

Science and Information Branch

WATER QUALITY

A Compendium of Working Water Quality Guidelines for British Columbia

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Ministry of Environment

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Introduction

Compendium of Working Guidelines for 2006.

The following questions and answers will introduce you to the 2006 Compendium of Working Water Quality Guidelines for British Columbia. They will explain what the report is about and guide you through its use. This report is revised periodically to incorporate new information. The authors invite your comments and suggestion on any errors or omissions in the guidelines cited here.

What are water quality guidelines and why are they important?

Water quality guidelines are environmental benchmarks. They are safe levels of substances for the protection of a given water use, including drinking water, aquatic life, recreation and agriculture. They are developed in order that water quality data can be assessed and site-specific water quality objectives can be prepared.

The Ministry of Environment has recently published, under a separate cover, a report on approved water quality guidelines: ***British Columbia Approved Water Quality Guidelines, 2006 Edition***. It lists water quality guidelines for certain priority substances and has been approved by the executive for use in B.C.

What are Working Guidelines and why do we have them?

The Working Guidelines Compendium brings together guidelines that have not yet been approved by the Province-hence, called the working guidelines. These guidelines were obtained from various Canadian (primarily the Canadian Council of the Ministers of the Environment or CCME), and other North American jurisdictions. These working guidelines provide benchmarks for those substances that have not yet been fully assessed and formally endorsed by the Ministry. They will be reviewed by the Ministry on a priority basis for their formal approval and use in British Columbia.

When are Working Guidelines used?

Working guidelines are used when there have not been guidelines approved by the province for a substance of concern to protect a particular water use. The working guidelines provide the best guidance that the Ministry can provide, at the time of publication, about safe levels for different substances in the environment. Because these estimates can be based on historic information or different derivation protocols, and are obtained from a number of different agencies, one should use them with caution.

Who can use this report?

Traditionally, water quality professionals such as consultants have used this report. We are hoping that members of the public, especially those associated with local stewardship groups, will use this new user-friendly edition of the report to evaluate water quality data that they collect.

What are sediment quality guidelines and how should they be used?

Sediment guidelines are generally stated in two ways:

- a. Safe levels of substances that will protect aquatic life from adverse effects of toxic substance
- b. Levels which, if exceeded, will cause severe effects on aquatic life.

These guidelines are not based on cause-effect studies, but on levels of toxic substances found in the sediment where biological effects have been measured. Caution should be exercised in the application of these guidelines.

What are site-specific water quality guidelines or objectives?

Site-specific water quality guidelines (or objectives) are a refinement of the province-wide guidelines. They are adapted to protect the most sensitive water use at a specific location, taking local circumstances into account. As suggested above, they have their basis in the water quality guidelines plus the site characteristics that may influence the toxic action of the substance of concern. The Ministry recognizes that site-specific factors may necessitate modification of the **Approved** or the **Working** guidelines and suggests means to do this in a 1997 publication: ***Methods for Deriving Site-Specific Water Quality Objectives in British Columbia and Yukon.***

What is the difference between the British Columbia water quality guidelines and the Canadian Council of Ministers of the Environment or CCME guidelines?

Care must be exercised when numbers from B.C. and CCME are compared. In some instances, B.C. guidelines for a substance may be specified as two values: one to protect aquatic life from short-term, lethal

effects (i.e., the maximum value or the acute criterion) and the other to protect it from long-term, sub-lethal effects (the 30-day average value or the chronic criterion). On the other hand, a CCME water quality guideline is always specified as a single maximum value to protect aquatic life from all adverse effects. CCME guidelines and B.C. chronic guidelines are generally similar in value.

How do I find the guidelines for a substance in all these tables?

The substances are arranged in alphabetical order in [Table 1](#) and [Table 2](#). Substances in the water column are listed in [Table 1](#) while substances in the bottom sediments are listed in [Table 2](#). The last column in the Tables indicates the source of the guidelines.

Which water users are included in the tables?

There are six uses of water that require protection: aquatic life, wildlife, raw drinking water prior to treatment, recreation, irrigation and livestock watering. Values to protect drinking water and recreational water uses are mostly specified in the ***British Columbia Water Quality Guidelines: 2006 Edition***.

How do I use the tables of values?

You determine for a waterbody the water uses that you want to ensure are protected. Knowing this, you go to the table for a substance and find the corresponding guideline for each use that you want to protect. Usually the lowest guideline associated with the uses that you want to protect will determine the level that must be met to ensure that all the uses are protected.

CAUTION: The guidelines as specified in the References cited take precedence over the guidelines in this summary document, and should be consulted when using the guidelines to ensure accuracy and a full understanding of the guidelines.

I have seen other references to similar reports issued by the Ministry in the past. Are those reports still valid?

As indicated above, this report is revised periodically to incorporate new information. Sections from the earlier versions that are still useful have been included in this 2006 report. This 2006 version and the ***British Columbia Water Quality Guidelines (Criteria): 2006 Edition*** supersede the following documents:

1. ***Preliminary Working Criteria for Water Quality***, October 1982.
2. ***Working Criteria for Water Quality***, April 1985.
3. ***Approved and Working Criteria for Water Quality***, April 1987, March 1989, May 1991, February 1994 and April 1995.
4. ***A Compendium of Working Water Quality Guidelines for British Columbia: 1998 Edition*** and updated August 23, 2001.
5. ***British Columbia Approved Water Quality Guidelines (Criteria)*** 1998 Edition and updated August 24, 2001.

Which water quality guidelines have been developed by the Ministry?

Water quality guidelines for the following substances have been approved:

Substance	
<ul style="list-style-type: none"> • Algae • Aluminum • Ammonia • Arsenic • Benthic sedimentation • Boron • Carbon (organic) • Chlorate • Chloride • Chlorine • Chlorophenols • Cobalt • Coliforms • Colour • Copper • Cyanide • Diisopropanolamine (DIPA) • Dissolved Oxygen • Ethylbenzene • Fluoride • Lead • Manganese • Mercury • Methyl tertiary-butyl ether (MTBE) • Microbiological indicators • Molybdenum 	<ul style="list-style-type: none"> • MTBE (methyl tertiary-butyl ether) • Nitrate • Nitrite • Nitrogen (nitrate, nitrite and ammonia) • Nutrients (phosphorus) and algae • Organic Carbon • Oxygen (dissolved) • PAHs (polycyclic aromatic hydrocarbons) • Particulate matter (suspended solids and turbidity) • PCBs (polychlorinated biphenyls) • pH • Phosphorus • Polychlorinated biphenyls (PCBs) • Polycyclic aromatic hydrocarbons (PAHs) • Pressure (total gas pressure) • Selenium • Silver • Sulphate • Sulpholane • Suspended solids • Temperature • Toluene • Total gas pressure • Turbidity • Zinc

Which water quality guidelines are currently being developed by the Ministry?

Guidelines for the following substances are being developed or reviewed for possible formal approval by the ministry:

Substance
<ul style="list-style-type: none"> • Barium • Benzene • Beryllium • Chromium • Dioxins and Furans • Iron • Xylene

What guidelines have changed since the 1998 (updated in 2001) edition?

Guidelines have been added for:

- Beryllium - drinking water
- DDAC (didecyl dimethyl ammonium chloride) - freshwater aquatic life
- IPBC (3-Iodo-2-propynyl butyl carbamate) - freshwater aquatic life
- Nonyphenol and its ethoxylates - freshwater & marine aquatic life & sediment
- Polycyclic aromatic hydrocarbons - Quinoline - freshwater aquatic life
- Styrene - freshwater aquatic life
- Thallium - freshwater aquatic life
- Polychlorinated dibenzo-p-dioxins/dibenzo furans - freshwater & marine sediment
- Toxaphene - freshwater & marine sediment

Guidelines have been revised for:

- DDT (dichlorodiphenyl trichloroethane) - freshwater & marine sediment
- Endrin - marine sediment
- Lithium - freshwater aquatic life
- Diazinon - freshwater aquatic life
- Potassium - freshwater aquatic life

Guidelines have been deleted for:

- Acrolein - livestock
- Aldrin & Dieldrin - freshwater aquatic life
- Arsenic - approved B.C. guidelines adopted
- Beryllium - freshwater aquatic life
- Boron - approved B.C. guidelines adopted
- Calcium - food processing & industrial
- Chlordane - freshwater aquatic life & livestock
- Chloride - approved B.C. guidelines adopted
- Cobalt - freshwater aquatic life - approved B.C. guidelines adopted
- DDT (dichlorodiphenyl trichloroethane) - freshwater aquatic life & livestock
- Diazinon - livestock
- Endrin - freshwater aquatic life & livestock
- Heptachlor - freshwater aquatic life & livestock
- Methylene chloride - drinking water
- Phenols - aquatic life
- Toluene - approved B.C. guidelines adopted

What other tools does the Ministry have to help one assess water quality?

In addition to the Guidelines, the Ministry has developed several tools that can be used to assess water quality. For instance, the **Principles** document and the **User's Guide**, (see below) outline the process that can be used to develop site-specific water quality objectives. The **Status Report** indicates the state of water quality for waterbodies in BC where data are available. The Ministry is also developing manuals that will help in designing and implementing monitoring programs, and interpreting water quality data. Titles of the completed reports are listed below:

- [Principles for Preparing Water Quality Objectives in British Columbia. 1986](#)

- [Developing Water Quality Objectives in British Columbia — A User's Guide. 1996](#)
- [British Columbia Water Quality Status Report. 1996](#)
- [Lake and Stream Bottom Sediment Sampling Manual. 1994](#)
- [Biological Sampling Manual. 1994](#)
- [Ambient freshwater and Effluent Sampling Manual. 1994](#)
- [Guidelines for Designing and Implementing a Water Quality Program. 1997](#)
- [Guidelines for Interpreting Water Quality Data. 1997](#)
- [Methods for Deriving Site-Specific Objectives in British Columbia and Yukon, 1997](#)

Tables

Table 1. Working Guidelines for the Water Column

Substance	Working Guidelines	References
Aldicarb - freshwater aquatic life	µg/L, (aldicarb, aldicarb sulfoxide, aldicarb sulfone) 1, interim maximum	1
Aldicarb - marine aquatic life	µg/L, (aldicarb, aldicarb sulfoxide, aldicarb sulfone) 0.15, interim maximum	1
Aldicarb - livestock	µg/L, (aldicarb, aldicarb sulfoxide, aldicarb sulfone) 11, interim maximum	1
Aldicarb - irrigation	µg/L, (aldicarb, aldicarb sulfoxide, aldicarb sulfone) 54.9, interim maximum, other non-target crops	1
Alkalinity - food processing	mg/L, total CaCO ₃ 30 to 250 (process dependent)	1
Alkalinity - industrial (process dependent)	mg/L, total CaCO ₃ 0.5, iron and steel 125 to 150, chemical 130, tanning 50 to 75, textiles 1 to 1000, boilers 20 to 500, cooling 40 to 150, pulp and paper	1
Alkalinity - freshwater aquatic life	mg/L, total CaCO ₃ up to 10, highly sensitive to acid inputs 10 to 20, moderately sensitive over 20 low sensitivity refer to calcium regarding sensitivity to acid inputs, the more restrictive of calcium or alkalinity is applicable	2
Aniline - freshwater aquatic life	µg/L, total 2.2, maximum	1
Antimony - freshwater aquatic life	µg/L, total 20, proposed Ontario guideline	4
Antimony - human health concerns	µg/L, total 14, human health protection	3

	(consumption of water + organisms) 4300 human health protection (consumption of organisms only)	
Atrazine - freshwater aquatic life	µg/L, Atrazine + metabolites 1.8 maximum	1
Atrazine - marine aquatic life	µg/L, Atrazine + metabolites 10 maximum	7
Atrazine - irrigation	µg/L, Atrazine + metabolites 10 interim maximum	1
Atrazine - livestock	µg/L, Atrazine + metabolites 5 interim maximum	1
Barium - freshwater aquatic life	mg/L, total (under Ministry review) 1, 30-/day average 5, maximum	8
Barium - marine aquatic life	mg/L, total (under Ministry review) 0.5, minimal risk 1, hazard	5 (p. 244)
Barium - marine aquatic life	mg/L, total (under Ministry review) 0.2, adverse effects on a bivalve	9
Benzene - freshwater aquatic life	µg/L, total (under Ministry review) 370, interim maximum	1
Benzene - marine aquatic life	µg/L, total (under Ministry review) 110, interim maximum	1
Beryllium - drinking water	µg/L, total 4.0, maximum contaminant level	52
Beryllium - freshwater aquatic life	µg/L, total (under Ministry review) 5.3, chronic criterion	10
Beryllium - marine aquatic life	µg/L, total (under Ministry review) 100, minimal risk 1500, hazard	5 (p. 244)
Beryllium - livestock	µg/L, total (under Ministry review) 100, tentative maximum	1
Beryllium - irrigation	µg/L, total (under Ministry review) 100, maximum, continuous use, all soils	1
Beryllium - irrigation	µg/L, total (under Ministry review) 500, maximum, up to 20 years on fine-textured, neutral to alkaline soils	11 (p. 21) 12 (p. 41) 5 (p. 341)
Bromide - drinking water	µg/L 50, annual mean of monthly raw water samples for systems using ozonation less than 50 requires reduced bromate monitoring of treated water greater than 50 requires increased bromate monitoring of treated water	51 (1999)
Bromocil - freshwater aquatic life	µg/L, total 5, maximum	1
Bromocil	µg/L, total	1

- livestock	1100, interim maximum	
Bromocil - irrigation	µg/L, total 0.2, interim maximum	1
Bromoxynl - freshwater aquatic life	µg/L, total 5, maximum	1
Bromoxynl - livestock	µg/L, total 11, maximum for most sensitive animals	1
Bromoxynl - irrigation	µg/L, total 0.33, maximum for most sensitive legume species	1
Cadmium - freshwater aquatic life	µg/L, total cadmium = $10 \exp(0.86[\log\{\text{hardness}\}]-3.2)$ 0.01 at 30 mg/L CaCO ₃ 0.02 at 60 mg/L CaCO ₃ 0.03 at 90 mg/L CaCO ₃ 0.04 at 120 mg/L CaCO ₃ 0.05 at 150 mg/L CaCO ₃ 0.06 at 210 mg/L CaCO ₃	1
Cadmium - marine aquatic life	µg/L, total 0.12, maximum	1
Cadmium - livestock	µg/L, total (under Ministry review) 80, maximum	1
Cadmium - irrigation	µg/L, total (under Ministry review) 5.1, maximum	1
Calcium - freshwater aquatic life	mg/L, dissolved up to 4, highly sensitive to acid inputs 4 to 8, moderately sensitive over 8 low sensitivity refer to alkalinity the more restrictive of calcium or alkalinity applies	2
Calcium - livestock	mg/L, dissolved 1000, maximum less if high levels of other major ions present	1
Captan - freshwater aquatic life	µg/L, total 1.3, interim maximum	1
Captan - livestock	µg/L, total 13, interim maximum	1
Carbaryl - freshwater aquatic life	µg/L, total 0.20 maximum	1
Carbaryl - marine aquatic life	µg/L, total 0.32, interim maximum	1

Carbaryl - livestock	µg/L, total 1100, maximum	1
Carbofuran - freshwater aquatic life	µg/L, total 1.8, maximum	1
Carbofuran - livestock	µg/L, total 45, maximum	1
Carbon tetrachloride - freshwater aquatic life	µg/L, total 13.3, interim maximum	1
Carbon tetrachloride - livestock	µg/L, total 5, interim maximum	1
Chlorobenzenes - livestock hexachlorobenzene	µg/L, total 0.52, interim maximum	1
Chlorobenzenes - marine aquatic life monochlorobenzene	µg/L, total 25, interim maximum	1
Chlorobenzenes -marine aquatic life 1,2-dichlorobenzene	µg/L, total 42, interim maximum	1
Chlorobenzenes - marine aquatic life 1,2,4-trichlorobenzene	µg/L, total 5.4, interim maximum	1
Chlorobenzenes - freshwater aquatic life monochlorobenzene	µg/L, total 1.3, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,2-dichlorobenzene	µg/L, total 0.7, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,3-dichlorobenzene	µg/L, total 150, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,4-dichlorobenzene	µg/L, total 26, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,2,3-trichlorobenzene	µg/L, total 8, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,2,4-trichlorobenzene	µg/L, total 24, interim maximum	1
Chlorobenzenes - freshwater aquatic life 1,2,3,4-tetrachlorobenzene	µg/L, total 1.8, interim maximum	1
Chlorobenzenes - freshwater aquatic life pentachlorobenzene	µg/L, total 6, interim maximum	1

Chloroethanes - freshwater aquatic life 1,2-dichloroethane	µg/L, total 100, interim maximum	1
Chloroethanes - freshwater aquatic life 1,2-dichloroethane	µg/L, total 5, interim maximum	1
Chloroethenes - freshwater aquatic life 1,1,2-trichloroethene (trichloroethylene, TCE)	µg/L, total 21, interim maximum	1
Chloroethenes - livestock 1,1,2-trichloroethene (trichloroethylene, TCE)	µg/L, total 50, interim maximum	1
Chloroethenes - freshwater aquatic life 1,1,2,2-tetrachloroethene (tetrachloroethylene, PCE)	µg/L, total 111, interim maximum	1
Chloromethanes - freshwater aquatic life dichloromethane (Methylene chloride)	µg/L, total 98.1, interim maximum	1
Chloromethanes - livestock dichloromethane (Methylene chloride)	µg/L, total 50, interim maximum	1
Chloromethanes Chloroform -freshwater aquatic life (trichloromethane)	µg/L, total trichloromethane 1.8, interim maximum	1
Chloromethanes Chloroform - livestock (trichloromethane)	µg/L, total 100, interim maximum	1
Chloromethanes - freshwater aquatic life tetrachloromethane (carbon tetrachloride)	µg/L, total 13.3, interim maximum	1
Chloromethanes - livestock tetrachloromethane (carbon tetrachloride)	µg/L, total 5, interim maximum	1
4-chloro-2-methylphenoxy acetic acid (MCPA) - drinking water	µg/L, total 10, lifetime health advisory	15
4-chloro-2-methylphenoxy acetic acid (MCPA) - freshwater aquatic life	µg/L, total 2.6, interim maximum	1

4-chloro-2-methylphenoxy acetic acid (MCPA) - marine aquatic life	µg/L, total 4.2, interim maximum	1
4-chloro-2-methylphenoxy acetic acid (MCPA) - livestock	µg/L, total 25, interim maximum	1
4-chloro-2-methylphenoxy acetic acid (MCPA) - irrigation	µg/L, total 0.025, maximum	1
Chlorothalonil - drinking water 2,4,5,6-tetrachloro-1,3 benzenedicarbonitrile	µg/L, total 200, health advisory	15
Chlorothalonil - freshwater aquatic life 2,4,5,6-tetrachloro-1,3 benzenedicarbonitrile	µg/L, total 0.18, interim maximum, chlorothalonil + 4-hydroxy transformation product	1
Chlorothalonil - marine aquatic life 2,4,5,6-tetrachloro-1,3 benzenedicarbonitrile	µg/L, total 0.36, interim maximum, chlorothalonil + 4-hydroxy transformation product	1
Chlorothalonil - livestock 2,4,5,6-tetrachloro-1,3 benzenedicarbonitrile	µg/L, total 170, interim maximum	1
Chlorothalonil - irrigation 2,4,5,6-tetrachloro-1,3 benzenedicarbonitrile	µg/L, total 5.8, interim maximum	1
Chlorpyrifos - freshwater aquatic life	µg/L, total 0.0035, maximum	1
Chlorpyrifos - marine aquatic life	µg/L, total 0.002, interim maximum	1
Chlorpyrifos - livestock	µg/L, total 24, interim maximum	1
Chromium - freshwater aquatic life	µg/L, total (under Ministry review) 1, maximum, Cr(VI) 8.9, interim maximum, Cr(III)	1
Chromium - marine aquatic life	µg/L, total (under Ministry review) 1.5, maximum, Cr(VI) 56, interim maximum, Cr(III)	1
Chromium - livestock	µg/L, total (under Ministry review) 50, maximum Cr(VI) 50, interim maximum Cr(III)	1
Chromium - irrigation	µg/L, total (under Ministry review) 8, maximum Cr(VI) 4.9, interim maximum Cr(III)	1

Cobalt - livestock	µg/L, total 1000, maximum	1
Cobalt - irrigation	µg/L, total 50, maximum (continuous use on all soils) 5000, maximum (for up to 20-year use on fine-textured neutral to alkaline soils)	1
Colour - industrial	true colour, process dependent 5, textiles and tanning 5 to 20, chemicals 25 to 100, pulp and paper	1
Conductivity (specific) - livestock	µS/cm, (see also filterable residue and salinity) 1400 to 4200, maximum, species dependent	1
Conductivity (specific) - irrigation	µS/cm, (see also filterable residue and salinity) 700 to 5000, soil and crop dependent	1
Conductivity (specific) - industrial	µS/cm, (see also filterable residue and salinity) 0.7 to 8000, boilers, process dependent 140 to 4000, cooling, process dependent	1
Cyanazine - freshwater aquatic life	µg/L, total 2, interim maximum	1
Cyanazine - irrigation	µg/L, total 0.5, interim maximum	1
Cyanazine - livestock	µg/L, total 10, interim maximum (same as drinking water)	1
2,4-D - freshwater aquatic life	µg/L, total (2,4-dichlorophenoxyacetic acid) 4, maximum (ester formulation)	1
2,4-D - livestock	µg/L, total (2,4-dichlorophenoxyacetic acid) 100, maximum	1
DDAC (didecyl dimethyl ammonium chloride) - freshwater aquatic life	µg/L, total 1.5, maximum	1
Dehydroabiatic Acid - freshwater aquatic life	See Resin Acids	38
Deltamethrin -freshwater aquatic life	µg/L, total 0.0004, maximum	1
Deltamethrin -livestock	µg/L, total 2.5, maximum	1
Diazinon - freshwater aquatic life	µg/L, total 0.08, Ontario's objective 0.043, secondary chronic value	24 14
Dibutylphthalate (DBP) Phthalate ester - freshwater aquatic life	µg/L, total 19, interim maximum	1
Dicamba - freshwater aquatic life	µg/L, total 10, interim maximum	1
Dicamba - livestock	µg/L, total 122, maximum	1
Dicamba	µg/L, total	1

- irrigation	0.006, maximum	
1,2-dichloroethane - freshwater aquatic life	µg/L, total 100, interim maximum, protection and maintenance	1
1,2-dichloroethane - livestock	µg/L, total 5, interim maximum (same as drinking water)	1
2,4-dichlorophenoxy acetic acid - freshwater aquatic life	µg/L, total 2,4-D acid 4, maximum (ester formulation)	1
2,4-dichlorophenoxy acetic acid - livestock	µg/L, total 2,4-D acid 100, maximum	1
Diclofop-methyl - freshwater aquatic life	µg/L, total 6.1, maximum	1
Diclofop-methyl - livestock	µg/L, total 9, interim maximum	1
Diclofop-methyl - irrigation	µg/L, total 0.18, maximum	1
Di-(2-ethylhexyl)phthalate (DEHP) Phthalate ester - freshwater aquatic life	µg/L, total 16, interim maximum	1
Dimethoate - freshwater aquatic life	µg/L, total 6.2, interim maximum	1
Dimethoate - livestock	µg/L, total 3, interim maximum	1
Di-n-butyl tin - freshwater aquatic life	µg/L, total 0.08, Ontario objective	25
Dinoseb - freshwater aquatic life	µg/L, total 0.05, maximum	1
Dinoseb - livestock	µg/L, total 150, maximum, protects lactating dairy cows	1
Dinoseb - irrigation	µg/L, total 93, maximum for legumes 46, maximum for cereals and hay 16, maximum for all other crops	1
Dissolved Solids (residue, filterable) - food processing	mg/L, total dissolved 50 to 850, process dependent	1
Dissolved Solids (residue, filterable) - livestock	mg/L, total dissolved 1000, maximum, sensitive species 3000, maximum, other species	1
Dissolved Solids (residue, filterable) - irrigation	mg/L, total dissolved 500 to 3500, maximum, crop and soil dependent	1
Dissolved Solids (residue, filterable) - industrial	mg/L, total dissolved, process dependent 0.5, boilers 100, textiles 750, petroleum 1000, iron and steel	1

	200, chemical 200 to 500, pulp and paper 500 to 35000, cooling	
Endosulfan - freshwater aquatic life	µ/L, total 0.02, maximum	1
Ethylene glycol - freshwater aquatic life	mg/L, total 192, interim maximum	1
Floatable Solids - industrial	mg/L, total 0, iron and steel	1
Glyphosate - freshwater aquatic life	µg/L, total 65, interim maximum	1
Glyphosate - livestock	µg/L, total 280, maximum, same as drinking water	1
Halogenated methanes (see also Choloromethanes) tribromomethane (Bromoform) - livestock	µg/L, total 100, maximum	1
Halogenated methanes dichlorobromomethane - livestock	µg/L, total 100, maximum	1
Halogenated methanes dibromochloromethane - livestock	µg/L, total 100, maximum	1
Hardness - food processing	µg/L, total dissolved 10 to 250, process dependent	1
Hardness - industrial process dependent	µg/L, total dissolved 0.07 to 1, boilers 0 to 150, tanning 8 to 55, textiles 0.1 to 100, iron and steel 130 to 6250, cooling low to 350, chemical 350, petroleum 100, pulp and paper	1
Hexachloro-1,3-butadiene (HCBD) - freshwater aquatic life	µg/L, total 1.3, interim maximum	1
Hexachlorocyclohexane	see Lindane	—
IPBC (3-Iodo-2-propynyl butyl carbamate) - freshwater aquatic life	µg/L, total 1.9, interim maximum	1
Iron - food processing	mg/L, total, under Ministry review 0.1 to 1, process dependent	1
Iron - freshwater aquatic life	mg/L, total, under Ministry review 0.3, maximum	1
Iron - marine aquatic life	mg/L, total, under Ministry review 0.05, minimal risk 0.3, hazardous	5 (p. 249)

Iron - irrigation	mg/L, total, under Ministry review 5, maximum, continuous use on all soils	5 (p. 343)
Iron - irrigation	mg/L, total, under Ministry review 20, maximum, 20-years use on alkaline to neutral fine-textured soils	1
Iron - industrial process dependent	mg/L, total, under Ministry review 0.01 to 1, boilers 0.02 to 0.1, chemical 1, petroleum 0.05 to 0.1, textiles 0.1 to 1, pulp and paper 0.1 to 50, tanning 0.5, make-up water for recirculating cooling	1
Lead - freshwater aquatic life tetra-ethyl lead	µg/L, total organic 0.0007, maximum, Ontario objective	18
Lead - freshwater aquatic life tri-ethyl lead	µg/L, total organic 0.4, maximum, Ontario objective	18
Lead - freshwater aquatic life tetra-methyl lead	µg/L, total organic 0.006, maximum, Ontario objective	18
Lindane - freshwater aquatic life hexachlorocyclohexane	µg/L, total 0.01, maximum	1
Lindane - livestock hexachlorocyclohexane	µg/L, total 4, maximum	1
Linuron - freshwater aquatic life	µg/L, total 7, interim maximum	1
Linuron - irrigation	µg/L, total 3.3, maximum, cereals, hay, pastures 0.071, interim maximum, other crops	1
Lithium - freshwater aquatic life	mg/L, total 0.014, secondary chronic value 0.096 Final chronic value 0.870 Aquatic maximum value	14 16 16
Lithium - irrigation	mg/L, total 2.5, maximum, continuous use on all soils (this may be too high for cereals since 1 mg/L suppressed barley growth)	1, 5
Magnesium - food processing	mg/L, total 10 to 30, process dependent	1
Magnesium - industrial	mg/L, total, process dependent 0.01, boilers 2 to 35, chemicals 12, pulp and paper 25, petroleum	1
Malathion - freshwater aquatic life	µg/L, total 0.1, maximum	10

- marine aquatic life		
Manganese - food processing	µg/L, total 30 to 200, process dependent	1
Manganese - marine aquatic life	µg/L, total 100, to protect consumers of shellfish	10
Manganese - irrigation	µg/L, total 200, maximum, continuous use on all soils 10000, maximum for up to 20 years on neutral to alkaline fine-textured soils	1
Manganese - industrial	µg/L 10, boilers 10 to 50, textiles 100 to 500, pulp and paper 10 to 200, tanning 20 to 100, chemical 20 to 50, cooling water	1
MCPA (4-chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid) - drinking water	µg/L, total 10, lifetime health advisory	15
MCPA (4-chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid) - freshwater aquatic life	µg/L, total 2.6, interim maximum	1
MCPA (4-chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid) - marine aquatic life	µg/L, total 4.2, interim maximum	1
MCPA (4-chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid) - livestock	µg/L, total 25, interim maximum	1
MCPA (4-chloro-2-methyl phenoxy acetic acid; 2-methyl-4-chloro phenoxy acetic acid) - irrigation	µg/L, total 0.16, cereals, hay and pastures 0.025, other crops	1
Methylene Chloride - freshwater aquatic life	µg/L, total 98.1, interim maximum	1
Methylene Chloride - livestock	µg/L, total 50, interim maximum	1
Metolachlor - freshwater aquatic life	µg/L, total 7.8, interim maximum	1
Metolachlor - irrigation	µg/L, total 28, interim maximum, crops	1
Metolachlor - livestock	µg/L, total 50, interim maximum, same as drinking water	1
Metribuzin - freshwater aquatic life	µg/L, total 1, interim maximum	1
Metribuzin	µg/L, total	1

- irrigation	0.5, interim maximum, non-target crop species	
Metribuzin - livestock	µg/L, total 80, interim maximum, same as drinking water	1
Nickel - freshwater aquatic life	µg/L, total 25, maximum at hardness of 0 to 60 mg/L as CaCO ₃ 65, maximum at hardness of 60 to 120 mg/L as CaCO ₃ 110, maximum at hardness of 120 to 180 mg/L as CaCO ₃ 150, maximum at hardness greater than 180 mg/L as CaCO ₃	1
Nickel - marine aquatic life	µg/L, total 8.3, 4-day average 75, 1-hour average	10
Nickel - livestock	µg/L, total 1000, maximum	1
Nickel - irrigation	µg/L, total 200, maximum, continuous use on all soils 2000 maximum, 20-year use on neutral to alkaline fine-textured soils	1
Nonylphenol (NP) and its ethoxylates - freshwater aquatic life	µg/L, total 1.0, interim maximum, expressed on a toxic equivalency (TEQ) basis using NP toxic equivalency factors (TEFs). See reference.	1
Nonylphenol (NP) and its ethoxylates - marine aquatic life	µg/L, total 0.7, interim maximum, expressed on a toxic equivalency (TEQ) basis using NP toxic equivalency factors (TEFs). See reference.	1
Oil and Grease - freshwater aquatic life	mg/L, total the surface water should be virtually free of petroleum, animal or vegetable oils	22
Oil and Grease - industrial	mg/L, total, process dependent 0, iron and steel 0.2 to 1, boilers	1
Organotins	See Tin.	
pH - industrial	pH, process dependent 2.5 to 10.5, textiles 7 to 10.5, boilers 6 to 9, petroleum 6 to 8, tanning 5 to 8.3, cooling 5 to 8.7, chemical 5 to 9, iron and steel 6 to 8, pulp and paper	1
Phthalate esters (DBP) Dibutylphthalate - freshwater aquatic life	µg/L, total 19, interim maximum	1
Phthalate esters (DEHP) Di-(2-ethylhexyl)phthalate - freshwater aquatic life	µg/L, total 16, interim maximum	1

Picloram - freshwater aquatic life	µg/L, total 29, interim maximum	1
Picloram - livestock	µg/L, total 190, interim maximum, same as drinking water	1
Polycyclic aromatic hydrocarbons (PAHs) Quinoline - freshwater aquatic life	µg/L, total 3.4, interim maximum (See Approved B.C. guidelines for other PAHs.)	1
Potassium - freshwater aquatic life	mg/L, as KCl 373 - 432, threshold for <i>Daphnia magna</i> immobilization	17
1,2-propylene glycol - freshwater aquatic life	mg/L, total 500, interim maximum	1
Residue, filterable (dissolved solids) - food processing	mg/L, total dissolved 50 to 850, process dependent	1
Residue, filterable (dissolved solids) - livestock	mg/L, total dissolved 1000, maximum, sensitive species 3000, maximum, other species	1
Residue, filterable (dissolved solids) - irrigation	mg/L, total dissolved 500 to 3500, maximum, crop and soil dependent	1
Residue, filterable (dissolved solids) - industrial	mg/L, total dissolved, process dependent 0.5, boilers 100, textiles 750, petroleum 1000, iron and steel 200, chemical 200 to 500, pulp and paper 500 to 35000, cooling	1
Residue, filterable (suspended solids) - food processing	mg/L, total 0 to 500	1
Residue, filterable (suspended solids) - industrial	mg/L, total, process dependent 0.05, boilers 5, textiles 10, petroleum 0 to 25, iron and steel 5 to 10, chemical 10, pulp and paper 100 to 5000, cooling	1
Resin Acids dehydroabietic acid (DHA) - freshwater aquatic life	µg/L, total 1 at pH 5.0 2 at pH 5.5 2 at pH 6.0 4 at pH 6.5 8 at pH 7.0 12 at pH 7.5 13 at pH 8.0 14 at pH 8.5 14 at pH 9.0	38

Resin Acids (total) abietic acid neoabietic acid pimaric acid isopimaric acid sandaracopimaric acid - freshwater aquatic life	µg/L, total 1 at pH 5.0 3 at pH 5.5 4 at pH 6.0 9 at pH 6.5 25 at pH 7.0 45 at pH 7.5 52 at pH 8.0 60 at pH 8.5 62 at pH 9.0	38
Salinity - freshwater aquatic life - terrestrial wildlife	g/L of NaCl or equivalent (the sea is about 35 g/L or 3.5%) 1.5, maximum	24 (p.32)
Salinity - marine aquatic life - estuarine aquatic life	g/L of NaCl or equivalent (the sea is about 35 g/L or 3.5%) + or - 10%, maximum change	24 (p.68)
Salinity - marine aquatic life - estuarine aquatic life - estuarine wildlife	g/L of NaCl or equivalent (the sea is about 35 g/L or 3.5%) 6, maximum for waterfowl marshes to protect vegetation For natural communities the maximum 24-hour change should not exceed 1 if natural salinity is 0 to 3.5 2 if natural salinity is 3.5 to 13.5 4 if natural salinity is 13.5 to 35	24 (p.53)
Salinity - recreation	g/L of NaCl or equivalent (the sea is about 35 g/L or 3.5%) 9, ideal 5 to 20, acceptable range this is isotonic to blood and tears	24 (p.18)
Settleable Solids - industrial	mg/L, total 0 to 100, iron and steel	1
Silica - food processing	mg/L, total 0 to 50, process dependent	1
Silica - industrial	mg/L, total, process dependent 0.01 to 150, boilers 25 to 200, cooling 20 to 100, pulp and paper 25, textiles	1
Simazine - freshwater aquatic life	µg/L, total 10, interim maximum	1
Simazine - irrigation	µg/L, total 0.5, interim maximum protection of non-target crops	1
Simazine - livestock	µg/L, total 10, interim maximum same as drinking water	1
Sodium - irrigation	mg/L, dissolved crop, soil and water regime dependent	1
Solids, Floatable - industrial	mg/L, total 0, iron and steel	1

Solids, Settleable - industrial	mg/L, total 0 to 100, iron and steel	1
Solids, Suspended (residue, non-filterable) - food processing	mg/L, total 0 to 500	1
Solids, Suspended (residue, non-filterable) - industrial	mg/L, total, process dependent 0.05, boilers 5, textiles 10, petroleum 0 to 25, iron and steel 5 to 10, chemical 10, pulp and paper 100 to 5000, cooling	1
Styrene - freshwater aquatic life	µg/L, total 72, interim maximum	1
Sulphate - livestock	mg/L, dissolved 1000, maximum	1
Sulphate - industrial	mg/L, dissolved process dependent 175 to 200, iron and steel 250, tanning 200 to 2700, cooling	1
Sulphide - food processing	µg/L, as H ₂ S 200, detected by smell in air at 2 ppb and in water at 0.025 to 0.25 µg/L	1
Sulphide - industrial	µg/L, as total sulphide 5000, cooling water	1
Sulphide - freshwater aquatic life - marine aquatic life	µg/L, as H ₂ S 2, detected by smell in air at 2 ppb and in water at 0.025 to 0.25 µg/L	11 (p. 213) 12, 15
Surfactant, LAS - drinking water	µg/L, total 500	5 (p. 67)
Surfactant - freshwater aquatic life	µg/L, total 200 Linear alkylbenzene sulphonates (LAS); 65 LAS -99% level of protection 340 Alcohol ethoxylated sulphate (AES) - 99% level of protection; 50 Alcohol ethoxylated surfactants (AE) - 99% level of protection	5 (p. 191) 19 (p. 3.4-10)
Suspended Solids (residue, non-filterable) - food processing	mg/L, total 0 to 500	1
Suspended Solids (residue, non-filterable) - industrial	mg/L, total, process dependent 0.05, boilers 5, textiles 10, petroleum 0 to 25, iron and steel 5 to 10, chemical 10, pulp and paper 100 to 5000, cooling	1

Tannins and Lignins - drinking water	µg/L, total 400, taste and odour threshold	22
Tebuthiuron 1-(5-tert-butyl-1,3,4- thiadiazol-2-yl)-1,3-dimethylurea - drinking water	µg/L, total 490, lifetime health advisory	15
Tebuthiuron 1-(5-tert-butyl-1,3,4- thiadiazol-2-yl)-1,3-dimethylurea - freshwater aquatic life	µg/L, total 1.6, interim maximum	1
Tebuthiuron 1-(5-tert-butyl-1,3,4- thiadiazol-2-yl)-1,3-dimethylurea - livestock	µg/L, total 130, interim maximum	1
Tebuthiuron 1-(5-tert-butyl-1,3,4- thiadiazol-2-yl)-1,3-dimethylurea - irrigation	µg/L, total 0.27, interim maximum for cereals, hay and pasture	1
Tetrachloroethylene - freshwater aquatic life	µg/L, total 111, interim maximum	1
Thallium - drinking water	µg/L, total 2, maximum 0.5, maximum contaminant level goal	23
Thallium - freshwater aquatic life	µg/L, total 1.7, human health, consumption of water + organism 6.3, human health, consumption of organism only	23
Thallium - freshwater aquatic life	µg/L, total 0.8, 30-day average, site-specific objective for the lower Columbia River, B.C.	13
Thallium - freshwater aquatic life	µg/L, total 0.3, water quality objective for Ontario	24
Tin, Organic Di-n-butyl tin - freshwater aquatic life	µg/L, total 0.08, Ontario objective	25
Tin, Organic Tributyl tin - freshwater aquatic life	µg/L, total 0.008, interim maximum	1
Tin, Organic Tributyl tin - marine aquatic life	µg/L, total 0.001, interim maximum	1
Tin, Organic Tributyl tin - livestock	µg/L, total 250, maximum, especially dairy cattle	1
Tin, Organic Tricyclohexyl tin - livestock	µg/L, total 250, interim maximum, especially dairy cattle	1
Tin, Organic	µg/L, total	25

Triethyl tin - freshwater aquatic life	0.4, Ontario objective	
Tin, Organic Triphenyl tin - freshwater aquatic life	µg/L, total 0.022, interim maximum	1
Tin, Organic Triphenyl tin - marine aquatic life	µg/L, total 96-hour LC50 = 34 to 48.9	1
Tin, Organic Triphenyl tin - livestock	µg/L, total 820, maximum, especially dairy cattle	1
Titanium - freshwater aquatic life	µg/L, total 2000, median threshold level: <i>Scenedesmus</i> 4600, median threshold level : <i>Daphnia</i>	17 (page 286)
Triallate - freshwater aquatic life	µg/L, total 0.24, interim maximum	1
Triallate - livestock	µg/L, total 230, interim maximum, same as drinking water	1
Tributyl tin - freshwater aquatic life	µg/L, total 0.008, interim maximum	1
Tributyl tin - marine aquatic life	µg/L, total 0.001, interim maximum	1
Tributyl tin - livestock	µg/L, total 250, maximum, especially dairy cattle	1
1,1,1-trichloroethane - drinking water	µg/L, total 200, maximum acceptable concentration	10, 26
1,1,1-trichloroethane - freshwater aquatic life	mg/L, total 11.1, 96-hour EC50 for <i>P. promelas</i> (loss of equilibrium, narcosis, etc.)	1
Trichloroethylene - freshwater aquatic life	µg/L, total 21, interim maximum	1
Trichloroethylene - livestock	µg/L, total 50, interim maximum	1
Trichloromethane - aquatic life (chloroform)	µg/L, total 1.8, interim maximum	1
Tricyclohexyl tin - livestock	µg/L, total 250, interim maximum, especially dairy cattle	1
Triethyl tin - freshwater aquatic life	µg/L, total 0.4, Ontario objective	25
Trifluralin - freshwater aquatic life	µg/L, total 0.2, maximum	1
Trifluralin - livestock	µg/L, total 45, interim, same as drinking water	1

Triphenyl tin - freshwater aquatic life	µg/L, total 0.022, interim maximum	1
Triphenyl tin - marine aquatic life	µg/L, total 96-hour LC50 = 34 to 48.9	1
Triphenyl tin - livestock	µg/L, total 820, interim maximum, especially dairy cattle	1
Turbidity - food processing	NTU, process dependent 1 to 10	1
Turbidity - industrial	NTU, process dependent 0, tanning 0.3 to 15, textiles 10 to 100, pulp and paper 1 to 2, chemical	1
Uranium - freshwater aquatic life	µg/L, total 300, maximum 500, Ontario's water quality objectives	27 24
Uranium - marine aquatic life	µg/L, total 100, minimal risk 500, hazardous	5 (p. 257)
Uranium - livestock	µg/L, total 200, maximum	1
Uranium - irrigation	µg/L, total 10, interim maximum, continuous or intermittent use on all soils 100, maximum for up to 20-years use on fine-textured soils with pH greater than or equal to 7	1
Vanadium - freshwater aquatic life	µg/L, total 6, Ontario's water quality objective 20, secondary chronic value	24 14
Vanadium - marine aquatic life	µg/L, total 50, trigger value for 99% level of protection	19
Vanadium - livestock	µg/L, total 100, maximum	1
Vanadium - irrigation	µg/L, total 100, maximum, continuous use on all soils 1000, maximum for 20-year use on fine-textured soils with pH less than or equal to 7	1
Zinc - industrial	mg/L, total 0.01, boilers	1

1. **Colour** — One TCU (true colour unit) is theoretically equal to 2 TAC (total absorbance colour) unit, but correlation between the two methods is poor.
2. **Conductivity** — Livestock and Irrigation values are derived from reference #1 assuming 1 mg/L filterable residue is about equal to 1.4 µS/cm.
3. **Iron** — Dissolved iron and iron precipitates are the important forms to consider. Total iron is often high due to iron content of suspended sediment and this is not important.
4. **Manganese** — Dissolved manganese and manganese precipitates are the important forms to consider. Total manganese is often high due to manganese content of suspended sediment and thus is not important.
5. **Nickel** — For freshwater aquatic life nickel was lethal (7-day test) to *C. dubia* at 7 µg/L (hardness = 40 mg/L CaCO₃) and 15 µg/L (hardness = 177 mg/L CaCO₃). See reference 21.
6. **Resin Acids** — Total resin acids include abietic acid, neoabietic acid, pimaric acid, isopimaric acid, and sandaracopimaric acid but not dehydroabietic acid.
7. **Sulphide** — Total sulphide = dissolved H₂S + HS + acid-soluble metal sulphides present in suspended matter. Dissolved sulphide is that remaining after suspended solids have been removed after flocculation or settling. In aquatic environments, H₂S and HS are in equilibrium as H₂S = H⁺ + HS⁻. The un-ionized H₂S can be calculated from dissolved sulphide, the sample pH and the ionization constant (which is dependent on the sample water temperature) of H₂S.
8. **X. (app. y)** in the references refers to appendix y in reference X.

Table 2. Working Guidelines for the Sediments

Substance	Working Guidelines (dry-weight basis)	References
Aldrin - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.002 lowest effect level based on SLC 0.08 severe effect level based on SLC	28
Aldrin - marine	µg/g 0.005 EPA chronic marine EqP threshold 0.0001 significantly toxic to <i>R. abronius</i> based on CoA	30
Arsenic (total) - freshwater	µg/g 5.9 ISQG 17 PEL	1
Arsenic (total) - marine	µg/g 7.24 ISQG	1

	42 PEL	
Benzene hexachloride	This is a conserved misleading name for Hexachlorocyclohexane, it is not an aromatic compound. This is not the same compound as Hexachlorobenzene.	—
Benzene hexachloride-total BHC-total Hexachlorocyclohexane see also Lindane (gamma isomer) - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.003 lowest effect level based on SLC 0.12 severe effect level based on SLC	28
Benzene hexachloride-alpha BHC-alpha Hexachlorocyclohexane see also Lindane (gamma isomer) - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.006 lowest effect level based on SLC 0.10 severe effect level based on SLC	28
Benzene hexachloride-beta BHC-beta Hexachlorocyclohexane see also Lindane (gamma isomer) - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.005 lowest effect level based on SLC 0.21 severe effect level based on SLC	28
Bis (2-ethylhexyl) phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 0.47 no adverse effect on biota 0.78 minor adverse effects	29
Butyl benzyl phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 0.049 no adverse effect on biota 0.64 minor adverse effects	29
Cadmium (total) - freshwater	µg/g 0.6, ISQG 3.5 PEL	1
Cadmium (total) - marine	µg/g 0.7 ISQG 4.2 PEL	1
Chlordane (total) - freshwater	µg/g 0.0045 ISQG 0.00887 PEL	1
Chlordane (total) - marine	µg/g 0.00226 ISQG 0.00479 PEL	1
Chromium (total) - freshwater	µg/g 37.3 ISQG 90 PEL	1
Chromium (total) - marine	µg/g 52.3 ISQG 160 PEL	1
Copper (total) - freshwater	µg/g 35.7 ISQG 197 PEL	1
Copper (total) - marine	µg/g 18.7 ISQG 108 PEL	1

Dibenzofuran - marine	µg/g, (when sediment contains 1% organic carbon) 0.15 no adverse effect on biota 0.58 minor adverse effects	29
1,2-Dichlorobenzene	µg/g, (sediment containing 1% organic carbon) 0.023 no adverse effects on biota	29
1,4-Dichlorobenzene	µg/g, (when sediment contains 1% organic carbon) 0.031 no adverse effects on biota 0.09 minor adverse effects	29
Dichloro diphenyl dichloroethane 1,1-Dichloro 2,2-bis (p-chloro-phenyl) ethane - freshwater p,p'-DDD	µg/g 0.00354 ISQG 0.00851 PEL	1
Dichloro diphenyl dichloroethane 1,1-Dichloro 2,2-bis (p-chloro-phenyl) ethane - marine p,p'-DDD	µg/g 0.00122 ISQG 0.00781 PEL	1
Dichloro diphenyl dichloroethene 1,1-Dichloro 2,2-bis (p-chloro-phenyl) ethene - freshwater p,p'-DDE	µg/g 0.00142 ISQG 0.00675 PEL	1
Dichloro diphenyl dichloroethene 1,1-Dichloro 2,2-bis (p-chloro-phenyl) ethene - marine p,p'-DDE	µg/g 0.00207 ISQG 0.374 PEL	1
Dichloro diphenyl trichloroethane 1,1,1-Trichloro 2,2-bis (p-chloro-phenyl) ethane - freshwater & marine total DDT	µg/g 0.00119 ISQG 0.00477 PEL	1
Dieldrin - freshwater	µg/g 0.00285 ISQG 0.00667 PEL	1
Dieldrin - marine	µg/g 0.00071 ISQG 0.0043 PEL	1
Diethyl phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 0.61 no adverse effect on biota 1.10 minor adverse effects	29
Diethyl phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 0.61 lowest AET benthic community composition	31
Dimethyl phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 0.53 no adverse effects on biota	29
Di-n-butyl phthalate - marine	µg/g, (when sediment contains 1% organic carbon) 2.2 no adverse effect on biota 17 minor adverse effects	29
Di-N-octyl phthalate	µg/g, (when sediment contains 1% organic carbon)	29

- marine	0.58 no adverse effects on biota 45 minor adverse effects	
Endrin - freshwater & marine	µg/g 0.00267 ISQG 0.0624 PEL	1
Heptachlor (Heptachlor epoxide) - freshwater & marine	µg/g 0.0006 ISQG 0.00274 PEL	1
Hexachlorobenzene - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.01 no effect level based on EqP 0.02 lowest effect level based on SLC 0.24 severe effect level	28
Hexachlorobenzene - marine	µg/g, (when sediment contains 1% organic carbon) 0.0038 no adverse effects on biota 0.023 minor adverse effects	29
Hexachlorobenzene - marine	µg/g 0.23 maximum level for drege disposal based on AET	33
Hexachlorobutadiene - marine	µg/g, (when sediment contains 1% organic carbon) 0.039 no adverse effects on biota 0.062 minor adverse effects	29
Hexachlorocyclohexane	see Benzene hexachloride (a conserved misleading name) see Lindane (gamma isomer only)	—
Iron (total) - freshwater	µg/g 21,200 (about 2%) lowest effect level based on SLC 43,766 (about 4%) severe effects level based on SLC	34
Lead (total) - freshwater	µg/g 35 ISQG 91 PEL	1
Lead (total) - marine	µg/g 30 ISQG 112 PEL	1
Lindane-gamma BHC (Hexachlorocyclohexane) - freshwater	µg/g 0.00094 ISQG 0.00138 PEL	1
Lindane-gamma BHC (Hexachlorocyclohexane) - marine	µg/g 0.00032 ISQG 0.00099 PEL	1
Mercury (total) - freshwater	µg/g 0.170 ISQG 0.486 PEL	1
Mercury (total) - marine	µg/g 0.130 ISQG 0.70 PEL	1
Mirex - freshwater	µg/g, (when sediment contains 1% organic carbon) 0.007 lowest effect level based on SLC	28

	1.30 severe effect level based on SLC	
Nickel (total) - freshwater	µg/g 16 lowest effect level based on SLC 75 severe effect level based on SLC	34
Nickel (total) - marine	µg/g 30 effects range low based on NSTPA 50 effects range median based on NSTPA	30
N-Nitrosodiphenylamine - marine	µg/g, (when sediment contains 1% organic carbon) 0.11 no adverse effect on biota	29
Nonylphenol (NP) and its ethoxylates - freshwater	µg/g dry weight, assuming 1% total organic carbon 1.4, provisional maximum using equilibrium partitioning approach, expressed on a toxic equivalency basis using NP toxic equivalency factors. See reference.	1
Nonylphenol (NP) and its ethoxylates - marine	µg/g dry weight, assuming 1% total organic carbon 1.0, provisional maximum using equilibrium partitioning approach, expressed on a toxic equivalency basis using NP toxic equivalency factors. See reference.	1
Polychlorinated Biphenyls (PCBs) - freshwater total PCBs	µg/g, (when sediment contains 1% organic carbon) 0.02 no effect level, approved provincial guideline	35
Polychlorinated Biphenyls (PCBs) - freshwater total PCBs	µg/g 0.0341 ISQG 0.277 PEL	1
Polychlorinated Biphenyls (PCBs) - freshwater Arochlor 1254	µg/g 0.060 ISQG 0.340 PEL Provisional, assuming 1% total organic carbon	1
Polychlorinated Biphenyls (PCBs) - freshwater Arochlor 1254	µg/g, (when sediment contains 1% organic carbon) 0.34 severe effect level based on SLC 90th percentile	28
Polychlorinated Biphenyls (PCBs) - freshwater Arochlor 1016	µg/g, (when sediment contains 1% organic carbon) 0.007 lowest effect level based on SLC 10th percentile 0.53 severe effect level based on SLC 90th percentile	28
Polychlorinated Biphenyls (PCBs) - freshwater Arochlor 1248	µg/g, (when sediment contains 1% organic carbon) 0.03 lowest effect level based on SLC 10th percentile 1.50 severe effect level based on SLC 90th percentile	28
Polychlorinated Biphenyls (PCBs) - freshwater Arochlor 1260	µg/g, (when sediment contains 1% organic carbon) 0.005 lowest effect level based on SLC 10th percentile 0.24 severe effect level based on SLC 90th percentile	28
Polychlorinated Biphenyls (PCBs) - marine total PCBs	µg/g, (when sediment contains 1% organic carbon) 0.02 no effect level, approved provincial guideline	35

Polychlorinated Biphenyls (PCBs) - marine total PCBs	µg/g 0.0215 ISQG 0.189 PEL	1
Polychlorinated Biphenyls (PCBs) - marine Arochlor 1254	µg/g 0.06333 ISQG 0.709 PEL Provisional, assuming 1% total organic carbon	1
Polychlorinated dibenzo- <i>p</i> - dioxins/dibenzo furans (PCDD/Fs) - freshwater & marine	µg/g dry weight 0.85 ISQG 21.5 PEL Provisional maximum expressed on a toxic equivalency basis using toxic equivalent factors for fish. See reference.	1
Polycyclic Aromatic Hydrocarbons (PAHs) total - freshwater	µg/g 4 effects range low based on NSTPA 35 effects range medium	30
Polycyclic Aromatic Hydrocarbons (PAHs) total - freshwater	µg/g, (when sediment contains 1% organic carbon) 100 severe effect level	39
Polycyclic Aromatic Hydrocarbons (PAHs) LPAH lower molecular weight - freshwater	µg/g 0.1 no effects threshold based on BA	32
Polycyclic Aromatic Hydrocarbons (PAHs) HPAH higher molecular weight - freshwater	µg/g 1.0 no effects threshold based on BA	32
Polycyclic Aromatic Hydrocarbon (PAH) Acenaphthene - freshwater	µg/g 0.00671 ISQG 0.0889 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Acenaphthylene - freshwater	µg/g 0.00587 ISQG 0.128 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Anthracene - freshwater	µg/g 0.0469 ISQG 0.245 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(a)anthracene - freshwater	µg/g 0.0317 ISQG 0.385 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Benzofluoranthene - freshwater	µg/g 0.3 no effect threshold based on BA	32
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(k)fluoranthene - freshwater	µg/g 0.24 lowest effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(k)fluoranthene - freshwater	µg/g, (when sediment contains 1% organic carbon) 13.4 severe effect level based on SLC	39

Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - freshwater	µg/g 0.1 no effect threshold based on BA	32
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - freshwater	µg/g 0.17 lowest effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - freshwater	µg/g, (when sediment contains 1% organic carbon) 3.2 severe effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(a)pyrene - freshwater	µg/g 0.0319 ISQG 0.782 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Chrysene - freshwater	µg/g 0.0571 ISQG 0.862 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Dibenzo(a,h) anthracene - freshwater	µg/g 0.00622 ISQG 0.135 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Fluoranthene - freshwater	µg/g 0.111 ISQG 2.355 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Fluorene - freshwater	µg/g 0.0212 ISQG 0.144 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Indeno (1,2,3,c,d) pyrene - freshwater	µg/g 0.07 no effect threshold based on BA	32
Polycyclic Aromatic Hydrocarbon (PAH) Indeno (1,2,3,c,d) pyrene - freshwater	µg/g 0.2 lowest effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Indeno (1,2,3,c,d) pyrene - freshwater	µg/g, (when sediment contains 1% organic carbon) 3.2 severe effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) 2-methylnaphthalene - freshwater	µg/g 0.0202 ISQG 0.201 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Naphthalene - freshwater	µg/g 0.0346 ISQG 0.391 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Phenanthrene - freshwater	µg/g 0.0419 ISQG 0.515 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Pyrene - freshwater	µg/g 0.053 ISQG 0.875 PEL	1

Polycyclic Aromatic Hydrocarbons (PAHs) LPAH lower molecular weight - marine	µg/g, (when sediment contains 1% organic carbon) 3.7 no adverse effects on biota 7.8 minor adverse effects on biota	29
Polycyclic Aromatic Hydrocarbons (PAHs) HPAH higher molecular weight - marine	µg/g, (when sediment contains 1% organic carbon) 9.6 no adverse effects on biota 53 minor adverse effects on biota	29
Polycyclic Aromatic Hydrocarbon (PAH) Acenaphthene - marine	µg/g 0.00671 ISQG 0.0889 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Acenaphthylene - marine	µg/g 0.00587 ISQG 0.128 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Anthracene - marine	µg/g 0.0469 ISQG 0.245 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(a)anthracene - marine	µg/g 0.0748 ISQG 0.693 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Benzofluoroanthenes (all) - marine	µg/g, (when sediment contains 1% organic carbon) 2.3 no adverse effect on biota 4.5 minor adverse effects on biota	29
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - marine	µg/g, (when sediment contains 1% organic carbon) 0.31 no adverse effect on biota 0.78 minor adverse effects on biota	29
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - marine	µg/g 0.17 lowest effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(g,h,i)perylene - marine	µg/g, (when sediment contains 1% organic carbon) 3.2 severe effect level based on SLC	39
Polycyclic Aromatic Hydrocarbon (PAH) Benzo(a)pyrene - marine	µg/g 0.0888 ISQG 0.763 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Chrysene - marine	µg/g 0.108 ISQG 0.846 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Dibenzo(a,h) anthracene - marine	µg/g 0.00622 ISQG 0.135 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Fluoranthene - marine	µg/g 0.113 ISQG 1.494 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Fluorene - marine	µg/g 0.0212 ISQG 0.144 PEL	1

Polycyclic Aromatic Hydrocarbon (PAH) Indeno (1,2,3,c,d) pyrene - marine	µg/g, (when sediment contains 1% organic carbon) 0.34 no adverse effect on biota 0.88 minor adverse effect on biota	29
Polycyclic Aromatic Hydrocarbon (PAH) 2-methylnaphthalene - marine	µg/g 0.020 ISQG 0.202 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Naphthalene - marine	µg/g 0.0346 ISQG 0.391 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Phenanthrene - marine	µg/g 0.0867 ISQG 0.544 PEL	1
Polycyclic Aromatic Hydrocarbon (PAH) Pyrene - marine	µg/g 0.153 ISQG 1.398 PEL	1
Selenium (total) -freshwater	µg/g 5	37 (p. 3)
Silver (total) - freshwater	µg/g 0.5 Ontario sediment quality guideline	36
Silver (total) - marine	µg/g 1.0 effects range low based on NSTPA 2.2 effects range median based on NSTPA	30
1,2,4-Trichlorobenzene - marine	µg/g, (when sediment contains 1% organic carbon) 0.0081 no adverse effects on biota 0.018 minor adverse effects 0.064 maximum level for dredge disposal	29
Toxaphene - freshwater & marine	µg/g, (when sediment contains 1% organic carbon) 0.0001, provisional maximum	1
Zinc (total) - freshwater	µg/g 123 ISQG 315 PEL	1
Zinc (total) - marine	µg/g 124 ISQG 271 PEL	1

1. Concentrations are expressed as µg/g or µg/g sediment containing 1% organic carbon. A guideline expressed as µg/g is based on the sediment as a whole and does not require adjustment for organic carbon content. Adjustments to guidelines are required when they are expressed in terms of the sediment containing 1% organic carbon. For sediments with organic carbon other than 1%, an adjustment in guidelines should be made by multiplying the guideline by the % organic carbon content of the sediment.

2. SLC = Screening Level Concentration

3. CoA = Co-Occurrence analyses

- 4. AET = Apparent Effects Threshold**
- 5. EqP = Equilibrium Partitioning**
- 6. NSTPA = National Status and Trends Program Approach**
- 7. BA = Background Approach**
- 8. PEL = Probable Effect Level**
- 9. ISQG = Interim Sediment Quality Guideline**
- 10. EPA = United States Environmental Protection Agency**

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