Revision of Idaho's Human Health Criteria for Arsenic

Docket No. 58-0102-1801
November 4, 2021

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Jason Pappani
Surface Water Bureau Chief

Outline

- Review Comments Received
- Review Draft Rule Revisions
- Implementation/Guidance
- Discussion
- Next Steps

Comments

- More science needed
- Implementation should provide exact guidelines; include in rule

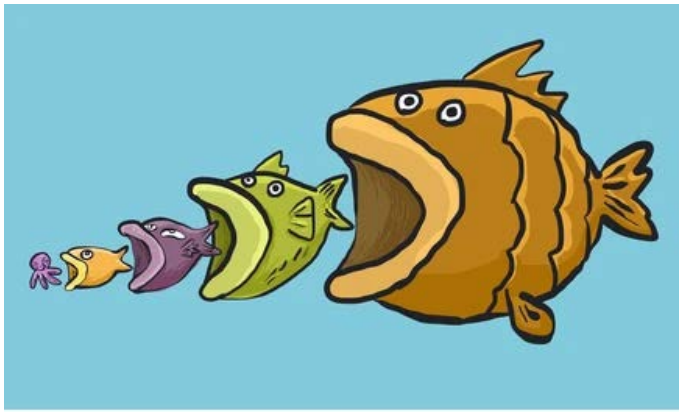
IDAHO CONSERVATION LEAGUE

Comments

- Agree should apply to total recoverable, not dissolved iAs
- Check 210.01 revisions to confirm correctly applied

Comments

- Support BAF approach
- Support DWS criterion approach



Comments

- Steady State

Comments

- Add arithmetic mean to 201.03.d.ii
- More narrowly tailor exception in 210.05.b
- Confirm that Rec Criteria still applies to DWS; Recommend DWS include Rec water column criterion

Comments

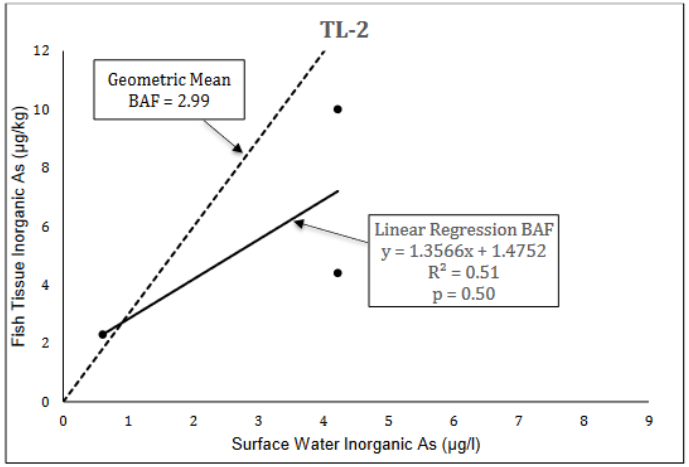
- Implementation
  - Steady state
  - Request more info on RP analysis
  - Minimum data required for site specific BAF
  - Performance based
  - Clarify terms
  - Downstream waters

Comments

- Suggest use of regression rather than geomean approach
- iAs flux - 10-15 days

- Guidance principles

IACI Idaho Association of Commerce & Industry



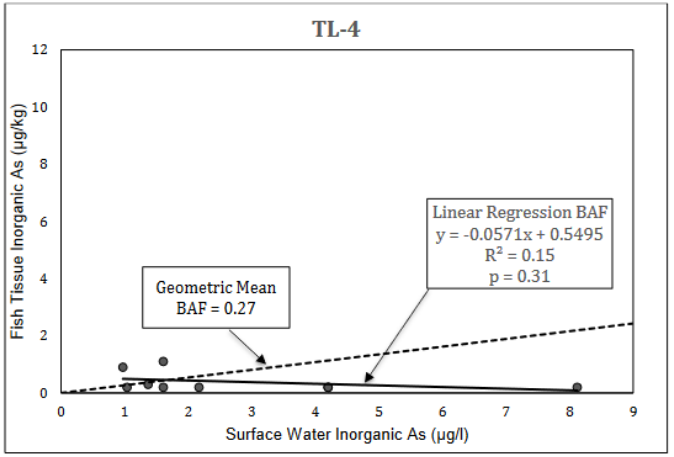
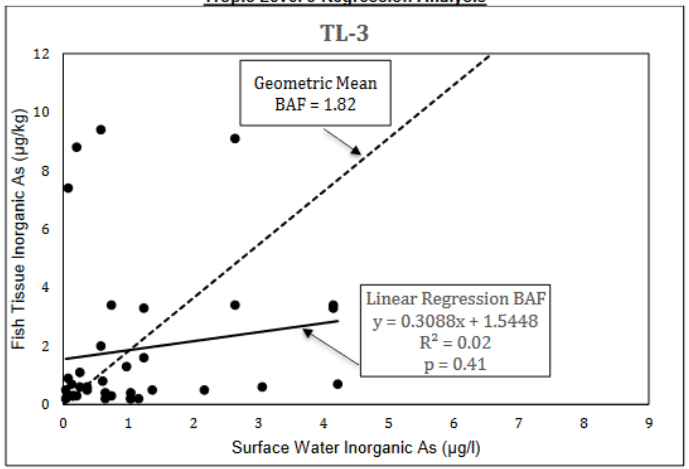


Figure 2
Tropic Level 3 Regression Analysis



TL-Weighted BAF = 0.61

HHWQC = 13 µg/L

Draft Rule Language

Draft Rule Language

- 210.01 – Revised to clarify that metals criteria apply to dissolved fraction unless otherwise noted

01. Criteria for Toxic Substances. The criteria of Section 210 apply to surface waters of the state as provided in Tables 1 and 2. Criteria for metals (arsenic through zinc) listed in Tables 1 and 2 are expressed as a dissolved fraction (i.e., passes through a 0.45 micron filter) unless otherwise noted. ~~(3-28-18)~~

Table 2. Criteria for Protection of Human Health (based on consumption of:)						
Compound	[a]CAS Number	Carcinogen?	Water & Fish (µg/L unless otherwise		Fish Only (µg/L unless otherwise	
Arsenic[2]	7440382	Y	10; 8.0 µg/kg fish tissue	c~~d~~jk	~~10~~4.3; 8.0 µg/kg fish tissue	c~~d~~jl

[2]Not yet effective for CWA purposes. Water & Fish footnote **k,** Fish Only value, and Fish Only footnote **l** are not effective for CWA purposes until the date EPA issues written notification that the revisions in Docket No. 58-0102-1801 have been approved.

Site	2019	2020	2021
AST001	0.21	0.23	0.23
AST002	0.62	0.46	0.49
AST003	0.82	0.48	0.58
AST004	0.15	0.17	0.16
AST005	0.12	0.11	0.12
AST006	0.26	0.25	0.26
AST007	0.09	0.08	0.08
AST008	0.50	0.74	1.66
AST009	3.46	2.73	2.74
AST010	0.05	0.06	0.05
AST011	0.11	0.11	0.14
AST012	0.05	0.06	0.05
AST013	0.18	0.15	0.13
AST014	0.50	0.16	0.16
AST015	0.19	0.15	0.10
AST016	13.34	10.79	9.31
AST017	0.19	0.15	0.19
AST018	0.33	0.31	0.31
AST019	2.47	2.18	2.29
AST020	3.38	3.08	3.11

Site	2019	2020	2021
AST021	8.95	6.45	6.21
AST022	0.58	0.63	0.59
AST023	4.41	4.11	3.84
AST024	2.11	2.14	2.04
AST025	1.57	1.10	1.24
AST026	2.36	1.98	1.88
AST027	2.41	2.37	2.96
AST028	1.32	1.17	1.71
AST029	1.51	1.39	1.96
AST030	0.60	0.58	0.49
AST031	1.37	1.34	1.39
AST032	1.89	1.87	1.90
AST033	0.89	0.90	0.90
AST034	0.12	0.14	0.13
AST035	2.77	2.62	2.92
AST036	1.82	1.70	1.88
AST037	2.69	2.09	1.91
AST038	1.36	1.30	1.28
AST039	4.42	2.69	3.49
AST040	3.15	3.13	2.79

Table 2. Criteria for Protection of Human Health (based on consumption of:)						
Compound	[a]CAS Number	Carcinogen?	Water & Fish (µg/L unless otherwise		Fish Only (µg/L unless otherwise	
Arsenic[2]	7440382	Y	10; 8.0 µg/kg fish	cdjk	~~10~~4.3; 8.0 µg/kg fish	cdjl

070. APPLICATION OF STANDARDS.

01. Multiple Criteria. In the application of the use designation, the most stringent criterion of a multiple criteria applies. (7-1-21)T

footnote I are not effective for CWA purposes until the date EPA issues written notification that the revisions in Docket No. 58-0102-1801 have been approved.

Fish Only (µg/L unless otherwise	
~~10~~4.3; 8.0 µg/kg fish tissue	c~~d~~j~~l~~

Recreation Uses

c. Inorganic forms only.

~~d. Criterion expressed as total recoverable (unfiltered) concentrations.~~

~~j. This criterion is based on the Maximum Contaminant Level (MCL).~~

Recreation Uses

Fish Only (µg/L unless otherwise
~~104.3.~~

I. For Fish Only exposure to inorganic arsenic, the human health criterion is:

Fish ~~Muscle/Fillet~~ Tissue (µg/kg wet-weight)	Water Column (µg/L)
8.0[1]	4.3[2]

Fish ~~Muscle/Fillet~~ Tissue (µg/kg wet-weight)
8.0[1]

[1] Fish ~~muscle (fillet)~~ tissue ~~values~~element ~~are~~is based on total recoverable inorganic arsenic in muscle or fillet. When sufficient fish tissue data are available ~~and the water column arsenic concentration is not increasing~~, the fish tissue element supersedes the water column element. Fish tissue ~~criteria~~element will be applied in accordance with Section 210.03.e ~~Single measurement using sufficiently sensitive methods. Based on an average or composite of a minimum of five (5) individual fish of the same species, collected from the same water body and within the same calendar year, where the smallest individual is no less than seventy-five percent (75%) of the total length (size) of the largest individual. Not to be exceeded; the Department will evaluate all representative fish tissue data to determine compliance with this criterion element.~~

Fish ~~Muscle/Fillet~~ Tissue (µg/kg wet-weight)
8.0[1]

[1] Fish ~~muscle (fillet)~~ tissue ~~values~~element ~~are~~is based on total recoverable inorganic arsenic in muscle or fillet. When sufficient fish tissue data are available ~~and the water column arsenic concentration is not increasing~~, the fish tissue element supersedes the water column elem

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~~exceeded; the Department will evaluate all representative fish tissue data to determine compliance with this criterion element.~~

[1] Fish tissue element is based on total recoverable inorganic arsenic in muscle or fillet. When sufficient fish tissue data are available the fish tissue element supersedes the water column element. Fish tissue element will be applied in accordance with Section 210.03.e.

Water Column (µg/L)
4.3[2]

[2]Water column ~~values~~element ~~are~~is based on ~~total recoverable~~ dissolved inorganic arsenic in water.

Domestic Water Supply Use

Water & Fish (µg/L unless otherwise	
10; 8.0 µg/kg fish	cdjk

k. Human health criteria for Water & Fish exposure to inorganic arsenic are attained if fish tissue concentrations comply with the Fish Only criterion and water column concentrations do not exceed 10 µg/L.

210.03.e.

e. Application of the fish tissue element of the arsenic criterion for human health.

i. The fish tissue ~~criterion~~element for inorganic arsenic is based on a single measurement using sufficiently sensitive methods.

210.03.e

ii. The single measurement must be made on a sample that is an average or composite of a minimum of five (5) individual fish of the same species, collected from the same water body and within the same calendar year, where the smallest individual is no less than seventy-five percent (75%) of the total length (size) of the largest individual.

iii. Not to be exceeded; the Department will evaluate all representative fish tissue data to determine compliance with this criterion element.

210.03.e

iv. When translating fish tissue criterion element to a water column value, the translation will be based on the ratio of total recoverable inorganic arsenic in fish muscle or fillet tissue to ambient water column concentration of dissolved inorganic arsenic from at least one paired water column and tissue sample.

v. Fish tissue sample(s) should be representative of gamefish species present at the site.

210.03.d.ii

ii. Frequency and duration for human health toxics criteria. Criteria in Table 2 ~~in,~~ Subsection 210.01, are not to be exceeded based on an annual ~~harmonic~~ arithmetic mean concentration. ~~(3-28-18)~~

210.05.b.ii and iii

iii. Subsection 210.05.b.ii. does not apply to water quality criteria for arsenic.

Downstream Protection

070.08

08. Protection of Downstream Water Quality. All waters shall maintain a level of water quality at their pour point into downstream waters that provides for the attainment and maintenance of the water quality standards of those downstream waters, including waters of another state or tribe. (7-1-21)T

Examples

Example

- “Sisyphus Creek” – Designated for both Primary Contact Recreation and Domestic Water Supply
  - Fish tissue data are not available

Fish Only	Fish & Water
4.3 µg/L	10 µg/L

  - Recreation is most sensitive use
    - Applicable criterion is 4.3 µg/L

Example

- “Groundhog Day Creek” – Designated for both Secondary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available, translation = 9.0 µg/L

Fish Only	Fish & Water
8.0 µg/kg; (9.0 µg/L)	10 µg/L

  - Recreation is the most sensitive use
    - Applicable criterion is fish tissue criterion; translation 9.0 µg/L

Example

- “Purgatory Creek” – Designated for both Secondary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available, translation = 11.0 µg/L

Fish Only	Fish & Water
8.0 µg/kg; (11.0 µg/L)	10 µg/L

  - DWS is most sensitive use
    - Applicable criterion is Fish & Water criterion; 10.0 µg/L

Example

- “River Styx” – Designated for both Primary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available and tissue concentrations do not exceed 8.0 µg/kg

Fish Only	Fish & Water
8.0 µg/kg	10 µg/L

  - Ambient water column concentration is 6.0 µg/L

Example

- “Hades River” – Designated for both Primary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available and tissue concentrations exceed 8.0 µg/kg

Fish Only	Fish & Water
8.0 µg/kg	10 µg/L

  - Ambient water column concentration is <4.3 µg/L

Example

- “Pandora Slough” – Designated for Secondary Contact Recreation

    - Ambient water column concentration is > 4.3 µg/L; fish tissue is < 8.0 µg/kg

Fish Only
8.0 µg/kg 4.3 µg/L

Full Support for recreation based on fish tissue; collect sufficient tissue and water column data to translate

Implementation

Fish Tissue Element

[1] Fish tissue element is based on total recoverable inorganic arsenic in muscle or fillet. When **sufficient fish tissue data** are available the fish tissue element supersedes the water column element. Fish tissue element will be applied in accordance with Section 210.03.e.

Fish Tissue Elem

- Described in 210.e
  - i. …sufficiently sensitive methods.
  - ii. … minimum 5 individual fish of the same species… same water body … same year… smallest individual is no less than 75% total length…
  - v. … fish tissue sample(s) should be representative of gamefish species present at the site

Guidance

- **Sufficient Fish Tissue Data**
  - **Sufficiently sensitive methods**: Reporting Limit must be less than criterion of 8.0 µg/L.
  - **Same water body**: Within the same Assessment Unit, or immediately adjacent assessment units.
  - **Same year**: Combine samples collected within the same calendar year into a single composite
  - **Representative gamefish species**: Fish that are typically caught and consumed. Guidance principle – sample all game species present in size range typically consumed

Translation of Fish Tissue Element

210.03.e.iv.

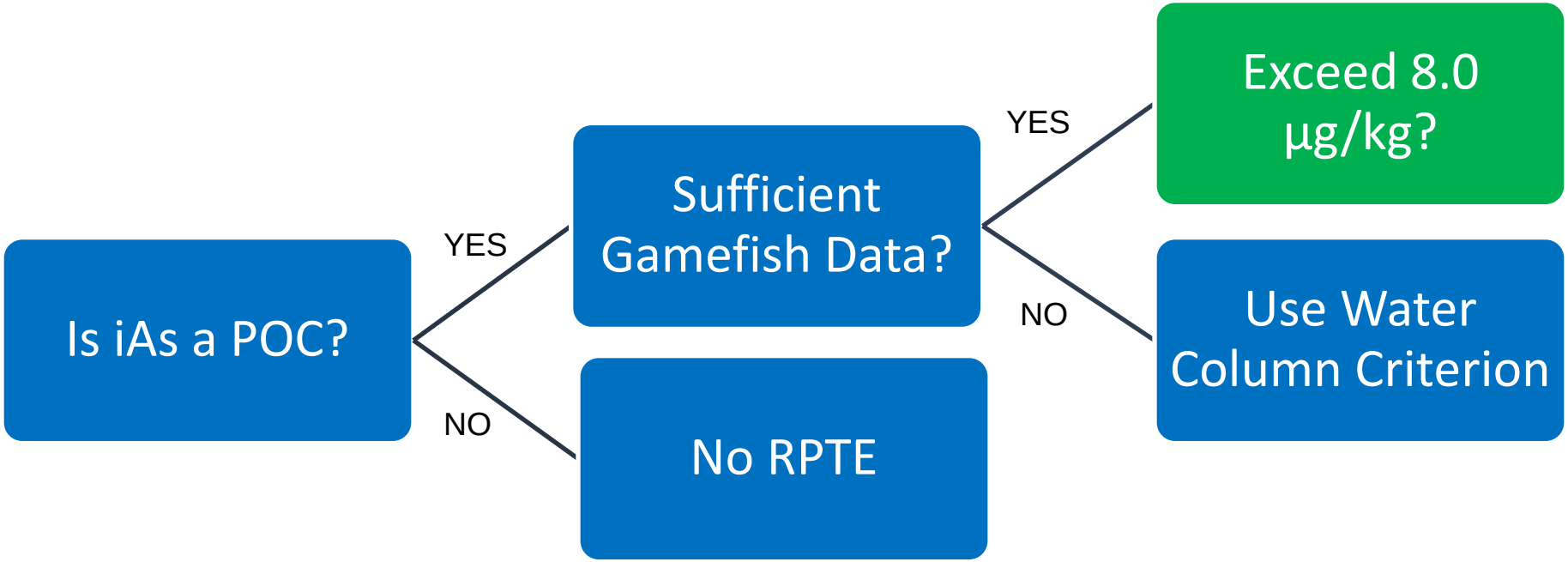
- When translating fish tissue criterion element to a water column value, the translation will be based on the ratio of total recoverable inorganic arsenic in fish muscle or fillet tissue to ambient water column concentration of dissolved inorganic arsenic from at least one paired water column and tissue sample.

Guidance

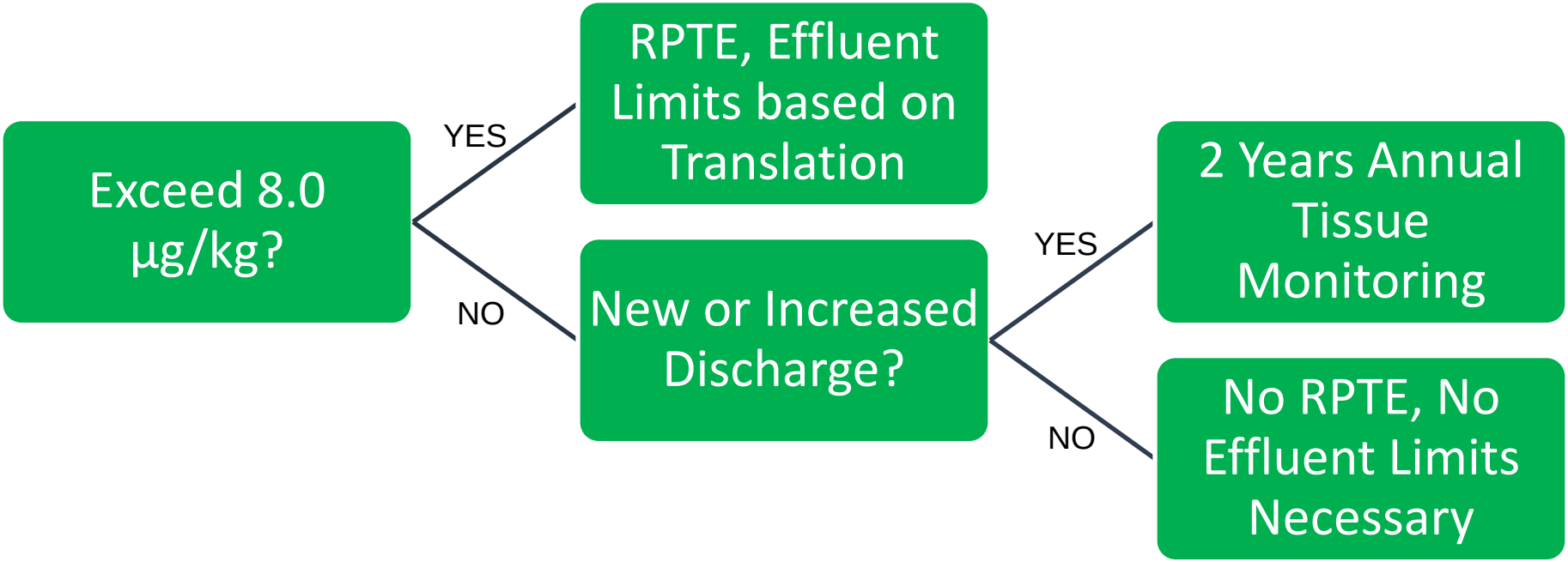
- Preference for geometric mean BAF; provide flexibility
  - Identify gamefish species present
  - Paired fish tissue and water samples for all gamefish species

Guidance – Permits – Fish Tissue

Permitting


Is iAs a POC?
YES
NO
Sufficient Gamefish Data?
No RPTE
YES
NO
Exceed 8.0 µg/kg?
Use Water Column Criterion

Permitting


Exceed 8.0 µg/kg?
YES
RPTE, Effluent Limits based on Translation
NO
New or Increased Discharge?
YES
2 Years Annual Tissue Monitoring
NO
No RPTE, No Effluent Limits Necessary

Examples

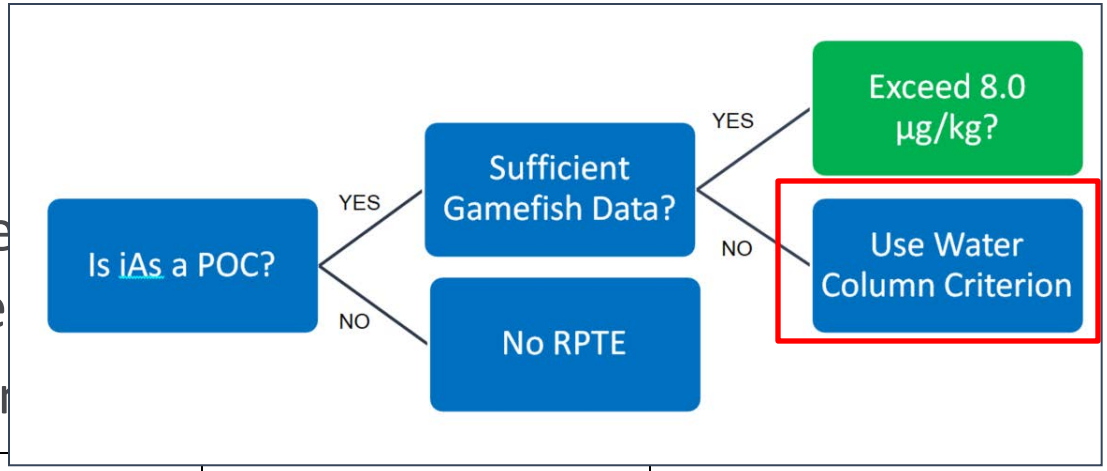
Example

- “Sisyphus Creek” – Designated for both Primary Contact Recreation and Domestic Water Supply
  - Fish tissue data are not available

Fish Only	Fish & Water
4.3 µg/L	10 µg/L

  - Recreation is most sensitive use
    - Applicable criterion is 4.3 µg/L; basis for water quality based effluent limits

Example



- "Sisyphus Creek" – De
  Recreation and Dome
  - Fish tissue data are

Fish Only	Fish & Water
4.3 µg/L	10 µg/L

  - Recreation is most sensitive use
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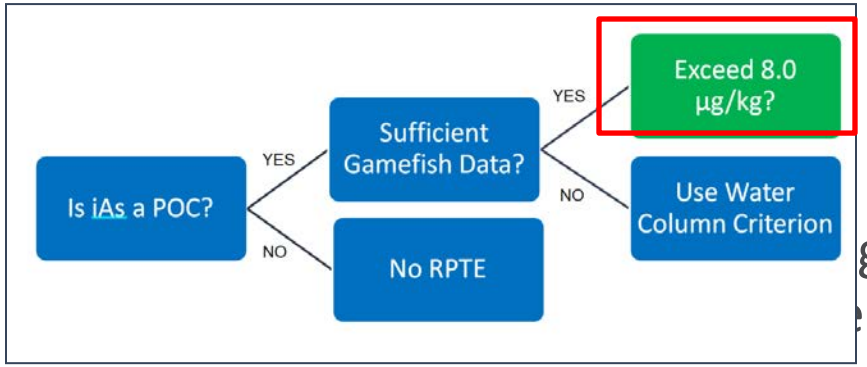
Example

- “Groundhog Day Creek” – Designated for both Secondary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available, translation = 9.0 µg/L

Fish Only	Fish & Water
8.0 µg/kg; (9.0 µg/L)	10 µg/L

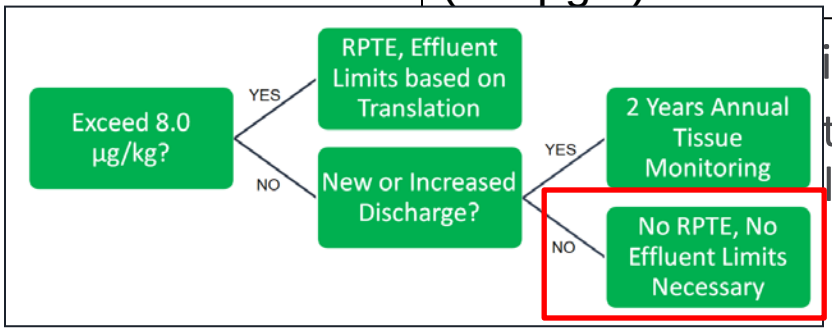
  - Recreation is the most sensitive use
    - Applicable criterion is fish tissue criterion



gnated for both Secondary Contact
r Supply

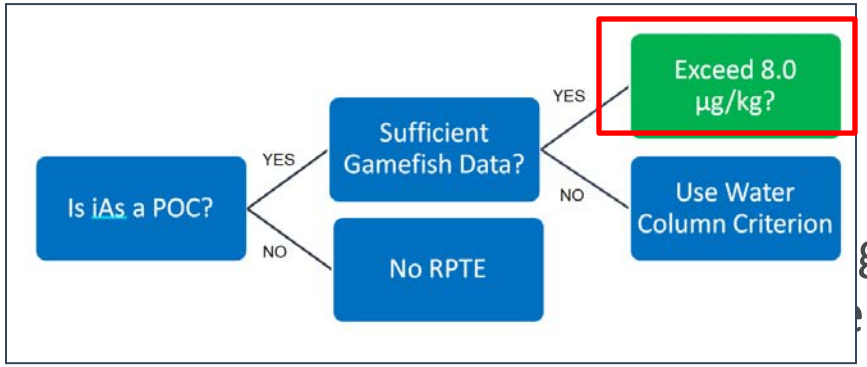
- Sufficient Fish tissue data are available, translation = 9.0 µg/L

Fish Only	Fish & Water
8.0 µg/kg; (9.0 µg/L)	10 µg/L



ive use

tissue criterion; translation 9.0 µg/L basis
luent limits



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Fish Only	Fish & Water
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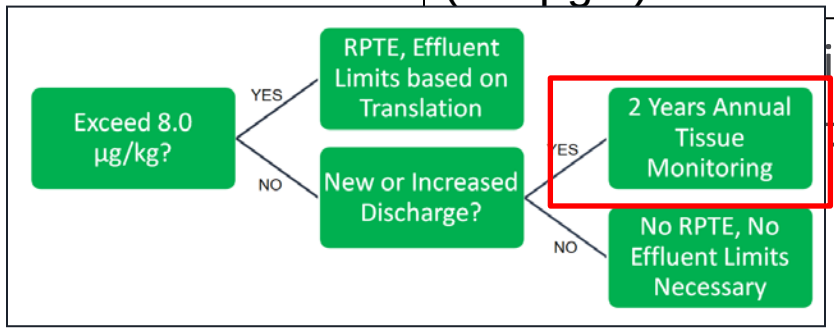

ive use

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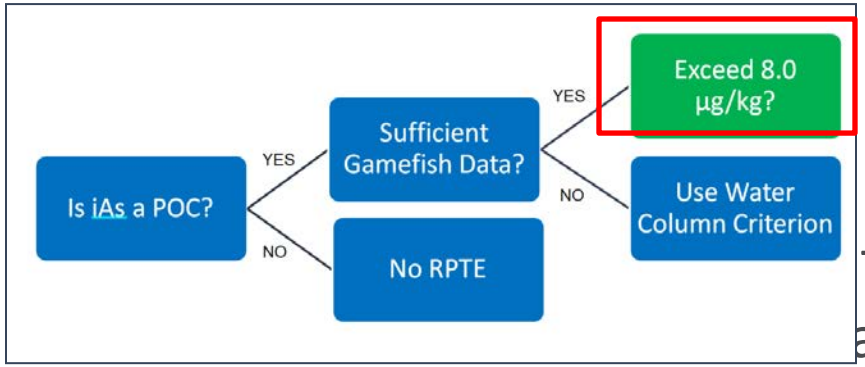
uent limits

Example

- “Hades River” – Designated for both Primary Contact Recreation and Domestic Water Supply
  - Sufficient Fish tissue data are available and tissue concentrations exceed 8.0 µg/kg

Fish Only	Fish & Water
8.0 µg/kg	10 µg/L

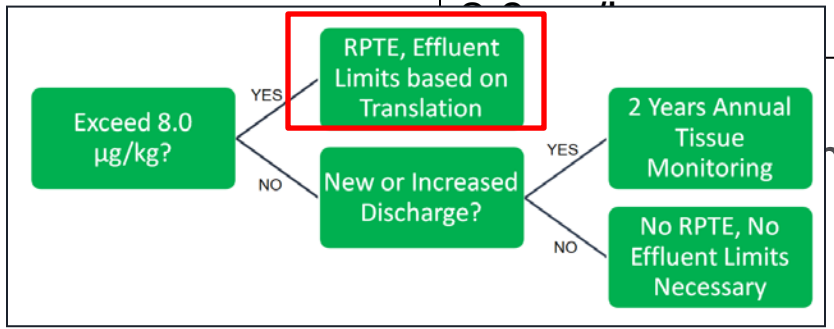
  - Ambient water column concentration is <4.3 µg/L



for both Primary Contact
ater Supply

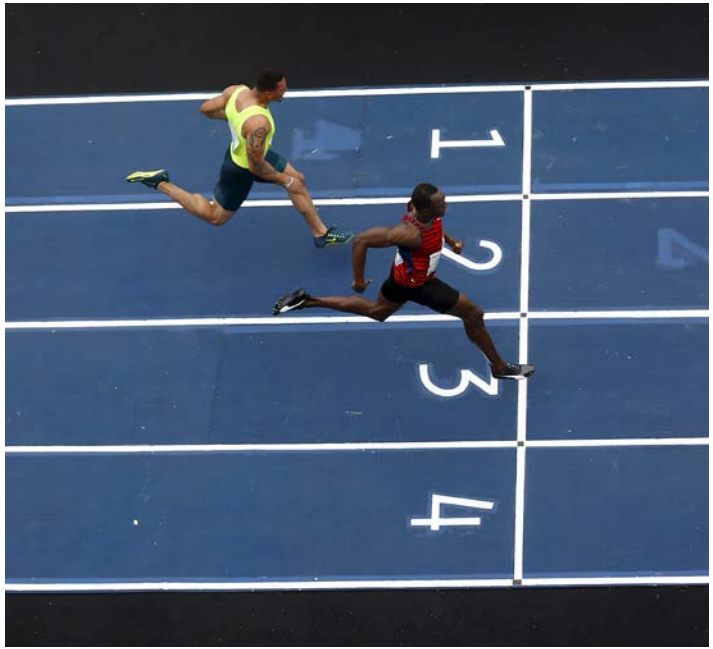
- Sufficient Fish tissue data are available and tissue concentrations exceed 8.0 µg/kg

Fish Only	Fish & Water
	10 µg/L



ncentration is <4.3 µg/L

Goal



Next Steps

- November 22, 2021 – Comments Due
- January 21, 2022 – Deadline for Proposed Rule for March Bulletin
- March 2022 – Proposed Rule published in Idaho Administrative Bulletin
- May 2022 – Proposed Rule presented to Idaho Board of Environmental Quality

Discussion

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Your name
Your title