

REVISED ATTACHMENT H

Table 3-1. One-hour Average Objective for Ammonia-N for Freshwaters (mg N/L)

<u>pH</u>	<u>Waters Designated COLD and/or MIGR</u>	<u>Waters Not Designated COLD and/or MIGR</u>
<u>6.5</u>	<u>32.6</u>	<u>48.8</u>
<u>6.6</u>	<u>31.3</u>	<u>46.8</u>
<u>6.7</u>	<u>29.8</u>	<u>44.6</u>
<u>6.8</u>	<u>28.1</u>	<u>42.0</u>
<u>6.9</u>	<u>26.2</u>	<u>39.1</u>
<u>7.0</u>	<u>24.1</u>	<u>36.1</u>
<u>7.1</u>	<u>22.0</u>	<u>32.8</u>
<u>7.2</u>	<u>19.7</u>	<u>29.5</u>
<u>7.3</u>	<u>17.5</u>	<u>26.2</u>
<u>7.4</u>	<u>15.4</u>	<u>23.0</u>
<u>7.5</u>	<u>13.3</u>	<u>19.9</u>
<u>7.6</u>	<u>11.4</u>	<u>17.0</u>
<u>7.7</u>	<u>9.65</u>	<u>14.4</u>
<u>7.8</u>	<u>8.11</u>	<u>12.1</u>
<u>7.9</u>	<u>6.77</u>	<u>10.1</u>
<u>8.0</u>	<u>5.62</u>	<u>8.40</u>
<u>8.1</u>	<u>4.64</u>	<u>6.95</u>
<u>8.2</u>	<u>3.83</u>	<u>5.72</u>
<u>8.3</u>	<u>3.15</u>	<u>4.71</u>
<u>8.4</u>	<u>2.59</u>	<u>3.88</u>
<u>8.5</u>	<u>2.14</u>	<u>3.20</u>
<u>8.6</u>	<u>1.77</u>	<u>2.65</u>
<u>8.7</u>	<u>1.47</u>	<u>2.20</u>
<u>8.8</u>	<u>1.23</u>	<u>1.84</u>
<u>8.9</u>	<u>1.04</u>	<u>1.56</u>
<u>9.0</u>	<u>0.885</u>	<u>1.32</u>

Reference: U.S. EPA 1999 Update of Ambient Water Quality Criteria for Ammonia¹

¹ For freshwaters, the one-hour average concentration (Criteria Maximum Concentration or CMC) of total ammonia as nitrogen (in mg N/L) shall not exceed the values described by the following equations.

For waters designated COLD and/or MIGR:

$$\text{CMC or One-hour Average Concentration} = \frac{0.275}{1 + 10^{7.204 - \text{pH}}} + \frac{39.0}{1 + 10^{\text{pH} - 7.204}}$$

Or for waters not designated COLD and/or MIGR:

$$\text{CMC or One-hour Average Concentration} = \frac{0.411}{1 + 10^{7.204 - \text{pH}}} + \frac{58.4}{1 + 10^{\text{pH} - 7.204}}$$

Table 3-2. 30-day Average Objective for Ammonia-N for Freshwaters Designated SPWN (mg N/L)

Temperature, °C

pH	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6.5	6.67	6.46	6.06	5.68	5.33	4.99	4.68	4.39	4.12	3.86	3.62	3.39	3.18	2.98	2.80	2.62	2.46
6.6	6.57	6.36	5.97	5.59	5.25	4.92	4.61	4.32	4.05	3.80	3.56	3.34	3.13	2.94	2.75	2.58	2.42
6.7	6.44	6.25	5.86	5.49	5.15	4.83	4.52	4.24	3.98	3.73	3.50	3.28	3.07	2.88	2.70	2.53	2.37
6.8	6.29	6.10	5.72	5.36	5.03	4.72	4.42	4.14	3.89	3.64	3.42	3.20	3.00	2.82	2.64	2.47	2.32
6.9	6.12	5.93	5.56	5.21	4.89	4.58	4.30	4.03	3.78	3.54	3.32	3.11	2.92	2.74	2.57	2.41	2.25
7.0	5.91	5.73	5.37	5.04	4.72	4.43	4.15	3.89	3.65	3.42	3.21	3.01	2.82	2.64	2.48	2.32	2.18
7.1	5.67	5.49	5.15	4.83	4.53	4.25	3.98	3.73	3.50	3.28	3.08	2.88	2.70	2.53	2.38	2.23	2.09
7.2	5.39	5.22	4.90	4.59	4.31	4.04	3.78	3.55	3.33	3.12	2.92	2.74	2.57	2.41	2.26	2.12	1.99
7.3	5.08	4.92	4.61	4.33	4.06	3.80	3.57	3.34	3.13	2.94	2.76	2.58	2.42	2.27	2.13	2.00	1.87
7.4	4.73	4.59	4.30	4.03	3.78	3.55	3.32	3.12	2.92	2.74	2.57	2.41	2.26	2.12	1.98	1.86	1.74
7.5	4.36	4.23	3.97	3.72	3.49	3.27	3.06	2.87	2.69	2.53	2.37	2.22	2.08	1.95	1.83	1.72	1.61
7.6	3.98	3.85	3.61	3.39	3.18	2.98	2.79	2.62	2.45	2.30	2.16	2.02	1.90	1.78	1.67	1.56	1.47
7.7	3.58	3.47	3.25	3.05	2.86	2.68	2.51	2.36	2.21	2.07	1.94	1.82	1.71	1.60	1.50	1.41	1.32
7.8	3.18	3.09	2.89	2.71	2.54	2.38	2.23	2.10	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
7.9	2.80	2.71	2.54	2.38	2.24	2.10	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17	1.10	1.03
8.0	2.43	2.36	2.21	2.07	1.94	1.82	1.71	1.60	1.50	1.41	1.32	1.24	1.16	1.09	1.02	0.957	0.897
8.1	2.10	2.03	1.91	1.79	1.68	1.57	1.47	1.38	1.29	1.21	1.14	1.07	1.00	0.938	0.879	0.824	0.773
8.2	1.79	1.74	1.63	1.53	1.43	1.34	1.26	1.18	1.11	1.04	0.973	0.912	0.855	0.802	0.752	0.705	0.661
8.3	1.52	1.48	1.39	1.30	1.22	1.14	1.07	1.00	0.941	0.882	0.827	0.775	0.727	0.682	0.639	0.599	0.562
8.4	1.29	1.25	1.17	1.10	1.03	0.966	0.906	0.849	0.796	0.747	0.700	0.656	0.615	0.577	0.541	0.507	0.475
8.5	1.09	1.06	0.990	0.928	0.870	0.816	0.765	0.717	0.672	0.630	0.591	0.554	0.520	0.487	0.457	0.428	0.401
8.6	0.920	0.892	0.836	0.784	0.735	0.689	0.646	0.606	0.568	0.532	0.499	0.468	0.439	0.411	0.386	0.362	0.339
8.7	0.778	0.754	0.707	0.663	0.622	0.583	0.547	0.512	0.480	0.450	0.422	0.396	0.371	0.348	0.326	0.306	0.287
8.8	0.661	0.641	0.601	0.563	0.528	0.495	0.464	0.435	0.408	0.383	0.359	0.336	0.315	0.296	0.277	0.260	0.244
8.9	0.565	0.548	0.513	0.481	0.451	0.423	0.397	0.372	0.349	0.327	0.306	0.287	0.269	0.253	0.237	0.222	0.208
9.0	0.486	0.471	0.442	0.414	0.389	0.364	0.342	0.320	0.300	0.281	0.264	0.247	0.232	0.217	0.204	0.191	0.179

* At temperatures below 14 °C, the objective is the same as that shown for 14 °C.

Reference: U.S. EPA 1999 Update of Ambient Water Quality Criteria for Ammonia²

² For freshwaters designated SPWN, the thirty-day average concentration (Criteria Continuous Concentration or CCC) of total ammonia as nitrogen (in mg N/L) shall not exceed the values described by the following equation.

$$CCC \text{ or } 30\text{-day Average Concentration} = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * MIN \left(2.85, 1.45 * 10^{0.028 * (25 - T)} \right)$$

Where T = temperature expressed in °C.

In addition, for freshwaters, the highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.

Table 3-3. 30-day Average Objective for Ammonia-N for Freshwaters Not Designated SPWN (mg N/L)

pH	Temperature, °C									
	0-7	8	9	10	11	12	13	14	15*	
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	
8.9	0.917	0.86	0.806	0.756	0.709	0.664	0.623	0.584	0.548	
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	

* At 15 °C and above, the 30-day average objective for waters not designated SPWN is the same as that for waters designated SPWN.
Reference: U.S. EPA 1999 Update of Ambient Water Quality Criteria for Ammonia³

³ For freshwaters not designated SPWN, the thirty-day average concentration(Criteria Continuous Concentration or CCC) of total ammonia as nitrogen (in mg N/L) shall not exceed the values described by the following equation.

$$CCC \text{ or } 30\text{-day Average Concentration} = \left(\frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} \right) * 1.45 * 10^{0.028 * (25 - MAX(T, 7))}$$

Where T = temperature expressed in °C.

In addition, for freshwaters, the highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.