Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

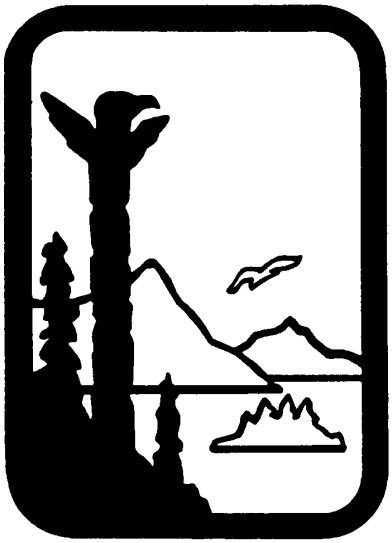
Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, May 15, 2003

Please note the following:

- The new aquatic life criteria for mercury and selenium will not be in effect for Clean Water Act (CWA) purposes until a decision is made by EPA about whether they can be approved. In the interim, the previously approved aquatic life criteria for mercury (2.4 ug/l acute and 0.012 ug/l chronic, both as total recoverable) and selenium (20 ug/l acute and 5 ug/l chronic, both as total recoverable) will remain the applicable CWA standards and will be retained in the CWA WQS docket until EPA acts on this revision (65 FR 24643).
- The secondary drinking water standards for fluoride (2.0 mg/l) and odor (3 threshold odor number) will remain in effect for CWA purposes.

STATE OF ALASKA

DEPARTMENT OF ENVIRONMENTAL CONSERVATION



ALASKA WATER QUALITY CRITERIA MANUAL FOR TOXIC AND OTHER DELETERIOUS ORGANIC AND INORGANIC SUBSTANCES

As amended through May 15, 2003

Frank Murkowski
Governor

Ernesta Ballard
Commissioner

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FORWARD

The following tables contain the water quality criteria adopted by the State of Alaska into the Water Quality Standards in 18 AAC 70.020(b). These criteria were taken from the EPA criteria documents cited in the references column and Alaska Drinking Water Regulations in 18 AAC 80. Although these EPA criteria documents are no longer adopted directly into state regulation, they contain valuable information on the science used to create the criteria limits and may affect how the criteria are applied or modified.

The water quality standards for radioactivity in 18 AAC 70.020(b)(7) and (19), and toxic and other deleterious organic and inorganic substances for fresh water uses for drinking, culinary, and food processing, and for contact recreation in 18 AAC 70.020(b)(11) must be based on criteria in Table I below:

TABLE I. DRINKING WATER PRIMARY MAXIMUM CONTAMINANT LEVELS

POLLUTANT[1]	CRITERIA (in mg/L unless shown otherwise)
Inorganic Chemical Contaminants	
1. Antimony	0.006
2. Arsenic	0.05
3. Asbestos	7 million fibers/liter (for fibers longer than 10 μm)
4. Barium	2
5. Beryllium	0.004
6. Cadmium	0.005
7. Chromium[2]	0.1
8. Cyanide (as free cyanide)	0.2
9. Fluoride	4.0
10. Mercury	0.002
11. Nickel	0.1
12. Nitrate (as nitrogen)	10
13. Nitrite (as nitrogen)	1
14. Total Nitrate and Nitrite (as nitrogen)	10
15. Selenium	0.05
16. Thallium	0.002
Organic Chemical Contaminants – Pesticides	
17. Alachlor	0.002
18. Atrazine	0.003
19. Carbofuran	0.04
20. Chlordane	0.002
21. Dalapon	0.2
22. Dibromochloropropane	0.0002
23. Dinoseb	0.007
24. Diquat	0.02
25. Endothall	0.1

[1] Criteria in this table were obtained from ADEC, *Alaska Drinking Water Regulations*, as amended through September 21, 2002, 18 AAC 80.300(b). The drinking water maximum contaminant levels are used as water quality criteria to protect the drinking water and contact recreation uses. The criteria for metals will be measured using the total method that is consistent with drinking water regulations measurement protocol.
[2] The drinking water maximum contaminant level for chromium is measured as total chromium

TABLE I. DRINKING WATER PRIMARY MAXIMUM CONTAMINANT LEVELS	
POLLUTANT[1]	**CRITERIA** (in mg/L unless shown otherwise)
Organic Chemical Contaminants – Pesticides – *cont.*	
26. Endrin	0.002
27. Ethylene dibromide	0.00005
28. Glyphosate	0.7
29. Heptachlor	0.0004
30. Heptachlor epoxide	0.0002
31. Lindane	0.0002
32. Methoxychlor	0.04
33. Oxamyl (vydate)	0.2
34. Pentachlorophenol	0.001
35. Picloram	0.5
36. Simazine	0.004
37. Toxaphene	0.003
38. 2,4-Dichlorophenoxy acetic acid (2,4-D)	0.07
39. (2,4,5-Trichlorophenoxy)-propionic acid (2,4,5-TP)	0.05
Volatile Organic Chemicals (VOCs)	
40. Benzene	0.005
41. Dichlorobenzene, o-	0.6
42. Dichlorobenzene, para-	0.075
43. Dichloroethane, 1,2-	0.005
44. Dichloroethylene, 1,1-	0.007
45. Dichloroethylene, cis-1,2-	0.07
46. Dichloroethylene, trans-1,2-	0.1
47. Dichloromethane	0.005
48. Dichloropropane, 1,2-	0.005
49. Carbon tetrachloride	0.005
50. Ethylbenzene	0.7
51. Monochlorobenzene	0.1
52. Styrene	0.1
53. Tetrachloroethylene	0.005
54. Toluene	1
55. Trichlorobenzene, 1,2,4-	0.07
56. Trichloroethane, 1,1,1-	0.2
57. Trichloroethane, 1,1,2-	0.005
58. Trichloroethylene	0.005
59. Vinyl chloride	0.002
60. Xylenes (total)	10

TABLE I. DRINKING WATER PRIMARY MAXIMUM CONTAMINANT LEVELS	
POLLUTANT[1]	**CRITERIA** (in mg/L unless shown otherwise)
Disinfection Byproducts	
61. Bromate	0.010
62. Chlorite	1.0
63. Halocetic Acids (five) (HAA5)	0.060
64. Total trihalomethanes (TTHMs)[3]	0.08
Other Organic Contaminants	
65. Benzo[a]pyrene	0.0002
66. Di(2-ethylhexyl)adipate	0.4
67. Di(2-ethylhexyl)phthalate	0.006
68. Dioxin (2,3,7,8-TCDD)	3×10^{-8}
69. Hexachlorobenzene	0.001
70. Hexachlorocyclopentadiene	0.05
71. Polychlorinated biphenyls (PCBs)	0.0005
Radioactive Contaminants (in picocuries/liter unless shown otherwise)	
72. Gross alpha[4]	15
73. Combined radium-226 and 228	5
74. Gross beta	4 millirems
75. Strontium-90	8
76. Tritium	20,000

[3] TTHMs are the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform), and trichloromethane (chloroform). The definition of TTHMs were obtained from ADEC, *Alaska Drinking Water Regulations,* as amended through September 21, 2002, in 18 AAC 80.1990(144).
[4] Including radium-226 but excluding activity from radon and uranium.

Water quality standards for toxic and other deleterious substances for fresh water use of water supply for agriculture in 18 AAC 70.020(b)(11) must be based on criteria in Table II below:

TABLE II. STOCKWATER AND IRRIGATION WATER CRITERIA

POLLUTANT	**STOCKWATER**[1] (mg/L)	**IRRIGATION WATER**[2] (for waters used continuously on all soil) (mg/L)
1. Aluminum	None	5.0
2. Arsenic	0.05	0.10
3. Beryllium	None	0.10
4. Boron	None	0.75
5. Cadmium	0.01	0.010
6. Chromium	0.05 (hexavalent)	0.10 (total)
7. Cobalt	None	0.050
8. Copper	None	0.20
9. Fluoride	None	1.0
10. Iron	None	5.0
11. Lead	0.05	5.0
12. Lithium	None	2.5
13. Manganese	None	0.20
14. Molybdenum	None	0.010
15. Nickel	None	0.20
16. Selenium	0.01	0.020
17. Vanadium	None	0.10
18. Zinc	None	2.0

[1] Criteria in this column were obtained from the *Report of the Committee on Water Quality Criteria*, (also known as the Green Book), 1968, Federal Water Pollution Control Administration, p. 135, Table IV-11.
[2] Criteria in this column were obtained from *Water Quality Criteria*, (also known as the Blue Book), 1972, National Academy of Sciences, National Academy of Engineering, Washington, D.C., p. 339, Table V-13.

Water quality standards for toxic and other deleterious substances for fresh water uses of aquaculture and growth and propagation of fish, shellfish, other aquatic life, and wildlife in 18 AAC 70.020(b)(11) must be based on criteria in Table III below:

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
1. Aldrin 309002	3.0 (24-hour maximum)[1]	None	• EPA, 1980, *Ambient Water Quality Criteria For Aldrin/Dieldrin*, EPA 440/5-80-019 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
2. Alkalinity[3]	None	20,000 (minimum) *as $CaCO_3$* except where natural conditions are less.	• EPA, 1976, *Red Book*, EPA 440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
3. Alpha-endosulfan[4] 959988	0.22 (24-hour maximum)[1]	0.056 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Endosulfan*, EPA 440/5-80-046 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[1] The acute criterion is to be met instantaneously at any point in the surface water.
[2] The National Toxics Rule (NTR) published on December 22, 1992 promulgated chemical-specific criteria for priority toxic pollutants to bring states into compliance with Section 303(c)(2)(B) of the Clean Water Act.
[3] Alkalinity is the sum total of components in the water that tend to elevate the pH of the water above about 4.5. It is measured by titration with standardized acid to a pH value of about 4.5 and it is expressed commonly as milligrams per liter of $CaCO_3$. Alkalinity is a measure of the buffering capacity of the water, and since pH has a direct effect on organisms as well as an indirect effect on the toxicity of some pollutants in the water, it is important to water quality.
[4] These criteria were derived from data for endosulfan and are most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
[5] The 24-hour average is to be applied as an average concentration and not as a criterion to be met instantaneously at any point in the surface water.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
4. Aluminum 7429905 pH 6.5-9.0	750 (one-hour average)[6] *total recoverable*	87 (four-day average)[7] *total recoverable*	• EPA, 1988, *Ambient Water Quality Criteria For Aluminum – 1988*, EPA 440/5-86-008 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
5. Ammonia 7664417 (As total ammonia nitrogen in mg N/L)	Where salmonids are present the pH dependent criterion is[8] $0.275 \div (1 + 10^{7.204 - pH}) + 39.0 \div (1 + 10^{pH - 7.204})$ (one-hour average)[6]	When early life stages of fish are present the criterion is[9] $[0.0577 \div (1 + 10^{7.688 - pH}) + 2.487 \div (1 + 10^{pH - 7.688})]$ x MIN(2.85, $1.45 \times 10^{0.028 (25-T)}$) (thirty-day average)[10]	• EPA, 1999, *1999 Update of Ambient Water Quality Criteria For Ammonia,* EPA 822-R-99-014 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
	When salmonids are not present the pH dependent criterion is[8] $0.411 \div (1 + 10^{7.204 - pH}) + 58.4 \div (1 + 10^{pH - 7.204})$ (one-hour average)[6]	When early life stages of fish are absent the criterion is[11] $[0.0577 \div (1 + 10^{7.688 - pH}) + 2.487 \div (1 + 10^{pH - 7.688})]$ x $1.45 \times 10^{0.028 (25-MAX (T, 7))}$ (thirty-day average)[10]	

[6] Acute criteria are based on the average concentration of chemical pollutants during a one-hour period. One hour was chosen because it is a substantially shorter period than the length of most acute toxicity tests. Acute and chronic criteria are used together to develop water quality-based effluent limits.
[7] Chronic criteria are based on the average concentration of chemical pollutants during a four-day period. A four-day averaging period was chosen because it is substantially shorter than most chronic toxicity tests. Chronic criteria are typically stricter than the acute criteria and are therefore used to protect ambient waters.
[8] For acute criteria see Table VI for the values calculated with salmonids both present and absent.
[9] For chronic criteria see Table VII-A for the values calculated when the early life stages of fish are present.
[10] The highest four-day average within the 30-day period should not exceed 2.5 times the chronic criterion.
[11] For chronic criteria see Table VII-B for the values calculated when the early life stages of fish are absent.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
6. Arsenic 7440382	340 (one-hour average)[6] *dissolved*[12]	150 (four-day average)[7] *dissolved*[13]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
7. Beta-endosulfan[4] 33213659	0.22 (24-hour maximum)[1]	0.056 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Endosulfan*, EPA 440/5-80-046 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
8. Cadmium 7440439 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only. (Continued on next page.)	The criterion is hardness [14] dependent. The criterion formula[15] is $e^{1.0166(\ln \text{hardness}) - 3.924}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent. The criterion formula[16]is $e^{0.7409(\ln \text{hardness}) - 4.719}$ (four-day average)[7] *total recoverable*	• EPA, 2001, *2001 Update of Ambient Water Quality Criteria for Cadmium*, EPA 822-R-01-001

[12] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (339.8)(1.0) = 339.8 ~ 340

[13] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (147.9)(1.0) = 147.9 ~ 150

[14] For waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water. The maximum hardness value shall not exceed 400 mg/l even if the actual ambient hardness is greater than 400 mg/l as calcium carbonate.

[15] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 0.52 to 8.7 µg/l.

[16] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 0.10 to 0.76 µg/l.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
8. Cadmium-cont.	The conversion factor is hardness[14] dependent. For cadmium and lead, water hardness mediates the conversion factor. The conversion factor formula[17] is 1.136672 – [(ln hardness)(0.041838)] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor.[18] (one-hour average)[6] *dissolved*	The conversion factor is hardness[14] dependent. For cadmium and lead, water hardness mediates the conversion factor. The conversion factor formula[19] is 1.101672 – [(ln hardness)(0.041838)] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor.[20] (four-day average)[7] *dissolved*	
9. Chlordane 57749	2.4 (24-hour maximum)[1]	0.0043 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Chlordane*, EPA 440/5-80-027 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
10. Chloride 16887006	860 mg/l (one-hour average)[6] Applies to dissolved chloride when associated with sodium.[21]	230 mg/l (four-day average)[7] Applies to dissolved chloride when associated with sodium.[21]	• EPA, 1988, *Ambient Water Quality Criteria For Chloride-1988*, EPA 440/5-88-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[17] For the hardness range of 25-400 mg/l $CaCO_3$, the conversion factor range is 1.0 to 0.89 µg/l.
[18] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 0.52 to 7.7 µg/l.
[19] For the hardness range of 25-400 mg/l $CaCO_3$, the conversion factor range is 0.97 to 0.85 µg/l.
[20] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 0.094 to 0.64 µg/l.
[21] This criterion may not be adequately protective when the chloride is associated with potassium, calcium, or magnesium. Also, because freshwater animals have a narrow range of acute susceptibilities to chloride, excursions above this criterion might affect a substantial number of species.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
11. Chlorine (total residual) 7782505	19 (one-hour average)[6]	11 (four-day average)[7]	• EPA, 1985, *Ambient Water Quality Criteria For Chlorine-1984*, EPA 440/5-84-030 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
12. Chloropyrifos 2921882	0.083 (one-hour average)[6]	0.041 (four-day average)[7]	• EPA, 1986, *Ambient Water Quality Criteria For Chloropyrifos-1986*, EPA 440/5-86-005 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
13. Chromium III 16065831 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent. The criterion formula[22] is $e^{0.819(\ln \text{hardness}) + 3.7256}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent. The criterion formula[23] is $e^{0.819(\ln \text{hardness}) + 0.6848}$ (four-day average)[7] *total recoverable*	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.316[24] (one-hour average)[6] *dissolved*	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.860[25] (four-day average)[7] *dissolved*	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[22] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 580 to 5600 µg/l.
[23] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 28 to 270 µg/l.
[24] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 180 to 1800 µg/l.
[25] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 24 to 230 µg/l.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
14. Chromium VI 18540299	16 (one-hour average)[6] dissolved[26]	11 (four-day average)[7] dissolved[27]	• EPA, 1985, *Ambient Water Quality Criteria For Chromium-84*, EPA 440/5-84-029. • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
15. Copper[28] 7440508 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent. The criterion formula[29] is $e^{0.9422(\ln \text{hardness}) - 1.700}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent. The criterion formula[30] is $e^{0.8545(\ln \text{hardness}) - 1.702}$ (four-day average)[7] *total recoverable*	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.960[31] (one-hour average)[6] *dissolved*	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.960[32] (four-day average)[7] *dissolved*	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[26] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (16.02)(0.982) = 15.73 ~ 16
[27] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (10.98)(0.962) = 10.56 ~ 11
[28] When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of site-specific criteria might be appropriate.
[29] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 3.8 to 52 µg/l.
[30] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 2.9 to 30 µg/l.
[31] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 3.6 to 50 µg/l.
[32] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 2.7 to 29 µg/l.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
16. Cyanide 57125	22 (one-hour average)[6] *free cyanide*[33]	5.2 (four-day average)[7] *free cyanide*[32]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
17. DDT, 4,4'- 50293	1.1 (24-hour maximum)[1]	0.001 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For DDT*, EPA 440/5-80-038 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
18. Demeton 8065483	None	0.1	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
19. Dieldrin[34] 60571	0.24 (one-hour average)[6]	0.056 (four-day average)[7]	•EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
20. Endrin[34] 72208	0.086 (one-hour average)[6]	0.036 (four-day average)[7]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[33] The aquatic life criteria for free cyanide shall be measured as weak acid dissociable (WAD) cyanide or equivalent approved EPA methods.
[34] The derivation of the chronic criterion for endrin and dieldrin did not consider exposure through the diet, which is probably important for aquatic life occupying upper trophic levels.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
21. Gamma-bhc 58899 (also called lindane)	0.95 (one-hour average)[6]	None	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
22. Guthion 86500	None	0.01	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
23. Heptachlor 76448	0.52 (24-hour maximum)[1]	0.0038 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Heptachlor*, EPA 440/5-80-052 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
24. Heptachlor epoxide[35] 1024573	0.52 (24-hour maximum)[1]	0.0038 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Heptachlor*, EPA 440/5-80-052 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[35] These criteria were derived from data for heptachlor, and the 1980 criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
25. Iron 7439896	None	1000	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
26. Lead 7439921 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent.[36] The criterion formula is $e^{1.273(\ln \text{hardness}) - 1.460}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent.[37] The criterion formula is $e^{1.273(\ln \text{hardness}) - 4.705}$ (four-day average)[7] *total recoverable*	• EPA, 1985, *Ambient Water Quality Criteria For Lead-1984*, EPA 440/5-84-027 • National Toxics Rule[2], 57 FR 60848
	The conversion factor is hardness[14] dependent. For cadmium and lead, water hardness mediates the conversion factor. The conversion factor formula[38] is 1.46203 - [(ln hardness)(0.145712)] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor[39] (one-hour average)[6] *dissolved*	The conversion factor is hardness[14] dependent. For cadmium and lead, water hardness mediates the conversion factor. The conversion factor formula[40] is 1.46203 - [(ln hardness)(0.145712)] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor[41] (four-day average)[7] *dissolved*	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[36] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 14 to 480 µg/l.
[37] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 0.54 to 19 µg/l.
[38] For the hardness range of 25-400 mg/l $CaCO_3$, the conversion factor range is 0.99 to 0.59
[39] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 14 to 280 µg/l.
[40] For the hardness range of 25-400 mg/l $CaCO_3$, the conversion factor range is 0.99 to 0.59
[41] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 0.54 to 11 µg/l.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
27. Malathion 121755	None	0.1	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
28. Mercury[42] 7439976	1.4 (one-hour average)[6] *dissolved* [43]	0.77 (four-day average)[7] *dissolved* [44]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
29. Methoxychlor 72435	None	0.03	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
30. Mirex 2385855	None	0.001	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[42] The recommended criteria were derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, the criteria will probably be underprotective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, these criteria do not account for uptake via the food chain because sufficient data were not available when the criteria were derived.

[43] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (1.694)(0.85) = 1.4399 ~ 1.4.

[44] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (0.9081)(0.85) = 0.771 ~ 0.77. The concentration of 0.9081 µg/l mighty not adequately protect rainbow trout, coho salmon and bluegill.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
31. Nickel 7440020 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent. The criterion formula[45] is $e^{0.846(\ln \text{hardness}) + 2.255}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent. The criterion formula[46] is $e^{0.846(\ln \text{hardness}) + 0.0584}$ (four-day average)[7] *total recoverable*	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.998[47] (one-hour average)[6] *dissolved*	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.997[48] (four-day average)[7] *dissolved*	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
32. Parathion 56382	0.065 (one-hour average)[6]	0.013 (four-day average)[7]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
33. Pentachlorophenol 87865	The criterion is pH dependent. The criterion formula[49] is $e^{1.005(\text{pH}) - 4.869}$ (one-hour average)[6]	The criterion is pH dependent. The criterion formula[50] is $e^{1.005(\text{pH}) - 5.134}$ (four-day average)[7]	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[45] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 150 to 1500 µg/l.
[46] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 16 to 170 µg/l.
[47] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 140 to 1500 µg/l.
[48] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 16 to 170 µg/l.
[49] For example, at a pH of 7.8 the criterion is 19.
[50] For example, at a pH of 7.8 the criterion is 15.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
34. Polychlorinated biphenyls[51]	None	0.014 (24-hour average)[5]	• EPA, 1980, *Ambient Water Quality Criteria For Polychlorinated Biphenyls*, EPA 440/5-80-068 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
35. Selenium 7782492 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	1/[(f1/acute1) + (f2/acute2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively, and acute1 and acute2 are 185.9 µg/l and 12.83 µg/l respectively. (one-hour average)[6] *total recoverable*	5.0 (four-day average)[7] *total recoverable*	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water*, EPA-820-B-96-001
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.922. (one-hour average)[6] *dissolved*	4.6 (four-day average)[7] *dissolved*[52]	• EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[51] PCBs are a class of chemicals that include aroclors, 1242, 1254, 1221, 1232, 1248, 1260, and 1016. The aquatic life criteria apply to this set of PCBs.
[52] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (5.0)(0.922) = 4.61 ~ 4.6

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
36. Silver 7440224 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent. The criterion formula[53] is $e^{1.72\,(\ln \text{hardness}) - 6.52}$ (24-hour maximum)[1] *total recoverable*	None	• EPA, 1980, *Ambient Water Quality Criteria For Silver*, EPA 440/5-80-071 • National Toxics Rule[2], 57 FR 60848
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.85[54] (one-hour average)[6] *dissolved*	None	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
37. Sulfide/Hydrogen Sulfide 7783064	None	2.0 *undissociated hydogen sulfide*	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
38. Toxaphene 8001352	0.73 (one-hour average)[6]	0.0002 (four-day average)[7]	• EPA, 1986, *Ambient Water Quality Criteria For Toxaphene-1986*, EPA 440/5-86-006 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[53] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 0.37 to 44 µg/l.
[54] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 0.32 to 37 µg/l.

TABLE III. AQUATIC LIFE CRITERIA FOR FRESH WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE FRESH WATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE FRESH WATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
39. Tributyltin (TBT)	0.46 (one-hour average)[6]	0.063 (four-day average)[7]	• EPA, 1997, *Ambient Aquatic Life Water Quality, Tributyltin—Draft,*EPA-822-D-97-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
40. Zinc 7440666 The criteria are in the dissolved form. Total recoverable criteria are shown for calculation purposes only.	The criterion is hardness[14] dependent. The criterion formula[55] is $e^{0.8473(\ln \text{hardness}) + 0.884}$ (one-hour average)[6] *total recoverable*	The criterion is hardness[14] dependent. The criterion formula[56] is $e^{0.8473(\ln \text{hardness}) + 0.884}$ (four-day average)[7] *total recoverable*	• EPA, 1996, *1995 Updates: Water Quality Criteria Documents For The Protection Of Aquatic Life In Ambient Water,* EPA-820-B-96-001
	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.978[57] (one-hour average)[6] *dissolved*	To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor, 0.986[58] (four-day average)[7] *dissolved*	• Interim Final Rule, 60 FR 22229 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[55] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 37 to 390 µg/l.
[56] For the hardness range of 25-400 mg/l $CaCO_3$, the total recoverable criteria range from 37 to 390 µg/l.
[57] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 36 to 380 µg/l.
[58] For the hardness range of 25-400 mg/l $CaCO_3$, the dissolved criteria range from 36 to 380 µg/l.

Water quality standards for toxic and other deleterious substances for marine water uses of aquaculture, seafood processing, and growth and propagation of fish, shellfish, other aquatic life, and wildlife in 18 AAC 70.020(b)(23) must be based on criteria in Table IV below:

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS

POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
1. Aldrin 309002	1.3 (24-hour maximum)[1]	None	• EPA, 1980, *Ambient Water Quality Criteria For Aldrin/Dieldrin*, EPA 440/5-80-019 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
2. Alpha-endosulfan[3] 959988	0.034 (24-hour maximum)[1]	0.0087 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For Endosulfan*, EPA 440/5-80-046 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
3. Ammonia 7664417 (Continued on next page.)	0.233 mg/L[5] *un-ionized ammonia* (one-hour average)[6]	0.035 mg/L[5] *un-ionized ammonia* (four-day average)[8]	• EPA, 1989, *Ambient Water Quality Criteria For Ammonia (Saltwater)-1989*, EPA 440/5-88-004 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[1] The acute criterion is to be met instantaneously at any point in the surface water.
[2] The National Toxics Rule (NTR) was published December 22, 1992 (57 FR 60848) and promulgated chemical-specific criteria for priority toxic pollutants to bring states into compliance with Section 303(c)(2)(B) of the Clean Water Act.
[3] These criteria were derived from data for endosulfan and are most appropriately applied to the sum of alpha-endosulfan and beta-endosulfan.
[4] The 24-hour average is to be applied as an average concentration and not as a criterion to be met instantaneously at any point in the surface water.
[5] Because sensitive saltwater animals appear to have a narrow range of acute susceptibilities to ammonia, this criterion will probably be as protective as intended only when the magnitudes and/or durations of excursions are appropriately small.

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
3. Ammonia – cont.	Criteria concentrations based on total ammonia for the pH range of 7.0 to 9.0, temperature range of 0 to 35°C, salinities of 10, 20 and 30 g/kg are shown in Table VIII. *total ammonia*	Criteria concentrations based on total ammonia for the pH range of 7.0 to 9.0, temperature range of 0 to 35°C, salinities of 10, 20 and 30 g/kg are shown in Table IX. *total ammonia*	
4. Arsenic 7440382	69 (one-hour average)[6] *dissolved*[7]	36 (four-day average)[8] *dissolved*[9]	• EPA, 1985, *Ambient Water Quality Criteria For Arsenic-1984*, EPA 440/5-84-033 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
5. Beta-endosulfan[3] 33213659	0.034 (24-hour maximum)[1]	0.0087 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For Endosulfan*, EPA 440/5-80-046 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[6] Acute criteria are based on the average concentration of chemical pollutants during a one-hour period. One hour was chosen because it is a substantially shorter period than the length of most acute toxicity tests. Acute and chronic criteria are used together to develop water quality-based effluent limits.
[7] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (68.55)(1.0) = 68.55 ~ 69
[8] Chronic criteria are based on the average concentration of chemical pollutants during a four-day period. A four-day averaging period was chosen because it is substantially shorter than most chronic toxicity tests. Chronic criteria are typically stricter than the acute criteria and are therefore used to protect ambient waters.
[9] To calculate the dissolved criterion, the total recoverable criterion was multiplied by the conversion factor (36.05)(1.0) = 36.05 ~ 36

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
6. Cadmium[10] 7440439	40 (24-hour average)[4] *dissolved*[11]	8.8 (four-day average)[8] *dissolved*[12]	• EPA, 2001, *2001 Update of Ambient Water Quality Criteria for Cadmium*, EPA 822-R-01-001
7. Chlordane 57749	0.09 (24-hour maximum)[1]	0.004 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For Chlordane*, EPA 440/5-80-027 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
8. Chlorine 7782505	13 (one-hour average)[6]	7.5 (four-day average)[8]	• EPA, 1985, *Ambient Water Quality Criteria For Chlorine-1984*, EPA 440/5-84-030 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
9. Chloropyrifos 2921882	0.011 (one-hour average)[6]	0.0056 (four-day average)[8]	• EPA, 1986, *Ambient Water Quality Criteria For Chlorpyrifos-1986*, EPA 440/5-86-005 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[10] The limited data suggest that the acute toxicity of cadmium is salinity-dependent; therefore the 24-hour average concentration might be underprotective at low salinities and overprotective at high salinities.
[11] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (40.28)(0.994) = 40.04 ~ 40
[12] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (8.846)(0.994) = 8.793 ~ 8.8

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
10. Chromium VI[13] 18540299	1100 (one-hour average)[6] *dissolved*[14]	50 (four-day average)[8] *dissolved*[15]	• EPA, 1985, *Ambient Water Quality Criteria For Chromium-84*, EPA 440/5-84-029 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
11. Copper[16] 7440508	4.8 (24-hour average)[4] *dissolved*[17]	3.1 (four-day average)[8] *dissolved*[17]	• Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
12. Cyanide 57125	1.0 (one-hour average)[6] *free cyanide*[18]	1.0 (four-day average)[8] *free cyanide*[15]	• EPA, *1985, Ambient Water Quality Criteria For Cyanide-*84, EPA 440/5-84-028 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[13] Data suggest that the acute toxicity of chromium VI is salinity-dependent; therefore the one-hour average concentration might be under protective at low salinities.
[14] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (1079)(0.993) = 1071.45 ~ 1100
[15] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (49.86)(0.993) = 49.51 ~ 50
[16] When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate.
[17] Conversion factors for saltwater chronic criterion are not currently available. The conversion factor of 0.83 derived for the saltwater acute criterion has been used for both saltwater acute and chronic criteria.
[18] The aquatic life criteria for free cyanide shall be measured as weak acid dissociable (WAD) cyanide or equivalent approved EPA methods.

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
13. DDT, 4,4'- 50293	0.13 (24-hour maximum)[1]	0.001 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For DDT*, EPA 440/5-80-038 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
14. Demeton 8065483	None	0.1	• EPA, *1976, Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
15. Dieldrin 60571	0.71 (24-hour maximum)[1]	0.0019 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For Aldrin/Dieldrin*, EPA 440/5-80-019 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
16. Endrin 72208	0.037 (24-hour maximum)[1]	0.0023 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria for Endrin*, EPA 440/5-80-047 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
17. Gamma-bhc (also called lindane) 58899	0.16 (24-hour maximum)[1]	None	• EPA, 1980, *Ambient Water Quality Criteria For Hexachlorocyclo-hexane*, EPA 440/5-80-054 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
18. Guthion 86500	None	0.01	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
19. Heptachlor 76448	0.053 (24-hour maximum)[1]	0.0036 (24-hour average)[4]	• EPA, 1980, *Ambient Water Quality Criteria For Heptachlor*, EPA 440/5-80-052 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
20. Heptachlor epoxide[19] 1024573	0.053 (24-hour maximum)[1]	0.0036 (24-hour average)[4]	• National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[19] These criteria were derived from data for heptachlor and the 1980 criteria document provides insufficient data to estimate the relative toxicities of heptachlor and heptachlor epoxide.

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
21. Lead 7439921	210 (one-hour average)[6] *dissolved*[20]	8.1 (four-day average)[8] *dissolved*[21]	• EPA, 1985, *Ambient Water Quality Criteria For Lead-1984*, EPA 440/5-84-027 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
22. Malathion 121755	None	0.1	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
23. Mercury[22] 7439976	1.8 (one-hour average)[6] *dissolved*[23]	0.94 (four-day average)[8] *dissolved*[24]	• EPA, 1985, *Ambient Water Quality Criteria For Mercury-1984*, EPA 440/5-84-026 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[20] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (217.16)(0.951) = 206.519 ~ 210

[21] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (8.468)(0.951) = 8.053 ~ 8.1

[22] The recommended criteria were derived from data for inorganic mercury (II), but is applied here to total mercury. If a substantial portion of the mercury in the water column is methylmercury, the criteria will probably be underprotective. In addition, even though inorganic mercury is converted to methylmercury and methylmercury bioaccumulates to a great extent, these criteria do not account for uptake via the food chain because sufficient data were not available when the criteria were derived.

[23] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (2.062)(0.85) = 1.752 ~ 1.8

[24] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (1.106)(0.85) = 0.9401 ~ 0.94

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
24. Methoxychlor 72435	None	0.03	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
25. Mirex 2385855	None	0.001	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
26. Nickel 7440020	74 (one-hour average)[6] *dissolved*[25]	8.2 (four-day average)[8] *dissolved*[26]	• EPA, 1986, *Ambient Water Quality Criteria For Nickel*, EPA 440/5-86-004 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
27. Pentachlorophenol 87865	13 (one-hour average)[6]	7.9 (four-day average)[8]	• EPA, 1986, *Ambient Water Quality Criteria For Pentachlorophenol-1986*, EPA 440/5-86-009 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[25] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (74.60)(0.990) = 73.854 ~ 74

[26] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (8.293)(0.990) = 8.21 ~ 8.2

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
28. Phosphorous 7723140	None	0.1 *yellow, elemental phoshporus*	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
29. Polychlorinated biphenyls PCB-1016 PCB-1221 PCB-1232 PCB-1242 PCB-1248 PCB-1254 PCB-1260	None	0.03 (24-hour average)[4]	• EPA, *1980, Ambient Water Quality Criteria For Polychlorinated Biphenyls*, EPA 440/5-80-068 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
30. Selenium[27] 7782492	290 (one-hour average)[6] *dissolved*[28]	71 (four-day average)[8] *dissolved*[29]	• EPA, 1987, *Ambient Water Quality Criteria For Selenium-1987*, EPA 440/5-87-008 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[27] If selenium is as toxic to saltwater fishes in the field as it is to freshwater fishes in the field, the status of the fish community should be monitored whenever the concentration of selenium exceeds 5 ug/l in saltwater (EPA, 1987, *Ambient Water Quality Criteria For Selenium-1987*, EPA 440/5-87-008, p. 35)
[28] To calculate the acute dissolved criterion, multiply the total recoverable criterion by the conversion factor (293.8)(0.998) = 293.21 ~ 290.
[29] To calculate the chronic dissolved criterion, multiply the total recoverable criterion by the conversion factor (71.14)(0.998) = 70.99 ~ 71.

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
31. Silver 7440224	1.9 (one-hour average)[6] *dissolved*[30]	None	• EPA, 1980, *Ambient Water Quality Criteria For Silver*, EPA 440/5-80-071 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
32. Sulfide/Hydrogen Sulfide 7783064	None	2.0 *undissociated hydrogen sulfide*	• EPA, 1976, *Quality Criteria For Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
33. Toxaphene 8001352	0.21 (one-hour average)[6]	0.0002 (four-day average)[8]	• EPA, 1986, *Ambient Water Quality Criteria For Toxaphene-1986*, EPA 440/5-86-006 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001
34. Tributyltin (TBT)	0.37 (one-hour average)[6]	0.010 (four-day average)[8]	• EPA, 1997, *Ambient Aquatic Life Water Quality Criteria, Tributyltin—Draft,* EPA-822-D-97-001 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[30] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (2.3)(0.85) = 1.955 ~ 1.9

TABLE IV. AQUATIC LIFE CRITERIA FOR MARINE WATERS			
POLLUTANT Calculated criteria are rounded to two significant figures. CAS number is shown under each pollutant when one is available.	**AQUATIC LIFE SALTWATER ACUTE** (in µg/L unless shown otherwise)	**AQUATIC LIFE SALTWATER CHRONIC** (in µg/L unless shown otherwise)	**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
35. Zinc 7440666	90 (one-hour average)[6] *dissolved*[31]	81 (four-day average)[8] *dissolved*[32]	• EPA, 1987, *Ambient Water Quality Criteria For Zinc-1987*, EPA 440/5-87-003 • National Toxics Rule[2], 57 FR 60848 • Interim Final Rule, 60 FR 22231 • EPA, 1999, *National Recommended Water Quality Criteria-Correction,* EPA 822-Z-99-001

[31] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (95.10)(0.946) = 89.96 ~ 90

[32] To calculate the dissolved criterion, multiply the total recoverable criterion by the conversion factor (86.14)(0.946) = 81.49 ~ 81

Water quality standards for toxic and other deleterious substances for fresh water uses of drinking, culinary, and food processing, and growth and propagation of fish, shellfish, other aquatic life, and wildlife in 18 AAC 70.020(b)(11); and marine water uses of aquaculture, growth and propagation of fish, shellfish, other aquatic life, and wildlife in 18 AAC 70.020(b)(23) must be based on criteria in Table V below:

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS

POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
1. Acenaphthene 83329	1,200[1]	2,700[1]	• EPA, 1980, *Ambient Water Quality Criteria for Acenaphthene*, EPA 440/5-80-015 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
2. Acrolein 107028	320	780	• EPA, 1980, *Ambient Water Quality Criteria for Acrolein,* EPA 440/5-80-015 • National Toxics Rule[2], 57 FR 60848 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
3. Alpha-endosulfan 959988	110[1]	240[1]	• EPA, 1980, *Ambient Water Quality Criteria for Endosulfan*, EPA 440/5-80-046 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[1] This criterion has been revised to reflect the Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of April 8, 1998. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

[2] The National Toxics Rule (NTR) was published December 22, 1992 and promulgated chemical-specific criteria for priority toxic pollutants to bring states into compliance with Section 303(c)(2)(B) of the Clean Water Act.

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS			
POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
4. Anthracene 120127	9,600[1]	110,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons*, EPA 440/5-80-069 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
5. Antimony 7440360	14[1]	4300[1]	• EPA, 1980, *Ambient Water Quality Criteria for Antimony*, EPA 440/5-80-020 • National Toxics Rule[2], 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
6. Beta-endosulfan 33213659	110[1]	240[1]	• EPA, 1980, *Ambient Water Quality Criteria for Endosulfan*, EPA 440/5-80-046 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
7. Bis(2-chloroisopropyl) ether 39638329	1,400[1]	170,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Chloroalkyl Ethers*, EPA 440/5-80-030 • National Toxics Rule[2] 57 FR 60848 • 1997 Proposed California Toxics Rule, 62 FR 42160 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS			
POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
8. Bis-chloromethyl ether 542881	0.00013[1]	0.00078[1]	• EPA, 1980, *Ambient Water Quality Criteria for Chloroalkyl Ethers*, EPA 440/5-80-030 • Integrated Risk Information System, 01/01/91 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
9. Butylbenzyl phthalate[3] 85687	3,000[1]	5,200[1]	• EPA, 1980, *Ambient Water Quality Criteria for Phthalate Esters*, EPA 440/5-80-067 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
10. Chlorobenzene 108907	680[1]	21,000[1,4]	• EPA, 1980, *Ambient Water Quality Criteria for Chlorinated Benzenes*, EPA 440/5-80-028 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[3] Although EPA has not published a final criteria document for this compound it is EPA's understanding that sufficient data exist to allow calculation of aquatic criteria.

[4] No criterion for protection of human health from consumption of aquatic organisms excluding water was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, sufficient information was presented in the 1980 document to allow the calculation of a criterion, even though the results of such a calculation were not shown in the document.

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS

POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
11. Chloronaphthalene, 2- 91587	1700[1]	4,300[1]	• EPA, 1980, *Ambient Water Quality Criteria for Chlorinated Naphthalene*, EPA 440/5-80-031 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
12. Chlorophenol, 2- 95578	120[1]	400[1]	• EPA, 1980, *Ambient Water Quality Criteria for 2-Dichlorophenol*, EPA 440/5-80-034 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
13. Copper 7440508	1300	None	• 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
14. Cyanide 57125	700[1]	220,000[1, 4]	• EPA, 1980, *Ambient Water Quality Criteria for Cyanide*, EPA 440/5-80-037 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
15. Dichlorobenzene, 1,2- 95501	2,700[1]	17,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Dichlorobenzenes*, EPA 440/5-80-039 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS			
POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
16. Dichlorobenzene, 1,3- 541731	400	2,600	• 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
17. Dichlorobenzene, 1,4- 106467	400	2,600	• 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
18. Dichlorophenol, 2,4- 120832	93[1]	790[1]	• EPA, 1980, *Ambient Water Quality Criteria for 2,4-Dichlorophenol*, EPA 440/5-80-042 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
19. Dichloropropene, 1,3- 542756	10[1]	1,700[1]	• EPA, 1980, *Ambient Water Quality Criteria for 1,2-Dichloropropane and 1,3-Dichloropropene*, EPA 440/5-80-043 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

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POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
20. Diethyl phthalate[3] 84662	23,000[1]	120,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Phthalate Esters*, EPA 440/5-80-067 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
21. Dimethylphenol, 2,4- 105679	540[1]	2,300[1]	• EPA, 1980, *Ambient Water Quality Criteria for 2,4-Dimethylphenol*, EPA 440/5-80-044 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
22. Dimethyl phthalate[3] 131113	313,000	2,900,000	• EPA, 1980, *Ambient Water Quality Criteria for Phthalate Esters*, EPA 440/5-80-067 • National Toxics Rule[2] 57 FR 60848 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
23. Di-n-butyl phthalate[3] 84742	2,700[1]	12,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Phthalate Esters*, EPA 440/5-80-067 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

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POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
24. Dinitrophenol, 2,4- 51285	70[1]	14,000[1]	• EPA, 1980, *Ambient Water Quality Criteria for Nitrophenols*, EPA 440/5-80-063 • National Toxics Rule[2] 57 FR 60848 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
25. Endosulfan sulfate 1031078	110[1]	240[1]	• EPA, 1980, *Ambient Water Quality Criteria for Endosulfan*, EPA 440/5-80-046 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
26. Endrin 72208	0.76[1]	0.81[1,4]	• EPA, 1980, *Ambient Water Quality Criteria for Endrin*, EPA 440/5-80-047 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
27. Endrin aldehyde 7421934	0.76[1]	0.81[1, 4]	• EPA, 1980, *Ambient Water Quality Criteria for Endrin*, EPA 440/5-80-047 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
28. Ethylbenzene 100414	3,100[1]	29,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Ethylbenzene, EPA 440/5-80-048 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

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	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
29. Fluoranthene 206440	300[1]	370[1]	• EPA, 1980, Ambient Water Quality Criteria for Fluoranthene, EPA 440/5-80-049 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
30. Fluorene 86737	1,300[1]	14,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons, EPA 440/5-80-069 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
31. Hexachlorocyclopentadiene 77474	240[1]	17,000[1,4]	• EPA, 1980, Ambient Water Quality Criteria for Hexachloropentadiene, EPA 440/5-80-055 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

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POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
32. Manganese 7439965	50[5]	100[5]	• EPA, 1976, *Quality Criteria for Water* (also called the *Red Book*) EPA-440/9-76-023 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
33. Mercury 7439976	0.050[1]	0.051[1]	• EPA, 1980, *Ambient Water Quality Criteria for Mercury*, EPA 440/5-80-058 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
34. Methyl bromide 74839	48[1]	4,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Halomethanes, EPA 440/5-80-051 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
35. Methyl-4,6-dinitrophenol, 2- 534521	13.4	765	• EPA, 1980, Ambient Water Quality Criteria for Nitrophenols, EPA 440/5-80-063 • National Toxics Rule[2] 57 FR 60848 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

[5]This human health criterion is the same as originally published in the Red Book which predates the 1980 methodology and did not use the fish ingestion BCF approach.

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS			
POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
36. Nickel 7440020	610[1]	4,600[1]	• EPA, 1980, Ambient Water Quality Criteria for Nickel, EPA 440/5-80-060 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
37. Nitrobenzene 98953	17[1]	1,900[1,4]	• EPA, 1980, Ambient Water Quality Criteria for Nitrobenzene, EPA 440/5-80-061 • National Toxics Rule[2] 57 FR 60848 • Integrated Risk Information System, 04/08/98 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
38. Pentachlorobenzene 608935	3.5[1]	4.1[1]	• EPA, 1980, Ambient Water Quality Criteria for Chlorinated Benzenes, EPA 440/5-80-028 • Integrated Risk Information System, 03/01/88 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
39. Phenol 108952	21,000[1]	4,600,000[1, 4]	• EPA, 1980, Ambient Water Quality Criteria for Phenol, EPA 440/5-80-066 • National Toxics Rule[2] 57 FR 60848 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

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POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
40. Pyrene 129000	960[1]	11,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons, EPA 440/5-80-069 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
41. Selenium 7782492	170	11,000	• Integrated Risk Information System, 09/01/91 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
42. Tetrachlorobenzene, 1,2,4,5- 95943	2.3[1]	2.9[1]	• EPA, 1980, Ambient Water Quality Criteria for Chlorinated Benzenes, EPA 440/5-80-028 • Integrated Risk Information System, 03/01/91 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
43. Thallium 7440280	1.7[1]	6.3[1]	• EPA, 1980, Ambient Water Quality Criteria for Thallium, EPA 440/5-80-074 • National Toxics Rule[2] 57 FR 60848 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
44. Toluene 108883	6,800[1]	200,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Toluene, EPA 440/5-80-075 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

TABLE V. HUMAN HEALTH CRITERIA FOR NONCARCINOGENS			
POLLUTANT CAS number is shown under each pollutant when one is available.	**Human Health Criteria for Consumption of:**		**REFERENCES** References are shown so the user can look up information on the criteria. These documents are not adopted by reference.
	Water + Aquatic organisms (µg/L) **Column A**	**Aquatic Organisms Only** (µg/L) **Column B**	
45. Trans-1,2-dichloroethylene 156605	700[1]	140,000[1]	• EPA, 1980, Ambient Water Quality Criteria for Dichloroethylenes, EPA 440/5-80-041 • 1997 Proposed California Toxics Rule, 62 FR 42160 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
46. Trichlorobenzene, 1,2,4- 120821	260	940	• Integrated Risk Information System, 11/01/96 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
47. Trichlorophenol, 2,4,5- 95954	2,600[1]	9,800[1]	• EPA, 1980, Ambient Water Quality Criteria for Chlorinated Phenols, EPA 440/5-80-032 • Integrated Risk Information System, 03/01/88 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001
48. Zinc 7440666	9,100	69,000	• Integrated Risk Information System, 10/01/92 • EPA, 1999 *National Recommended Water Quality Criteria-Correction*, EPA 822-Z-99-001

The acute criterion for total ammonia for the fresh water aquatic life criteria in Table III of this manual must be based on Table VI below:

TABLE VI. ACUTE, FRESH WATER AMMONIA CRITERIA BASED ON PH. [1]		
pH	**Total Ammonia Nitrogen in mg-N/L**	
	Acute Criteria with Salmonids Present	**Acute Criteria with Salmonids Absent**
6.5	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0	0.885	1.32

[1] The reference for this table is EPA, 1999, *1999 Update of Ambient Water Quality Criteria for Ammonia*, EPA 822-R-99-014.

The chronic criterion for total ammonia for the fresh water aquatic life criteria in Table III of this manual must be based on Table VII-A below when early stages of fish are present; and Table VII-B (next page) when early life stages of fish are absent.

TABLE VII-A. CHRONIC, FRESH WATER AMMONIA CRITERIA BASED ON PH AND TEMPERATURE FOR WHEN EARLY LIFE STAGES OF FISH ARE PRESENT.[1]

Total Ammonia in mg-N/L										
pH	**Temperature**									
	0°C	**14°C**	**16°C**	**18°C**	**20°C**	**22°C**	**24°C**	**26°C**	**28°C**	**30°C**
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.52	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.29	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.09	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.920	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.778	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.661	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.565	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0	0.486	0.486	0.422	0.389	0.342	0.300	0.264	0.232	0.204	0.179

[1] The reference for this table is EPA, 1999, *1999 Update of Ambient Water Quality Criteria forAmmonia*, EPA 822-R-99-014.

TABLE VII-B. CHRONIC, FRESH WATER AMMONIA CRITERIA BASED ON PH AND TEMPERATURE FOR WHEN EARLY LIFE STAGES OF FISH ARE ABSENT.[1]

Total Ammonia in mg-N/L

pH	Temperature									
	0-7°C	**8°C**	**9°C**	**10°C**	**11°C**	**12°C**	**13°C**	**14°C**	**15°C [2]**	**16°C [2]**
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.990
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892	0.836
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754	0.707
8.8	1.07	1.01	0.944	0.885	0.829	0.778	0.729	0.684	0.641	0.601
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548	0.513
9.0	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471	0.442

[1] The reference for this table is EPA, 1999, *1999 Update of Ambient Water Quality Criteria for Ammonia*, EPA 822-R-99-014.

[2] At 15 C and above, the criterion for when the early life stages of fish are absent is the same as the criterion for when the early life stages of fish are present.

The acute criterion for total ammonia for the saltwater aquatic life criteria in Table IVof this manual must be based on Table VIII below:

TABLE VIII. TOTAL AMMONIA ACUTE CRITERIA FOR SALTWATER AQUATIC LIFE[1]

Total Ammonia in mg-N/L at 10 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	270	191	131	92	62	44	29	21
7.2	175	121	83	58	40	27	19	13
7.4	110	77	52	35	25	17	12	8.3
7.6	69	48	33	23	16	11	7.7	5.6
7.8	44	31	21	15	10	7.1	5.0	3.5
8.0	27	19	13	9.4	6.4	4.6	3.1	2.3
8.2	18	12	8.5	5.8	4.2	2.9	2.1	1.5
8.4	11	7.9	5.4	3.7	2.7	1.9	1.4	1.0
8.6	7.3	5.0	3.5	2.5	1.8	1.3	0.98	0.75
8.8	4.6	3.3	2.3	1.7	1.2	0.92	0.71	0.56
9.0	2.9	2.1	1.5	1.1	0.85	0.67	0.52	0.44

Total Ammonia in mg-N/L at 20 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	291	200	137	96	64	44	31	21
7.2	183	125	87	60	42	29	20	14
7.4	116	79	54	37	27	18	12	8.7
7.6	73	50	35	23	17	11	7.9	5.6
7.8	46	31	23	15	11	7.5	5.2	3.5
8.0	29	20	14	9.8	6.7	4.8	3.3	2.3
8.2	19	13	8.9	6.2	4.4	3.1	2.1	1.6
8.4	12	8.1	5.6	4.0	2.9	2.0	1.5	1.1
8.6	7.5	5.2	3.7	2.7	1.9	1.4	1.0	0.77
8.8	4.8	3.3	2.5	1.7	1.3	0.94	0.73	0.56
9.0	3.1	2.3	1.6	1.2	0.87	0.69	0.54	0.44

[1] These values were calculated by Hampson's (1977) program and Whitfield's (1974) model for hydrolysis of ammonium ions in sea water cited in EPA, 1989, *Ambient Water Quality Criteria for Ammonia (Saltwater)-1989*, EPA 440/5-88-004. See below for actual references.

● Hampson, B.L., 1977, *Relationship Between Total Ammonia and Free Ammonia in Terrestrial and Ocean Waters,* J Cons. Int. Expl. Mer 37(2): 117-122.

● Whitfield, M., 1974, *The Hydrolysis of Ammonium Ions in Sea Water – A Theoretical Study,* J. Mar. Biol. Assoc. U.K. 54:565-580.

TABLE VIII. TOTAL AMMONIA ACUTE CRITERIA FOR SALTWATER AQUATIC LIFE (cont.)								
Total Ammonia in mg-N/L at 30 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	312	208	148	102	71	48	33	23
7.2	196	135	94	64	44	31	21	15
7.4	125	85	58	40	27	19	13	9.4
7.6	79	54	37	25	21	12	8.5	6.0
7.8	50	33	23	16	11	7.9	5.4	3.7
8.0	31	21	15	10	7.3	5.0	3.5	2.5
8.2	20	14	9.6	6.7	4.6	3.3	2.3	1.7
8.4	12.7	8.7	6.0	4.2	2.9	2.1	1.6	1.1
8.6	8.1	5.6	4.0	2.7	2.0	1.4	1.1	0.81
8.8	5.2	3.5	2.5	1.8	1.3	1.0	0.75	0.58
9.0	3.3	2.3	1.7	1.2	0.94	0.71	0.56	0.46

The chronic criterion for total ammonia for the saltwater aquatic life criteria in Table IVof this manual must be based on Table IX below:

TABLE IX. TOTAL AMMONIA CHRONIC CRITERIA FOR SALTWATER AQUATIC LIFE[1]

Total Ammonia in mg-N/L at 10 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	41	29	20	14	9.4	6.6	4.4	3.1
7.2	26	18	12	8.7	5.9	4.1	2.8	2.0
7.4	17	12	7.8	5.3	3.7	2.6	1.8	1.2
7.6	10	7.2	5.0	3.4	2.4	1.7	1.2	0.84
7.8	6.6	4.7	3.1	2.2	1.5	1.1	0.75	0.53
8.0	4.1	2.9	2.0	1.40	0.97	0.69	0.47	0.34
8.2	2.7	1.8	1.3	0.87	0.62	0.44	0.31	0.23
8.4	1.7	1.2	0.81	0.56	0.41	0.29	0.21	0.16
8.6	1.1	0.75	0.53	0.37	0.27	0.20	0.15	0.11
8.8	0.69	0.50	0.34	0.25	0.18	0.14	0.11	0.08
9.0	0.44	0.31	0.23	0.17	0.13	0.10	0.08	0.07

Total Ammonia in mg-N/L at 20 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	44	30	21	14	9.7	6.6	4.7	3.1
7.2	27	19	13	9.0	6.2	4.4	3.0	2.1
7.4	18	12	8.1	5.6	4.1	2.7	1.9	1.3
7.6	11	7.5	5.3	3.4	2.5	1.7	1.2	0.84
7.8	6.9	4.7	3.4	2.3	1.6	1.1	0.78	0.53
8.0	4.4	3.0	2.1	1.5	1.0	0.72	0.50	0.34
8.2	2.8	1.9	1.3	0.94	0.66	0.47	0.31	0.24
8.4	1.8	1.2	0.84	0.59	0.44	0.30	0.22	0.16
8.6	1.1	0.78	0.56	0.41	0.28	0.20	0.15	0.12
8.8	0.72	0.50	0.37	0.26	0.19	0.14	0.11	0.08
9.0	0.47	0.34	0.24	0.18	0.13	0.10	0.08	0.07

[1] These values were calculated by Hampson's (1977) program and Whitfield's (1974) model for hydrolysis of ammonium ions in sea water cited in EPA, 1989, *Ambient Water Quality Criteria for Ammonia (Saltwater)-1989*, EPA 440/5-88-004. See below for actual references.

● Hampson, B.L., 1977, *Relationship Between Total Ammonia and Free Ammonia in Terrestrial and Ocean Waters,* J Cons. Int. Expl. Mer 37(2): 117-122.

● Whitfield, M., 1974, *The Hydrolysis of Ammonium Ions in Sea Water – A Theoretical Study,* J. Mar. Biol. Assoc. U.K. 54:565-580.

TABLE IX. TOTAL AMMONIA CHRONIC CRITERIA FOR SALTWATER AQUATIC LIFE								
Total Ammonia in mg-N/L at 30 g/kg Salinity								
pH	**Temperature**							
	0°C	**5°C**	**10°C**	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**
7.0	47	31	22	15	11	7.2	5.0	3.4
7.2	29	20	14	9.7	6.6	4.7	3.1	2.2
7.4	19	13	8.7	5.9	4.1	2.9	2.0	1.4
7.6	12	8.1	5.6	3.7	3.1	1.8	1.3	0.90
7.8	7.5	5.0	3.4	2.4	1.7	1.2	0.81	0.56
8.0	4.7	3.1	2.2	1.6	1.1	0.75	0.53	0.37
8.2	3.0	2.1	1.4	1.0	0.69	0.50	0.34	0.25
8.4	1.9	1.3	0.90	0.62	0.44	0.31	0.23	0.17
8.6	1.2	0.84	0.59	0.41	0.30	0.22	0.16	0.12
8.8	0.78	0.53	0.37	0.27	0.20	0.15	0.11	0.09
9.0	0.50	0.34	0.26	0.19	0.14	0.11	0.08	0.07