

# **ENCLOSURE 1**

**Aquatic Life Criteria Submitted  
by Oregon in July 2004 As Amended  
by the April 2007 and July 2011  
Water Quality Standards Submissions**

**TABLE 20**

**AQUATIC LIFE WATER QUALITY CRITERIA SUMMARY<sup>1</sup>**

**(Applicable to all Basins)<sup>1</sup>**

The concentration for each compound listed in this chart is a criteria or guidance value\* not to be exceeded in waters of the state for the protection of aquatic life and human health. Specific descriptions of each compound and an explanation of values are included in Quality Criteria for Water (1986). Selecting values for regulatory purposes will depend on the most sensitive beneficial use to be protected, and what level of protection is necessary for aquatic life and human health. The concentration for each compound listed in Table 20 is a criterion not to be exceeded in waters of the state in order to protect aquatic life and human health. All values are expressed as micrograms per liter (µg/L) except where noted. Compounds are listed in alphabetical order with the corresponding designations as to whether EPA has identified it as a priority pollutant and a carcinogen, aquatic life freshwater acute and chronic criteria, aquatic life marine acute and chronic criteria, human health water & organism and fish consumption only criteria, and Drinking Water Maximum Contaminant Level (MCL). The acute criteria refer to the average concentration for one (1) hour and the chronic criteria refer to the average concentration for 96 hours (4 days), and that these criteria should not be exceeded more than once every three (3) years.

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			ACENAPTHENE	Y	N	*1,700
ACROLEIN	Y	N	*68	*21	*55	
ACRYLONITRILE	Y	Y	*7,550	*2,600		
ALDRIN	Y	Y	3		1.3	
ALKALINITY	N	N		20,000		

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			AMMONIA	N	N	CRITERIA ARE pH AND TEMPERATURE DEPENDENT—SEE DOCUMENT USEPA JANUARY 1985 (Fresh Water) CRITERIA ARE pH AND TEMPERATURE DEPENDENT—SEE DOCUMENT USEPA APRIL 1989 (Marine Water)
ANTIMONY	Y	N	*9,000	*1,600		
ARSENIC	Y	Y				
ARSENIC (PENT)	Y	Y	*850	*48	*2,319	*13
ARSENIC (TRI)	Y	Y	360	190	69	36
ASBESTOS	Y	Y				
BARIUM	N	N				
BENZENE	Y	Y	*5,300		*5,100	*700
BENZIDINE	Y	Y	*2,500			
BERYLLIUM	Y	Y	*130	*5.3		
BHC	Y	N	*100		*0.34	
CADMIUM	Y	N	3.9+	1.1+	43	9.3
CARBON TETRACHLORIDE	Y	Y	*35,200		*50,000	
CHLORDANE	Y	Y	2.4	0.0043	0.09	0.004
CHLORIDE	N	N	860 mg/L	230 mg/L		
CHLORINATED BENZENES	Y	Y	*250	*50	*160	*129
CHLORINATED NAPHTHALENES	Y	N	*1,600		*7.5	
CHLORINE	N	N	19	11	13	7.5
CHLOROALKYL ETHERS	Y	N	*238,000			
CHLOROETHYL ETHER (BIS-2)	Y	Y				
CHLOROFORM	Y	Y	*28,900	*1,240		
CHLOROISOPROPYL ETHER (BIS-2)	Y	N				
CHLOROMETHYL ETHER (BIS)	N	Y				
CHLOROPHENOL 2	Y	N	*4,380	*2,000		
CHLOROPHENOL 4	N	N			*29,700	

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			CHLOROPHENOXY HERBICIDES (2,4,5,-TP)	N	N	
CHLOROPHENOXY HERBICIDES (2,4-D)	N	N				
CHLORPYRIFOS	N	N	0.083	0.041	0.011	0.0056
CHLORO-4 METHYL-3 PHENOL	N	N	*30			
CHROMIUM (HEX)	Y	N	16	11	1,100	50
CHROMIUM (TRI)	N	N	1,700.+	210.+	*10,300	
COPPER	Y	N	18.+	12.+	2.9	2.9
CYANIDE	Y	N	22	5.2	1	1
DDT	Y	Y	1.1	0.001	0.13	0.001
(TDE) DDT METABOLITE	Y	Y	*0.06		*3.6	
(DDE) DDT METABOLITE	Y	Y	*1,050		*14	
DEMETON	Y	N		0.1		0.1
DIBUTYLPHTHALATE	Y	N				
DICHLOROBENZENES	Y	N	*1,120	*763	*1,970	
DICHLOROBENZIDINE	Y	Y				
DICHLOROETHANE 1,2	Y	Y	*118,000	*20,000	*113,000	
DICHLOROETHYLENES	Y	Y	*11,600		*224,000	
DICHLOROPHENOL 2,4	N	N	*2,020	*365		
DICHLOROPROPANE	Y	N	*23,000	*5,700	*10,300	*3,040
DICHLOROPROPENE	Y	N	*6,060	*244	*790	
DIELDRIN	Y	Y	2.5	0.0019	0.71	0.0019
DIETHYLPHTHALATE	Y	N				
DIMETHYL PHENOL 2,4	Y	N	*2,120			
DIMETHYL PHTHALATE	Y	N				

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			DINITROTOLUENE 2,4	N	☞	
DINITROTOLUENE	Y	☞				
DINITROTOLUENE	N	☞	*330	*230	*590	*370
DINITRO-O-CRESOL 2,4	Y	☞				
DIOXIN (2,3,7,8-TCDD)	Y	☞	*0.01	*38pg/L		
DIPHENYLHYDRAZINE	Y	☞				
DIPHENYLHYDRAZINE 1,2	Y	☞	*270			
DI-2-ETHYLHEXYL PHTHALATE	Y	☞				
ENDOSULFAN	Y	☞	0.22	0.056	0.034	0.0087
ENDRIN	Y	☞	0.18	0.0023	0.037	0.0023
ETHYLBENZENE	Y	☞	*32,000		*430	
FLUORANTHENE	Y	☞	*3,980		*40	*16
GUTHION	N	☞		0.01		0.01
HALOETHERS	Y	☞	*360	*122		
HALOMETHANES	Y	☞	*11,000		*12,000	*6,400
HEPTACHLOR	Y	☞	0.52	0.0038	0.053	0.0036
HEXACHLOROETHANE	N	☞	*980	*540	*940	
HEXACHLOROBENZENE	Y	☞				
HEXACHLOROBUTADIENE	Y	☞	*90	*9.3	*32	
HEXACHLOROCYCLOHEXAN E (LINDANE)	Y	☞	2	0.08	0.16	
HEXACHLOROCYCLOHEXAN E-ALPHA	Y	☞				
HEXACHLOROCYCLOHEXAN E-BETA	Y	☞				
HEXACHLOROCYCLOHEXAN E-GAMA	Y	☞				

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			HEXACHLOROCYCLOHEXAN E-TECHNICAL	Y	✗	
HEXACHLOROCYCLOPENTADIENE	Y	✗	*7	*5.2	*7	
IRON	N	✗		1,000		
ISOPHORONE	Y	✗	*117,000		*12,900	
LEAD	Y	✗	82.+	3.2+	140	5.6
MALATHION	N	✗		0.1		0.1
MANGANESE	N	✗				
MERCURY	Y	✗	2.4	0.012	2.1	0.025
METHOXYCHLOR	N	✗		0.03		0.03
MIREX	N	✗		0.001		0.001
MONOCHLOROBENZENE	Y	✗				
NAPHTHALENE	Y	✗	*2,300	*620	*2,350	
NICKEL	Y	✗	1,400.+	160+	75	8.3
NITRATES	N	✗				
NITROBENZENE	Y	✗	*27,000		*6,680	
NITROPHENOLS	Y	✗	*230	*150	*4,850	
NITROSAMINES	Y	✗	*5,850		*3,300,000	
NITROSODIBUTYLAMINE N	Y	✗				
NITROSODIETHYLAMINE N	Y	✗				
NITROSODIMETHYLAMINE N	Y	✗				
NITROSODIPHENYLAMINE N	Y	✗				
NITROSOPYRROLIDINE N	Y	✗				
PARATHION	N	✗	0.065	0.013		
PCB's	Y	✗	2	0.014	10	0.03
PENTACHLORINATED ETHANES	N	✗	*7,240	*1,100	*390	*281
PENTACHLOROBENZENE	N	✗				

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			PENTACHLOROPHENOL	Y	N	***20
PHENOL	Y	N	*10,200	*2,560	*5,800	
PHOSPHORUS ELEMENTAL	N	N				0.1
PHTHALATE ESTERS	Y	N	*940	*3	*2,944	*3.4
POLYNUCLEAR AROMATIC HYDROCARBONS	Y	N			*300	
SELENIUM	Y	N	260	35	410	54
SILVER	Y	N	4.1+	0.12	2.3	
SULFIDE HYDROGEN SULFIDE	N	N		2		2
TETRACHLORINATED ETHANES	Y	N	*9,320			
TETRACHLOROENZENE 1,2,4,5	Y	N				
TETRACHLOROETHANE 1,1,2,2	Y	N		*2,400	*9,020	
TETRACHLOROETHANES	Y	N	*9,320			
TETRACHLOROETHYLENE	Y	N	*5,280	*840	*10,200	*450
TETRACHLOROPHENOL 2,3,5,6	Y	N				*440
THALLIUM	Y	N	*1,400	*40	*2,130	
TOLUENE	Y	N	*17,500		*6,300	*5,000
TOXAPHENE	Y	N	0.73	0.0002	0.21	0.0002
TRICHLORINATED ETHANES	Y	N	*18,000			
TRICHLOROETHANE 1,1,1	Y	N			*31,2000	
TRICHLOROETHANE 1,1,2	Y	N		*9,400		
TRICHLOROETHYLENE	Y	N	*45,000	*21,900	*2,000	
TRICHLOROPHENOL 2,4,5	N	N				

Compound Name (or Class)	Priority Pollutant	Carcinogen	Concentration in Micrograms Per Liter for Protection of Aquatic Life			
			Fresh Acute Criteria	Fresh Chronic Criteria	Marine Acute Criteria	Marine Chronic Criteria
			TRICHLOROPHENOL 2,4,6	Y	☒	
VINYL CHLORIDE	Y	☒				
ZINC	Y	N	120+	110+	95	86

### MEANING OF SYMBOLS:

g = grams

M.C.L = Maximum Contaminant Level

mg = milligrams

+ = Hardness Dependent Criteria (100 mg/L used).

The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. Criteria values for hardness may be calculated from the following formulae (CMC refers to Acute Criteria; CCC refers to Chronic Criteria):

$$\text{CMC} = (\exp(m_A * [\ln(\text{hardness})] + b_A)) * \text{CF}$$

$$\text{CCC} = (\exp(m_C * [\ln(\text{hardness})] + b_C)) * \text{CF}$$

Chemical	$m_A$	$b_A$	$m_C$	$b_C$
Cadmium	1.128	-3.828	0.7852	-3.49
Chromium III	0.819	3.688	0.819	1.561
Copper	0.9422	-1.464	0.8545	-1.465
Lead	1.273	-1.46	1.273	-4.705
Nickel	0.846	3.3612	0.846	1.1645
Silver	1.72	-6.52		
Zinc	0.8473	0.8604	0.8473	0.76





**Table 33A**

Note: The environmental Quality Commission adopted the following criteria on May 20, 2004 to become effective February 15, 2005. However, EPA has not yet acted (as of June 2006) approved the criteria. Thus, Table 33A criteria may be used in NPDES permits, but not for the section 303(d) list of impaired waters.<sup>1</sup>

**AQUATIC LIFE WATER QUALITY CRITERIA SUMMARY<sup>A</sup>**

The concentration for each compound listed in Table 33A is a criterion not to be exceeded in waters of the state in order to protect aquatic life ~~and human health~~. All values are expressed as micrograms per liter (µ/L) except where noted. Compounds are listed in alphabetical order with the corresponding EPA number (from National Recommended Water Quality Criteria:2002, EPA 822OR-02-047), the Chemical Abstract Service (CAS) number, aquatic life freshwater acute and chronic criteria, aquatic life saltwater acute and chronic criteria, ~~and human health water & organism and organism only criteria, and Drinking Water Maximum Contaminant Level (MCL)~~. The acute criteria refer to the average concentration for one (1) hour and the chronic criteria refer to the average concentration for 96 hours (4-days), and that these criteria should not be exceeded more than once every three (3) years.

EPA No.	Compound	CAS Number	Freshwater				Saltwater				
			Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	
<u>56</u>	<u>Acenaphthene</u>	<u>83329</u>									
<u>57</u>	<u>Acenaphthylene</u>	<u>208968</u>									
<u>17</u>	<u>Acrolein</u>	<u>107028</u>									
<u>18</u>	<u>Acrylonitrile</u>	<u>107131</u>									
<u>102</u>	<u>Aldrin</u>	<u>309002</u>	3 <u>Q</u>	<u>X</u>				1.3 <u>Q</u>	<u>X</u>		
<u>1 N</u>	<u>Alkalinity</u>				20,000 <u>P</u>						
<u>2 N</u>	<u>Aluminum (pH 6.5 - 9.0)</u>	<u>7429905</u>									

<sup>1</sup> This note was approved by EPA in its February 28, 2011 action.

EPA No.	Compound		CAS Number	Freshwater				Saltwater				
				Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective	
					Date		Date		Date		Date	
<u>3 N</u>	<u>Ammonia</u>		<u>7664417</u>					<u>D</u>	<u>X</u>	<u>D</u>	<u>X</u>	
<u>58</u>	<u>Anthracene</u>		<u>120127</u>									
<u>1</u>	<u>Antimony</u>		<u>7440360</u>									
<u>2</u>	<u>Arsenic</u>		<u>7440382</u>									
<u>15</u>	<u>Asbestos</u>		<u>1332214</u>									
<u>6 N</u>	<u>Barium</u>		<u>7440393</u>									
<u>19</u>	<u>Benzene</u>		<u>71432</u>									
<u>59</u>	<u>Benzidine</u>		<u>92875</u>									
<u>60</u>	<u>Benzo(a)Anthracene</u>		<u>56553</u>									
<u>61</u>	<u>Benzo(a)Pyrene</u>		<u>50328</u>									
<u>62</u>	<u>Benzo(b)Fluoranthene</u>		<u>205992</u>									
<u>63</u>	<u>Benzo(g,h,i)Perylene</u>		<u>191242</u>									
<u>64</u>	<u>Benzo(k)Fluoranthene</u>		<u>207089</u>									
<u>3</u>	<u>Beryllium</u>		<u>7440417</u>									
<u>103</u>	<u>BHC alpha-</u>		<u>319846</u>									
<u>104</u>	<u>BHC beta-</u>		<u>319857</u>									
<u>106</u>	<u>BHC delta-</u>		<u>319868</u>									
<u>105</u>	<u>BHC gamma- (Lindane)</u>		<u>58899</u>	<u>0.95</u>		<u>0.08</u>	<u>X</u>	<u>0.16 O</u>				
<u>7 N</u>	<u>Boron</u>		<u>7440428</u>									
<u>20</u>	<u>Bromoform</u>		<u>75252</u>									
<u>69</u>	<u>Bromophenyl Phenyl Ether</u>											
	<u>4-</u>											

EPA No.	Compound	CAS Number	Freshwater				Saltwater				
			Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective	
				Date		Date		Date		Date	
70	Butylbenzyl Phthalate	85687									
4	Cadmium	7440439									
21	Carbon Tetrachloride	56235									
107	Chlordane	57749	2.4 O	X	0.0043 O	X	0.09 O	X	0.004 O	X	X
8 N	Chloride	16887006	860000		230000						
9 N	Chlorine	7782505	19	X	11	X	13	X	7.5	X	X
22	Chlorobenzene	108907									
23	Chlorodibromomethane	124481									
24	Chloroethane	75003									
65	ChloroethoxyMethane Bis2-	111911									
66	ChloroethylEther Bis2-	111444									
25	Chloroethylvinyl Ether 2-	110758									
26	Chloroform	67663									
67	ChloroisopropylEther Bis2-	108601									
15 N	ChloromethylEther, Bis	542881									
71	Chloronaphthalene 2-	91587									
45	Chlorophenol 2-	95578									
10 N	Chlorophenoxy Herbicide (2,4,5,-TP)	93721									
11 N	Chlorophenoxy Herbicide (2,4-D)	94757									
72	Chlorophenyl Phenyl Ether 4-	7005723									
12 N	Chloropyrifos	2921882	0.083	X	0.041	X	0.011	X	0.0056	X	X

EPA No.	Compound		CAS Number	Freshwater				Saltwater				
				Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective	
					Date		Date		Date		Date	
<u>5a</u>	<u>Chromium (III)</u>											
<u>5b</u>	<u>Chromium (VI)</u>		<u>18540299</u>									
<u>73</u>	<u>Chrysene</u>		<u>218019</u>									
<u>6</u>	<u>Copper</u>		<u>7440508</u>									
<u>14</u>	<u>Cyanide</u>		<u>57125</u>	<u>22 S</u>	<u>X</u>	<u>5.2 S</u>	<u>X</u>	<u>1 S</u>	<u>X</u>	<u>1 S</u>	<u>X</u>	<u>X</u>
<u>108</u>	<u>DDT 4,4'-</u>		<u>50293</u>	<u>1.1 O,T</u>	<u>X</u>	<u>0.001 O,T</u>	<u>X</u>	<u>0.13 O,T</u>	<u>X</u>	<u>0.001 O,T</u>	<u>X</u>	<u>X</u>
<u>109</u>	<u>DDE 4,4'-</u>		<u>72559</u>									
<u>110</u>	<u>DDD 4,4'-</u>		<u>72548</u>									
<u>14 N</u>	<u>Demeton</u>		<u>8065483</u>			<u>0.1</u>	<u>X</u>			<u>0.1</u>	<u>X</u>	<u>X</u>
<u>74</u>	<u>Dibenzo(a,h)Anthracene</u>		<u>53703</u>									
<u>75</u>	<u>Dichlorobenzene 1,2-</u>		<u>95501</u>									
<u>76</u>	<u>Dichlorobenzene 1,3-</u>		<u>541731</u>									
<u>77</u>	<u>Dichlorobenzene 1,4-</u>		<u>106467</u>									
<u>78</u>	<u>Dichlorobenzidine 3,3'-</u>		<u>91941</u>									
<u>27</u>	<u>Dichlorobromomethane</u>		<u>75274</u>									
<u>28</u>	<u>Dichloroethane 1,1-</u>		<u>75343</u>									
<u>29</u>	<u>Dichloroethane 1,2-</u>		<u>107062</u>									
<u>30</u>	<u>Dichloroethylene 1,1-</u>		<u>75354</u>									
<u>46</u>	<u>Dichlorophenol 2,4-</u>		<u>120832</u>									
<u>31</u>	<u>Dichloropropane 1,2-</u>		<u>78875</u>									
<u>32</u>	<u>Dichloropropene 1,3-</u>		<u>542756</u>									
<u>111</u>	<u>Dieldrin</u>		<u>60571</u>	<u>0.24</u>				<u>0.71 O</u>	<u>X</u>	<u>0.0019 O</u>	<u>X</u>	<u>X</u>

EPA No.	Compound		CAS Number	Freshwater				Saltwater				
				Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective	
					Date		Date		Date		Date	
79	DiethylPhthalate		84662									
47	Dimethylphenol 2,4-		105679									
80	DimethylPhthalate		131113									
81	Di-n-Butyl Phthalate		84742									
49	Dinitrophenol 2,4-		51285									
27 N	Dinitrophenols		25550587									
82	Dinitrotoluene 2,4-		121142									
83	Dinitrotoluene 2,6-		606202									
84	Di-n-Octyl Phthalate		117840									
16	Dioxin (2,3,7,8-TCDD)		1746016									
85	Diphenylhydrazine 1,2-		122667									
68	EthylhexylPhthalate Bis2-		117817									
	Endosulfan			0.22 I.P	X	0.056 I.P	X	0.034 I.P	X	0.0087 I.P	X	
112	Endosulfan alpha-		959988	0.22 O		0.056 O		0.034 O		0.0087 O		
113	Endosulfan beta-		33213659	0.22 O		0.056 O		0.034 O		0.0087 O		
114	Endosulfan Sulfate		1031078									
115	Endrin		72208	0.086				0.037 O		0.0023 O		
116	Endrin Aldehyde		7421934									
33	Ethylbenzene		100414									
86	Fluoranthene		206440									
87	Fluorene		86737									
17 N	Guthion		86500			0.01	X			0.01	X	

EPA No.	Compound		CAS Number	Freshwater				Saltwater			
				Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective
					Date		Date		Date		Date
117	Heptachlor		76448	0.52 O	X	0.0038 O	X	0.053 O	X	0.0036 O	X
118	Heptachlor Epoxide		1024573	0.52 O		0.0038 O		0.053 O		0.0036 O	
88	Hexachlorobenzene		118741								
89	Hexachlorobutadiene		87683								
91	Hexachloroethane		67721								
19 N	Hexachlorocyclo-hexane-Technical		319868								
90	Hexachlorocyclopentadiene		77474								
92	Ideno1,2,3-(cd)Pyrene		193395								
20 N	Iron		7439896			1,000	X				
93	Isophorone		78591								
7	Lead		7439921								
21 N	Malathion		121755			0.1	X			0.1	X
22 N	Manganese		7439965								
8a	Mercury		7439976	2.4	X	0.012	X	2.1	X	0.025	X
23 N	Methoxychlor		72435			0.03	X			0.03	X
34	Methyl Bromide		74839								
35	Methyl Chloride		74873								
48	Methyl-4,6-Dinitrophenol 2-		534521								
52	Methyl-4-Chlorophenol 3-		59507								

EPA No.	Compound	CAS Number	Freshwater				Saltwater			
			Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	Acute (CMC)	Effective	Chronic (CCC)	Effective Date
36	<u>Methylene Chloride</u>	<u>75092</u>								
8b	<u>Methylmercury</u>	<u>22967926</u>								
24 N	<u>Mirex</u>	<u>2385855</u>			0.001	<u>X</u>			0.001	<u>X</u>
94	<u>Naphthalene</u>	<u>91203</u>								
9	<u>Nickel</u>	<u>7440020</u>								
25 N	<u>Nitrates</u>	<u>14797558</u>								
95	<u>Nitrobenzene</u>	<u>98953</u>								
50	<u>Nitrophenol 2-</u>	<u>88755</u>								
51	<u>Nitrophenol 4-</u>	<u>100027</u>								
26 N	<u>Nitrosamines</u>	<u>35576911</u>								
28 N	<u>Nitrosodibutylamine.N</u>	<u>924163</u>								
29 N	<u>Nitrosodiethylamine.N</u>	<u>55185</u>								
96	<u>N-Nitrosodimethylamine</u>	<u>62759</u>								
98	<u>N-Nitrosodiphenylamine</u>	<u>86306</u>								
30 N	<u>Nitrosopyrrolidine.N</u>	<u>930552</u>								
97	<u>N-Nitrosodi-n-Propylamine</u>	<u>621647</u>								
32 N	<u>Oxygen, Dissolved</u>	<u>7782447</u>								
33 N	<u>Parathion</u>	<u>56382</u>	0.065	<u>X</u>	0.013	<u>X</u>				
119	<u>Polychlorinated Biphenyls PCBs:</u>	<u>1336363</u>	2 <u>U</u>	<u>X</u>	0.014 <u>U</u>	<u>X</u>	10 <u>U</u>	<u>X</u>	0.03 <u>U</u>	<u>X</u>
34 N	<u>Pentachlorobenzene</u>	<u>608935</u>								
53	<u>Pentachlorophenol</u>	<u>87865</u>	<u>M</u>				13		<u>7.9</u>	
99	<u>Phenanthrene</u>	<u>85018</u>								
54	<u>Phenol</u>	<u>108952</u>								



EPA No.	Compound	CAS Number	Freshwater				Saltwater				
			Acute (CMC)	Effective	Chronic (CCC)	Effective	Acute (CMC)	Effective	Chronic (CCC)	Effective	
				Date		Date		Date		Date	
<u>36 N</u>	<u>Phosphorus Elemental</u>	<u>7723140</u>								0.1	
<u>100</u>	<u>Pyrene</u>	<u>129000</u>									
<u>10</u>	<u>Selenium</u>	<u>7782492</u>									
<u>11</u>	<u>Silver</u>	<u>7440224</u>									
<u>40 N</u>	<u>Sulfide-Hydrogen Sulfide</u>	<u>7783064</u>			2	<u>X</u>				2	<u>X</u>
<u>43 N</u>	<u>Tetrachlorobenzene,1,2,4,5</u>	<u>95943</u>									
<u>37</u>	<u>Tetrachloroethane 1,1,2,2-</u>	<u>79345</u>									
<u>38</u>	<u>Tetrachloroethylene</u>	<u>127184</u>									
<u>12</u>	<u>Thallium</u>	<u>7440280</u>									
<u>39</u>	<u>Toluene</u>	<u>108883</u>									
<u>120</u>	<u>Toxaphene</u>	<u>8001352</u>	0.73	<u>X</u>	0.0002	<u>X</u>	0.21	<u>X</u>	0.0002	<u>X</u>	
<u>40</u>	<u>Trans-Dichloroethylene 1,2-</u>	<u>156605</u>									
<u>44 N</u>	<u>Tributyltin (TBT)</u>	<u>688733</u>									
<u>101</u>	<u>Trichlorobenzene 1,2,4-</u>	<u>120821</u>									
<u>41</u>	<u>Trichloroethane 1,1,1-</u>	<u>71556</u>									
<u>42</u>	<u>Trichloroethane 1,1,2-</u>	<u>79005</u>									
<u>43</u>	<u>Trichloroethylene</u>	<u>79016</u>									
<u>45 N</u>	<u>Trichlorophenol 2,4,5</u>	<u>95954</u>									
<u>55</u>	<u>Trichlorophenol 2,4,6-</u>	<u>88062</u>									
<u>44</u>	<u>Vinyl Chloride</u>	<u>75014</u>									
<u>13</u>	<u>Zinc</u>	<u>7440666</u>									

**Footnotes for Table 33A and 33B**

A Values in Table 20 are applicable to all basins.

B Human Health criteria values were calculated using a fish consumption rate of 17.5 grams per day (0.6 ounces/day) unless otherwise noted.

C Ammonia criteria for freshwater may depend on pH, temperature, and the presence of salmonids or other fish with ammonia-sensitive early life stages.

Values for freshwater criteria (of total ammonia nitrogen in mg N/L) can be calculated using the formulae specified in 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014; <http://www.epa.gov/ost/standards/ammonia/99update.pdf>):

Freshwater Acute:

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

$$\text{salmonids not present...CMC} = \frac{0.411}{1 + 10^{7.204 - \text{pH}}} + \frac{58.4}{1 + 10^{\text{pH} - 7.204}}$$

Freshwater Chronic:

fish early life stages present:

$$\text{CCC} = \frac{0.0577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} * \text{MIN}(2.85, 1.45 * 10^{0.028 * (25 - T)})$$

fish early life stages not present:

$$\text{CCC} = \frac{0.577}{1 + 10^{7.688 - \text{pH}}} + \frac{2.487}{1 + 10^{\text{pH} - 7.688}} * 1.45 * 10^{0.028 * (25 - \text{MAX}(T, 7))}$$

Note: these chronic criteria formulae would be applied to calculate the 30-day average concentration limit; in addition, the highest 4-day average within the 30-day period should not exceed 2.5 times the CCC.

D 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://www.epa.gov/ost/pc/ambientwqc/ammoniasalt1989.pdf>).

E Freshwater and saltwater criteria for metals are expressed in terms of “dissolved” concentrations in the water column, except where otherwise noted (e.g. aluminum).

F The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. Criteria values for hardness may be calculated from the following formulae (CMC refers to Acute Criteria; CCC refers to Chronic Criteria):

$$\text{CMC} = (\exp(m_A * [\ln(\text{hardness})] + b_A)) * \text{CF}$$

$$CCC = (\exp(m_C * [\ln(\text{hardness})] + b_C)) * CF$$

where 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.

<u>Chemical</u>	<u>m<sub>A</sub></u>	<u>b<sub>A</sub></u>	<u>m<sub>C</sub></u>	<u>b<sub>C</sub></u>
<u>Cadmium</u>	<u>1.0166</u>	<u>-3.924</u>	<u>0.7409</u>	<u>-4.719</u>
<u>Chromium III</u>	<u>0.8190</u>	<u>3.7256</u>	<u>0.8190</u>	<u>0.6848</u>
<u>Copper</u>	<u>0.9422</u>	<u>-1.700</u>	<u>0.8545</u>	<u>-1.702</u>
<u>Lead</u>	<u>1.273</u>	<u>-1.460</u>	<u>1.273</u>	<u>-4.705</u>
<u>Nickel</u>	<u>0.8460</u>	<u>2.255</u>	<u>0.8460</u>	<u>0.0584</u>
<u>Silver</u>	<u>1.72</u>	<u>-6.59</u>		
<u>Zinc</u>	<u>0.8473</u>	<u>0.884</u>	<u>0.8473</u>	<u>0.884</u>

Conversion factors (CF) for dissolved metals (the values for total recoverable metals criteria were multiplied by the appropriate conversion factors shown below to calculate the dissolved metals criteria):

<u>Chemical</u>	<u>Freshwater</u>		<u>Saltwater</u>	
	<u>Acute</u>	<u>Chronic</u>	<u>Acute</u>	<u>Chronic</u>
<u>Arsenic</u>	<u>1.000</u>	<u>1.000</u>	<u>1.000</u>	<u>1.000</u>
<u>Cadmium</u>	<u>1.136672-[(ln hardness)(0.041838)]</u>	<u>1.101672-[(ln hardness)(0.041838)]</u>	<u>0.994</u>	<u>0.994</u>
<u>Chromium III</u>	<u>0.316</u>	<u>0.860</u>	<u>--</u>	<u>--</u>
<u>Chromium VI</u>	<u>0.982</u>	<u>0.962</u>	<u>0.993</u>	<u>0.993</u>
<u>Copper</u>	<u>0.960</u>	<u>0.960</u>	<u>0.83</u>	<u>0.83</u>
<u>Lead</u>	<u>1.46203-[(ln hardness)(0.145712)]</u>	<u>1.46203-[(ln hardness)(0.145712)]</u>	<u>0.951</u>	<u>0.951</u>
<u>Nickel</u>	<u>0.998</u>	<u>0.997</u>	<u>0.990</u>	<u>0.990</u>
<u>Selenium</u>	<u>0.996</u>	<u>0.922</u>	<u>0.998</u>	<u>0.998</u>
<u>Silver</u>	<u>0.85</u>	<u>0.85</u>	<u>0.85</u>	<u>--</u>
<u>Zinc</u>	<u>0.978</u>	<u>0.986</u>	<u>0.946</u>	<u>0.946</u>

~~G Human Health criterion is the same as originally published in the 1976 EPA Red Book (Quality Criteria for Water, EPA 440/9-76-023) which predates the 1980 methodology and did not use a fish ingestion BCF approach.~~

~~H This value is based on a Drinking Water regulation.~~

I This value is based on 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.

~~J No BCF was available; therefore, this value is based on that published in the 1986 EPA Gold Book.~~

~~K Human Health criterion is for “dissolved concentration based on the 1976 EPA Red Book conclusion that adverse effects from exposure at this level are aesthetic rather than toxic.~~

~~L This value is expressed as the fish tissue concentration of methylmercury.~~

~~M Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows:  $CMC = (\exp(1.005(pH) - 4.869))$ ;  $CCC = \exp(1.005(pH) - 5.134)$ .~~

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

~~O This criterion is based on EPA recommendations issued in 1980 that were derived using guidelines that differed from EPA's 1985 Guidelines for minimum data requirements and derivation procedures. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.~~

~~P Criterion shown is the minimum (i.e. CCC in water should not be below this value in order to protect aquatic life).~~

~~Q Criterion is applied as total arsenic (i.e. arsenic (III) + arsenic (V)).~~

~~R Arsenic criterion refers to the inorganic form only.~~

~~S This criterion is expressed as  $\mu\text{g}$  free cyanide (CN)/L.~~

~~T This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).~~

~~U This criterion applies to total PCBs (e.g. the sum of all congener or all isomer or homolog or Arochlor analyses).~~

~~V The  $CMC = 1 / [(f1/CMC1) + (f2/CMC2)]$  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  $\mu\text{g}/\text{L}$  and 12.82  $\mu\text{g}/\text{L}$ , respectively.~~

~~W The acute and chronic criteria for aluminum are 750  $\mu\text{g}/\text{L}$  and 87  $\mu\text{g}/\text{L}$ , respectively. These values for aluminum are expressed in terms of “total recoverable” concentration of metal in the water column. The criterion applies at  $\text{pH} < 6.6$  and hardness  $< 12 \text{ mg}/\text{L}$  (as  $\text{CaCO}_3$ ).~~

~~X The effective date for the criterion in the column immediately to the left is 1991.~~

~~Y No criterion<sup>2</sup>~~

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<sup>2</sup> Footnote Y was added in Oregon's 2011 adoption.

**Table 33B**

Note: The environmental Quality Commission adopted the following criteria on May 20, 2004 to become effective on EPA approval. EPA has not yet (as of June 2006) approved the criteria. The Table 33B criteria may not be used until they are approved by EPA<sup>3</sup>.

**AQUATIC LIFE WATER QUALITY CRITERIA SUMMARY<sup>A</sup>**

The concentration for each compound listed in Table 33A is a criterion not to be exceeded in waters of the state in order to protect aquatic life and human health. All values are expressed as micrograms per liter (µ/L) except where noted. Compounds are listed in alphabetical order with the corresponding EPA number (from National Recommended Water Quality Criteria:2002, EPA 8220R-02-047), the Chemical Abstract Service (CAS) number, aquatic life freshwater acute and chronic criteria, aquatic life saltwater acute and chronic criteria, and human health water & organism and organism only criteria, and Drinking Water Maximum Contaminant Level (MCL). The acute criteria refer to the average concentration for one (1) hour and the chronic criteria refer to the average concentration for 96 hours (4-days), and that these criteria should not be exceeded more than once every three (3) years.

<u>EPA No.</u>	<u>Compound</u>	<u>CAS Number</u>	<u>Freshwater</u>				<u>Saltwater</u>				
			<u>Acute (CMC)</u>	<u>Effective Date</u>	<u>Chronic (CCC)</u>	<u>Effective Date</u>	<u>Acute (CMC)</u>	<u>Effective Date</u>	<u>Chronic (CCC)</u>	<u>Effective Date</u>	
<u>2 N</u>	<u>Aluminum (pH 6.5 - 9.0)</u>	<u>7429905</u>	<u>W</u>		<u>W</u>						
<u>3 N</u>	<u>Ammonia</u>	<u>7664417</u>	<u>C</u>		<u>C</u>						
<u>2</u>	<u>Arsenic</u>	<u>7440382</u>	<u>340 E.Q</u>		<u>150 E.Q</u>			<u>69 E.Q</u>		<u>36 E.Q</u>	
<u>15</u>	<u>Asbestos</u>	<u>1332214</u>									

<sup>3</sup> This note was approved by EPA in its February 28, 2011 action.

EPA No.	Compound	CAS Number	Freshwater				Saltwater			
			Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date
19	Benzene	71432								
3	Beryllium	7440417								
105	BHC gamma- (Lindane)	58899								
4	Cadmium	7440439	E.F		E.F		40 E		8.8 E	
107	Chlordane	57749								
	<u>CHLORINATED BENZENES</u>									
26	Chloroform	67663								
67	ChloroisopropylEther Bis2-	108601								
15 N	ChloromethylEther, Bis	542881								
5a	Chromium (III)		E.F		E.F					
5b	Chromium (VI)	1854029 9	16 E		11 E		<del>1100 E</del>		<del>50 E</del>	
6	Copper	7440508	E.F		E.F		4.8 E		3.1 E	
108	DDT 4,4'-	50293								
	<u>DIBUTYLPHTHALATE</u>									
	<u>DICHLOROBENZENES</u>									
	<u>DICHLOROBENZIDINE</u>									

<u>EPA No.</u>	<u>Compound</u>		<u>CAS Number</u>	<u>Freshwater</u>				<u>Saltwater</u>			
				<u>Acute (CMC)</u>	<u>Effective Date</u>	<u>Chronic (CCC)</u>	<u>Effective Date</u>	<u>Acute (CMC)</u>	<u>Effective Date</u>	<u>Chronic (CCC)</u>	<u>Effective Date</u>
	<u>DICHLOROETHYLENES</u>										
	<u>DICHLOROPROPENE</u>										
<u>111</u>	<u>Dieldrin</u>		<u>60571</u>			<u>0.056</u>					
	<u>DINITROTOLUENE</u>										
	<u>DIPHENYLHYDRAZINE</u>										
<u>115</u>	<u>Endrin</u>		<u>72208</u>			<u>0.036</u>					
<u>86</u>	<u>Fluoranthene</u>		<u>206440</u>								
	<u>HALOMETHANES</u>										
<u>20 N</u>	<u>Iron</u>		<u>7439896</u>								
<u>7</u>	<u>Lead</u>		<u>7439921</u>	<u>E,F</u>		<u>E,F</u>		<u>210 E</u>		<u>8.1 E</u>	
<u>22 N</u>	<u>Manganese</u>		<u>7439965</u>								
<u>8a</u>	<u>Mercury</u>		<u>7439976</u>								
	<u>MONOCHLOROBENZENE</u>										
<u>9</u>	<u>Nickel</u>		<u>7440020</u>	<u>E,F</u>		<u>E,F</u>		<u>74 E</u>		<u>8.2 E</u>	
<u>53</u>	<u>Pentachlorophenol</u>		<u>87865</u>			<u>M</u>					
<u>54</u>	<u>Phenol</u>		<u>108952</u>								

EPA No.	Compound	CAS Number	Freshwater				Saltwater				
			Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	Acute (CMC)	Effective Date	Chronic (CCC)	Effective Date	
	<u>POLYNUCLEAR AROMATIC HYRDOCARBONS</u>										
<u>10</u>	<u>Selenium</u>	<u>7782492</u>	<u>E,V</u>		<u>5 E</u>			<u>290 E</u>		<u>71 E</u>	
<u>11</u>	<u>Silver</u>	<u>7440224</u>	<u>E,F,P</u>		<u>0.10 E</u>			<u>1.9 E,P</u>			
<u>44 N</u>	<u>Tributyltin (TBT)</u>	<u>688733</u>	<u>0.46</u>		<u>0.063</u>			<u>0.37</u>		<u>0.01</u>	
<u>41</u>	<u>Trichloroethane 1,1,1-</u>	<u>71556</u>									
<u>55</u>	<u>Trichlorophenol 2,4,6-</u>	<u>88062</u>									
<u>13</u>	<u>Zinc</u>	<u>7440666</u>	<u>E,F</u>		<u>E,F</u>			<u>90 E</u>		<u>81 E</u>	

**Footnotes for Table 33A and 33B**

A Values in Table 20 are applicable to all basins.

~~B Human Health criteria values were calculated using a fish consumption rate of 17.5 grams per day (0.6 ounces/day) unless otherwise noted. (was deleted in 2011)~~

C Ammonia criteria for freshwater may depend on pH, temperature, and the presence of salmonids or other fish with ammonia-sensitive early life stages. Values for freshwater criteria (of total ammonia nitrogen in mg N/L) can be calculated using the formulae specified in *1999 Update of Ambient Water Quality Criteria for Ammonia* (EPA-822-R-99-014; <http://www.epa.gov/ost/standards/ammonia/99update.pdf>):

Freshwater Acute:

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

$$\text{salmonids not present...CMC} = \frac{0.411}{1 + 10^{7.204 - \text{pH}}} + \frac{58.4}{1 + 10^{\text{pH} - 7.204}}$$



Freshwater Chronic:

fish early life stages present:

$$CCC = \frac{0.0577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} * \text{MIN}(2.85, 1.45 * 10^{0.028 * (25 - T)})$$

fish early life stages not present:

$$CCC = \frac{0.577}{1 + 10^{7.688 - pH}} + \frac{2.487}{1 + 10^{pH - 7.688}} * 1.45 * 10^{0.028 * (25 - \text{MAX}(T, 7))}$$

Note: these chronic criteria formulae would be applied to calculate the 30-day average concentration limit; in addition, the highest 4-day average within the 30-day period should not exceed 2.5 times the CCC.

D 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://www.epa.gov/ost/pc/ambientwqc/ammoniasalt1989.pdf>).

E Freshwater and saltwater criteria for metals are expressed in terms of “dissolved” concentrations in the water column, except where otherwise noted (e.g. aluminum).

F The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. Criteria values for hardness may be calculated from the following formulae (CMC refers to Acute Criteria; CCC refers to Chronic Criteria):

$$CMC = (\exp(m_A * \ln(\text{hardness})) + b_A) * CF$$

$$CCC = (\exp(m_C * \ln(\text{hardness})) + b_C) * CF$$

where 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.

<u>Chemical</u>	<u>b<sub>A</sub></u>	<u>m<sub>C</sub></u>	<u>b<sub>C</sub></u>
<u>Cadmium</u>	<u>1.0166</u>	<u>-3.924</u>	<u>0.7409</u>
<u>Chromium III</u>	<u>0.8190</u>	<u>3.7256</u>	<u>0.6848</u>
<u>Copper</u>	<u>0.9422</u>	<u>-1.700</u>	<u>0.8545</u>
<u>Lead</u>	<u>1.273</u>	<u>-1.460</u>	<u>1.273</u>
<u>Nickel</u>	<u>0.8460</u>	<u>2.255</u>	<u>0.8460</u>
<u>Silver</u>	<u>1.72</u>	<u>-6.59</u>	
<u>Zinc</u>	<u>0.8473</u>	<u>0.884</u>	<u>0.8473</u>

Conversion factors (CF) for dissolved metals (the values for total recoverable metals criteria were multiplied by the appropriate conversion factors shown below to calculate the dissolved metals criteria):

<u>Chemical</u>	<u>Freshwater</u>	<u>Saltwater</u>
-----------------	-------------------	------------------

	<u>Acute</u>	<u>Chronic</u>	<u>Acute</u>	<u>Chronic</u>
<u>Arsenic</u>	<u>1.000</u>	<u>1.000</u>	<u>1.000</u>	<u>1.000</u>
<u>Cadmium</u>	<u>1.136672-[(ln hardness)(0.041838)]</u>	<u>1.101672-[(ln hardness)(0.041838)]</u>	<u>0.994</u>	<u>0.994</u>
<u>Chromium III</u>	<u>0.316</u>	<u>0.860</u>	<u>--</u>	<u>--</u>
<u>Chromium VI</u>	<u>0.982</u>	<u>0.962</u>	<u>0.993</u>	<u>0.993</u>
<u>Copper</u>	<u>0.960</u>	<u>0.960</u>	<u>0.83</u>	<u>0.83</u>
<u>Lead</u>	<u>1.46203-[(ln hardness)(0.145712)]</u>	<u>1.46203-[(ln hardness)(0.145712)]</u>	<u>0.951</u>	<u>0.951</u>
<u>Nickel</u>	<u>0.998</u>	<u>0.997</u>	<u>0.990</u>	<u>0.990</u>
<u>Selenium</u>	<u>0.996</u>	<u>0.922</u>	<u>0.998</u>	<u>0.998</u>
<u>Silver</u>	<u>0.85</u>	<u>0.85</u>	<u>0.85</u>	<u>--</u>
<u>Zinc</u>	<u>0.978</u>	<u>0.986</u>	<u>0.946</u>	<u>0.946</u>

G ~~Human Health criterion is the same as originally published in the 1976 EPA Red Book (Quality Criteria for Water, EPA 440/9-76-023) which predates the 1980 methodology and did not use a fish ingestion BCF approach.~~

H ~~This value is based on a Drinking Water regulation.~~

I This value is based on 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.

J ~~No BCF was available; therefore, this value is based on that published in the 1986 EPA Gold Book.~~

K ~~Human Health criterion is for "dissolved concentration based on the 1976 EPA Red Book conclusion that adverse effects from exposure at this level are aesthetic rather than toxic.~~

L ~~This value is expressed as the fish tissue concentration of methylmercury.~~

M Freshwater aquatic life values for pentachlorophenol are expressed as a function of pH, and are calculated as follows:  $CMC = (\exp(1.005(\text{pH}) - 4.869))$ ;  $CCC = \exp(1.005(\text{pH}) - 5.134)$ .

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

O This criterion is based on EPA recommendations issued in 1980 that were derived using guidelines that differed from EPA's 1985 Guidelines for minimum data requirements and derivation procedures. For example, a "CMC" derived using the 1980 Guidelines was derived to be used as an instantaneous maximum. If assessment is to be done using an averaging period, the values given should be divided by 2 to obtain a value that is more comparable to a CMC derived using the 1985 Guidelines.

P Criterion shown is the minimum (i.e. CCC in water should not be below this value in order to protect aquatic life).

Q ~~Criterion is applied as total arsenic (i.e. arsenic (III) + arsenic (V)).~~

R Arsenic criterion refers to the inorganic form only.

S This criterion is expressed as  $\mu\text{g}$  free cyanide (CN)/L.

T This criterion applies to DDT and its metabolites (i.e. the total concentration of DDT and its metabolites should not exceed this value).

U This criterion applies to total PCBs (e.g. the sum of all congener or all isomer or homolog or Arochlor analyses).

V The  $CMC = 1 / [(f1/CMC1) + (f2/CMC2)]$  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  $\mu\text{g}/\text{L}$  and 12.82  $\mu\text{g}/\text{L}$ , respectively.

W The acute and chronic criteria for aluminum are 750  $\mu\text{g}/\text{L}$  and 87  $\mu\text{g}/\text{L}$ , respectively. These values for aluminum are expressed in terms of "total recoverable" concentration of metal in the water column. The criterion applies at  $\text{pH} < 6.6$  and hardness  $< 12 \text{ mg}/\text{L}$  (as  $\text{CaCO}_3$ ).

~~X. The effective date for the criterion in the column immediately to the left is 1991.~~  
Y. No criterion.