

Negotiated Rule Development – Meeting 2

Ammonia

58-0102-2602



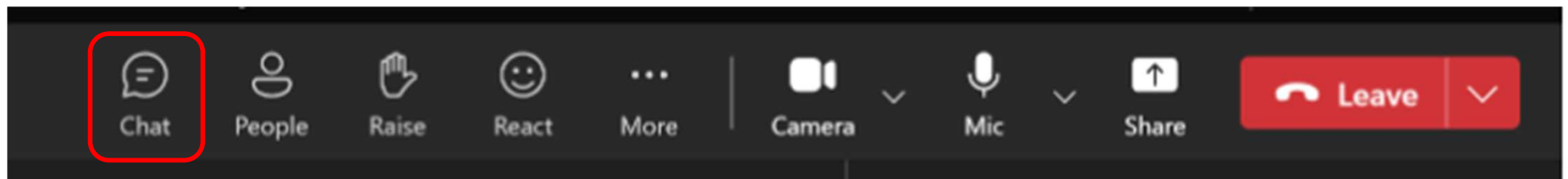
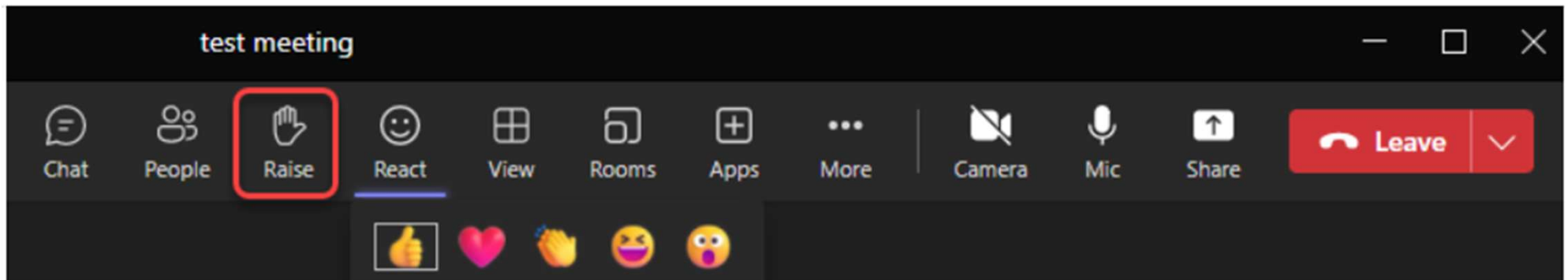
STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Beth Spelsberg
Senior Water Quality Standards Scientist

Agenda

- Housekeeping/Introductions
- Overview/Timeline of Process
- Acute Equation Correction
- Response to questions/comments
- Summary of Proposed Rule Language
- Questions

Housekeeping



Introductions



Timeline

58-0102-2602: Water Quality Standards - Ammonia	
	NEGOTIATED RULEMAKING
10-August	First Negotiated Rule Meeting
17-August	End comment period (one week comment period)
6-October	Second Negotiated Rule Meeting
13-October	End comment period (one week comment period)
	DETERMINE IF FURTHER RULE MEETINGS ARE NEEDED
November	Third Negotiated Rule Meeting
November	Comment period
	PROPOSED & PENDING RULE
TBD 2027	Submit proposed Rule Package
TBD 2027	Board Meeting: Present rule docket for approval
TBD 2027	Pending Rule posted in January Bulletin
	LEGISLATIVE APPROVAL
Jan/Feb 2028	Present rule to House and Senate committees for approval

Correction to Acute Criteria Equation

From Meeting 1

- 
- Chronic equation/criteria table did not need correcting – see simplified version for Proposed Rule.
 - Percent difference tables remain accurate.

Correct Acute Criteria Equation

$$CMC = MIN \left(\left(\frac{0.275}{1 + 10^{7.20}} + \frac{39.0}{1 + 10^{pH-7.204}} \right), \left(\frac{0.4015}{1 + 10^{7.20}} + \frac{56.98}{1 + 10^{pH-7.204}} \right) \times (10^{0.036 \times (20-T)}) \right)$$

Equation presented at NRM 1 was a simplification error. The above equation is the correct acute criteria equation, derived as described in NRM 1.

Corrected Acute Criteria Table

	Temp (°C)												
pH	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	33	33	33	33	33	33	33	31	29	27	25	23	21
6.6	31	31	31	31	31	31	31	30	28	26	24	22	20
6.7	30	30	30	30	30	30	30	29	26	24	22	21	19
6.8	28	28	28	28	28	28	28	27	25	23	21	19	18
6.9	26	26	26	26	26	26	26	25	23	21	20	18	17
7	24	24	24	24	24	24	24	23	21	20	18	17	15
7.1	22	22	22	22	22	22	22	21	19	18	17	15	14
7.2	20	20	20	20	20	20	20	19	18	16	15	14	13
7.3	18	18	18	18	18	18	18	17	16	14	13	12	11
7.4	15	15	15	15	15	15	15	15	14	13	12	11	10
7.5	13	13	13	13	13	13	13	13	12	11	10	9.2	8.5
7.6	11	11	11	11	11	11	11	11	10	9.3	8.6	7.9	7.3
7.7	10	10	10	10	10	10	10	9.3	8.6	7.9	7.3	6.7	6.2
7.8	8.1	8.1	8.1	8.1	8.1	8.1	8.1	7.8	7.2	6.6	6.1	5.6	5.2
7.9	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.5	6.0	5.5	5.1	4.7	4.3
8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.4	5.0	4.6	4.2	3.9	3.6
8.1	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.5	4.1	3.8	3.5	3.2	3.0
8.2	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.7	3.4	3.1	2.9	2.7	2.4
8.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.0	2.8	2.6	2.4	2.2	2.0
8.4	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.3	2.1	2.0	1.8	1.7
8.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.9	1.7	1.6	1.5	1.4
8.6	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.6	1.4	1.3	1.2	1.1
8.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.2	1.1	1.0	0.94
8.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.0	0.93	0.85	0.79
8.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.92	0.85	0.78	0.72	0.66
9	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.85	0.79	0.72	0.67	0.61	0.56

Chronic Criteria Equation

From EPA's Recommendation to CVCWA

$$CCC = 0.8634 \times \left(\frac{0.0278}{1 + 10^{7.688 - pH}} + \frac{1.1994}{1 + 10^{pH - 7.688}} \right) \times \text{MIN}(6.663, 3.854 \times 10^{0.028 \times (20 - T)})$$

=

Simplified version – as it appears in the Proposed Rule Language

$$CCC = \left(\frac{0.0240}{1 + 10^{7.688 - pH}} + \frac{1.0356}{1 + 10^{pH - 7.688}} \right) \times \text{MIN}(6.663, 3.854 \times 10^{0.028 \times (20 - T)})$$

Chronic Criteria Table

Temperature and pH Dependent Values of Site-Specific CCC - Salmonids Present																					
	Temperature (°C)																				
pH	0-10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	6.5	6.5	6.3	5.9	5.5	5.2	4.9	4.6	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0
6.6	6.4	6.4	6.2	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.9	2.7	2.5	2.4	2.2	2.1	1.9
6.7	6.3	6.3	6.1	5.7	5.3	5.0	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9
6.8	6.1	6.1	5.9	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.3	2.1	2.0	1.9
6.9	6.0	6.0	5.8	5.4	5.1	4.8	4.5	4.2	3.9	3.7	3.4	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8
7	5.8	5.8	5.6	5.2	4.9	4.6	4.3	4.0	3.8	3.5	3.3	3.1	2.9	2.7	2.6	2.4	2.3	2.1	2.0	1.9	1.7
7.1	5.5	5.5	5.3	5.0	4.7	4.4	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7
7.2	5.2	5.2	5.1	4.8	4.5	4.2	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6
7.3	4.9	4.9	4.8	4.5	4.2	3.9	3.7	3.5	3.3	3.0	2.9	2.7	2.5	2.4	2.2	2.1	1.9	1.8	1.7	1.6	1.5
7.4	4.6	4.6	4.5	4.2	3.9	3.7	3.4	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.4
7.5	4.2	4.2	4.1	3.9	3.6	3.4	3.2	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3
7.6	3.9	3.9	3.7	3.5	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2
7.7	3.5	3.5	3.4	3.2	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
7.8	3.1	3.1	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94
7.9	2.7	2.7	2.6	2.5	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83
8	2.4	2.4	2.3	2.2	2.0	1.9	1.8	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.93	0.87	0.82	0.77	0.72
8.1	2.0	2.0	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.0	1.0	0.91	0.86	0.80	0.75	0.70	0.66	0.62
8.2	1.7	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	1.0	0.95	0.89	0.83	0.78	0.73	0.69	0.64	0.60	0.57	0.53
8.3	1.5	1.5	1.4	1.3	1.3	1.2	1.1	1.0	1.0	0.92	0.86	0.80	0.75	0.71	0.66	0.62	0.58	0.55	0.51	0.48	0.45
8.4	1.3	1.3	1.2	1.1	1.1	1.0	0.94	0.88	0.83	0.77	0.73	0.68	0.64	0.60	0.56	0.53	0.49	0.46	0.43	0.41	0.38
8.5	1.1	1.1	1.0	1.0	0.90	0.85	0.79	0.74	0.70	0.65	0.61	0.57	0.54	0.51	0.47	0.44	0.42	0.39	0.37	0.34	0.32
8.6	0.90	0.90	0.87	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27
8.7	0.76	0.76	0.73	0.69	0.65	0.60	0.57	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23
8.8	0.64	0.64	0.62	0.58	0.55	0.51	0.48	0.45	0.42	0.40	0.37	0.35	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.20
8.9	0.55	0.55	0.53	0.50	0.47	0.44	0.41	0.39	0.36	0.34	0.32	0.30	0.28	0.26	0.25	0.23	0.22	0.20	0.19	0.18	0.17
9	0.47	0.47	0.46	0.43	0.40	0.38	0.35	0.33	0.31	0.29	0.27	0.26	0.24	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14

Other Comments/Questions

From Meeting 1

- 
- Question about 4-day average: 2.5 x CCC component
 - Site-specific criteria survey questions

4-day average not to exceed 2.5 x CCC

Question in NRM 1:

Is this based on early-life stages being present in the current criteria?

Answer: No.

It is based on conservative measures to account for the chronic toxicity averaging period.

4-day average not to exceed 2.5 x CCC

Many chronic toxicity tests used in developing the criteria cover exposure lengths other than 30 days. Tests include 7-day exposures to fathead minnows which are ~2.5 times more sensitive than the most sensitive 30-day exposure tests (fertilized eggs). The 4-day clause covers “excursions” of this magnitude that may endanger residents without being captured in a 30-day average value.

This provision is not typically used in writing permits, as including acute and chronic monitoring components should satisfy all concerns of toxic effects to resident aquatic life.

Surveys to Support Developing Mussels-Absent Site-Specific Criteria

EPA: [Technical Support Document for Conducting and Reviewing Freshwater Mussel Occurrence Surveys](#)

What geographic scale would surveys need to cover?

- For dischargers, limiting surveys to the receiving waterbody is most practical.
- Single channels would be the main targets for surveying.
 - Ex: 500 m upstream and downstream of a point-source discharge
 - Ex: from a discharge point in a tributary to its' confluence with a larger water
- DEQ would not recommend surveying watersheds, large rivers, or lakes, generally, due to survey design and logistical challenges.
- Any waterbody with records of mussels since 1975, should be considered “mussels present,” per CWA definitions, and would therefore not be a target for surveys.

Surveys to Support Developing Mussels-Absent Site-Specific Criteria

What training and survey intensity requirements would need to be met?

- EPA's guidance:
“[I]t is important to have surveyors or surveying crews who are experienced with mussel sampling and have expert knowledge of the species habitat and life history. Such experience is crucial because it is often difficult to find small, juvenile, or cryptic mussels and distinguish them in the substrate.”
- The state of Idaho does not currently have any requirements for surveying for/handling mussels.
- DEQ recommends any surveys be conducted by personnel with training and experience surveying for mussels and identifying unionids to at least genus-level.
IDFG, USFWS, Xerces Conservation Society, and other agencies/groups provide training for surveyors.

Surveys to Support Developing Mussels-Absent Site-Specific Criteria

Other Notes:

- Waterbodies that go dry (intermittent streams) can not sustain mussels, and could be targets for SSC without needing surveys.
- Observations of unionids in Idaho have been catalogued by IDFG and the Xerces Conservation Society. Their databases should be consulted prior to survey design.
- The Western Ridged Mussel is currently petitioned to be listed as endangered. If it is added to the ESA list, training and survey method requirements as well as reporting of take may all be changed significantly.

DEQ does not anticipate a challenge to the proposed ammonia standard from EPA or the services regardless of the determination made by USFW, but future SSC applications may be scrutinized more heavily if the species is listed.



Western Pearlshell mussels in Lolo Creek near Weippe, ID



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Gunnar Hilborn
Gunnar.Hilborn@deq.Idaho.gov
Water Quality Standards Analyst

Proposed Rule Language



Acute

d. For Ammonia, ~~The-the~~ following criteria are not to be exceeded dependent upon the temperature, T (degrees C), and pH of the water body: (3-31-22)

i. For Acute Criterion (Criterion Maximum Concentration (CMC)), ~~The-the~~ one (1) hour average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equation:

$$CMC = MIN \left(\left(\frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}} \right), \left(\frac{0.4015}{1 + 10^{7.204 - pH}} + \frac{56.98}{1 + 10^{pH - 7.204}} \right) \times 10^{0.036 \times (20 - T)} \right)$$

$$CMC = \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

Chronic

ii. Chronic Criterion (Criterion Continuous Concentration (CCC)). (3-31-22)

(1) The thirty (30) day average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equations: (3-31-22)

$$CCC = \left(\frac{0.0240}{1 + 10^{7.688 - pH}} + \frac{1.0356}{1 + 10^{pH - 7.688}} \right) \times MIN(6.663, 3.854 \times 10^{0.028 \times (20 - T)})$$

~~(a) When fish early life stages are likely present:~~

~~$$CCC = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) \times MIN(2.851, 45.10^{0.028 \times (25 - T)})$$~~

~~(3-31-22)~~

~~(b) When fish early life stages are likely absent:~~

~~$$CCC = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) \times 1.45.10^{0.028 \times (25 - T)}$$~~

~~(3-31-22)~~

(2) The highest four-day (4) average within the thirty-day (30) period should not exceed two point five (2.5) times the CCC. (3-31-22)

~~(3) Because the Department presumes that many waters in the state may have both spring spawning and fall spawning species of fish present, early life stages of fish may be present throughout much of the year. Accordingly, the Department will apply the CCC for when fish early life stages are present at all times of the year unless:~~ (3-31-22)

~~(a) Time frames during the year are identified when early life stages are unlikely to be present, and~~

~~(3-31-22)~~

~~(b) The Department is provided all readily available information supporting this finding such as the fish species distributions, spawning periods, nursery periods, and the duration of early life stages found in the water body; and~~ (3-31-22)

~~(c) The Department determines early life stages are likely absent.~~

~~(3-31-22)~~

Spokane River

275. SITE-SPECIFIC SURFACE WATER QUALITY CRITERIA.

~~283. — SPOKANE RIVER, SUBSECTION 110.12, HUC 17010305, UNITS P-3 AND P-4, SITE-SPECIFIC CRITERIA FOR AMMONIA:~~

~~The following criteria are to be met dependent upon the temperature, T (degrees C), and pH of the water body:~~

~~3-31-22)~~

~~01. — Acute Criterion (Criterion Maximum Concentration (CMC)). The one (1) hour average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equation:~~

$$\text{CMC} = \frac{0.275}{1 + 10^{-(7.25 - \text{pH})}} + \frac{39.0}{1 + 10^{-(\text{pH} - 7.25)}}$$

~~3-31-22)~~

~~02. — Chronic Criterion (Criterion Continuous Concentration (CCC)).~~
~~(3-31-22)~~

~~a. — The thirty (30) day average concentration of total ammonia nitrogen (in mg N/L) is not to exceed, more than once every three (3) years, the value calculated using the following equation:~~

$$\text{CCC} = \left(\frac{0.0577}{1 + 10^{-(7.25 - \text{pH})}} + \frac{2.487}{1 + 10^{-(\text{pH} - 7.25)}} \right) \cdot \text{M/N} (2.85, 1.45 \cdot 10^{0.028(25 - T)})$$

~~3-31-22)~~

~~b. — The highest four (4) day average within the thirty (30) day period should not exceed two and five tenths (2.5) times the CCC.~~
~~(3-31-22)~~



Discussion:

Western Pearlshell mussels in Lolo Creek near Weippe, ID



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Gunnar Hilborn
Gunnar.Hilborn@deq.Idaho.gov
Water Quality Standards Analyst