Canadian Water Quality Guidelines for the Protection of Aquatic Life

SUMMARY TABLE

Summary of Canadian water quality guidelines for the protection of aquatic life.

Parameter[a]	Freshwater		Marine	
	Concentration (µg·L^{-1})	Date[b]	Concentration (µg·L^{-1})	Date[b]
Acenaphthene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Acridine [See Polycyclic aromatic hydrocarbons (PAHs)]				
Aldicarb	1[c]	1993	0.15[c]	1993
Aldrin + Dieldrin[d]	~~0.004~~ [e, f]	1987		
Aluminum[d]	5–100[g]	1987		
Ammonia (total)[d]	1370–2200[h]	1987		
Aniline	2.2[i]	1993	Insufficient data	1993
Anthracene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Arsenic[j]	5.0[k]	1997	12.5[c]	1997
Atrazine	1.8[i]	1989		
Benz*(a)*anthracene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Benzene[j]	370[c, k]	1999	110[c]	1999
Benzo*(a)*pyrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
2,2-Bis(*p*-chlorophenyl)-1,1,1-trichloroethane [See DDT (total)]				
Bromacil	5.0[c, i]	1997	Insufficient data	1997
Bromoform [See Halogenated methanes, Tribromomethane]				
Bromoxynil	5.0[i]	1993	Insufficient data	1993
Cadmium	0.017[c, l]	1996	0.12[i]	1996
Captan	1.3[c]	1991		
Carbaryl	0.20[i]	1997	0.32[c, i]	1997
Carbofuran	1.8[i]	1989		
Carbon tetrachloride [See Halogenated methanes, Tetrachloromethane]				
Chlordane[d]	~~0.006~~ [e, f]	1987		
Chlorinated benzenes				
Monochlorobenzene	1.3[c, k]	1997	25[c, k]	1997
1,2-Dichlorobenzene	0.70[c, k]	1997	42[c, k]	1997
1,3-Dichlorobenzene	150[c, k]	1997	Insufficient data[k]	1997
1,4-Dichlorobenzene	26[c, k]	1997	Insufficient data[k]	1997
1,2,3-Trichlorobenzene	8.0[c, k]	1997	Insufficient data[k]	1997

Continued.

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration (µg·L^{-1})	Date[b]	Concentration (µg·L^{-1})	Date[b]
Chlorinated benzenes—Continued				
1,2,4-Trichlorobenzene	24[c, k]	1997	5.4[c, k]	1997
1,3,5-Trichlorobenzene[d]	Insufficient data[k]	1997	Insufficient data[k]	1997
1,2,3,4-Tetrachlorobenzene	1.8[c, k]	1997	Insufficient data[k]	1997
1,2,3,5-Tetrachlorobenzene[d]	Insufficient data[k]	1997	Insufficient data[k]	1997
1,2,4,5-Tetrachlorobenzene[d]	Insufficient data[k]	1997	Insufficient data	1997
Pentachlorobenzene	6.0[c, k]	1997	Insufficient data	1997
Hexachlorobenzene[d]	Insufficient data[e, f, k]	1997	Insufficient data	1997
Chlorinated ethanes				
1,2-Dichloroethane	100[c, i]	1991	Insufficient data	1991
1,1,1-Trichloroethane	Insufficient data	1991	Insufficient data	1991
1,1,2,2-Tetrachloroethane	Insufficient data	1991	Insufficient data	1991
Chlorinated ethenes				
1,1,2-Trichloroethene (Tichloroethylene; TCE)	21[c, i]	1991	Insufficient data	1991
1,1,2,2-Tetrachloroethene (Tetrachloroethylene; PCE)	111[c, i]	1993	Insufficient data	1993
Chlorinated methanes [See Halogenated methanes]				
Chlorinated phenols[d]				
Monochlorophenols	7	1987		
Dichlorophenols	0.2	1987		
Trichlorophenols	18	1987		
Tetrachlorophenols	1	1987		
Pentachlorophenol (PCP)	0.5	1987		
Chlorine, reactive [See Reactive chlorine species]				
Chloroform [See Halogenated methanes, Trichloromethane]				
4-Chloro-2-methyl phenoxy acetic acid [See MCPA]				
Chlorothalonil	0.18[c]	1994	0.36[c]	1994
Chlorpyrifos	0.0035	1997	0.002[c]	1997
Chromium				
Trivalent chromium (Cr(III))	8.9[c, k]	1997	56[c, k]	1997
Hexavalent chromium (Cr(VI))	1.0[k]	1997	1.5[k]	1997
Chrysene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Colour	Narrative	1999	Narrative	1999
Copper[d]	2–4[m]	1987		
Cyanazine	2.0[c, i]	1990		
Cyanide[d]	5 (as free CN)	1987		

Continued.

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration (µg·L^{-1})	Date[b]	Concentration (µg·L^{-1})	Date[b]
DDAC (Didecyl dimethyl ammonium chloride)	1.5	1999		
DDT (total)[d] (2,2-Bis(*p*-chlorophenyl)-1,1,1-trichloroethane; dichloro diphenyl trichloroethane)	~~0.001~~ [e, f]	1987		
Debris (litter/settleable matter)			Narrative[c]	1996
Deltamethrin	0.0004	1997	Insufficient data	1997
Deposited bedload sediment [See Total particulate matter]				
Dibromochloromethane [See Halogenated methanes]				
Dicamba	10[c, i]	1993		
Dichlorobenzene [See Chlorinated benzenes]				
Dichlorobromomethane [See Halogenated methanes]				
Dichloro diphenyl trichloroethane [See DDT (total)]				
Dichloroethane [See Chlorinated ethanes]				
Dichloroethylene [See Chlorinated ethanes, 1,2-Dichloroethane]				
Dichloromethane [See Halogenated methanes]				
Dichlorophenols [See Chlorinated phenols]				
1,3-Dichlorophenoxyacetic acid [see Phenoxy herticides]				
Diclofop-methyl	6.1	1993		
Didecyl dimethyl ammonium chloride [See DDAC]				
Diethylene glycol [See Glycols]				
Di(2-ethylhexyl) phthalate [See Phthalate esters]				
Dimethoate	6.2[c]	1993	Insufficient data	1993
Di-*n*-butyl phthalate [See Phthalate esters]				
Di-*n*-octyl phthalate [See Phthalate esters]				
Dinoseb	0.05	1992		
Dissolved gas supersaturation	Narrative	1999	Narrative	1999
Dissolved oxygen	5500–9500[k, n]	1999	>8000 & narrative [c, k]	1996
Endosulfan[d]	0.02	1987		
Endrin[d]	~~0.0023~~ [f, i]	1987		
Ethylbenzene[j]	90[c, k]	1996	25[c, k]	1996
Ethylene glycol [See Glycols]				
Fluoranthene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Fluorene [See Polycyclic aromatic hydrocarbons (PAHs)]				

Continued.

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Glycols				
Ethylene glycol	192 000[k]	1997	Insufficient data	1997
Diethylene glycol	Insufficient data[k]	1997	Insufficient data	1997
Propylene glycol	500 000[k]	1997	Insufficient data	1997
Glyphosate	65[c]	1989		
Halogenated methanes				
Monochloromethane (Methyl chloride)[d]	Insufficient data	1992	Insufficient data	1992
Dichloromethane (Methylene chloride)	98.1[c, i]	1992	Insufficient data	1992
Trichloromethane (Chloroform)	1.8[c, i]	1992	Insufficient data	1992
Tetrachloromethane (Carbon tetrachloride)	13.3[c, i]	1992	Insufficient data	1992
Monobromomethane (Methyl bromide)[d]	Insufficient data	1992	Insufficient data	1992
Tribromomethane (Bromoform)[d]	Insufficient data	1992	Insufficient data	1992
Dibromochloromethane[d]	Insufficient data	1992	Insufficient data	1992
Dichlorobromomethane[d]	Insufficient data	1992	Insufficient data	1992
HCBD [See Hexachlorobutadiene (HCBD)]				
Heptachlor (Heptochlor epoxide)[d]	~~0.01~~ [e,f]	1987		
Hexachlorobenzene [See Chlorinated benzenes]				
Hexachlorobutadiene (HCBD)	1.3[c, k]	1999		
Hexachlorocyclohexane (Lindane)[d]	0.01	1987		
Hypochlorous acid [See Reactive chlorine species]				
3-Iodo-2-propynyl butyl carbamate [See IPBC]				
IPBC (3-Iodo-2-propynyl butyl carbamate)	1.9	1999		
Iron[d]	300	1987		
Lead[d]	1–7[o]	1987		
Lindane [See Hexachlorocyclohexane]				
Linuron	7.0[c]	1995	Insufficient data	1995
MCPA (4-Chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid)	2.6[c]	1995	4.2[c]	1995
Mercury[d]	0.1	1987		
Methyl bromide [See Halogenated methanes, Monobromomethane]				
Methyl chloride [See Halogenated methanes, Monochloromethane]				
2-Methyl-4-chloro phenoxy acetic acid [See MCPA]				
Methylene chloride [See Halogenated methanes, Dichloromethane]				
Metolachlor	7.8[c]	1991		
Metribuzin	1.0[c]	1990		
Molybdenum[j]	73[c]	1999		
Monobromomethane [See Halogenated methanes]				

Continued.

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration ($\mu g \cdot L^{-1}$)	Date[b]	Concentration ($\mu g \cdot L^{-1}$)	Date[b]
Monochloramine [See Reactive chlorine species]				
Monochlorobenzene [See Chlorinated benzenes]				
Monochloromethane [See Halogenated methanes]				
Monochlorophenols [See Chlorinated phenols]				
Naphthalene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Nickel[d]	25–150[p]	1987		
Nitrate[d]	Concentrations that stimulate weed growth should be avoided.	1987		
Nitrite[d]	60	1987		
Organotins				
Tributyltin	0.008[c]	1992	0.001	1992
Tricyclohexyltin	Insufficient data	1992	Insufficient data	1992
Triphenyltin	0.022[c, i]	1992	Insufficient data	1992
Oxygen, dissolved [See Dissolved oxygen]				
PAHs [See Polycyclic aromatic hydrocarbons (PAHs)]				
PCBs [See Polychlorinated biphenyls (PCBs)(total)]				
PCE [See Chlorinated ethenes, 1,1,2,2-Tetrachloroethene]				
PCP [See Chlorinated phenols, Pentachlorophenol]				
Pentachlorobenzene [See Chlorinated benzenes]				
Pentachlorophenol [See Chlorinated phenols]				
pH	6.5–9[d]	1987	7.0–8.7 & narrative	1996
Phenanthrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Phenols (mono- & dihydric)	4.0[k]	1999		
Phenoxy herbicides[d, q]	4.0	1987		
Phthalate esters				
Di-*n*-butyl phthalate	19[c]	1993	Insufficient data	1993
Di(2-ethylhexyl) phthalate	16[c]	1993	Insufficient data	1993
Di-*n*-octyl phthalate	Insufficient data	1993	Insufficient data	1993
Picloram	29[c]	1990		
Polychlorinated biphenyls (PCBs) (total)[d]	~~0.001~~[e, f]	1987	~~0.01~~[e, f]	1991

Continued.

Continued.

Parameter[a]	Freshwater		Marine	
	Concentration (µg·L^{-1})	Date[b]	Concentration (µg·L^{-1})	Date[b]
Polycyclic aromatic hydrocarbons (PAHs)				
Acenaphthene	5.8[c]	1999	Insufficient data	1999
Acridine	4.4[c]	1999	Insufficient data	1999
Anthracene	0.012[c]	1999	Insufficient data	1999
Benz*(a)*anthracene	0.018[c]	1999	Insufficient data	1999
Benzo*(a)*pyrene	0.015[c]	1999	Insufficient data	1999
Chrysene	Insufficient data	1999	Insufficient data	1999
Fluoranthene	0.04[c]	1999	Insufficient data	1999
Fluorene	3.0[c]	1999	Insufficient data	1999
Naphthalene	1.1[c]	1999	1.4[c]	1999
Phenanthrene	0.4[c]	1999	Insufficient data	1999
Pyrene	0.025[c]	1999	Insufficient data	1999
Quinoline	3.4[c]	1999	Insufficient data	1999
Propylene glycol [See Glycols]				
Pyrene [See Polycyclic aromatic hydrocarbons (PAHs)]				
Quinoline [See Polycyclic aromatic hydrocarbons (PAHs)]				
Reactive chlorine species (hypochlorous acid and monochloramine)	0.5	1999	0.5	1999
Salinity			<10% fluctuation[c]	1996
Selenium[d]	1.0	1987		
Silver[d]	0.1	1987		
Simazine	10	1991		
Streambed substrate [See Total particulate matter]				
Styrene	72[c]	1999		
Suspended sediments [See Total particulate matter]				
TCE [See Chlorinated ethenes, 1,1,2-Trichloroethene]				
Tebuthiuron	1.6[c]	1995	Insufficient data	1995
Temperature	Narrative[d]	1987	Not to exceed ±1°C[c]	1996
Tetrachlorobenzene [See Chlorinated benzenes]				
Tetrachloroethane [See Chlorinated ethanes]				
Tetrachloroethene [See Chlorinated ethenes]				
Tetrachloroethylene [See Chlorinated ethenes, 1,1,2,2-Tetrachloroethene]				
Tetrachloromethane [See Halogenated methanes]				
Tetrachlorophenols [See Chlorinated phenols]				
Thallium[j]	0.8	1999		
Toluene	2.0[c, j, k]	1996	215[c, k]	1996

Continued.

Continued.

Parameter[a]	Freshwater Concentration (µg·L^{-1})	Freshwater Date[b]	Marine Concentration (µg·L^{-1})	Marine Date[b]
Total particulate matter[r]				
Deposited bedload sediment	Insufficient data	1999	Insufficient data	1999
Streambed substrate	Narrative	1999	Narrative	1999
Suspended sediments	Narrative	1999	Narrative	1999
Turbidity	Narrative	1999	Narrative	1999
Toxaphene[d]	~~0.008~~ [e, f]	1987		
Triallate	0.24[c]	1992		
Tribromomethane [See Halogenated methanes]				
Tributyltin [See Organotins]				
Trichlorobenzene [See Chlorinated benzenes]				
Trichloroethane [See Chlorinated ethanes]				
Trichloroethene [See Chlorinated ethenes]				
Trichloroethylene [See Chlorinated ethenes, 1,1,2-Trichloroethene]				
Trichloromethane [See Halogenated methanes]				
Trichlorophenols [See Chlorinated phenols]				
Tricyclohexyltin [See Organotins]				
Trifluralin	0.20[i]	1993		
Triphenyltin [See Organotins]				
Turbidity [See Total particulate matter]				
Zinc[d]	30	1987		

[a]Unless otherwise indicated, supporting documents are available from the Guidelines and Standards Division, Environment Canada.

[b]The guidelines dated 1987 have been carried over from *Canadian Water Quality Guidelines* (CCREM 1987) and no fact sheet was prepared. The guidelines dated 1989 to 1997 were developed and initially published in CCREM 1987 as appendixes on the date indicated. They are published as fact sheets in this document. Other guidelines dated 1997 and those dated 1999 are published for the first time in this document.

[c]Interim guideline.

[d]No fact sheet created.

[e]This guideline (originally published in *Canadian Water Quality Guidelines* [CCREM 1987 + Appendixes] in 1987 or 1991 [PCBs in marine waters]) is no longer recommended and the value is withdrawn. A water quality guideline is not recommended. Environmental exposure is predominantly via sediment, soil, and/or tissue, therefore, the reader is referred to the respective guidelines for these media.

[f]This substance meets the criteria for Track 1 substances under the national CCME Policy for the Management of Toxic Substances (PMTS) (i.e., persistent, bioaccumulative, primarily the result of human activity, and CEPA-toxic or equivalent), and should be subject to virtual elimination strategies. Guidelines can serve as action levels or interim management objectives towards virtual elimination.

[g]Aluminum guideline = 5 µg·L^{-1} at pH <6.5; [Ca^{2+}] <4 mg·L^{-1}; DOC <2 mg·L^{-1}
= 100 µg·L^{-1} at pH ≥6.5; [Ca^{2+}] ≥4 mg·L^{-1}; DOC ≥2 mg·L^{-1}

[h]Ammonia guideline = 1370 µg·L^{-1} at pH 8.0; 10ºC
= 2200 µg·L^{-1} at pH 6.5; 10ºC

[i]Guideline value slightly modified from CCREM 1987 + Appendixes due to re-evaluation of the significant figures.

[j]The technical document for the guideline is available from the Ontario Ministry of the Environment.

[k]Substance has been re-evaluated since CCREM 1987 + Appendixes. Either a new guideline has been derived or insufficient data existed to derive a new guideline.

[l]Cadmium guideline = $10^{\{0.86[\log(\text{hardness})] - 3.2\}}$.

[m] Copper guideline = 2 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 0–120 $mg \cdot L^{-1}$
= 3 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 120–180 $mg \cdot L^{-1}$
= 4 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ >180 $mg \cdot L^{-1}$

[n] Dissolved oxygen for warm-water biota: early life stages = 6000 $\mu g \cdot L^{-1}$
other life stages = 5500 $\mu g \cdot L^{-1}$
for cold-water biota: early life stages = 9500 $\mu g \cdot L^{-1}$
other life stages = 6500 $\mu g \cdot L^{-1}$

[o] Lead guideline = 1 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 0–60 $mg \cdot L^{-1}$
= 2 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 60–120 $mg \cdot L^{-1}$
= 4 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 120–180 $mg \cdot L^{-1}$
= 7 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = >180 $mg \cdot L^{-1}$

[p] Nickel guideline = 25 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 0–60 $mg \cdot L^{-1}$
= 65 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 60–120 $mg \cdot L^{-1}$
= 110 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = 120–180 $mg \cdot L^{-1}$
= 150 $\mu g \cdot L^{-1}$ at $[CaCO_3]$ = >180 $mg \cdot L^{-1}$

[q] The guideline of 4.0 $\mu g \cdot L^{-1}$ for phenoxy herbicides is based on data for ester formulations of 2,4-dicholorophenoxyacetic acid.

[r] The technical document for the guideline is available from British Columbia Ministry of Environment, Lands and Parks.

Reference

CCREM (Canadian Council of Resource and Environment Ministers). 1987. Canadian water quality guidelines. Prepared by the Task Force on Water Quality Guidelines.

Reference listing:

Canadian Council of Ministers of the Environment. 1999. Canadian water quality guidelines for the protection of aquatic life: Summary table. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

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Excerpt from Publication No. 1299; ISBN 1-896997-34-1

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