**DIVISION 41**

**WATER QUALITY STANDARDS: BENEFICIAL USES, POLICIES, AND CRITERIA FOR OREGON**

**340-041-0033**

**Toxic Substances**

**TABLE 30: Aquatic Life Water Quality Criteria for Toxic Pollutants**

*Effective April 18, 2014*

**Aquatic Life Criteria Summary**

The concentration for each compound listed in Table 30 is a criterion not to be exceeded in waters of the state in order to protect aquatic life. The aquatic life criteria apply to waterbodies where the protection of fish and aquatic life are the designated uses. All values are expressed as micrograms per liter (µg/L). Compounds are listed in alphabetical order with the corresponding information: the Chemical Abstract Service (CAS) number, whether there is a human health criterion for the pollutant (i.e. “y”= yes, “n” = no), and the associated aquatic life freshwater and saltwater acute and chronic criteria. Italicized pollutants are not identified as priority pollutants by EPA. Dashes in the table column indicate that there is no aquatic life criterion.

Unless otherwise noted in the table below, the acute criterion is the Criterion Maximum Concentration (CMC) applied as a one-hour average concentration, and the chronic criterion is the Criterion Continuous Concentration (CCC) applied as a 96-hour (4 days) average concentration. The CMC and CCC criteria should not be exceeded more than once every three years. Footnote A, associated with eleven pesticide pollutants in Table 30, describes the exception to the frequency and duration of the toxics criteria stated in this paragraph.

| Table 30  **Aquatic Life Water Quality Criteria for Toxic Pollutants** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pollutant** | **CAS Number** | | **Human Health Criterion** | **Freshwater**  **(*µg/L)*** | | **Saltwater**  ***(µg/L)*** | |
| **Acute Criterion (CMC)** | **Chronic Criterion (CCC)** | **Acute Criterion (CMC)** | **Chronic Criterion (CCC)** |
| 1 | Aldrin | 309002 | | y | 3 **A** | -- | 1.3 **A** | -- |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 2 | *Alkalinity* |  | | n | -- | 20,000 **B** | -- | -- |
| **B** *Criterion shown is the minimum (i.e. CCC in water may not be below this value in order to protect aquatic life).* | | | | | | | | |
| 3 | *Ammonia* | 7664417 | | n | *Criteria are pH, temperature, and salmonid or sensitive coldwater species dependent-- See document USEPA January 1985 (Fresh Water).***M** | | *Ammonia criteria for saltwater may depend on pH and temperature. Values for saltwater criteria (total ammonia) can be calculated from the tables specified in Ambient Water Quality Criteria for Ammonia (Saltwater)--1989 (EPA 440/5-88-004;*  [*http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm*](http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm)*)* | |
| **M** *See expanded endnote M equations at bottom of Table 30 to calculate freshwater ammonia criteria* | | | | | | | | |
| 4 | Arsenic | 7440382 | | y | 340 **C, D** | 150 **C, D** | 69 **C, D** | 36 **C, D** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **D** *Criterion is applied as total inorganic arsenic (i.e. arsenic (III) + arsenic (V)).* | | | | | | | | |
| 5 | BHC Gamma (Lindane) | 58899 | | y | 0.95 | 0.08 **A** | 0.16 **A** | -- |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 6 | Cadmium | 7440439 | | n | *See* **E** | *See* **C,**  **F** | 40 **C** | 8.8 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **E** *The freshwater criterion for this metal is expressed as “total recoverable” and is a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote E at bottom of Table 30.*  **F** *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |
| 7 | Chlordane | 57749 | | y | 2.4**A** | 0.0043**A** | 0.09**A** | 0.004**A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 8 | *Chloride* | 16887006 | | n | 860,000 | 230,000 | -- | -- |
| 9 | *Chlorine* | 7782505 | | n | 19 | 11 | 13 | 7.5 |
| 10 | *Chlorpyrifos* | 2921882 | | n | 0.083 | 0.041 | 0.011 | 0.0056 |
| 11 | Chromium III | 16065831 | | n | *See* **C,** **F** | *See* **C,** **F** | -- | -- |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **F** *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |
| 12 | Chromium VI | 18540299 | | n | 16 **C** | 11 **C** | 1100**C** | 50**C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.* | | | | | | | | |
| 13 | Copper | 7440508 | | y | *See* **E** | *See* **E** | 4.8 **C** | 3.1 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **E** *The freshwater criterion for this metal is expressed as “total recoverable” and is a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote E at bottom of Table 30.* | | | | | | | | |
| 14 | Cyanide | 57125 | | y | 22 **J** | 5.2 **J** | 1 **J** | 1 **J** |
| **J** *This criterion is expressed as µg free cyanide (CN)/L.* | | | | | | | | |
| 15 | DDT 4,4' | 50293 | | y | 1.1 **A , G** | 0.001 **A, G** | 0.13 **A, G** | 0.001 **A, G** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*  **G** *This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).* | | | | | | | | |
| 16 | *Demeton* | 8065483 | | n | -- | 0.1 | -- | 0.1 |
| 17 | Dieldrin | 60571 | | y | 0.24 | 0.056 | 0.71**A** | 0.0019**A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 18 | Endosulfan | 115297 | | n | 0.22 **A , H** | 0.056 **A , H** | 0.034 **A , H** | 0.0087 **A, H** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.*  **H** *This value is based on* *the* *criterion published in Ambient Water Quality Criteria for Endosulfan (EPA 440/5-80-046) and should be applied as the sum of alpha- and beta-endosulfan.* | | | | | | | | |
| 19 | Endosulfan Alpha | 959988 | | y | 0.22 **A** | 0.056 **A** | 0.034 **A** | 0.0087 **A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 20 | Endosulfan Beta | 33213659 | | y | 0.22 **A** | 0.056 **A** | 0.034 **A** | 0.0087 **A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 21 | Endrin | 72208 | | y | 0.086 | 0.036 | 0.037 **A** | 0.0023 **A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 22 | *Guthion* | 86500 | | n | -- | 0.01 | -- | 0.01 |
| 23 | Heptachlor | 76448 | | y | 0.52 **A** | 0.0038 **A** | 0.053 **A** | 0.0036 **A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 24 | Heptachlor Epoxide | 1024573 | | y | 0.52 **A** | 0.0038 **A** | 0.053 **A** | 0.0036 **A** |
| ***A*** *See expanded endnote A at bottom of Table 30 for alternate frequency and duration of this criterion.* | | | | | | | | |
| 25 | *Iron (total)* | 7439896 | | n | -- | 1000 | -- | -- |
| 26 | Lead | 7439921 | | n | *See* **C , F** | *See* **C , F** | 210 **C** | 8.1 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **F** *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |
| 27 | *Malathion* | 121755 | | n | -- | 0.1 | -- | 0.1 |
| 28 | Mercury (total) | 7439976 | | n | 2.4 | 0.012 | 2.1 | 0.025 |
| 29 | *Methoxychlor* | 72435 | | y | -- | 0.03 | -- | 0.03 |
| 30 | *Mirex* | 2385855 | | n | -- | 0.001 | -- | 0.001 |
| 31 | Nickel | 7440020 | | y | *See* **C , F** | *See* **C , F** | 74 **C** | 8.2 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **F** *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |
| 32 | *Parathion* | | 56382 | n | 0.065 | 0.013 | -- | -- |
| 33 | Pentachlorophenol | | 87865 | y | *See* **H** | *See* **H** | 13 | 7.9 |
| **H** *Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows: CMC=(exp(1.005(pH)-4.869); CCC=exp(1.005(pH)-5.134).* | | | | | | | | |
| 34 | *Phosphorus Elemental* | 7723140 | | n | -- | -- | -- | 0.1 |
| 35 | Polychlorinated Biphenyls (PCBs) | NA | | y | 2 **K** | 0.014 **K** | 10 **K** | 0.03 **K** |
| **K** *This criterion applies to total PCBs (e.g.* determined as Aroclors or congeners) | | | | | | | | |
| 36 | Selenium | 7782492 | | y | *See* **C** , **L** | 4.6 **C** | 290 **C** | 71 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **L** *The CMC=(1/[(f1/CMC1)+(f2/CMC2)]µg/L) \* CF where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate, respectively,and CMC1 and CMC2 are 185.9 μg/L and 12.82 μg/L, respectively. See expanded endnote F for the Conversion Factor (CF) for selenium.* | | | | | | | | |
| 37 | Silver | 7440224 | | n | *See* **C** , **F** | 0.10 **C** | 1.9 **C** | -- |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **F** *The freshwater acute criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |
| 38 | *Sulfide Hydrogen Sulfide* | 7783064 | | n | -- | 2 | -- | 2 |
| 39 | Toxaphene | 8001352 | | y | 0.73 | 0.0002 | 0.21 | 0.0002 |
| 40 | *Tributyltin (TBT)* | 688733 | | n | 0.46 | 0.063 | 0.37 | 0.01 |
| 41 | Zinc | 7440666 | | y | *See* **C , F** | *See* **C , F** | 90 **C** | 81 **C** |
| **C** *Criterion is expressed in terms of “dissolved” concentrations in the water column.*  **F** *The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. To calculate the criterion, use formula under expanded endnote F at bottom of Table 30.* | | | | | | | | |

**Expanded Endnotes A, E, F, M**

**Endnote A: Alternate Frequency and Duration for Certain Pesticides**

This criterion is based on EPA recommendations issued in 1980 that were derived using guidelines that differed from EPA's 1985 Guidelines which update minimum data requirements and derivation procedures. The CMC may not be exceeded at any time and the CCC may not be exceeded based on a 24-hour average. The CMC may be applied using a one hour averaging period not to be exceeded more than once every three years, if the CMC values given in Table 30 are divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

**Endnote E: Equations for Hardness-Dependent Freshwater Metals Criteria for Cadmium Acute and Copper Acute and Chronic Criteria**

The freshwater criterion for this metal is expressed as total recoverable with two significant figures, and is a function of hardness (mg/L) in the water column. Criteria values for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

**CMC** = (exp(mA\*[ln(hardness)] + bA))

**CCC** = (exp(mC\*[ln(hardness)] + bC))

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical** | **mA** | **bA** | **mC** | **bC** |
| Cadmium | 1.128 | -3.828 | N/A | N/A |
| Copper | 0.9422 | -1.464 | 0.8545 | -1.465 |

**Endnote F: Equations for Hardness-Dependent Freshwater Metals Criteria and Conversion Factor Table**

The freshwater criterion for this metal is expressed as dissolved with two significant figures, and is a function of hardness (mg/L) in the water column. Criteria values for hardness are calculated using the following formulas (CMC refers to the acute criterion; CCC refers to the chronic criterion):

**CMC** = (exp(mA\*[ln(hardness)] + bA))\*CF

**CCC** = (exp(mC\*[ln(hardness)] + bC))\*CF

“CF” is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical** | **mA** | **bA** | **mC** | **bC** |
| Cadmium | N/A | N/A | 0.7409 | -4.719 |
| Chromium III | 0.8190 | 3.7256 | 0.8190 | 0.6848 |
| Lead | 1.273 | -1.460 | 1.273 | -4.705 |
| Nickel | 0.8460 | 2.255 | 0.8460 | 0.0584 |
| Silver | 1.72 | -6.59 | -- | -- |
| Zinc | 0.8473 | 0.884 | 0.8473 | 0.884 |

The conversion factors (CF) below must be used in the equations above for the hardness-dependent metals in order to convert total recoverable metals criteria to dissolved metals criteria. For metals that are not hardness-dependent (i.e. arsenic, chromium VI, selenium, and silver (chronic)), or are saltwater criteria, the criterion value associated with the metal in Table 30 already reflects a dissolved criterion based on its conversion factor below.

**Conversion Factor (CF) Table for Dissolved Metals**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Chemical** | **Freshwater** | | **Saltwater** | |
| **Acute** | **Chronic** | **Acute** | **Chronic** |
| Arsenic | 1.000 | 1.000 | 1.000 | 1.000 |
| Cadmium | N/A | 1.101672-[(ln hardness)(0.041838)] | 0.994 | 0.994 |
| Chromium III | 0.316 | 0.860 | -- | -- |
| Chromium VI | 0.982 | 0.962 | 0.993 | 0.993 |
| Copper | N/A | N/A | 0.83 | 0.83 |
| Lead | 1.46203-[(ln hardness)(0.145712)] | 1.46203-[(ln hardness)(0.145712)] | 0.951 | 0.951 |
| Nickel | 0.998 | 0.997 | 0.990 | 0.990 |
| Selenium | 0.996 | 0.922 | 0.998 | 0.998 |
| Silver | 0.85 | 0.85 | 0.85 | -- |
| Zinc | 0.978 | 0.986 | 0.946 | 0.946 |

**Endnote M: Equations for Freshwater Ammonia Calculations**

**Acute Criterion**

The 1-hour average concentration of un-ionized ammonia (mg/L NH3) may not exceed more often than once every three years on average, the numerical value given by:

CMCNH3 = 0.52/FT/FPH/2 where:

*FT = temperature adjustment factor*

*FPH = pH adjustment factor*

*TCAP = temperature cap*

FT = 10 0.03(20-TCAP); TCAP ≤ T ≤ 30˚ C

FT = 10 0.03(20-T); 0 ≤ T ≤ TCAP

FPH = 1 8≤ pH ≤ 9

FPH = 1 + 10 7.4-pH 6.5 ≤ pH ≤ 8

1.25

TCAP = 20 ˚C; Salmonids and other sensitive coldwater species present

TCAP = 25 ˚C; Salmonids and other sensitive coldwater species absent

**Chronic Criterion**

The 4-day average concentration of un-ionized ammonia (mg/L NH3) may not exceed more often than once every three years on average, the average numerical value given by:

CCCNH3 = 0.80/FT/FPH/RATIO

where FT and FPH are as above for acute criterion and:

RATIO = 16 *where* 7.7 ≤ pH ≤ 9

RATIO = 24 x 107.7 – pH *where* 6.5≤ pH ≤ 7.7

1 + 10 7.4 - pH

TCAP = 15 ˚C; Salmonids and other sensitive coldwater species present

TCAP = 20 ˚C; Salmonids and other sensitive coldwater species absent

**TABLE 31:Aquatic Life Water Quality Guidance Values for Toxic Pollutants**

*Effective April 18, 2014*

**Water Quality Guidance Values Summary A**

The concentration for each compound listed in Table 31 is a guidance value that can be used in application of Oregon’s Toxic Substances Narrative (340-041-0033(2)) to waters of the state in order to protect aquatic life. All values are expressed as micrograms per liter (µg/L) except where noted. Compounds are listed in alphabetical order with the corresponding EPA number (from National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047), corresponding Chemical Abstract Service (CAS) number, aquatic life freshwater acute and chronic guidance values, and aquatic life saltwater acute and chronic guidance values.

| Table 31  **Aquatic Life Water Quality Guidance Values for Toxic Pollutants** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **EPA No.** | **Pollutant** | **CAS Number** | **Freshwater** | | **Saltwater** | |
| **Acute** | **Chronic** | **Acute** | **Chronic** |
| 56 | Acenaphthene | 83329 | 1,700 | 520 | 970 | 710 |
| 17 | Acrolein | 107028 | 68 | 21 | 55 |  |
| 18 | Acrylonitrile | 107131 | 7,550 | 2,600 |  |  |
| 1 | Antimony | 7440360 | 9,000 | 1,600 |  |  |
| 19 | Benzene | 71432 | 5,300 |  | 5,100 | 700 |
| 59 | Benzidine | 92875 | 2,500 |  |  |  |
| 3 | Beryllium | 7440417 | 130 | 5.3 |  |  |
| 19 B | BHC (Hexachlorocyclohexane-Technical) | 319868 | 100 |  | 0.34 |  |
| 21 | Carbon Tetrachloride | 56235 | 35,200 |  | 50,000 |  |
|  | Chlorinated Benzenes |  | 250 | 50 | 160 | 129 |
|  | Chlorinated naphthalenes |  | 1,600 |  | 7.5 |  |
|  | Chloroalkyl Ethers |  | 238,000 |  |  |  |
| 26 | Chloroform | 67663 | 28,900 | 1,240 |  |  |
| 45 | Chlorophenol 2- | 95578 | 4,380 | 2,000 |  |  |
|  | Chlorophenol 4- | 106489 |  |  | 29,700 |  |
| 52 | Methyl-4-chlorophenol 3- | 59507 | 30 |  |  |  |
| 5a | Chromium (III) | 16065831 |  |  | 10,300 |  |
| 109 | DDE 4,4'- | 72559 | 1,050 |  | 14 |  |
| 110 | DDD 4,4'- | 72548 | 0.06 |  | 3.6 |  |
|  | Diazinon | 333415 | 0.08 | 0.05 |  |  |
|  | Dichlorobenzenes |  | 1,120 | 763 | 1,970 |  |
| 29 | Dichloroethane 1,2- | 107062 | 118,000 | 20,000 | 113,000 |  |
|  | Dichloroethylenes |  | 11,600 |  | 224,000 |  |
| 46 | Dichlorophenol 2,4- | 120832 | 2,020 | 365 |  |  |
| 31 | Dichloropropane 1,2- | 78875 | 23,000 | 5,700 | 10,300 | 3,040 |
| 32 | Dichloropropene 1,3- | 542756 | 6,060 | 244 | 790 |  |
| 47 | Dimethylphenol 2,4- | 105679 | 2,120 |  |  |  |
|  | Dinitrotoluene |  | 330 | 230 | 590 | 370 |
| 16 | Dioxin (2,3,7,8-TCDD) | 1746016 | 0.01 | 38 pg/L |  |  |
| 85 | Diphenylhydrazine 1,2- | 122667 | 270 |  |  |  |
| 33 | Ethylbenzene | 100414 | 32,000 |  | 430 |  |
| 86 | Fluoranthene | 206440 | 3,980 |  | 40 | 16 |
|  | Haloethers |  | 360 | 122 |  |  |
|  | Halomethanes |  | 11,000 |  | 12,000 | 6,400 |
| 89 | Hexachlorobutadiene | 87683 | 90 | 9.3 | 32 |  |
| 90 | Hexachlorocyclopentadiene | 77474 | 7 | 5.2 | 7 |  |
| 91 | Hexachloroethane | 67721 | 980 | 540 | 940 |  |
| 93 | Isophorone | 78591 | 117,000 |  | 12,900 |  |
| 94 | Naphthalene | 91203 | 2,300 | 620 | 2,350 |  |
| 95 | Nitrobenzene | 98953 | 27,000 |  | 6,680 |  |
|  | Nitrophenols |  | 230 | 150 | 4,850 |  |
| 26 B | Nitrosamines | 35576911 | 5,850 |  | 3,300,000 |  |
|  | Pentachlorinated ethanes |  | 7,240 | 1,100 | 390 | 281 |
| 54 | Phenol | 108952 | 10,200 | 2,560 | 5,800 |  |
|  | Phthalate esters |  | 940 | 3 | 2,944 | 3.4 |
|  | Polynuclear Aromatic Hydrocarbons |  |  |  | 300 |  |
|  | Tetrachlorinated Ethanes |  | 9,320 |  |  |  |
| 37 | Tetrachloroethane 1,1,2,2- | 79345 |  | 2,400 | 9,020 |  |
|  | Tetrachloroethanes |  | 9,320 |  |  |  |
| 38 | Tetrachloroethylene | 127184 | 5,280 | 840 | 10,200 | 450 |
|  | Tetrachlorophenol 2,3,5,6 |  |  |  |  | 440 |
| 12 | Thallium | 7440280 | 1,400 | 40 | 2,130 |  |
| 39 | Toluene | 108883 | 17,500 |  | 6,300 | 5,000 |
|  | Trichlorinated ethanes |  | 18,000 |  |  |  |
| 41 | Trichloroethane 1,1,1- | 71556 |  |  | 31,200 |  |
| 42 | Trichloroethane 1,1,2- | 79005 |  | 9,400 |  |  |
| 43 | Trichloroethylene | 79016 | 45,000 | 21,900 | 2,000 |  |
| 55 | Trichlorophenol 2,4,6- | 88062 |  | 970 |  |  |

The following chemicals/compounds/classes are of concern due to the potential for toxic effects to aquatic organisms; however, no guidance values are designated. If these compounds are identified in the waste stream, then a review of the scientific literature may be appropriate for deriving guidance values.

* Polybrominated diphenyl ethers (PBDE)
* Polybrominated biphenyls (PBB)
* Pharmaceuticals
* Personal care products
* Alkyl Phenols
* Other chemicals with Toxic effects

**Footnotes:**

A Values in Table 31 are applicable to all basins.

B This number was assigned to the list of non-priority pollutants in National Recommended Water Quality Criteria: 2002 (EPA-822-R-02-047).

**TABLE 40: Human Health Water Quality Criteria for Toxic Pollutants**

*Effective April 18, 2014*

**Human Health Criteria Summary**

The concentration for each pollutant listed in Table 40 was derived to protect Oregonians from potential adverse health impacts associated with long-term exposure to toxic substances associated with consumption of fish, shellfish, and water. The “organism only” criteria are established to protect fish and shellfish consumption and apply to waters of the state designated for fishing. The “water + organism” criteria are established to protect the consumption of drinking water, fish, and shellfish, and apply where both fishing and domestic water supply (public and private) are designated uses. All criteria are expressed as micrograms per liter (µg/L), unless otherwise noted. Pollutants are listed in alphabetical order. Additional information includes the Chemical Abstract Service (CAS) number, whether the criterion is based on carcinogenic effects (can cause cancer in humans), and whether there is an aquatic life criterion for the pollutant (i.e. “y”= yes, “n” = no). All the human health criteria were calculated using a fish consumption rate of 175 grams per day unless otherwise noted. A fish consumption rate of 175 grams per day is approximately equal to 23 8-ounce fish meals per month. For pollutants categorized as carcinogens, values represent a cancer risk of one additional case of cancer in one million people (i.e. 10-6), unless otherwise noted. All metals criteria are for total metal concentration, unless otherwise noted. Italicized pollutants represent non-priority pollutants. The human health criteria revisions established by OAR 340-041-0033 and shown in Table 40 do not become applicable for purposes of ORS chapter 468B or the federal Clean Water Act until approved by EPA pursuant to 40 CFR 131.21 (4/27/2000).

| Table 40  **Human Health Water Quality Criteria for Toxic Pollutants** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Pollutant** | **CAS Number** | **Carcinogen** | **Aquatic Life Criterion** | ***Human Health Criteria for the Consumption of:*** | |
| **Water + Organism (µg/L)** | **Organism Only (µg/L)** |
| 1 | Acenaphthene | 83329 | n | n | 95 | 99 |
| 2 | Acrolein | 107028 | n | n | 0.88 | 0.93 |
| 3 | Acrylonitrile | 107131 | y | n | 0.018 | 0.025 |
| 4 | Aldrin | 309002 | y | y | 0.0000050 | 0.0000050 |
| 5 | Anthracene | 120127 | n | n | 2900 | 4000 |
| 6 | Antimony | 7440360 | n | n | 5.1 | 64 |
| 7 | Arsenic (inorganic) **A** | 7440382 | y | y | 2.1 | 2.1(freshwater)  1.0 (saltwater) |
|  | **A***The arsenic criteria are expressed as total inorganic arsenic. The “organism only” freshwater criterion is based on a risk level of approximately 1 x 10-5, and the “water + organism” criterion is based on a risk level of 1 x 10-4.* | | | | | |
| 8 | Asbestos **B** | 1332214 | y | n | 7,000,000 fibers/L | -- |
|  | **B** *Thehuman health risks from asbestos are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 9 | *Barium***C** | 7440393 | n | n | 1000 | -- |
|  | **C** *The human health criterion for barium is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 10 | Benzene | 71432 | y | n | 0.44 | 1.4 |
| 11 | Benzidine | 92875 | y | n | 0.000018 | 0.000020 |
| 12 | Benz(a)anthracene | 56553 | y | n | 0.0013 | 0.0018 |
| 13 | Benzo(a)pyrene | 50328 | y | n | 0.0013 | 0.0018 |
| 14 | Benzo(b)fluoranthene 3,4 | 205992 | y | n | 0.0013 | 0.0018 |
| 15 | Benzo(k)fluoranthene | 207089 | y | n | 0.0013 | 0.0018 |
| 16 | BHC Alpha | 319846 | y | n | 0.00045 | 0.00049 |
| 17 | BHC Beta | 319857 | y | n | 0.0016 | 0.0017 |
| 18 | BHC Gamma (Lindane) | 58899 | n | y | 0.17 | 0.18 |
| 19 | Bromoform | 75252 | y | n | 3.3 | 14 |
| 20 | Butylbenzyl Phthalate | 85687 | n | n | 190 | 190 |
| 21 | Carbon Tetrachloride | 56235 | y | n | 0.10 | 0.16 |
| 22 | Chlordane | 57749 | y | y | 0.000081 | 0.000081 |
| 23 | Chlorobenzene | 108907 | n | n | 74 | 160 |
| 24 | Chlorodibromomethane | 124481 | y | n | 0.31 | 1.3 |
| 25 | Chloroethyl Ether bis 2 | 111444 | y | n | 0.020 | 0.053 |
| 26 | Chloroform | 67663 | n | n | 260 | 1100 |
| 27 | Chloroisopropyl Ether bis 2 | 108601 | n | n | 1200 | 6500 |
| 28 | *Chloromethyl ether, bis* | 542881 | y | n | 0.000024 | 0.000029 |
| 29 | Chloronaphthalene 2 | 91587 | n | n | 150 | 160 |
| 30 | Chlorophenol 2 | 95578 | n | n | 14 | 15 |
| 31 | *Chlorophenoxy Herbicide (2,4,5,-TP)***D** | 93721 | n | n | 10 | -- |
|  | **D***TheChlorophenoxy Herbicide (2,4,5,-TP) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 32 | *Chlorophenoxy Herbicide (2,4-D)***E** | 94757 | n | n | 100 | -- |
|  | **E** *The Chlorophenoxy Herbicide (2,4-D) criterion is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 33 | Chrysene | 218019 | y | n | 0.0013 | 0.0018 |
| 34 | Copper**F** | 7440508 | n | y | 1300 | -- |
|  | **F***Human health risks from copper are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 35 | Cyanide**G** | 57125 | n | y | 130 | 130 |
|  | **G***The cyanide criterion is expressed as total cyanide (CN)/L.* | | | | | |
| 36 | DDD 4,4' | 72548 | y | n | 0.000031 | 0.000031 |
| 37 | DDE 4,4' | 72559 | y | n | 0.000022 | 0.000022 |
| 38 | DDT 4,4' | 50293 | y | y | 0.000022 | 0.000022 |
| 39 | Dibenz(a,h)anthracene | 53703 | y | n | 0.0013 | 0.0018 |
| 40 | Dichlorobenzene(m) 1,3 | 541731 | n | n | 80 | 96 |
| 41 | Dichlorobenzene(o) 1,2 | 95501 | n | n | 110 | 130 |
| 42 | Dichlorobenzene(p) 1,4 | 106467 | n | n | 16 | 19 |
| 43 | Dichlorobenzidine 3,3' | 91941 | y | n | 0.0027 | 0.0028 |
| 44 | Dichlorobromomethane | 75274 | y | n | 0.42 | 1.7 |
| 45 | Dichloroethane 1,2 | 107062 | y | n | 0.35 | 3.7 |
| 46 | Dichloroethylene 1,1 | 75354 | n | n | 230 | 710 |
| 47 | Dichloroethylene trans 1,2 | 156605 | n | n | 120 | 1000 |
| 48 | Dichlorophenol 2,4 | 120832 | n | n | 23 | 29 |
| 49 | Dichloropropane 1,2 | 78875 | y | n | 0.38 | 1.5 |
| 50 | Dichloropropene 1,3 | 542756 | y | n | 0.30 | 2.1 |
| 51 | Dieldrin | 60571 | y | y | 0.0000053 | 0.0000054 |
| 52 | Diethyl Phthalate | 84662 | n | n | 3800 | 4400 |
| 53 | Dimethyl Phthalate | 131113 | n | n | 84000 | 110000 |
| 54 | Dimethylphenol 2,4 | 105679 | n | n | 76 | 85 |
| 55 | Di-n-butyl Phthalate | 84742 | n | n | 400 | 450 |
| 56 | Dinitrophenol 2,4 | 51285 | n | n | 62 | 530 |
| 57 | *Dinitrophenols* | 25550587 | n | n | 62 | 530 |
| 58 | Dinitrotoluene 2,4 | 121142 | y | n | 0.084 | 0.34 |
| 59 | Dioxin (2,3,7,8-TCDD) | 1746016 | y | n | 0.00000000051 | 0.00000000051 |
| 60 | Diphenylhydrazine 1,2 | 122667 | y | n | 0.014 | 0.020 |
| 61 | Endosulfan Alpha | 959988 | n | y | 8.5 | 8.9 |
| 62 | Endosulfan Beta | 33213659 | n | y | 8.5 | 8.9 |
| 63 | Endosulfan Sulfate | 1031078 | n | n | 8.5 | 8.9 |
| 64 | Endrin | 72208 | n | y | 0.024 | 0.024 |
| 65 | Endrin Aldehyde | 7421934 | n | n | 0.030 | 0.030 |
| 66 | Ethylbenzene | 100414 | n | n | 160 | 210 |
| 67 | Ethylhexyl Phthalate bis 2 | 117817 | y | n | 0.20 | 0.22 |
| 68 | Fluoranthene | 206440 | n | n | 14 | 14 |
| 69 | Fluorene | 86737 | n | n | 390 | 530 |
| 70 | Heptachlor | 76448 | y | y | 0.0000079 | 0.0000079 |
| 71 | Heptachlor Epoxide | 1024573 | y | y | 0.0000039 | 0.0000039 |
| 72 | Hexachlorobenzene | 118741 | y | n | 0.000029 | 0.000029 |
| 73 | Hexachlorobutadiene | 87683 | y | n | 0.36 | 1.8 |
| 74 | *Hexachlorocyclo-hexane-Technical* | 608731 | y | n | 0.0014 | 0.0015 |
| 75 | Hexachlorocyclopentadiene | 77474 | n | n | 30 | 110 |
| 76 | Hexachloroethane | 67721 | y | n | 0.29 | 0.33 |
| 77 | Indeno(1,2,3-cd)pyrene | 193395 | y | n | 0.0013 | 0.0018 |
| 78 | Isophorone | 78591 | y | n | 27 | 96 |
| 79 | *Manganese***H** | 7439965 | n | n | -- | 100 |
|  | **H***The “fish consumption only” criterion for manganese applies only to salt water and is for total manganese. This EPA recommended criterion predates the 1980 human health methodology and does not utilize the fish ingestion BCF calculation method or a fish consumption rate.* | | | | | |
| 80 | *Methoxychlor* **I** | 72435 | n | y | 100 | -- |
|  | **I** *The human health criterion for methoxychlor is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the1986 EPA Gold Book.* *Human health risks are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 81 | Methyl Bromide | 74839 | n | n | 37 | 150 |
| 82 | Methyl-4,6-dinitrophenol 2 | 534521 | n | n | 9.2 | 28 |
| 83 | Methylene Chloride | 75092 | y | n | 4.3 | 59 |
| 84 | Methylmercury (mg/kg)**J** | 22967926 | n | n | -- | 0.040 mg/kg |
|  | **J** *This value is expressed as the fish tissue concentration of methylmercury. Contaminated fish and shellfish is the primary human route of exposure to methylmercury.* | | | | | |
| 85 | Nickel | 7440020 | n | y | 140 | 170 |
| 86 | *Nitrates***K** | 14797558 | n | n | 10000 | -- |
|  | **K** *The human health criterion for nitrates is the same as originally published in the 1976 EPA Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value was also published in the 1986 EPA Gold Book. Human health risks are primarily from drinking water, therefore no “organism only” criterion was developed. The “water + organism” criterion is based on the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act.* | | | | | |
| 87 | Nitrobenzene | 98953 | n | n | 14 | 69 |
| 88 | *Nitrosamines* | 35576911 | y | n | 0.00079 | 0.046 |
| 89 | *Nitrosodibutylamine, N* | 924163 | y | n | 0.0050 | 0.022 |
| 90 | *Nitrosodiethylamine, N* | 55185 | y | n | 0.00079 | 0.046 |
| 91 | Nitrosodimethylamine, N | 62759 | y | n | 0.00068 | 0.30 |
| 92 | Nitrosodi-n-propylamine, N | 621647 | y | n | 0.0046 | 0.051 |
| 93 | Nitrosodiphenylamine, N | 86306 | y | n | 0.55 | 0.60 |
| 94 | *Nitrosopyrrolidine, N* | 930552 | y | n | 0.016 | 3.4 |
| 95 | *Pentachlorobenzene* | 608935 | n | n | 0.15 | 0.15 |
| 96 | Pentachlorophenol | 87865 | y | y | 0.15 | 0.30 |
| 97 | Phenol | 108952 | n | n | 9400 | 86000 |
| 98 | Polychlorinated Biphenyls (PCBs)**L** | NA | y | y | 0.0000064 | 0.0000064 |
|  | **L***This criterion applies to total PCBs (e.g. determined as Aroclors or congeners).* | | | | | |
| 99 | Pyrene | 129000 | n | n | 290 | 400 |
| 100 | Selenium | 7782492 | n | y | 120 | 420 |
| 101 | *Tetrachlorobenzene, 1,2,4,5-* | 95943 | n | n | 0.11 | 0.11 |
| 102 | Tetrachloroethane 1,1,2,2 | 79345 | y | n | 0.12 | 0.40 |
| 103 | Tetrachloroethylene | 127184 | y | n | 0.24 | 0.33 |
| 104 | Thallium | 7440280 | n | n | 0.043 | 0.047 |
| 105 | Toluene | 108883 | n | n | 720 | 1500 |
| 106 | Toxaphene | 8001352 | y | y | 0.000028 | 0.000028 |
| 107 | Trichlorobenzene 1,2,4 | 120821 | n | n | 6.4 | 7.0 |
| 108 | Trichloroethane 1,1,2 | 79005 | y | n | 0.44 | 1.6 |
| 109 | Trichloroethylene | 79016 | y | n | 1.4 | 3.0 |
| 110 | Trichlorophenol 2,4,6 | 88062 | y | n | 0.23 | 0.24 |
| 111 | *Trichlorophenol, 2, 4, 5-* | 95954 | n | n | 330 | 360 |
| 112 | Vinyl Chloride | 75014 | y | n | 0.023 | 0.24 |
| 113 | Zinc | 7440666 | n | y | 2100 | 2600 |