

# Update to Copper Criteria for Aquatic Life Use

Rule Docket No. 58-0102-1502

June 6, 2017



# Outline

- Review of changes to preliminary draft rule
- Review of Comments Received
- Statewide Monitoring Draft Report
- Draft Guidance
- Discussion
- Next steps

# Preliminary Draft Rule Revision

# Comments on Draft Guidance

- Association of Idaho Cities:
  - Would like guidance to address copper and DOC filtration in lab vs. field



# Copper Development Association

- Request discussion of how BLM criteria will be included in permit limits, how new BLM criteria will affect anti-backsliding and antidegradation

## Idaho Pollutant Discharge Elimination System

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User's Guide to Permitting and Compliance  
Volume 2—Sector-Specific Information



State of Idaho  
Department of Environmental Quality

May 2017

# Copper Development Association

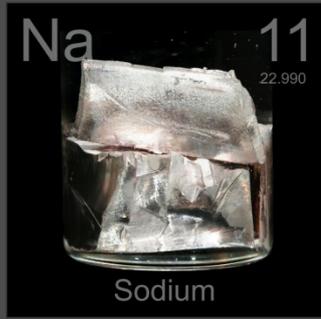
- Clarification on what is required to demonstrate that selected percentile of IWQC would be protective of aquatic life

# EPA

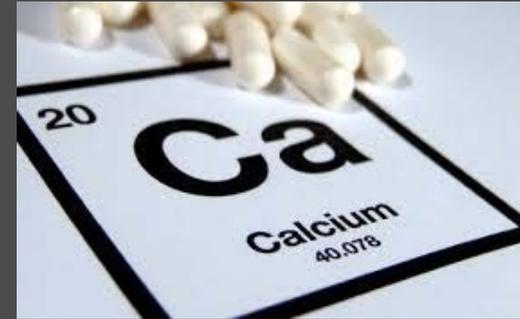
- Outlines two approaches for adopting BLM:
  - Site specific criteria submitted for approval
  - Performance based approach- with specifications for how it will be used site-specifically

# EPA

- Suggest rule language be added to specify most bioavailable conditions



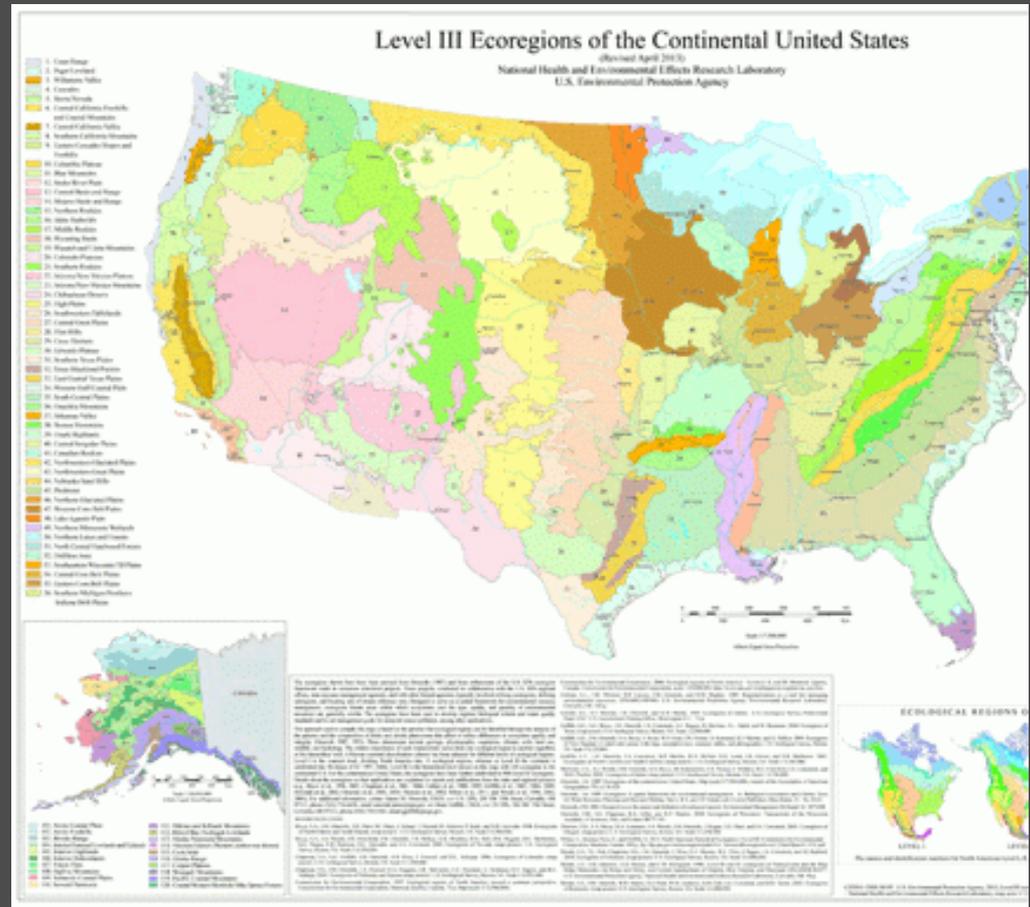
EPA



- Allow for use of estimated input parameters for Ca, Mg, Na, K, Alk, Cl, SO<sub>4</sub>, and DOC
- Require pH and temperature be site specific or conservative estimates

# EPA

- Concern about site classification scheme, and that a single sample event per site is insufficient



# EPA

## • Rule language suggestions

### *General Policy for the copper BLM*

- 1) *Criteria will be calculated using the BLM that protect designated uses of Idaho waterbodies at all times, including under the most bioavailable or toxic conditions.*
- 2) *Determination of where and when the most bioavailable conditions occur at a site is required.*
- 3) *Use of appropriate statistical methods to collect sufficiently representative data is required in order to ensure that the most bioavailable period is captured by the dataset.*
- 4) *When reconciling multiple instantaneous water quality criteria (IWQC) derived using the BLM, procedures will be used to ensure that the waterbody is protected at all times, including sensitive conditions i.e., most bioavailable.*

# EPA

- Guidance include specific methods for:
  - Selection of protective IWQC
  - Use of conservative inputs when data are not available
  - How to reconcile multiple datasets

# EPA

- More detail on what constitutes a representative location
- Location should represent most bioavailable condition, not just upstream or downstream

# EPA

- Include in rule that the criteria are not the BLM output, but rather a reconciliation of the IWQCs that protects the water at all times

# EPA

- Who are the “Users” defined in guidance?
- Provide more detail for how and when defaults should be used
- What statistical methods may be used for estimating geochemical ions

**DRAFT**  
**Statewide Monitoring for Inputs to  
the Copper Biotic Ligand Model**

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**State of Idaho**  
**Department of Environmental Quality**

**June 2017**

# Revised Data Handling

- Data handling followed procedure outlined in IPDES User's Guide
  - Samples  $<$  Detection Limit received value of 0
  - Samples  $>$  DL but  $<$  Reporting Limit received a value = DL

# Revised Data Handling

- ~~Data handling followed procedure outlined in IPDES User's Guide~~
  - ~~Samples  $<$  Detection Limit received value of 0~~
  - ~~Samples  $>$  DL but  $<$  Reporting Limit received a value = DL~~

# Revised Data Handling

- Copper: Used DL when  $<DL$ 
  - Used reported value when  $<RL$
- All others:
  - $< DL$  were assigned  $\frac{1}{2} DL$
  - $< RL$  were assigned DL

# Data Quality Assessment

- 8% of sites had duplicates\*
  - Goal = 5%
  - 4.2% of sites had DOC duplicates
- 10.6% of sites had blanks\*
  - Goal = 5%
  - 8% of sites had DOC blanks

# Field Blanks

- Several Cu, Ca, Na, and DOC blanks > DL

	Cu ( $\mu\text{g/L}$ )	DOC (mg/L)	Ca (mg/L)	Na (mg/L)
Blank	0.1 – 4.9	0.21 - 0.24	0.14 - 0.16	0.11 - 0.31
DL	0.1	0.04	0.01	0.01
RL	1	0.2	0.1	0.1
min	0.1	0.35	1.63	0.53
10th %ile	0.2	0.66	4.81	2.07
mean	7	2.2	26.13	13.5

# RPD

## Relative Percent Difference (%)

	Cu	DOC	Ca	Mg	Na	K	SO <sub>4</sub>	Cl	Alk
min	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.6
max	48.3	2.5	3.7	3.8	3.8	6.3	47.2	10.1	29.4
mean	10.4	1.8	1.8	1.6	1.4	2.1	5.0	3.1	4.8
median	4.2	1.9	2.1	1.0	0.9	1.5	1.2	2.0	2.2

# Copper

Site ID	Stream Name	Acute Criterion ( $\mu\text{g/L}$ )	Chronic Criterion ( $\mu\text{g/L}$ )	Dissolved Copper ( $\mu\text{g/L}$ )
<b>ID0000167U</b>	Canyon Creek	0.39	0.24	0.25
<b>ID0027120D</b>	Little Wood River	0.56	0.35	0.49
<b>ID0028321D</b>	Big Deer Creek	2.59	1.61	2.86
<b>ID0028321U</b>	Big Deer Creek	3.51	2.18	2.42
<b>SFDeerCKD</b>	South Fork Deer Creek	3.93	2.44	6.65

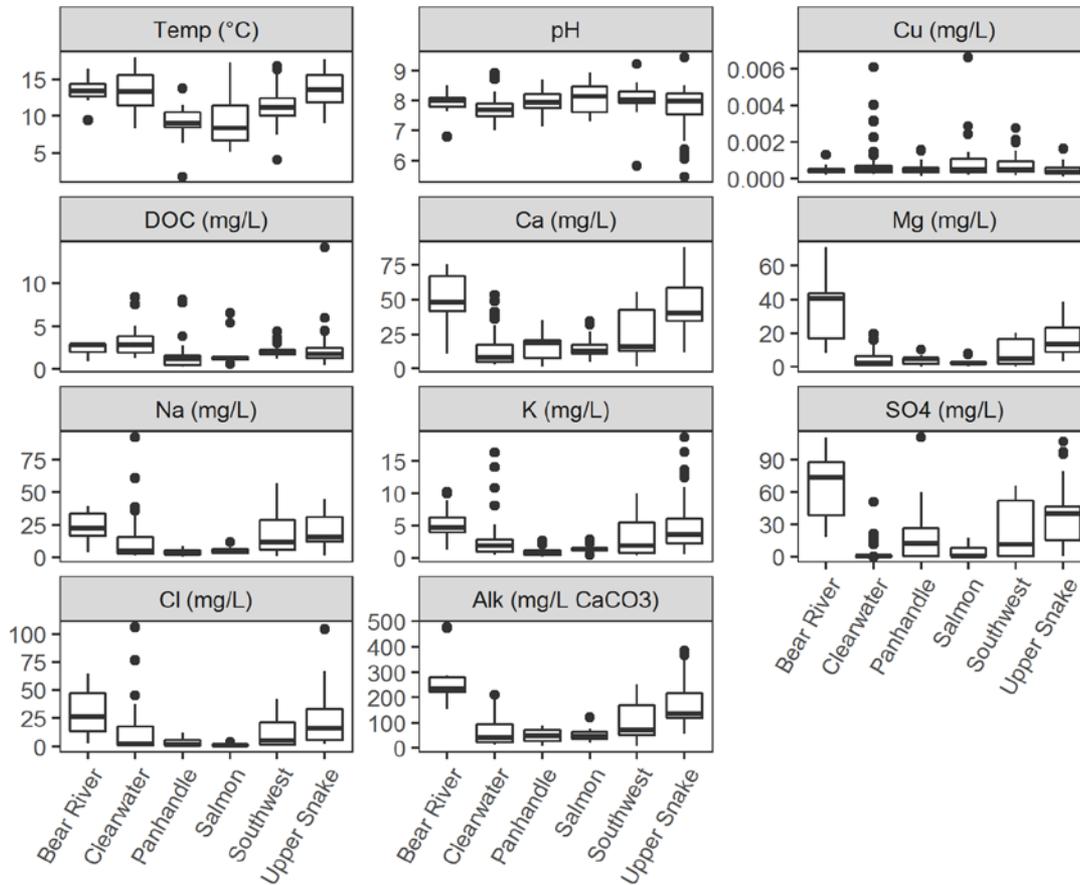
- Cu detection limit =  $0.1 \mu\text{g/L}$
- Cu reporting limit =  $1.0 \mu\text{g/L}$

# Regional Classification

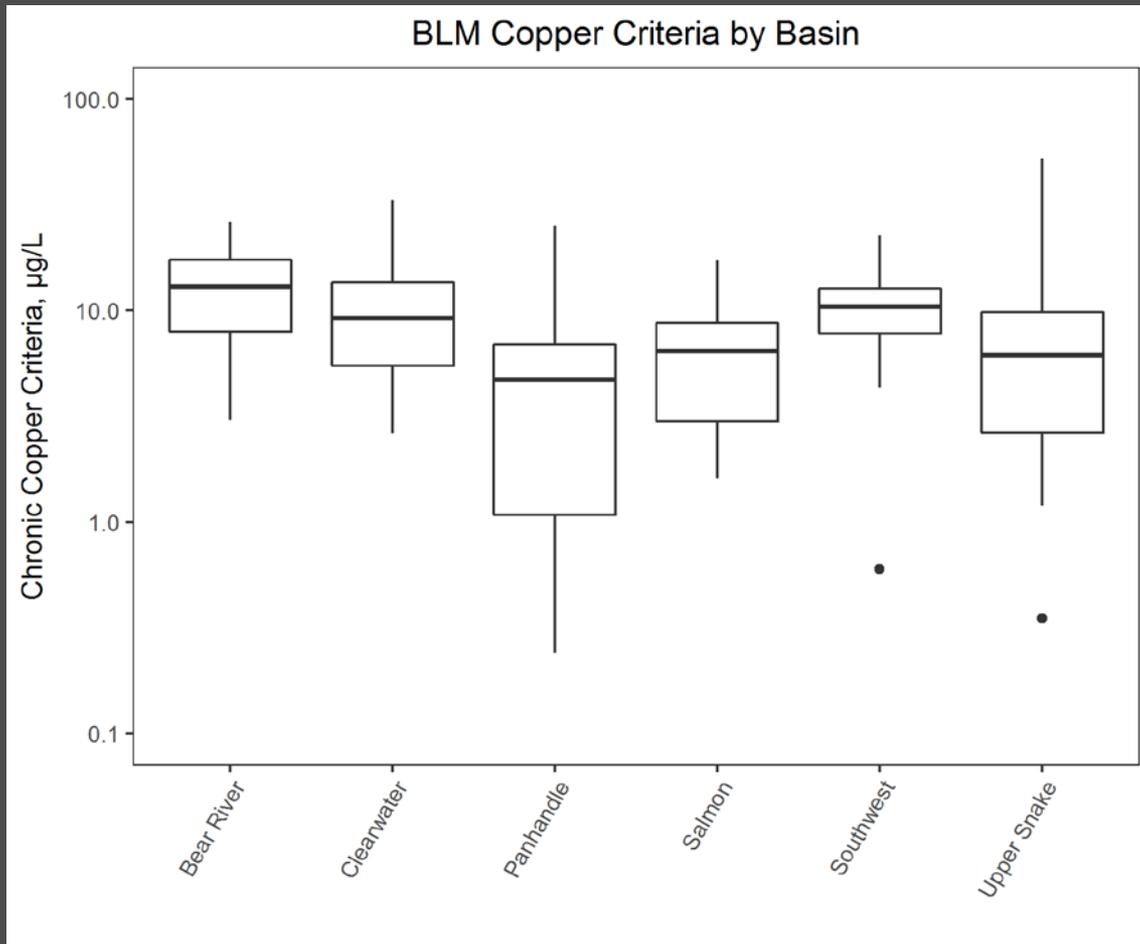
- Basins
- Ecoregions
- Stream Order
- Site Classes
- Site Class + River/Stream.

- Generated BLM criteria for each complete site
- Calculated summary statistics for inputs and BLM criteria for each Regional Classification System
- Evaluated variability as coefficient of variation

# Basin



# Basin



# Basin

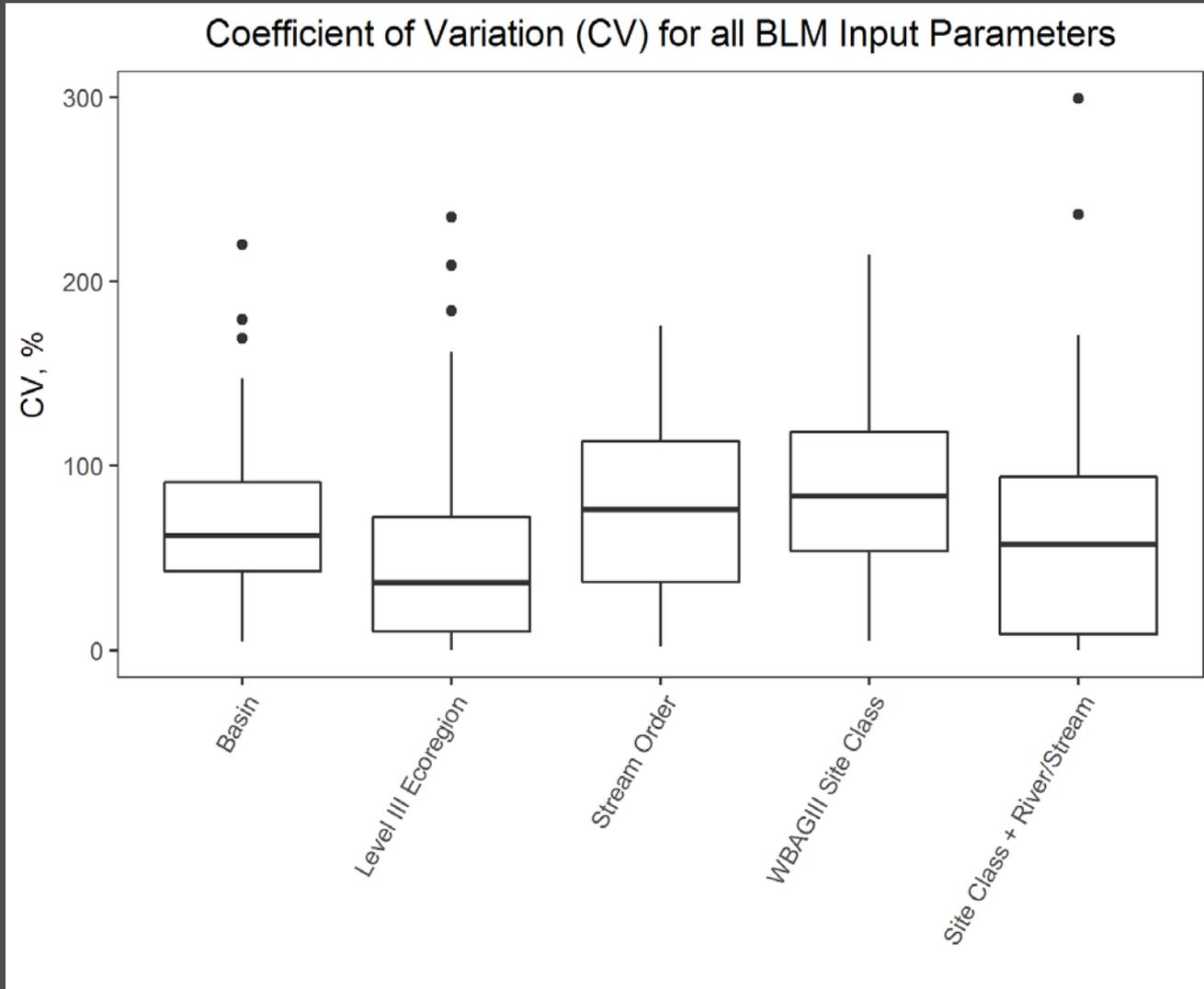
Basin	N	Min ( $\mu\text{g/L}$ )	Max ( $\mu\text{g/L}$ )	10 <sup>th</sup> %ile ( $\mu\text{g/L}$ )	Mean ( $\mu\text{g/L}$ )	SD ( $\mu\text{g/L}$ )	CV (%)
<b>Bear River</b>	12	3.0	26.1	4.9	13.6	7.25	53
<b>Clearwater</b>	40	2.6	33.2	4.7	10.4	6.21	60
<b>Panhandle</b>	37	0.2	25.1	0.7	5.5	6.17	113
<b>Salmon</b>	18	1.6	17.3	2.4	7.0	4.38	63
<b>Southwest</b>	49	0.6	22.7	5.8	10.5	4.17	40
<b>Upper Snake</b>	33	0.4	52.2	1.6	9.0	10.13	113

# Basin

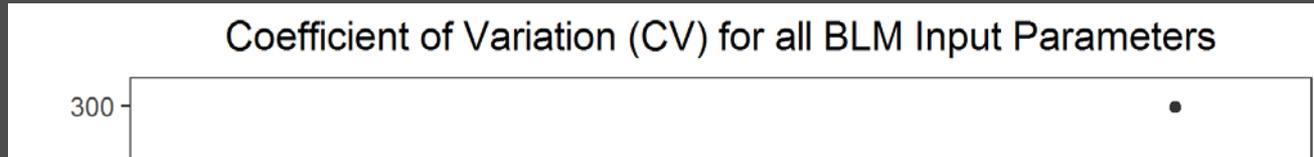
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$$CV (\%) = (SD/mean) \times 100$$

# Regional Classification Systems, Evaluation of CV



# Regional Classification Systems, Evaluation of CV



Regional Classification System	Min	Max	10th %ile	90th %ile	Mean	Median
<b>Basin</b>	5	220	15	128	70	62
<b>Ecoregion</b>	0	235	3	99	48	37
<b>Stream Order</b>	2	176	15	143	77	76
<b>Site Class</b>	5	214	20	157	86	83
<b>Site Class + River/Stream</b>	0	299	3	132	61	57
<b>Statewide</b>	7	147	26	131	92	108

# 10<sup>th</sup> Percentile Criteria values

## Estimated copper criteria

10th percentile ( $\mu\text{g/L}$ )

### Regional Classification

Acute

Chronic

### Basins

Bear River

7.9

4.9

Clearwater

7.6

4.7

Panhandle

1.1

0.7

Salmon

3.9

2.4

Southwest

9.3

5.8

Upper Snake

2.6

1.6

## Estimated copper criteria

10th percentile ( $\mu\text{g/L}$ )

### Regional Classification

Acute

Chronic

### Ecoregion

Blue Mountains

10.1

6.3

Central Basin and Range

14.3

8.9

Columbia Plateau

7.2

4.5

Idaho Batholith

3.9

2.4

Middle Rockies

8.4

5.2

Northern Basin and Range

13.0

8.1

Northern Rockies

1.4

0.9

Snake River Plain

3.2

2.0

Wasatch and Uinta

9.0

5.6

Mountains

Wyoming Basin

38.6

24.0

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10th percentile ( $\mu\text{g/L}$ )

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Acute

Chronic

### Ecoregion

Blue Mountains

10.1

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9.0

5.6

Mountains

Wyoming Basin

38.6

24.0

# 10<sup>th</sup> Percentile Criteria values

<b>Stream Order</b>	<b>Acute</b>	<b>Chronic</b>
<b>1</b>	5.2	3.2
<b>2</b>	3.7	2.3
<b>3</b>	4.0	2.5
<b>4</b>	1.6	1.0
<b>5</b>	8.9	5.5
<b>6</b>	2.3	1.4
<b>7</b>	10.1	6.3
<b>8</b>	7.6	4.7
<b>Unassigned</b>	9.0	5.6

# 10<sup>th</sup> Percentile Criteria values

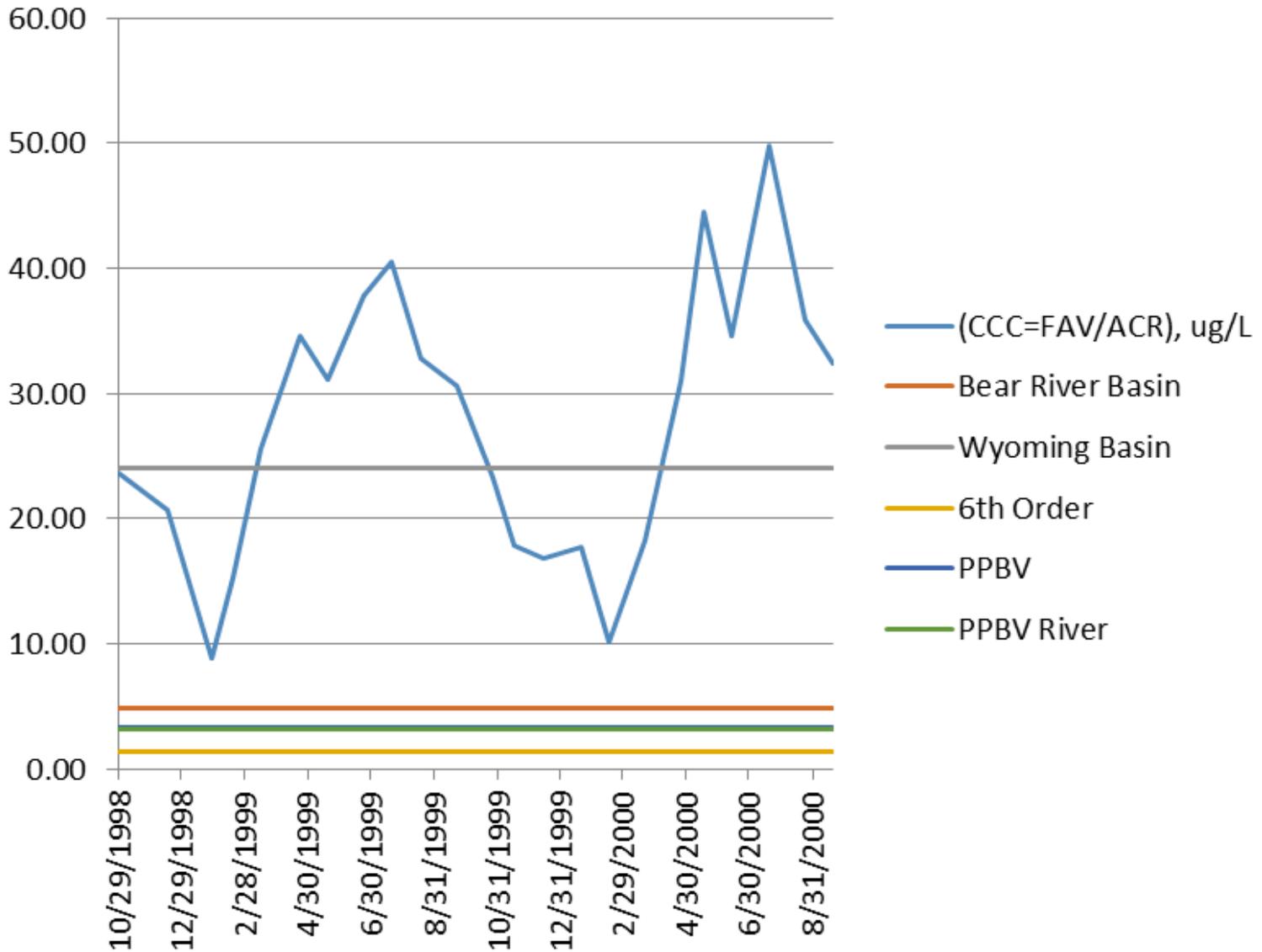
<b>Site Class</b>	<b>Acute</b>	<b>Chronic</b>
Mountains	1.4	0.9
Foothills	6.3	3.9
PPBV	5.3	3.3

# 10<sup>th</sup> Percentile Criteria values

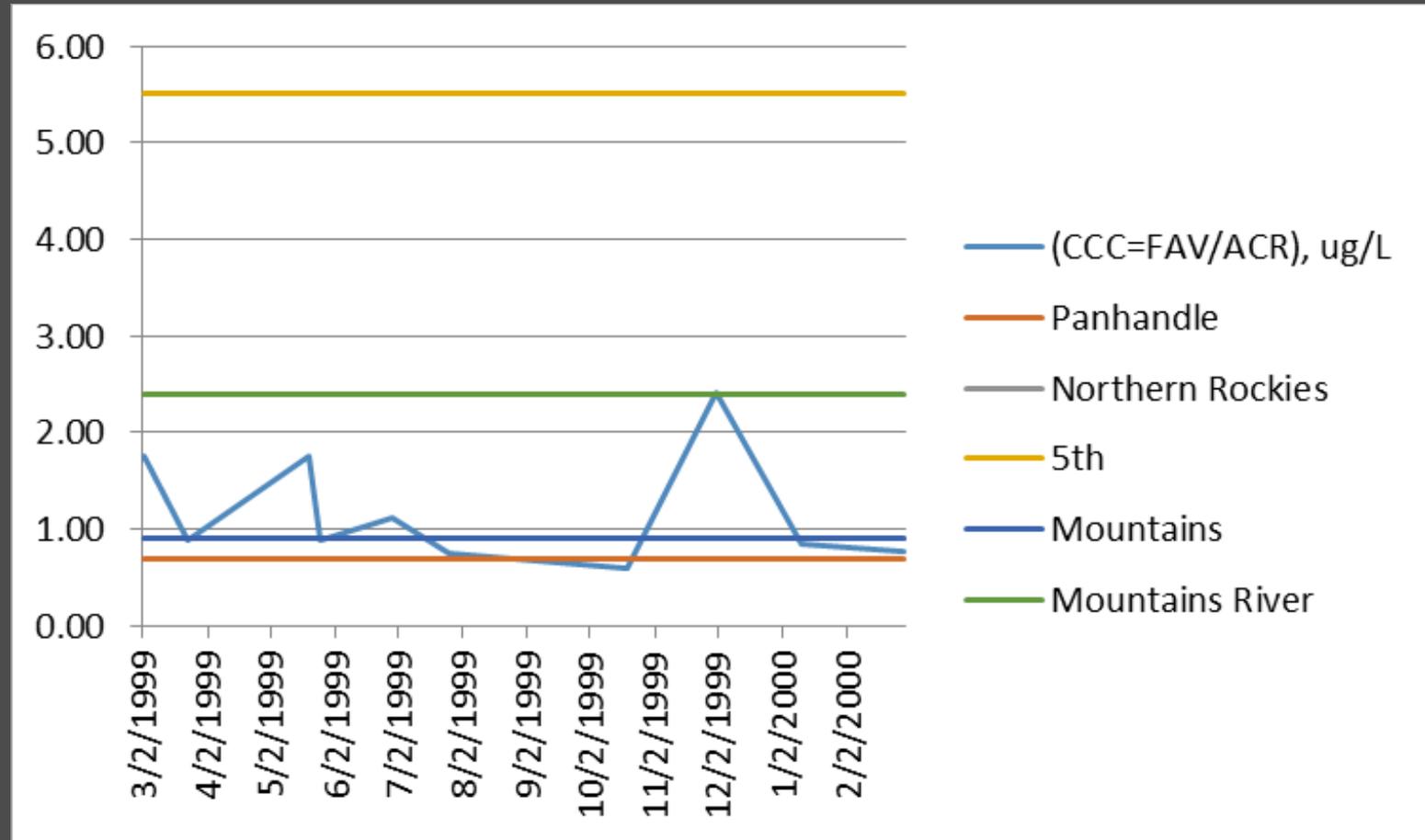
<b>Site Class</b>	<b>Acute</b>	<b>Chronic</b>
Mountains River	3.9	2.4
Mountains Stream	1.0	0.6
Foothills River	9.7	6.0
Foothills Stream	4.7	2.9
PPBV River	5.0	3.1
PPBV Stream	5.5	3.4

- *Although no single regional classification system provided consistently lower criteria estimates, data indicate that protective conservative criteria can be estimated at any site by taking the lowest of the 10<sup>th</sup> percentile criteria calculated from the five regional site classes.*

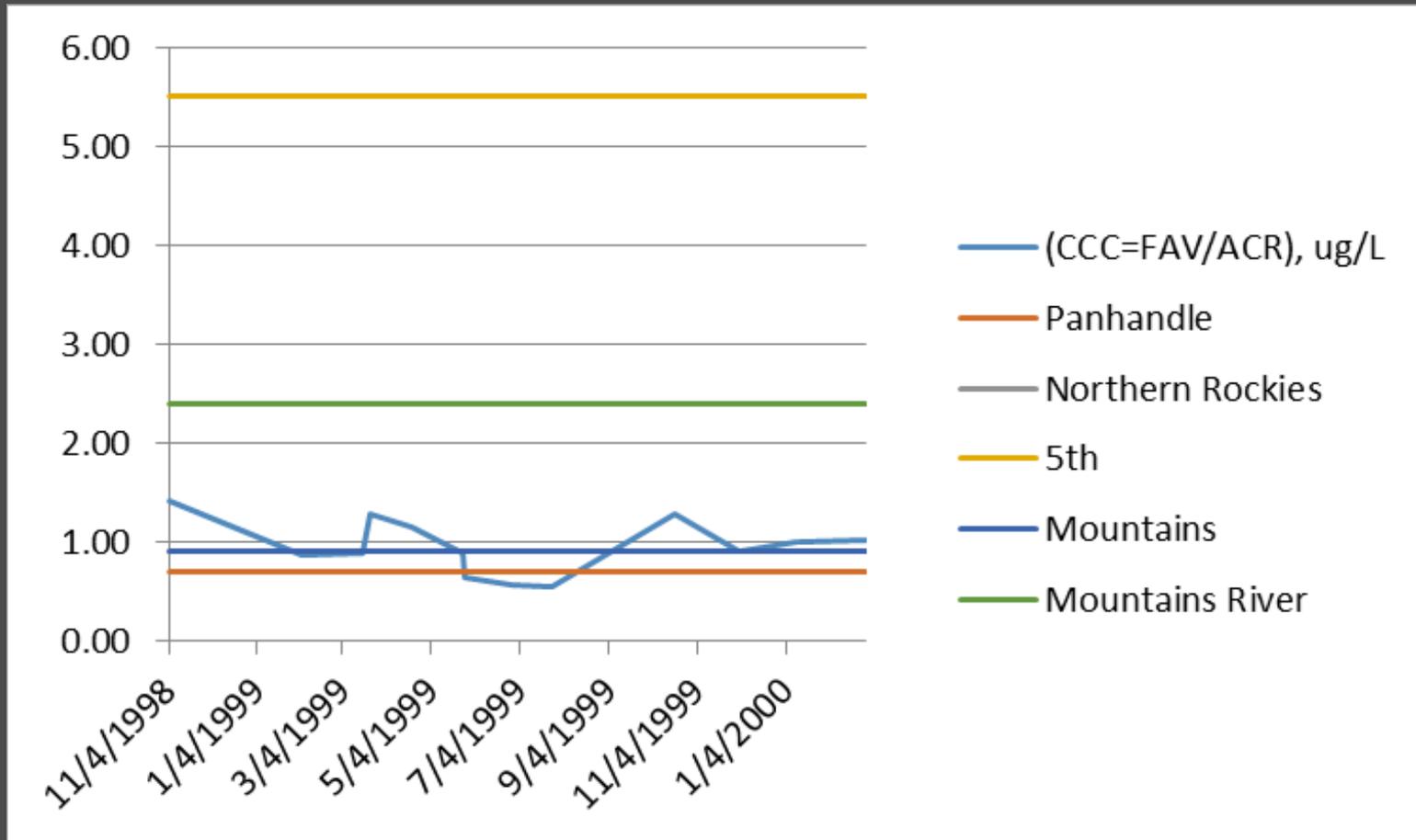
# Bear River at Pescadero



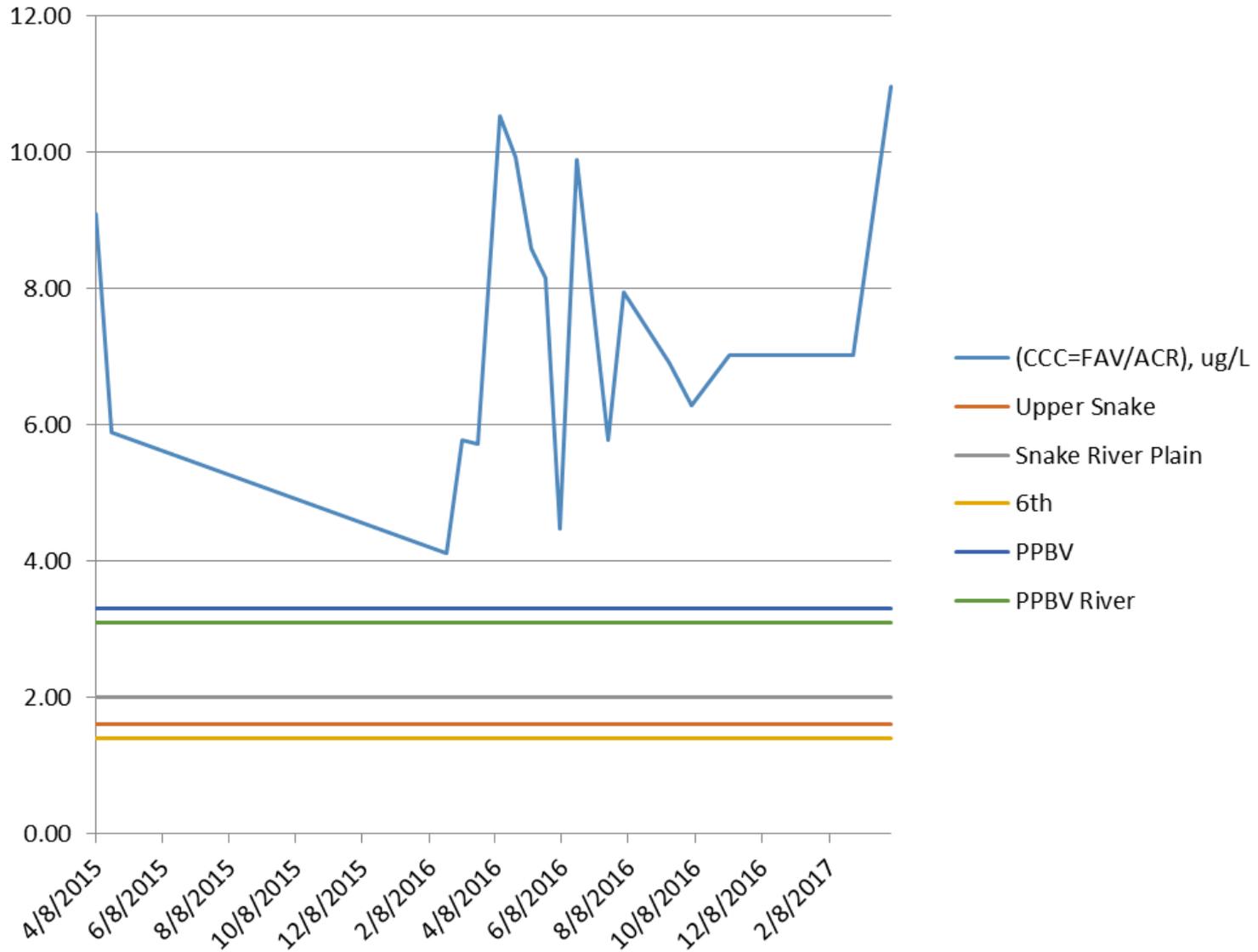
# North Fork Coeur d'Alene at Enaville



# South Fork Coeur d'Alene at Pinehurst



# Henry's Fork near Rexburg



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# **DRAFT Implementation Guidance for the Idaho Copper Criteria for Aquatic Life**

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Using the Biotic Ligand Model



**State of Idaho  
Department of Environmental Quality**

**June 2017**

## 5.2 Special Considerations for Monitoring pH and DOC

- pH discussion to new section
- Moved discussion of DOC contamination concern from footnote in table suggestion that lab filtered provides better results
- QAPPs and Monitoring plans should address pH and DOC concerns, should target “most bioavailable conditions”

# ~~6.1 Estimating Input Parameters~~

# 6.2 Critical Conditions

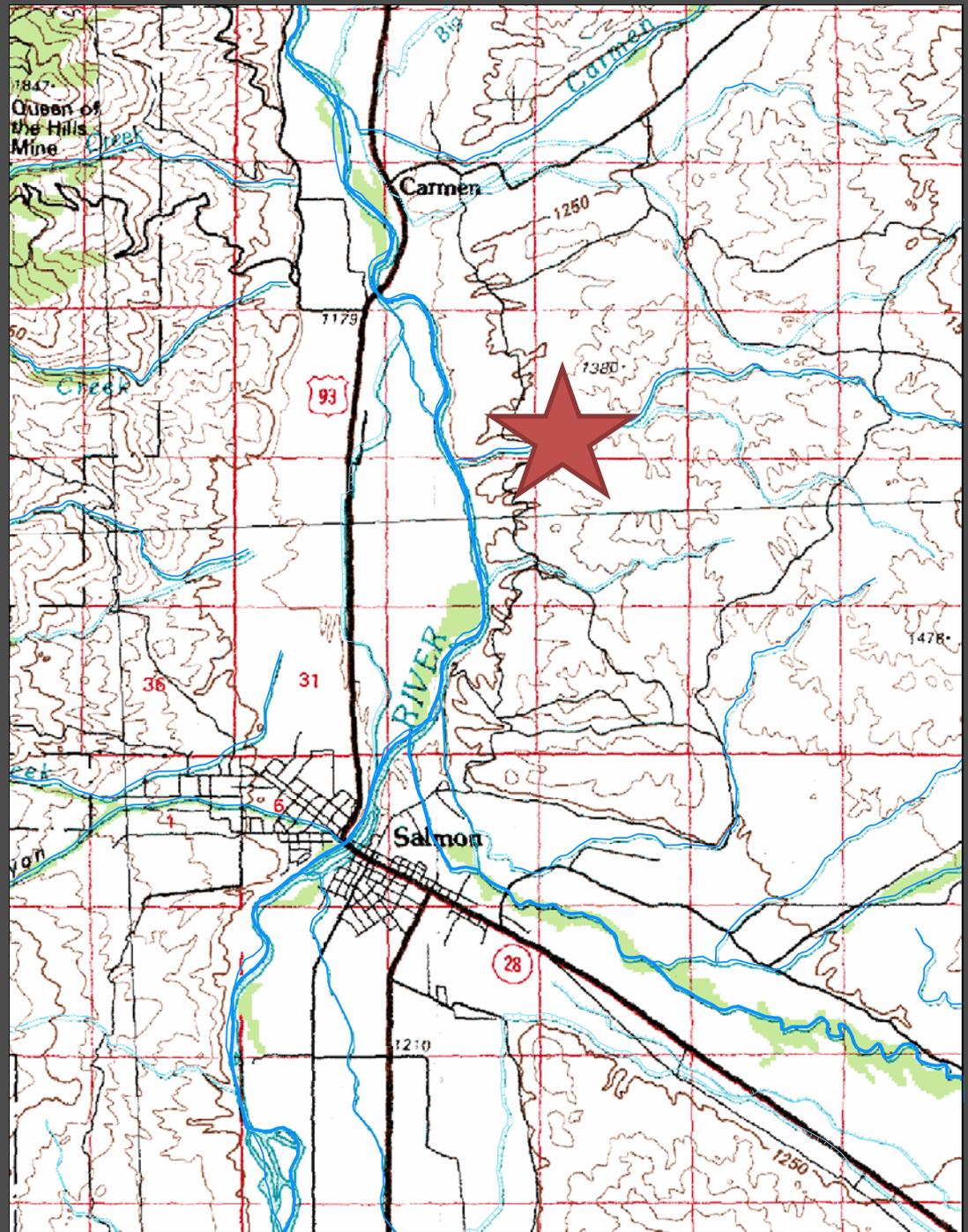
## ~~6.2 Critical Conditions~~

### 6.1 Estimating Conservative Criteria

- Revised example:

*Conservative criteria can be estimated for a site by applying the lowest of the 10<sup>th</sup> percentile criteria calculated from the five regional classifications (DEQ 2017b).*

# Example



# 6.1 Estimating Conservative Criteria

	Estimated Conservative Criteria	
Regional Classification	Acute ( $\mu\text{g/L}$ )	Chronic ( $\mu\text{g/L}$ )
Salmon Basin	3.9	2.4
Middle Rockies	8.4	5.2
3 <sup>rd</sup> Order Stream	4.0	2.5
Foothills	6.3	3.9
Foothills Stream	4.7	2.9

# 6.1 Estimating Conservative Criteria

	<b>Estimated Conservative Criteria</b>	
<b>Regional Classification</b>	Acute ( $\mu\text{g/L}$ )	Chronic ( $\mu\text{g/L}$ )

# 6.1 Estimating Conservative Criteria

	<b>Estimated Conservative Criteria</b>	
<b>Regional Classification</b>	<b>Acute (<math>\mu\text{g/L}</math>)</b>	<b>Chronic (<math>\mu\text{g/L}</math>)</b>
<b>Salmon Basin</b>	3.9	2.4

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Foothills	6.3	3.9
Foothills Stream	4.7	2.9

## 6.1 Estimating Conservative Criteria

- *Users may propose alternative methods for estimating protective criteria. The proposed estimates must be based on scientifically sound methods and must be demonstrated to be protective of aquatic life. Analysis similar to what is found in DEQ (2017b) would be considered sufficient to demonstrate protectiveness.*

# Discussion



- Comment deadline: June 16, 2017
  - Revised draft proposed rule
  - Presented materials
- Next meeting July 18, 2017
  - Data Report
  - Guidance Revision