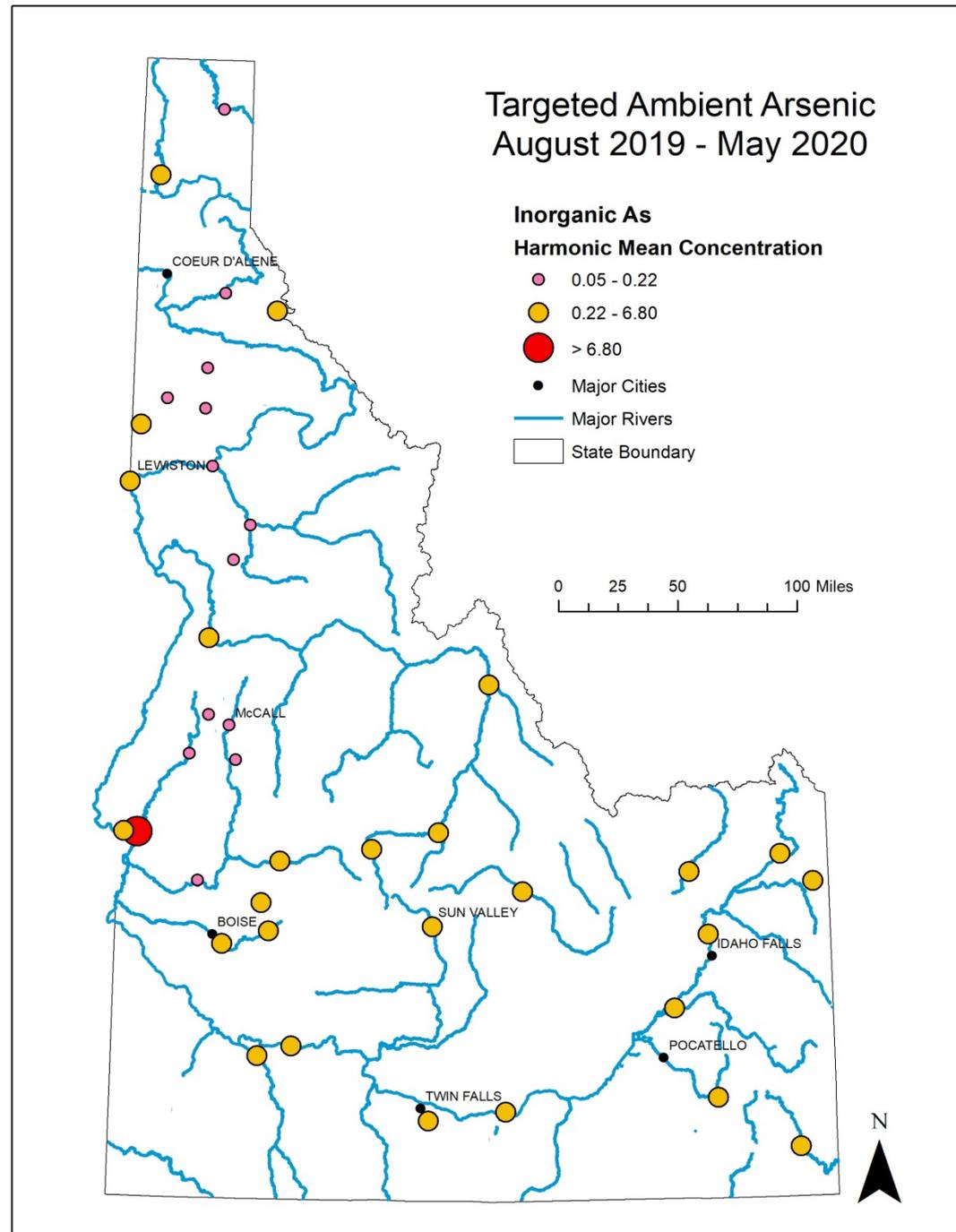


Inorganic As, Aug 2019 - May 2020

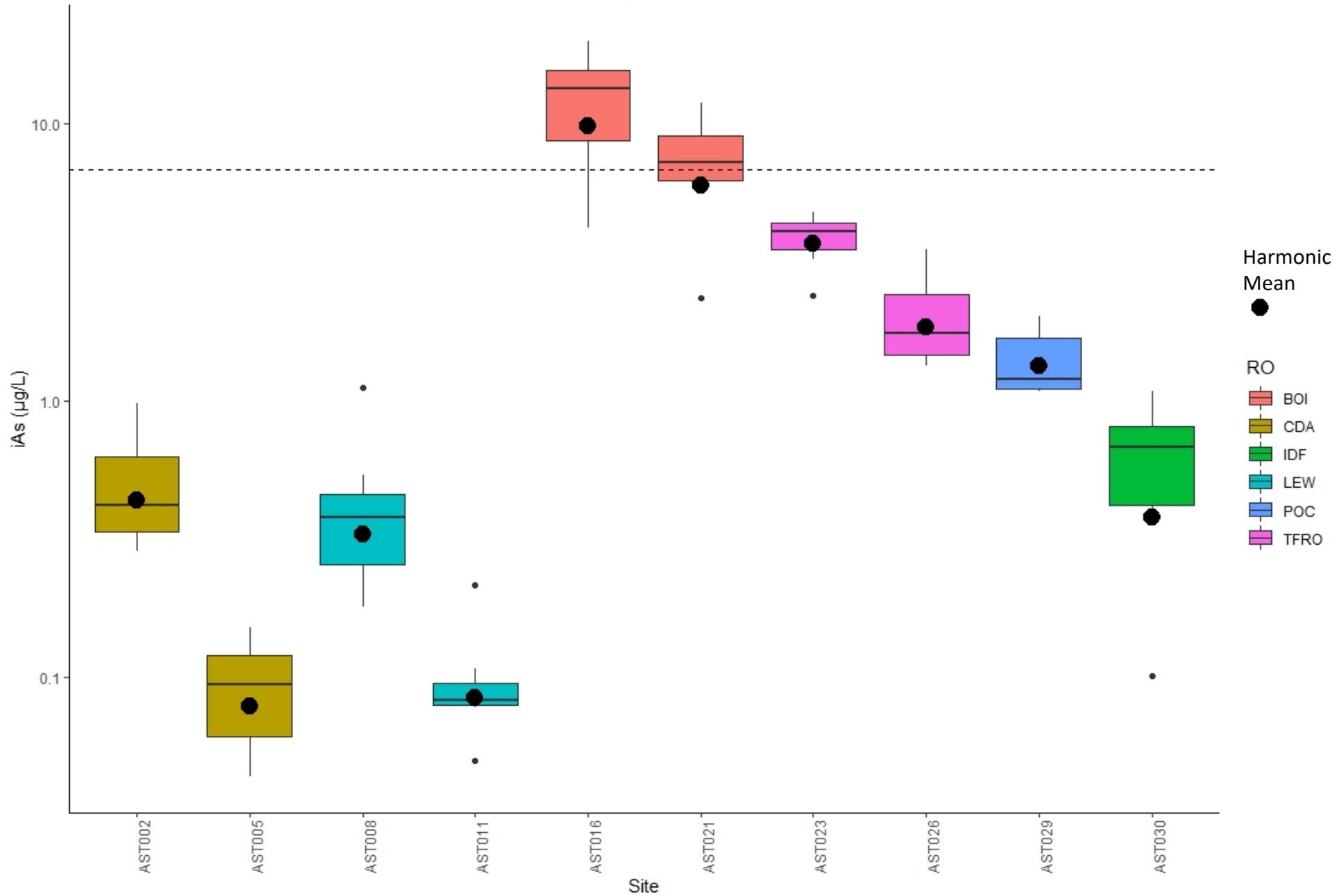


Monitoring Results - Targeted

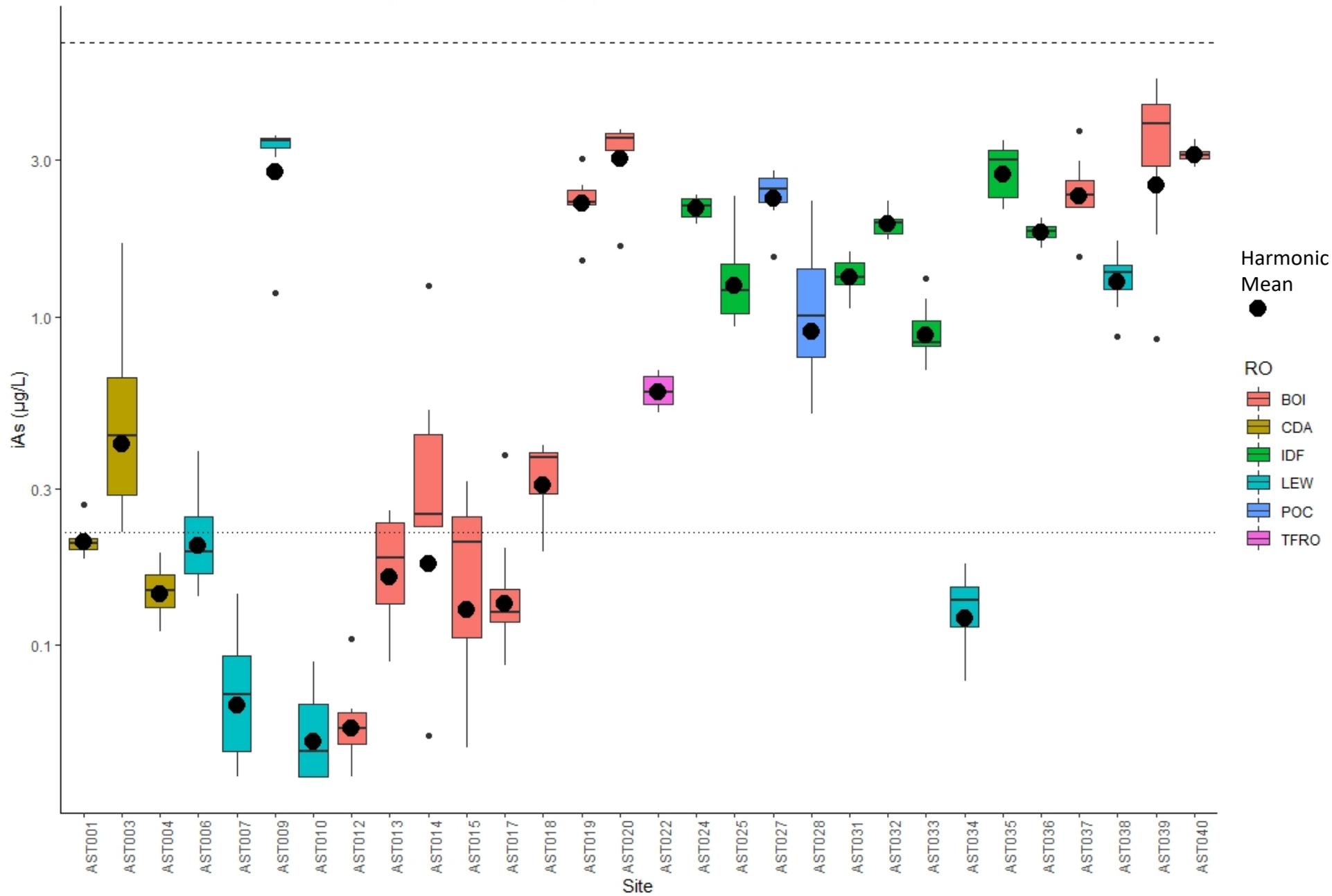
Harmonic Mean Concentration of monthly samples from August 2019 – May 2020



Inorganic As, Not Designated DWS, Aug 2019 - May 2020



Inorganic As, Designated DWS, Aug 2019 - May 2020



Implementation Options



Implementation Tools in WQS

- Variances
- Intake Credits



Cancer risk factor

Oregon



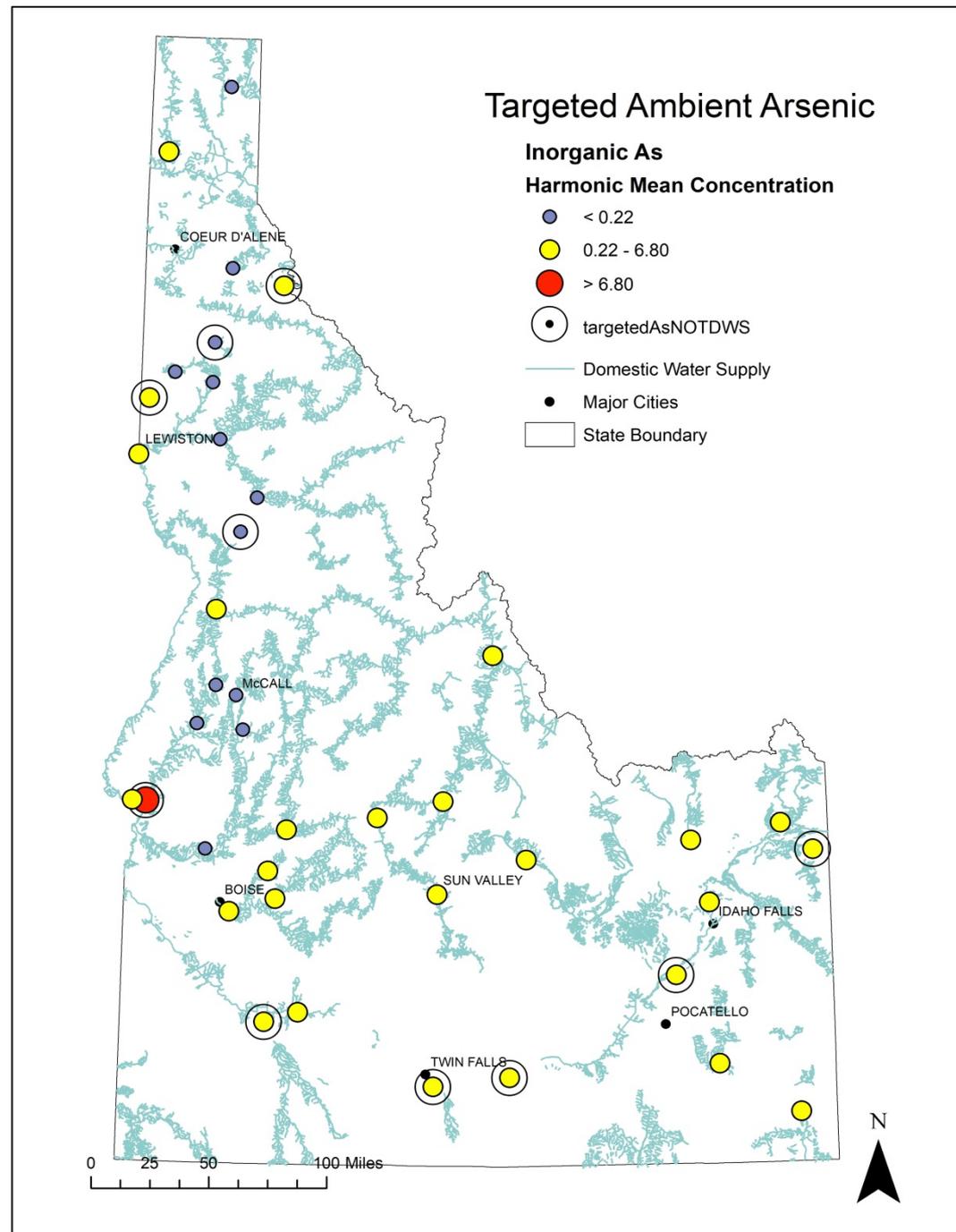
Fish Only = 1.1×10^{-5}

Fish + Water = 1.0×10^{-4}

Much higher fish consumption
(175 g/day vs 66.5 g/day)

Use change or revision

- Remove DWS use from waters where As criteria is unattainable



Natural Background

- Use Idaho's existing natural background provisions



Mass Balance

- Use mass-balance approach, and provide for human-use allowance for a small fraction of existing ambient load
- Data intensive, may require statewide TMDL



Use Protection

100.03.a. Domestic (DWS): water quality appropriate for use as untreated raw water... for public drinking water



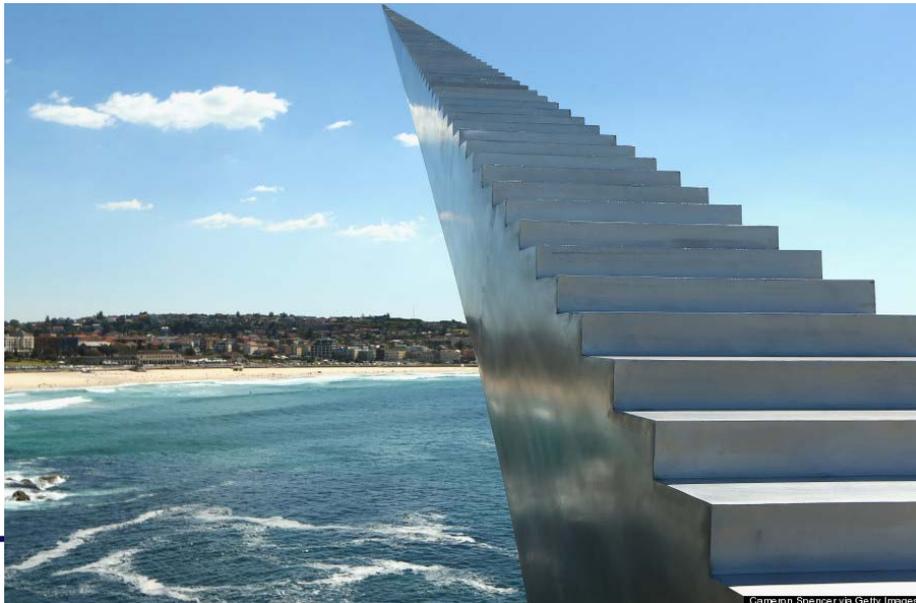
Next Steps

- Continue targeted monitoring on quarterly basis
- Continue to monitor EPA progress on IRIS evaluation of As toxicity
- Start developing rule language



Next Steps

- Comments due July 29
- Options presented for implementation, any other considerations



Next Steps

- Next Rulemaking Meeting:
November 5





Questions/Discussion