**Appendix E**
**Comparison of 2011 WQ Criteria to 2002 Water Quality Criteria**

The following table shows the water quality criteria that are being adopted with the 2011 revisions to the Water Quality Standards. The table is formatted to show edits to the table of water quality criteria contained in the 2002 Water Quality Standards, which form the basis for the current revisions. Criteria values in black font are the criteria values from the 2002 Water Quality Standards. Where these criteria are being revised, the 2002 criteria values have been marked with a strikethrough line and the new criteria value indicated in red text. Similarly, the names of chemical constituents for which criteria are being adopted are in black font if the chemical is included in the 2002 Water Quality Standards. New chemicals added to the criteria list are identified by red font.

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| **Inorganics** | | | | | | | | |
| Antimony | 7440360 | | | | | ~~4300~~ 640 | ~~6~~ 5.6 | TT |
| Arsenic (total) | 7440382 | 340 | 150 | 69 | 36 | 0.021 | 0.011 | A |
| Beryllium | 7440417 | | | | | 0.13 | 0.0077 | TT |
| Cadmium | 7440439 | ~~2.02~~ 1.0 | ~~1.35~~ 0.125 | ~~42~~ 40 | ~~9.3~~ 8.8 | 10,769 | 5 | TT |
| Chromium (hex) | 18540299 | 16 | 11 | 1,100 | 50 | 2,019 | 100 | TT |
| Chromium (tri) | 16065831 | 323 | 42 | | | 1,009,615 | 100 | TT |
| Copper | 7440508 | 14.3 | 4.8 | 4.8 | 3.1 | | 1,300 | TT |
| Copper (site-specific) | 7440508 | 25.7 | 18.1 | | | | 1,300 | TT |
| Cyanide (Total) | 57125 | 22 | 5.20 | 1 | 1 | ~~220,000~~ 140 | ~~200~~ 140 | TT |
| Lead | 7439921 | 30 | 1.2 | 210 | 8.1 | | 15 | TT |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Mercury (Total) | 7439976 | 1.4 | 0.77 | 1.8 | 0.94 | 0.051 | 0.050 | TT-HB |
| Nickel | 7440020 | 260.5 | 28.9 | 74 | 8.2 | 4,600 | 610 | TT |
| Selenium (Total) | 7782492 | 20 | 5 | 290 | 71 | ~~11,000~~ 4,200 | 50 | TT |
| Silver | 7440224 | 1.02 | | ~~1.96~~ 1.9 | | 107,692 | 175 | TT |
| Thallium | 7440280 | | | | | ~~6.3~~ 0.47 | ~~1.7~~ 0.24 | TT |
| Zinc | 7440666 | 65 | 65 | 90 | 81 | ~~68,740~~ 26,000 | ~~9,100~~ 7,400 | TT |
| **Volatiles** | | | | | | | | |
| Acrolein | 107028 | 3 | 3 | | | ~~780~~ 9 | ~~320~~ 6 | TT |
| Acrylonitrile | 107131 | | | | | ~~0.66~~ 0.25 | ~~0.059~~ 0.051 | C |
| Benzene | 71432 | | | | | ~~71~~ 51 | 1.2 | A |
| Bromoform | 75252 | | | | | ~~360~~ 140 | 4.3 | C |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Carbon Tetrachloride | 56235 | | | | | ~~4.4~~ 1.6 | ~~0.25~~ 0.23 | C |
| Chlorobenzene | 108907 | | | | | ~~21,000~~ 1,600 | 100 | TT |
| Chlorodibromomethane | 124481 | | | | | ~~34~~ 13 | ~~0.41~~ 0.40 | C |
| Chloroethane | 75003 | | | | | | | |
| 2-Chloroethylvinyl Ether | 110758 | | | | | | | |
| Chloroform | 67663 | | | | | 470 | 5.7 | C |
| Dichlorobromomethane | 75274 | | | | | ~~46~~ 17 | ~~0.56~~ 0.55 | C |
| 1,1-Dichloroethane | 75343 | | | | | | | |
| 1,2-Dichloroethane | 107062 | | | | | ~~99~~ 37 | 0.38 | C |
| 1,1-Dichloroethylene | 75354 | | | | | 3.2 | 0.057 | C |
| 1,2T-Dichloroethylene | 156605 | | | | | ~~140,000~~ 10,000 | 100 | TT |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| 1,2-Dichloropropane | 78875 | | | | | ~~39~~ 15 | ~~0.52~~ 0.50 | TT |
| 1,3-Dichloropropylene | 542756 | | | | | ~~1,700~~ 21 | ~~10~~ 0.34 | TT |
| Ethylbenzene | 100414 | | | | | ~~29,000~~ 2,100 | ~~700~~ 530 | TT |
| Methyl Bromide | 74839 | | | | | ~~4,000~~ 1,500 | ~~48~~ 47 | TT |
| Methyl Chloride | 74873 | | | | | 470 | 5.7 | TT |
| Methylene Chloride | 75092 | | | | | ~~1,600~~ 590 | ~~4.7~~ 4.6 | C |
| 1,1,2,2,-Tetrachloroethane | 79345 | | | | | ~~11~~ 4.0 | 0.17 | C-HB |
| Tetrachloroethylene | 127184 | | | | | ~~8.85~~ 3.3 | ~~0.8~~ 0.69 | TT |
| Toluene | 108883 | | | | | ~~200,000~~ 15,000 | 1,000 | TT |
| 1,1,1,-Trichloroethane | 71556 | | | | | | | |
| 1,1,2-Trichloroethane | 79005 | | | | | ~~42~~ 16 | ~~0.6~~ 0.59 | C |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Trichloroethlyene | 79016 | | | | | ~~81~~ 30 | ~~2.7~~ 2.5 | C |
| Vinyl Chloride | 75014 | | | | | ~~525~~ 2.4 | ~~2~~ 0.025 | C |
| **GC/MS: Acid Compounds** | | | | | | | | |
| 2-Chlorophenol | 95578 | | | | | ~~400~~ 150 | ~~120~~ 81 | TT |
| 2,4-Dichlorophenol | 120832 | | | | | ~~790~~ 290 | ~~93~~ 77 | TT |
| 2,4-Dimethylphenol | 105679 | | | | | 850 | 380 | TT |
| 3-Methyl-4-chlorophenol | 59507 | | | | | | | |
| 2-Methyl-4,6-Dinitrophenol | 534521 | | | | | ~~765~~ 280 | ~~13.4~~ 13 | TT |
| 2,4-Dinitrophenol | 51285 | | | | | ~~14,000~~ 5,300 | ~~70~~ 69 | TT |
| 2-Nitrophenol | 88755 | | | | | | | |
| 4-Nitrophenol | 100027 | | | | | | | |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Pentachlorophenol | 87865 | 19 | 15 | 13 | 7.9 | ~~8.2~~ 3.0 | ~~0.28~~ 0.27 | C-HB |
| Phenol | 108952 | | | | | ~~4,600,000~~ 860,000 | ~~21,000~~ 10,000 | TT |
| 2,4,6-Trichlorophenol | 88062 | | | | | ~~6.5~~ 2.4 | ~~2.1~~ 1.4 | C-HB |
| **Base Neutral Compounds** | | | | | | | | |
| Acenaphthene | 83329 | | | | | 6.1 | 2.7 | TT-HB |
| Acenapthylene | 208968 | | | | | 49.2 | 4.37 | C-HB |
| Anthracene | 120127 | | | | | 4.92 | 0.44 | C-HB |
| Benzidine | 92875 | | | | | ~~0.00054~~ 0.00020 | ~~0.00012~~ 0.000086 | A |
| Benzo(a)anthracene | 56553 | | | | | ~~0.49~~ 0.018 | ~~0.044~~ 0.0038 | C-HB |
| Benzo(a)pyrene | 50328 | | | | | ~~0.049~~ 0.018 | ~~0.044~~ 0.0038 | C-HB |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Benzo(b)fluoranthene | 205992 | | | | | ~~0.49~~ 0.018 | ~~0.044~~ 0.0038 | C-HB |
| Benzo(ghi)perylene | 191242 | | | | | 4.92 | 0.44 | C-HB |
| Benzo(k)fluoranthene | 207089 | | | | | ~~0.49~~ 0.018 | ~~0.044~~ 0.0038 | C-HB |
| Bis(2-chloroethoxy)Methane | 111911 | | | | | | | |
| Bis(2-Chloroethyl)Ether | 111444 | | | | | ~~1.4~~ 0.53 | ~~0.031~~ 0.030 | C |
| Bis(2-Chloroisopropyl)Ether | 108601 | | | | | ~~170,000~~ 65,000 | 1,400 | TT |
| Bis(2-Ethylhexyl)Phthalate | 117817 | | | | | ~~5.9~~ 2.2 | ~~1.8~~ 1.2 | C-HB |
| 4-Bromophenylether | 101553 | | | | | | | |
| Butyl Benzyl Phthalate | 85687 | | | | | ~~5,200~~ 1,900 | ~~3,000~~ 1,500 | TT-HB |
| 2-Chloronapthylene | 91587 | | | | | ~~4,300~~ 1,600 | ~~1,700~~ 1,000 | TT-HB |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| 4-Chlorophenylphenylether | 7005723 | | | | | | | |
| Chrysene | 218019 | | | | | ~~4.92~~ 0.018 | ~~0.44~~ 0.0038 | C-HB |
| Dibenzo(a,h)anthracene | 53703 | | | | | 0.010 | 0.0009 | C-HB |
| 1,2-Dichlorobenzene | 95501 | | | | | ~~17,000~~ 1,300 | ~~2,700~~ 420 | TT-HB |
| 1,3-Dichlorobenzene | 541731 | | | | | ~~2,600~~ 960 | ~~400~~ 320 | TT-HB |
| 1,4-Dichlorobenzene | 106467 | | | | | ~~2,600~~ 190 | ~~400~~ 63 | TT-HB |
| 3,3'-Dibenzidenes | 91941 | | | | | ~~0.077~~ 0.028 | ~~0.04~~ 0.021 | C-HB |
| Diethyl Phthalate | 84662 | | | | | ~~120,000~~ 44,000 | ~~23,000~~ 17,000 | TT |
| Dimethyl Phthalate | 131113 | | | | | ~~2,900,000~~ 1,100,000 | ~~313,000~~ 270,000 | TT |
| Di-n-butyl Phthlate | 84742 | | | | | ~~12,000~~ 4,500 | ~~2,700~~ 2,000 | TT-HB |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Di-n-octyl Phthalate ester | 117840 | | | | | | | |
| 2,4-Dinitrotoluene | 121142 | | | | | ~~9.1~~ 3.4 | 0.11 | C |
| 2,6-Dinitrotoluene | 606202 | | | | | | | |
| Di-n-ocytyl phthalate | 117840 | | | | | | | |
| 1,2-Diphenylhydrazine | 122667 | | | | | ~~0.54~~ 0.20 | ~~0.04~~ 0.036 | C |
| Fluoranthene | 206440 | | | | | 1.28 | 1.01 | C-HB |
| Fluorene | 86737 | | | | | 49.2 | 4.37 | C-HB |
| Hexachlorobenzene | 118741 | | | | | ~~0.00077~~ 0.00029 | ~~0.00075~~ 0.00028 | C-HB |
| Hexachlorobutadiene | 87683 | | | | | ~~50~~ 18 | 0.44 | C-HB |
| Hexachlorocyclopentadiene | 77474 | | | | | ~~17,000~~ 1,100 | ~~50~~ 40 | TT-HB |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Hexachloroethane | 67721 | | | | | ~~8.9~~ 3.3 | ~~1.9~~ 1.4 | C-HB |
| Indeno (1,2,3-cd) pyrene | 193395 | | | | | ~~0.49~~ 0.018 | ~~0.044~~ 0.0038 | C-HB |
| Isophorone | 78591 | | | | | ~~2,600~~ 960 | ~~36~~ 35 | TT |
| Napthalene | 91203 | | | | | 20,513 | 677 | TT |
| Nitrobenzene | 98953 | | | | | ~~1,900~~ 690 | 17 | TT |
| N-Nitrosodimethylamine | 62759 | | | | | ~~8.1~~ 3 | 0.00069 | C |
| N-Nitrosodi-N-propylamine | 621647 | | | | | ~~1.4~~ 0.51 | 0.005 | C |
| N-Nitrosodiphenylamine | 86306 | | | | | ~~16~~ 6.0 | ~~5~~ 3.3 | C |
| Phenanthrene | 85018 | | | | | 49.17 | 4.37 | C-HB |
| Pyrene | 129000 | | | | | 49.17 | 4.37 | C-HB |
| 1,2,4-Trichlorobenzene | 120821 | | | | | ~~940~~ 70 | ~~70~~ 35 | TT |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| **Pesticides** | | | | | | | | |
| Aldrin | 309002 | 1.50 | | 0.65 | | ~~0.00014~~ 0.00005 | ~~0.00013~~ 0.000049 | C-HB |
| Chlordane | 57749 | 1.20 | 0.0043 | 0.045 | 0.004 | ~~0.0022~~ 0.00081 | ~~0.0021~~ 0.00080 | C-HB |
| DDT | 50293 | 0.55[11] | 0.001[11] | 0.065[11] | 0.001[11] | ~~0.00059~~ 0.00022 | ~~0.00059~~ 0.00022 | C-HB |
| DDD | 72548 | | | | | ~~0.00084~~ 0.00031 | ~~0.00083~~ 0.00031 | C-HB |
| DDE | 72559 | | | | | ~~0.00059~~ 0.00022 | ~~0.00059~~ 0.00022 | C-HB |
| Dieldrin | 60571 | 0.24 | 0.056 | 0.355 | 0.0019 | ~~0.00014~~ 0.000054 | ~~0.00014~~ 0.000052 | C |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Endosulfan Alpha | 959988 | 0.11[12] | 0.056[12] | 0.017[12] | 0.0087[12] | ~~240~~ 89 | ~~110~~ 62 | TT |
| Endosulfan Beta | 33213659 | 0.11[12] | 0.056[12] | 0.017[12] | 0.0087[12] | ~~240~~ 89 | ~~110~~ 62 | TT |
| Endosulfan Sulfate | 1031078 | | | | | ~~240~~ 89 | ~~110~~ 62 | TT |
| Endrin | 72208 | 0.086 | 0.036 | 0.0185 | 0.0023 | ~~0.81~~ 0.060 | ~~0.76~~ 0.059 | TT |
| Endrin Aldehyde | 7421934 | | | | | ~~0.81~~ 0.30 | ~~0.76~~ 0.29 | TT |
| Heptachlor | 76448 | 0.26 | 0.0038 | 0.0265 | 0.0036 | ~~0.00021~~ 0.000079 | ~~0.00021~~ 0.000079 | C |
| Heptachlor epoxide | 1024573 | 0.26 | 0.0038 | 0.0265 | 0.0036 | ~~0.00011~~ 0.000039 | ~~0.00010~~ 0.000039 | C |
| Hexachlorocyclohexane alpha | 319846 | | | | | ~~0.013~~ 0.0049 | ~~0.0039~~ 0.0026 | C-HB |
| Hexachlorocyclohexane beta | 319857 | | | | | ~~0.046~~ 0.017 | ~~0.014~~ 0.0091 | C-HB |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Hexachlorocyclohexane delta | 319868 | | | | | | | |
| Hexachlorocyclohexane gamma (Lindane) | 58899 | 0.95 | | 0.08 | | 0.063 | 0.019 | TT-HB |
| Polychlorinated Biphenyls | | | 0.014 | | 0.03 | ~~0.00017~~ 0.000064 | ~~0.00017~~ 0.000064 | C-HB |
| 2,3,7,8-TCDD (Dioxin) | 1746016 | | | | | ~~0.000000014~~ 0.0000000051 | ~~0.000000013~~ 0.000000005 | C-HB |
| Toxaphene | 8001352 | 0.73 | 0.0002 | 0.21 | 0.0002 | ~~0.00075~~ 0.00028 | ~~0.00073~~ 0.00028 | C-HB |
| **Other Substances** | | | | | | | | |
| Aluminum | 7429905 | 750 | 87 | | | | | |
| Ammonia | 7664417 | * | ** | 233 | 35 | | | |

| Numerical Water Quality Criteria for Chemical Constituents (ug/L) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Aquatic Life Criteria | | | | Human health Criteria | | |
| | | Freshwater: Class AA, A & B | | Saltwater Class SA & SB | | Class B, SA & SB Waters | Class AA & A Waters | |
| Chemical Constituents | CASRN | Acute | Chronic | Acute | Chronic | Consumption of Fish | Consumption of Water & Fish | Health Designation |
| Asbestos | 1332214 | | | | | | 7 Million fibers per liter | A |
| Chlorine | 7782505 | 19 | 11 | 13 | 7.5 | | | |
| Chloride | 16887006 | 86,000 | 230,000 | | | | | |
| Formaldehyde | 50000 | 4,554 | 1,178 | | | | | |

**Appendix F**

**Comparison of 2011 WQ Criteria to 2009 Proposed Water Quality Criteria**

# Aquatic Life Criteria:  Freshwater

Acute and chronic aquatic life water quality criteria for marine waters are presented in the following table.  The table contains the criteria that are being adopted with the 2011 revisions to the Water Quality Standards along with the criteria that are contained in the 2002 Water Quality Standards and those proposed in the 2009 revisions.

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Inorganic Substances | | | | | | |
| Aluminum (Total) | | 750 | **750** | | 87 | **87** |
| Ammonia | Equations in WQS | No change | No change | Equations in WQS | No change | No change |
| Antimony | | 900 | | | 190 | |
| Arsenic (Total) | 340 | 340 | **340** | 150 | 150 | **150** |
| Asbestos | | | | | | |
| Barium | | 2000 | | | 220 | |
| Beryllium (Total) | | 30.6 | | | 3.6 | |
| Boron | | 8500 | | | 950 | |
| Cadmium | 2.02 | 1 | **1** | 1.35 | 0.15 | **0.125** |
| Chloride | | 860000 | **860000** | | 230000 | **230000** |
| Chlorine | 19 | 19 | **19** | 11 | 11 | **11** |
| Chromium, hexavalent | 16 | 16 | **16** | 11 | 11 | **11** |
| Chromium, trivalent | 323 | 323 | **323** | 42 | 42 | **42** |
| Cobalt | | 220 | | | 24 | |
| Copper | 14.3 | 14.3 | **14.3** | 4.8 | 4.8 | **4.8** |
| Copper (site specific) | 25.7 | 25.7 | **25.7** | 18.1 | 18.1 | **18.1** |
| Cyanide (Total) | 22 | 22 | **22** | 5.2 | 5.2 | **5.2** |
| Iron | | | | | 1000 | |
| Lead | 30 | 30 | **30** | 1.2 | 1.2 | **1.2** |
| Lithium | | | | | | |
| Manganese | | | | | | |
| Mercury -(total) | 1.4 | 1.4 | **1.4** | 0.77 | 0.77 | **0.77** |
| Nickel | 260.5 | 260 | **260.5** | 28.9 | 29 | **28.9** |
| Selenium (Total) | 20 | 20 | **20** | 5 | 5 | **5** |
| Silver | 1.02 | 1.02 | **1.02** | | 0.06 | |
| Thallium | | 79 | | | 17 | |
| Tin | | 1600 | | | 180 | |
| Uranium | | | | | | |
| Vanadium | | 150 | | | 44 | |
| Zinc (Total) | 65 | 65 | **65** | 65 | 65 | **65** |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Acetone | | 15000 | | | 1700 | |
| Acetonitrile | | 73705 | | | 8189 | |
| Acrolein | | 0.8 | **3** | | 0.1 | **3** |
| Acrylonitrile | | 369 | | | 41 | |
| Benzene | | 700 | | | 160 | |
| Bromomethane | | 0.04 | | | 0.005 | |
| Butanone, 2- | | 123077 | | | 13752 | |
| Butylbenzene, n- | | | | | | |
| Butylbenzene, sec- | | | | | | |
| Butylbenzene, t- | | | | | | |
| Carbon disulfide | | 130 | | | 15 | |
| Carbon Tetrachloride | | 2200 | | | 240 | |
| Chlorobenzene | | 420 | | | 47 | |
| Chloroethane | | | | | | |
| Chloroethylvinyl ether, 2- (mixed) | | | | | | |
| Chloroform | | 1300 | | | 140 | |
| Chloromethane | | | | | | |
| Chloronapthalene, 2- | | 79 | | | 9 | |
| Chlorotoluene, 2- | | | | | | |
| Chlorotoluene, 4- | | 64 | | | **7** | |
| Cyclohexane | | 2480 | | | 276 | |
| Dibenzofuran | | 36 | | | 4 | |
| Dichlorobenzene, 1,2- | | 130 | | | 23 | |
| Dichlorobenzene, 1,3- | | 79 | | | 22 | |
| Dichlorobenzene, 1.4- | | 57 | | | 9.4 | |
| Dichlorobromomethane | | | | | | |
| Dichlorobutene, 1,4- | | | | | | |
| Dichlorodiflouromethane | | | | | | |
| Dichloroethane, 1,1- | | 3700 | | | 410 | |
| Dichloroethane, 1,2- | | 9600 | | | 2000 | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Dichloroethene, 1,2- | | 8800 | | | 970 | |
| Dichloroethylene, 1,1- | | 1900 | | | 210 | |
| Dichloroethylene, cis-1,2- | | 5500 | | | 620 | |
| Dichloroethylene, trans-1,2- | | 5000 | | | 560 | |
| Dichloropropane, 1,2- | | 847 | | | 94 | |
| Dichloropropene, 1,3- | | 15 | | | 1.7 | |
| Ethyl acetate | | 14375 | | | 1597 | |
| Ethylbenzene | | 550 | | | 61 | |
| Ethylene dibromide | | | | | | |
| Hexane, n- | | | | | | |
| Isopropylbenzene | | 193 | | | 21 | |
| Isopropyltoluene, 4- | | 148 | | | 16.5 | |
| Methyl isobutyl ketone | | | | | | |
| Methyl methacrylate | | | | | | |
| Methyl tert butyl ether | | 151000 | | | 51000 | |
| Methylene chloride | | 11000 | | | 1900 | |
| Methylnaphthalene, 2- | | 42 | | | 4.7 | |
| Nitrobenzene | | 1989 | | | 221 | |
| Nitrophenol, 2- | | 650 | | | 73 | |
| Nitrophenol, 4- | | | | | | |
| Propylbenzene, n- | | | | | | |
| Pyridine | | 236 | | | 26 | |
| Styrene | | 214 | | | 24 | |
| Tetrachloroethane, 1,1,1,2- | | 770 | | | 85 | |
| Tetrachloroethane, 1,1,2,2- | | 1155 | | | 655 | |
| Tetrachloroethylene | | 430 | | | 53 | |
| Tetrahydrofuran | | 74000 | | | 11000 | |
| Toluene | | 560 | | | 62 | |
| Trichloro-1,2,2- | | | | | | |
| trifluoroethane, 1,1,2- | | | | | | |
| Trichlorobenzene, 1,2,4- | | | | | 5 | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Trichloroethane, 1,1,1- | | 690 | | | 76 | |
| Trichloroethane, 1,1,2- | | 3300 | | | 740 | |
| Trichloroethylene | | 2000 | | | 220 | |
| Trichlorofluoromethane | | | | | | |
| Trimethylbenzene, 1,2,4- | | 142 | | | 16 | |
| Trimethylbenzene, 1,3,5- | | 237 | | | 26 | |
| Vinyl acetate | | | | | | |
| Vinyl chloride | | 8400 | | | 930 | |
| Xylenes | | 240 | | | 27 | |
| SemiVolatile Substances | | | | | | |
| Acenaphthene | | 19 | | | 15 | |
| Acenaphthylene | | 120 | | | 13 | |
| Aniline | | 11.4 | | | 1.3 | |
| Anthracene | | 0.18 | | | 0.02 | |
| Benzidine | | 38 | | | 4 | |
| Benzo(a)anthracene | | 42 | | | 4.7 | |
| Benzo(a)pyrene | | 0.54 | | | 0.06 | |
| Benzo(b)fluoranthene | | 23 | | | 2.6 | |
| Benzo(g,h,i)perylene | | | | | | |
| Benzo(k)fluoranthene | | | | | | |
| Benzoic Acid | | | | | | |
| Bis(2-chloroethoxy)methane | | 7077 | | | 786 | |
| Bis(2-chloroethyl)ether | | 9231 | | | 1026 | |
| Bis(2-chloroisopropyl)ether | | | | | | |
| Bis(2-ethylhexyl)phthalate | | 5 | | | 1 | |
| Bromoform | | 1115 | | | 124 | |
| Bromophenyl-phenylether, 4- | | | | | | |
| Butylbenzyl phthalate | | 130 | | | 23 | |
| Carbazole | | 48 | | | 5.3 | |
| Chloroaniline, 4- | | 9 | | | 1 | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| SemiVolatile Substances | | | | | | |
| Chlorodibromomethane | | | | | | |
| Chlorophenol, 2- | | 290 | | | 32 | |
| Chlorophenol, 3-methyl-4 | | 66 | | | 7 | |
| Chlorophenyl-phenylether, 4- | | | | | | |
| Chrysene | | 42 | | | 4.7 | |
| Cresol, m- | | 560 | | | 62 | |
| Dibenzo(a,h)anthracene | | | | | | |
| Dibromo-3-chloropropane, 1,2- | | | | | | |
| Dichlorobenzidine, 3,3'- | | 40 | | | 4.5 | |
| Dichlorophenol, 2,4- | | 110 | | | 11 | |
| Dichlorotrifluoroethane | | | | | | |
| Diethyl phthalate | | 980 | | | 220 | |
| Dimethyl phthalate | | 2788 | | | 310 | |
| Dimethylphenol, 2,4- | | 140 | | | 15 | |
| Di-n-butyl phthalate | | 34 | | | 4 | |
| Dinitrophenol, 2,4- | | 199 | | | 22 | |
| Dinitrophenol, 2-methyl-4,6- | | 6.4 | | | 0.7 | |
| Dinitrotoluene, 2,4- | | 394 | | | 44 | |
| Dinitrotoluene, 2,6- | | 730 | | | 81 | |
| Di-n-octyl phthalate | | | | | | |
| Dioxane, 1,4- | | | | | | |
| Diphenylhydrazine, 1,2- | | 10 | | | 1 | |
| Ethanol | | 20491 | | | 2277 | |
| Ethylene glycol | | 1300000 | | | 140000 | |
| Fluoranthene | | 3.7 | | | 0.8 | |
| Fluorene | | 110 | | | 19 | |
| Formaldehyde | | 4554 | | | 1178 | |
| Hexachlorobenzene | | 0.34 | | | 0.04 | |
| Hexachlorobutadiene | | | | | | |
| Hexachloroethane | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| SemiVolatile Substances | | | | | | |
| Indeno(1,2,3-c,d)pyrene | | | | | | |
| Isophorone | | 7500 | | | 920 | |
| Isopropanol | | | | | | |
| Methanol | | 3000 | | | 330 | |
| Methylphenol, 2- | | 600 | | | 67 | |
| Methylphenol, 4- | | 499 | | | 55.5 | |
| Naphthalene | | 170 | | | 21 | |
| Nitroaniline, 2- | | 188 | | | 21 | |
| Nitroaniline, 3- | | 61 | | | 7 | |
| Nitroaniline, 4- | | 1063 | | | 118 | |
| Nitrosodimethylamine, N- | | | | | | |
| Nitrosodi-n-propylamine, N- | | | | | | |
| Nitrosodiphenylamine, N- | | 220 | | | 25 | |
| Nonylphenol | | 28 | | | 6.6 | |
| Pentachloronitrobenzene | | 22 | | | 2.5 | |
| Pentachlorophenol | 19 | 19 | **19** | 15 | 15 | **15** |
| Phenanthrene | | 31 | | | 2.3 | |
| Phenol | | 4700 | | | 160 | |
| Propylene glycol | | 640 | | | 71 | |
| Pyrene | | 42 | | | 4.6 | |
| Sodium acetate | | | | | | |
| Tert-butyl alcohol | | 211692 | | | 23521 | |
| Tetrachlorobenzene, 1,2,4,5- | | 18 | | | 2 | |
| Tetrachlorodibenzo-p-dioxin, 2,3,7,8- | | | | | | |
| Trichlorophenol, 2,4,5- | | 25 | | | 2.8 | |
| Trichlorophenol, 2,4,6- | | 30 | | | 3.3 | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Freshwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Pesticides | | | | | | |
| Alachlor | | 294 | | | 33 | |
| Aldicarb | | 11.4 | | | 1.3 | |
| Aldrin | 1.5 | 0.45 | **1.5** | | 0.05 | **0.65** |
| Atrazine | | 14.5 | | | 1.6 | |
| Chlordane | 1.2 | 1.2 | **1.2** | 0.0043 | 0.00215 | **0.0043** |
| Chlorpyrifos | | 0.083 | | | 0.041 | |
| D, 2,4- | | 47 | | | 5 | |
| DDD, 4,4- | | | | | | |
| DDE, 4,4- | | | | | | |
| DDT, 4,4- (total) | 0.55 | 0.55 | **0.55** | 0.001 | 0.005 | **0.001** |
| Diazinon | | 0.17 | | | 0.17 | |
| Dicamba | | 1619 | | | 180 | |
| Dichloroprop | | 105 | | | 12 | |
| Dieldrin | 0.24 | 0.24 | **0.24** | 0.056 | 0.056 | **0.056** |
| Endosulfan | 0.11 | 0.11 | **0.11** | 0.056 | 0.028 | **0.056** |
| Endosulfan sulfate | | | | | | |
| Endrin | 0.086 | 0.086 | **0.086** | 0.036 | 0.036 | **0.036** |
| Endrin aldehyde | | 0.086 | | | 0.036 | |
| Endrin ketone | | 0.086 | | | 0.036 | |
| Heptachlor | 0.26 | 0.26 | **0.26** | 0.0038 | 0.0019 | **0.0038** |
| Heptachlor epoxide | 0.26 | 0.26 | **0.26** | 0.0038 | 0.0019 | **0.0038** |
| Hexachlorocyclohexane, alpha | | | | | | |
| Hexachlorocyclohexane, beta- | | | | | | |
| Hexachlorocyclohexane, delta- | | | | | | |
| Hexachlorocyclopentadiene | | 2.8 | | | 0.3 | |
| Lindane | 0.95 | 0.95 | **0.95** | | 0.057 | |
| Methoxychlor | | | | | 0.03 | |
| Simazine | | 5 | | | 1 | |
| Toxaphene | 0.73 | 0.73 | **0.73** | 0.0002 | 0.002 | **0.0002** |
| Polychlorinated biphenyls | | | | 0.014 | 0.014 | **0.014** |
| Radionuclides | | | | | | |
| Alpha particles | | | | | | |
| Beta Particles | | | | | | |

# Aquatic Life Criteria:  Marine Waters

Acute and chronic aquatic life water quality criteria for marine waters are presented in the following table.  The table contains the criteria that are being adopted with the 2011 revisions to the Water Quality Standards along with the criteria that are contained in the 2002 Water Quality Standards and those proposed in the 2009 revisions.

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Inorganic Substances | | | | | | |
| Aluminum (Total) | | | | | | |
| Ammonia | 233 | 233 | **233** | 35 [10] | 35[(9)] | **35 [(15)]** |
| Antimony | | | | | | |
| Arsenic (Total) | 69 | 69 | **69** | 36 | 36 | **36** |
| Asbestos | | | | | | |
| Barium | | | | | | |
| Beryllium (Total) | | | | | | |
| Boron | | | | | | |
| Cadmium | 42 | 40 | **40** | 9.3 | 8.8 | **8.8** |
| Chloride | | | | | | |
| Chlorine | 13 | | **13** | 7.5 | | **7.5** |
| Chromium, hexavalent | 1100 | 1100 | **1100** | 50 | 50 | **50** |
| Chromium, trivalent | | | | | | |
| Cobalt | | | | | | |
| Copper | 4.8 | 4.8 | **4.8** | 3.1 | 3.1 | **3.1** |
| Copper (site specific) | | | | | | |
| Cyanide (Total) | 1 | 1 | **1** | 1 | 1 | **1** |
| Iron | | | | | | |
| Lead | 210 | 210 | **210** | 8.1 | 8.1 | **8.1** |
| Lithium | | | | | | |
| Manganese | | | | | | |
| Mercury -(total) | 1.8 | 1.8 | **1.8** | 0.94 | 0.94 | **0.94** |
| Nickel | 74 | 74 | **74** | 8.2 | 8.2 | **8.2** |
| Selenium (Total) | 290 | 290 | **290** | 71 | 71 | **71** |
| Silver | 1.96 | 1.9 | **1.9** | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc (Total) | 90 | 90 | **90** | 81 | 81 | **81** |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Acetone<br>Acetonitrile | | | | | | |
| Acrolein<br>Acrylonitrile | | | | | | |
| Benzene<br>Bromomethane | | | | | | |
| Butanone, 2-<br>Butylbenzene, n- | | | | | | |
| Butylbenzene, sec-<br>Butylbenzene, t- | | | | | | |
| Carbon disulfide<br>Carbon Tetrachloride | | | | | | |
| Chlorobenzene<br>Chloroethane | | | | | | |
| Chloroethylvinyl ether, 2-<br>(mixed)<br>Chloroform | | | | | | |
| Chloromethane<br>Chloronapthalene, 2- | | | | | | |
| Chlorotoluene, 2-<br>Chlorotoluene, 4- | | | | | | |
| Cyclohexane<br>Dibenzofuran | | | | | | |
| Dichlorobenzene, 1,2-<br>Dichlorobenzene, 1,3- | | | | | | |
| Dichlorobenzene, 1.4-<br>Dichlorobromomethane | | | | | | |
| Dichlorobutene, 1,4-<br>Dichlorodiflouromethane | | | | | | |
| Dichloroethane, 1,1-<br>Dichloroethane, 1,2- | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Dichloroethene, 1,2-<br>Dichloroethylene, 1,1- | | | | | | |
| Dichloroethylene, cis-1,2-<br>Dichloroethylene, trans-1,2- | | | | | | |
| Dichloropropane, 1,2-<br>Dichloropropene, 1,3- | | | | | | |
| Ethyl acetate<br>Ethylbenzene | | | | | | |
| Ethylene dibromide<br>Hexane, n- | | | | | | |
| Isopropylbenzene<br>Isopropyltoluene, 4- | | | | | | |
| Methyl isobutyl ketone<br>Methyl methacrylate | | | | | | |
| Methyl tert butyl ether<br>Methylene chloride | | | | | | |
| Methylnaphthalene, 2-<br>Nitrobenzene | | | | | | |
| Nitrophenol, 2-<br>Nitrophenol, 4- | | | | | | |
| Propylbenzene, n-<br>Pyridine | | | | | | |
| Styrene<br>Tetrachloroethane, 1,1,1,2- | | | | | | |
| Tetrachloroethane, 1,1,2,2-<br>Tetrachloroethylene | | | | | | |
| Tetrahydrofuran<br>Toluene | | | | | | |
| Trichloro-1,2,2-<br>trifluoroethane, 1,1,2-<br>Trichlorobenzene, 1,2,4- | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Trichloroethane, 1,1,1-<br>Trichloroethane, 1,1,2- | | | | | | |
| Trichloroethylene<br>Trichlorofluoromethane | | | | | | |
| Trimethylbenzene, 1,2,4-<br>Trimethylbenzene, 1,3,5- | | | | | | |
| Vinyl acetate<br>Vinyl chloride | | | | | | |
| Xylenes | | | | | | |
| SemiVolatile Substances | | | | | | |
| Acenaphthene<br>Acenaphthylene | | | | | | |
| Aniline<br>Anthracene | | | | | | |
| Benzidine<br>Benzo(a)anthracene | | | | | | |
| Benzo(a)pyrene<br>Benzo(b)fluoranthene | | | | | | |
| Benzo(g,h,i)perylene<br>Benzo(k)fluoranthene | | | | | | |
| Benzoic Acid<br>Bis(2-chloroethoxy)methane | | | | | | |
| Bis(2-chloroethyl)ether<br>Bis(2-chloroisopropyl)ether | | | | | | |
| Bis(2-ethylhexyl)phthalate<br>Bromoform | | | | | | |
| Bromophenyl-phenylether, 4-<br>Butylbenzyl phthalate | | | | | | |
| Carbazole<br>Chloroaniline, 4- | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| SemiVolatile Substances | | | | | | |
| Chlorodibromomethane | | | | | | |
| Chlorophenol, 2- | | | | | | |
| Chlorophenol, 3-methyl-4 | | | | | | |
| Chlorophenyl-phenylether, 4- | | | | | | |
| Chrysene | | | | | | |
| Cresol, m- | | | | | | |
| Dibenzo(a,h)anthracene | | | | | | |
| Dibromo-3-chloropropane, 1,2- | | | | | | |
| Dichlorobenzidine, 3,3'- | | | | | | |
| Dichlorophenol, 2,4- | | | | | | |
| Dichlorotrifluoroethane | | | | | | |
| Diethyl phthalate | | | | | | |
| Dimethyl phthalate | | | | | | |
| Dimethylphenol, 2,4- | | | | | | |
| Di-n-butyl phthalate | | | | | | |
| Dinitrophenol, 2,4- | | | | | | |
| Dinitrophenol, 2-methyl-4,6- | | | | | | |
| Dinitrotoluene, 2,4- | | | | | | |
| Dinitrotoluene, 2,6- | | | | | | |
| Di-n-octyl phthalate | | | | | | |
| Dioxane, 1,4- | | | | | | |
| Diphenylhydrazine, 1,2- | | | | | | |
| Ethanol | | | | | | |
| Ethylene glycol | | | | | | |
| Fluoranthene | | | | | | |
| Fluorene | | | | | | |
| Formaldehyde | | | | | | |
| Hexachlorobenzene | | | | | | |
| Hexachlorobutadiene | | | | | | |
| Hexachloroethane | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| SemiVolatile Substances | | | | | | |
| Indeno(1,2,3-c,d)pyrene | | | | | | |
| Isophorone | | | | | | |
| Isopropanol | | | | | | |
| Methanol | | | | | | |
| Methylphenol, 2- | | | | | | |
| Methylphenol, 4- | | | | | | |
| Naphthalene | | | | | | |
| Nitroaniline, 2- | | | | | | |
| Nitroaniline, 3- | | | | | | |
| Nitroaniline, 4- | | | | | | |
| Nitrosodimethylamine, N- | | | | | | |
| Nitrosodi-n-propylamine, N- | | | | | | |
| Nitrosodiphenylamine, N- | | | | | | |
| Nonylphenol | | 7 | | | 1.7 | |
| Pentachloronitrobenzene | | | | | | |
| Pentachlorophenol | 13 | 13 | **13** | 7.9 | 7.9 | **7.9** |
| Phenanthrene | | | | | | |
| Phenol | | | | | | |
| Propylene glycol | | | | | | |
| Pyrene | | | | | | |
| Sodium acetate | | | | | | |
| Tert-butyl alcohol | | | | | | |
| Tetrachlorobenzene, 1,2,4,5- | | | | | | |
| Tetrachlorodibenzo-p-dioxin, 2,3,7,8- | | | | | | |
| Trichlorophenol, 2,4,5- | | | | | | |
| Trichlorophenol, 2,4,6- | | | | | | |

| Chemical Constituent | Aquatic Life Criteria | | | | | |
|---|---|---|---|---|---|---|
| | Saltwater | | | | | |
| | Acute | | | Chronic | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Pesticides | | | | | | |
| Alachlor | | | | | | |
| Aldicarb | | | | | | |
| Aldrin | 0.65 | 0.65 | **0.65** | | | |
| Atrazine | | | | | | |
| Chlordane | 0.045 | 0.045 | **0.045** | 0.004 | 0.0045 | **0.004** |
| Chlorpyrifos | | 0.011 | | | 0.0056 | |
| D, 2,4- | | | | | | |
| DDD, 4,4- | | | | | | |
| DDE, 4,4- | | | | | | |
| DDT, 4,4- (total) | 0.065 | 0.065 | **0.065** | 0.001 | 0.001 | **0.001** |
| Diazinon | | 0.82 | | | 0.82 | |
| Dicamba | | | | | | |
| Dichloroprop | | | | | | |
| Dieldrin | 0.355 | | **0.355** | 0.0019 | | **0.0019** |
| Endosulfan | 0.017 | 0.017 | **0.017** | 0.0087 | 0.0087 | **0.0087** |
| Endosulfan sulfate | | | | | | |
| Endrin | 0.0185 | 0.0185 | **0.0185** | 0.0023 | 0.0023 | **0.0023** |
| Endrin aldehyde | | | | | | |
| Endrin ketone | | | | | | |
| Heptachlor | 0.0265 | 0.0265 | **0.0265** | 0.0036 | 0.0036 | **0.0036** |
| Heptachlor epoxide | 0.0265 | 0.0265 | **0.0265** | 0.0036 | 0.0036 | **0.0036** |
| Hexachlorocyclohexane, alpha | | | | | | |
| Hexachlorocyclohexane, beta- | | | | | | |
| Hexachlorocyclohexane, delta- | | | | | | |
| Hexachlorocyclopentadiene | | | | | | |
| Lindane | 0.08 | 0.08 | **0.08** | | | |
| Methoxychlor | | | | | | |
| Simazine | | | | | | |
| Toxaphene | 0.21 | 0.21 | **0.21** | 0.0002 | 7.5 | **0.0002** |
| Polychlorinated biphenyls | | | | 0.03 | 0.03 | **0.03** |
| Radionuclides | | | | | | |
| Alpha particles | | | | | | |
| Beta Particles | | | | | | |

# Human Health-Based Criteria

Water quality criteria for the protection of human health are presented in the following table for two exposure scenarios: drinking water and eating fish or only eating fish. For each exposure scenario, the table contains the criteria that are being adopted with the 2011 revisions to the Water Quality Standards along with the criteria that are contained in the 2002 Water Quality Standards and those proposed in the 2009 revisions.

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters Consumption of Fish | | | Class AA & A Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Inorganic Substances | | | | | | |
| Aluminum (Total) | | 168,000 | | | 2074 | |
| Ammonia | | 11,200 | | | 138 | |
| Antimony | 4300 | 280 | **640** | 6 | 2.8 | **5.6** |
| Arsenic | 0.021 | 0.05 | **0.021** | 0.011 | 0.02 | **0.011** |
| Asbestos | | 7 million fibers/L | | 7 million fibers/L | | **7 million fibers/L** |
| Barium | | 112,000 | | | 1383 | |
| Beryllium (Total) | 0.13 | 7 | **0.13** | 0.0077 | 1 | **0.0077** |
| Boron | | 112,000 | | | 1383 | |
| Cadmium | 10,679 | 11.2 | **10,769** | 5 | 0.14 | **5.00** |
| Chloride | | | | | | |
| Chlorine | | 56,000 | | | 691 | |
| Chromium, hexavalent | 2,019 | 0.28 | **2,019** | 100 | 0.038 | **100** |
| Chromium, trivalent | 1,009,615 | 65,625 | **1,009,615** | 100 | 9052 | **100** |
| Cobalt | | 168 | | | 2 | |
| Copper | | 194 | | 1,300 | 51 | **1,300** |
| Copper (site specific) | | 194 | | 1,300 | 51 | **1,300** |
| Cyanide | 220,000 | 14,000 | **140** | 200 | 139 | **140** |
| Iron | | | | | | |
| Lead | | | | 15 | 15 | **15** |
| Lithium | | 1,120 | | | 14 | |
| Manganese | | 39,200 | | | 484 | |
| Mercury (total) | 0.051 | 0.00029 | **0.051** | 0.05 | 0.00029 | **0.05** |
| Nickel | 4,600 | 30 | **4600** | 610 | 9.5 | **610** |
| Selenium (Total) | 11,000 | 729 | **4200** | 50 | 33 | **50** |
| Silver | 107,692 | 7,000 | **107692** | 175 | 35 | **175** |
| Thallium | 6.3 | 0.48 | **0.47** | 1.70 | 0.26 | **0.24** |
| Tin | | 177 | | | 50 | |
| Uranium | | 1,680 | | | 21 | |
| Vanadium | | 46 | | | 6 | |
| Zinc (Total) | 68,740 | 4,468 | **26000** | 9,100 | 1429 | **7400** |

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters Consumption of Fish | | | Class AA & A Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Acetone | | 504,000 | | | 6222 | |
| Acetonitrile | | 2,800 | | | 35 | |
| Acrolein | 780 | 0.16 | **9.00** | 320.00 | 0.11 | **6.00** |
| Acrylonitrile | 0.66 | 0.22 | **0.25** | 0.06 | 0.049 | **0.051** |
| Benzene | 71 | 6.73 | **51.00** | 1.20 | 0.33 | **1.20** |
| Bromomethane | 4000 | 93.00 | **1500** | 48 | 3.37 | **47** |
| Butanone, 2- | | 336,000 | | | 4148 | |
| Butylbenzene, n- | | | | | | |
| Butylbenzene, sec- | | | | | | |
| Butylbenzene, t- | | | | | | |
| Carbon disulfide | | 28544 | | | 683 | |
| Carbon Tetrachloride | 4.4 | 1.44 | **1.60** | 0.25 | 0.23 | **0.23** |
| Chlorobenzene | 21,000 | 1359 | **1,600** | 100 | 127 | **100** |
| Chloroethane | | 752 | | | 7.37 | |
| Chloroethylvinyl ether, 2- (mixed) | | | | | | |
| Chloroform | 470 | 187 | **470** | 5.7 | 6.75 | **5.70** |
| Chloromethane | | 199 | | | 17.54 | |
| Chloronapthalene, 2- | 4,300 | 277 | **1600** | 1700 | 185 | **1000** |
| Chlorotoluene, 2- | | 41 | | | 10 | |
| Chlorotoluene, 4- | | 19 | | | 8 | |
| Cyclohexane | | 33922 | | | 8810 | |
| Dibenzofuran | | | | | | |
| Dichlorobenzene, 1,2- | 17,000 | 1133 | **1300** | 2,700 | 405 | **420** |
| Dichlorobenzene, 1,3- | 2,600 | 13 | **960** | 400 | 4.50 | **320** |
| Dichlorobenzene, 1.4- | 2,600 | 2.60 | **190** | 400.00 | 0.94 | **63** |
| Dichlorobromomethane | 46 | 15.00 | **17.00** | 0.56 | 0.54 | **0.55** |
| Dichlorobutene, 1,4- | | | | | | |
| Dichlorodiflouromethane | | 9642 | | | 338 | |
| Dichloroethane, 1,1- | | 3723 | | | 69 | |
| Dichloroethane, 1,2- | 99 | 32 | **37** | 0.38 | 0.38 | **0.38** |
| Dichloroethene, 1,2- | | 2564 | | | 68 | |
| Dichloroethylene, 1,1- | 3.2 | 625 | **3.2** | 0.057 | 33 | **0.057** |
| Dichloroethylene, cis-1,2- | | 4430 | | | 69 | |
| Dichloroethylene, trans-1,2- | 140,000 | 4430 | **10,000** | 100 | 69 | **100** |
| Dichloropropane, 1,2- | 39 | 24 | **15** | 0.52 | 0.93 | **0.50** |
| Dichloropropene, 1,3- | 1,700 | 18 | **21** | 10 | 0.34 | **0.34** |

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters Consumption of Fish | | | Class AA & A Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Volatile Substances | | | | | | |
| Ethyl acetate | | 504000 | | | 6222 | |
| Ethylbenzene | 29,000 | 187 | **2,100** | 700 | 51 | **530** |
| Ethylene dibromide | | 0.69 | | | 0.017 | |
| Hexane, n- | | 177 | | | 78 | |
| Isopropylbenzene | | 1351 | | | 461 | |
| Isopropyltoluene, 4- | | 169 | | | 94 | |
| Methyl isobutyl ketone | | 70000 | | | 556 | |
| Methyl methacrylate | | 107692 | | | 972 | |
| Methyl tert butyl ether | | 5600 | | | 69 | |
| Methylene chloride | 1,600 | 519 | **590** | 4.7 | 4.63 | **4.60** |
| Methylnaphthalene, 2- | | 38 | | | 16 | |
| Nitrobenzene | 1900 | 121 | **690** | 17 | 3.40 | **17** |
| Nitrophenol, 2- | | | | | | |
| Nitrophenol, 4- | | | | | | |
| Propylbenzene, n- | | | | | | |
| Pyridine | | 168 | | | 2 | |
| Styrene | | 951 | | | 122 | |
| Tetrachloroethane, 1,1,1,2- | | 9.48 | | | 1.18 | |
| Tetrachloroethane, 1,1,2,2- | 11 | 3.5 | **4** | 0.17 | 0.17 | **0.17** |
| Tetrachloroethylene | 8.85 | 0.21 | **3.30** | 0.8 | 0.05 | **0.69** |
| Tetrahydrofuran | | 368 | | | 4.55 | |
| Toluene | 200,000 | 438 | **15,000** | 1,000 | 42 | **1000** |
| Trichloro-1,2,2-trifluoroethane, 1,1,2- | | 98315 | | | 17303 | |
| Trichlorobenzene, 1,2,4- | 940 | 7.75 | **70.00** | 70.00 | 4.31 | **35.00** |
| Trichloroethane, 1,1,1- | | 9500 | | | 504 | |
| Trichloroethane, 1,1,2- | 42 | 13.65 | **16.00** | 0.6 | 0.59 | **0.59** |
| Trichloroethylene | 81 | 3.71 | **30.00** | 2.70 | 0.36 | **2.50** |
| Trichlorofluoromethane | | 30045 | | | 1963 | |
| Trimethylbenzene, 1,2,4- | | 712 | | | 235 | |
| Trimethylbenzene, 1,3,5- | | 1010 | | | 260 | |
| Vinyl acetate | | 11200 | | | 138 | |
| Vinyl chloride | 525 | 2 | **2.4** | 2 | 0.023 | **0.25** |
| Xylenes | | 6554 | | | 1154 | |

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters Consumption of Fish | | | Class AA & A Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Semivolatile Substances | | | | | | |
| Acenaphthene | 6.1 | 174 | **6.1** | 2.7 | 123 | **2.7** |
| Acenaphthylene | 49.2 | 1400 | **49.2** | 4.37 | 323 | **4.37** |
| Aniline | | 491 | | | 6 | |
| Anthracene | 4.92 | 5833 | **4.92** | 0.44 | 1544 | **0.44** |
| Benzidine | 0.00054 | 0.00017 | **0.00020** | 0.00012 | 0.000081 | **0.000086** |
| Benzo(a)anthracene | 0.49 | 0.003 | **0.018** | 0.044 | 0.003 | **0.0038** |
| Benzo(a)pyrene | 0.049 | 0.0002 | **0.018** | 0.0044 | 0.0002 | **0.0038** |
| Benzo(b)fluoranthene | 0.49 | 0.003 | **0.018** | 0.044 | 0.003 | **0.0038** |
| Benzo(g,h,i)perylene | 4.92 | 0.016 | **4.92** | 0.44 | 0.015 | **0.44** |
| Benzo(k)fluoranthene | 0.49 | 0.004 | **0.018** | 0.044 | 0.004 | **0.0038** |
| Benzoic Acid | | 2240000 | | | 27654 | |
| Bis(2-chloroethoxy)methane | | | | | | |
| Bis(2-chloroethyl)ether | 1.4 | 0.20 | **0.53** | 0.031 | 0.013 | **0.030** |
| Bis(2-chloroisopropyl)ether | 170,000 | 20.00 | **65000.00** | 1400 | 0.49 | **1400.00** |
| Bis(2-ethylhexyl)phthalate | 5.9 | 0.02 | **2.2** | 1.8 | 0.02 | **1.2** |
| Bromoform | 360 | 117 | **140** | 4.3 | 4.22 | **4.30** |
| Bromophenyl-phenylether, 4- | | | | | | |
| Butylbenzyl phthalate | 5,200 | 24 | **1900** | 3,000 | 21 | **1500** |
| Carbazole | | 3 | | | 1.11 | |
| Chloroaniline, 4- | | 32 | | | 0.64 | |
| Chlorodibromomethane | 34 | 11.00 | **13.00** | 0.41 | 0.40 | **0.40** |
| Chlorophenol, 2- | 400 | 26 | **150** | 120 | 15 | **81** |
| Chlorophenol, 3-methyl-4 | | | | | | |
| Chlorophenyl-phenylether, 4- | | | | | | |
| Chrysene | 4.92 | 0.11 | **0.018** | 0.44 | 0.10 | **0.0038** |
| Cresol, m- | | 4684 | | | 116 | |
| Dibenzo(a,h)anthracene | 0.010 | 0.0001 | **0.010** | 0.0009 | 0.0001 | **0.0009** |
| Dibromo-3-chloropropane, 1,2- | | 0.033 | | | 0.004 | |
| Dichlorobenzidine, 3,3'- | 0.077 | 0.025 | **0.028** | 0.04 | 0.019 | **0.021** |
| Dichlorophenol, 2,4- | 790 | 17 | **290** | 93 | 5 | **77** |
| Dichlorotrifluoroethane | | | | | | |
| Diethyl phthalate | 120,000 | 767 | **44000** | 23,000 | 323 | **17000** |
| Dimethyl phthalate | 2,900,000 | 1556 | **1100000** | 313,000 | 412 | **270000** |
| Dimethylphenol, 2,4- | | 149 | **850** | | 72 | **380** |
| Di-n-butyl phthalate | 12,000 | 66 | **4500** | 2700 | 34 | **2000** |
| Dinitrophenol, 2,4- | 14,000 | 93 | **5300** | 70 | 1.40 | **69.00** |
| Dinitrophenol, 2-methyl-4,6- | 765 | 51 | **280** | 13.4 | 2.70 | **13.00** |

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters Consumption of Fish | | | Class AA & A Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Semivolatile Substances | | | | | | |
| Dinitrotoluene, 2,4- | 9.1 | 1.35 | **3.4** | 0.11 | 0.05 | **0.11** |
| Dinitrotoluene, 2,6- | | 1.35 | | | 0.05 | |
| Di-n-octyl phthalate | | 2.80 | | | 2.70 | |
| Dioxane, 1,4- | | 1680 | | | 21 | |
| Diphenylhydrazine, 1,2- | 0.54 | 0.18 | **0.20** | 0.04 | 0.035 | **0.036** |
| Ethanol | | 37520 | | | 463 | |
| Ethylene glycol | | 1120000 | | | 13827 | |
| Fluoranthene | 1.28 | 5.70 | **1.28** | 1.01 | 5.60 | **1.01** |
| Fluorene | 49.2 | 848.00 | **49.2** | 4.37 | 211 | **4.37** |
| Formaldehyde | | 11200 | | | 138 | |
| Hexachlorobenzene | 0.00077 | 0.0000076 | **0.00029** | 0.00075 | 0.0000076 | **0.00028** |
| Hexachlorobutadiene | 50 | 11.00 | **18** | 0.44 | 0.43 | **0.44** |
| Hexachloroethane | 8.9 | 2.60 | **3.3** | 1.9 | 1.30 | **1.4** |
| Indeno(1,2,3-c,d)pyrene | 0.49 | 0.0016 | **0.018** | 0.044 | 0.0016 | **0.0038** |
| Isophorone | 2600 | 841 | **960** | 36 | 35 | **35** |
| Isopropanol | | 1848 | | | 1027 | |
| Methanol | | 84000 | | | 1037 | |
| Methylphenol, 2- | | 840 | | | 20 | |
| Methylphenol, 4- | | 854 | | | 20 | |
| Naphthalene | 20,513 | 133 | **20513** | 677 | 13 | **677** |
| Nitroaniline, 2- | | 84 | | | 1.70 | |
| Nitroaniline, 3- | | 197 | | | 1.70 | |
| Nitroaniline, 4- | | 188 | | | 1.70 | |
| Nitrosodimethylamine, N- | 8.1 | 8.40 | **3** | 0.00069 | 0.002 | **0.00069** |
| Nitrosodi-n-propylamine, N- | 1.4 | 0.44 | **0.51** | 0.005 | 0.005 | **0.005** |
| Nitrosodiphenylamine, N- | 16 | 5.30 | **6.00** | 5 | 3 | **3.3** |
| Nonylphenol | | | | | | |
| Pentachloronitrobenzene | | 1.80 | | | 1.50 | |
| Pentachlorophenol | 8.2 | 0.83 | **3.00** | 0.28 | 0.22 | **0.27** |
| Phenanthrene | 49.17 | 972.00 | **49.17** | 4.37 | 257 | **4.37** |
| Phenol | 4,600,000 | 15000 | **860,000** | 21,000 | 207 | **10,000** |
| Propylene glycol | | 280000 | | | 3457 | |
| Pyrene | 49.17 | 350 | **49.17** | 4.37 | 131 | **4.37** |
| Sodium acetate | | | | | | |
| Tert-butyl alcohol | | 9520 | | | 118 | |
| Tetrachlorobenzene, 1,2,4,5- | | 0.14 | | | 0.13 | |
| Tetrachlorodibenzo-p-dioxin, 2,3,7,8- | 0.000000014 | $5.38 \times 10^{-11}$ | **$5.1 \times 10^{-9}$** | 0.000000013 | $5.38 \times 10^{-11}$ | **$5.0 \times 10^{-9}$** |
| Trichlorophenol, 2,4,5- | | 64 | | | 33 | |
| Trichlorophenol, 2,4,6- | 6.5 | 0.30 | **2.40** | 2.1 | 0.2 | **1.4** |

| Numerical Water Quality Criteria (ug/L) for Chemical Constituents: Human Health Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Chemical Constituent | Class B, SA and SB Waters<br>Consumption of Fish | | | Class AA & A<br>Consumption of Water and Fish | | |
| | 2002 | 2009 | **2011** | 2002 | 2009 | **2011** |
| Pesticides and PCBs | | | | | | |
| Alachlor | | 1.50 | | | 0.45 | |
| Aldicarb | | 1207 | | | 7 | |
| Aldrin | 0.00014 | 0.00000044 | **0.00005** | 0.00013 | 0.00000044 | **0.000049** |
| Atrazine | | 18.00 | | | 0.67 | |
| Chlordane | 0.0022 | 0.0000084 | **0.00081** | 0.0021 | 0.0000084 | **0.00080** |
| Chlorpyrifos | | | | | | |
| D, 2,4- | | 560 | | | 6.91 | |
| DDD, 4,4- | 0.00084 | 0.000004 | **0.00031** | 0.00083 | 0.000004 | **0.00031** |
| DDE, 4,4- | 0.00059 | 0.000002 | **0.00022** | 0.00059 | 0.000002 | **0.00022** |
| DDT, 4,4- (total) | 0.00059 | 0.000002 | **0.00022** | 0.00059 | 0.000002 | **0.00022** |
| Diazinon | | | | | | |
| Dicamba | | 16800 | | | 207 | |
| Dichloroprop | | 2016 | | | 25.00 | |
| Dieldrin | 0.00014 | 0.0000059 | **0.000054** | 0.00014 | 0.0000058 | **0.000052** |
| Endosulfan | 240 | 0.52 | **89** | 110 | 0.38 | **62** |
| Endosulfan sulfate | 240 | 0.52 | **89** | 110 | 0.38 | **62** |
| Endrin | 0.81 | 0.012 | **0.060** | 0.76 | 0.012 | **0.059** |
| Endrin aldehyde | 0.81 | 0.035 | **0.300** | 0.76 | 0.035 | **0.29** |
| Endrin ketone | | 0.052 | | | 0.052 | |
| Heptachlor | 0.00021 | 0.00000093 | **0.000079** | 0.00021 | 0.00000093 | **0.000079** |
| Heptachlor epoxide | 0.00011 | 0.000013 | **0.000039** | 0.00010 | 0.000013 | **0.000039** |
| Hexachlorocyclohexane, alpha | 0.013 | 0.0043 | **0.0049** | 0.0039 | 0.0024 | **0.0026** |
| Hexachlorocyclohexane, beta- | 0.046 | 0.015 | **0.017** | 0.014 | 0.0085 | **0.0091** |
| Hexachlorocyclohexane, delta- | | 0.014 | | | 0.008 | |
| Hexachlorocyclopentadiene | 17000 | 372 | **1100** | 50 | 38 | **40** |
| Lindane | 0.063 | 0.024 | **0.063** | 0.019 | 0.014 | **0.019** |
| Methoxychlor | | 0.17 | | | 0.16 | |
| Simazine | | 194.44 | | | 3.44 | |
| Toxaphene | 0.73 | 0.0000052 | **0.00028** | 0.00075 | 0.0000052 | **0.00028** |
| Polychlorinated biphenyls | 0.00017 | 0.00000056 | **0.000064** | 0.00017 | 0.00000056 | **0.000064** |
| Radionuclides | | | | | | |
| Alpha particles | | | | | 15 pCi/L | |
| Beta Particles | | | | | 4 pCi/L | |