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The Importance of Updating Water Quality Guidelines

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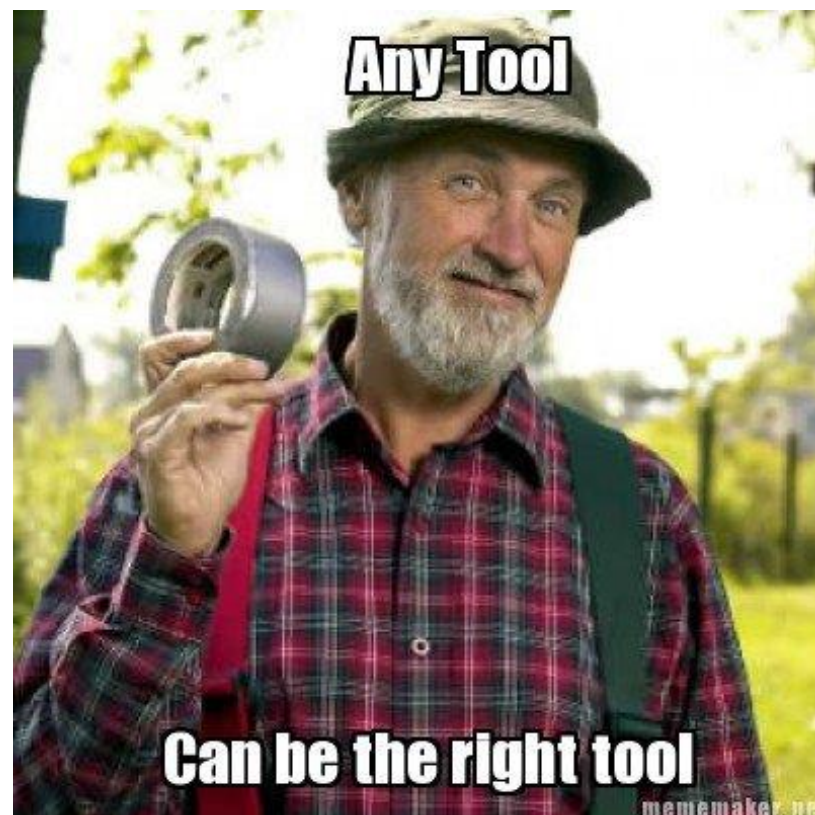


► Water Quality Guidelines



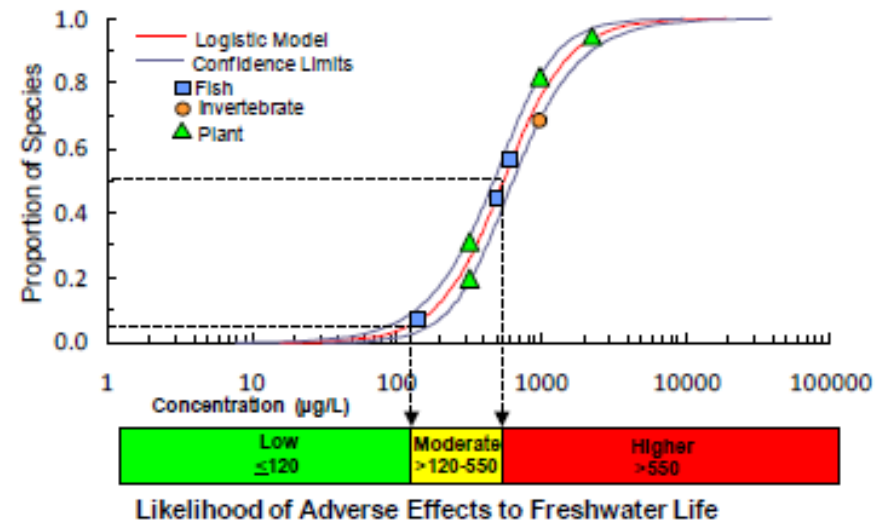
► Water Quality Guidelines

- Used to assess water quality
- Indicator of potential influence on organisms
- Conservative, generic
- Recommendation – not law*
- Frequently used, easy to use, freely available
- Based on best available data at the time
- No requirement for updates



Water Quality Guidelines

- Different approaches
 - Safety factor approach
 - Species sensitivity distributions
- Data availability
 - Dependent on research
 - Typically peer-review journals, may include grey literature
 - Driven by need – CMP, policy, research interests
- Reviews as needed/wanted rather than periodic
- Many guidelines adopted among Canadian jurisdictions



Water Quality Guidelines Sources

Canadian Council of Ministers of the Environment **CCME** Le Conseil canadien des ministres de l'environnement

Excel 2003 or more recent is required to download the Excel spreadsheet.
[Back to Chemical Search](#) [Bookmark this page](#) [Download Excel spreadsheet](#) [Download PDF](#)

		Water Quality Guidelines for the Protection of Aquatic Life			
		Freshwater			
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)
Chemical name	Chemical groups	Short Term	Long Term		Short Term
1,1,1-Trichloroethane CASRN 71556	Organic Halogenated aliphatic compounds Chlorinated ethanes	No data	Insufficient data	1991	No data
1,1,2,2-Tetrachloroethane PCE (Tetrachloroethylene) CASRN 127184	Organic Halogenated aliphatic compounds Chlorinated ethanes	No data	110	1993	No data
					Insufficient data
				1991	No data
					Insufficient data
				1991	No data
					Insufficient data

Alberta Government

Environmental Quality Guidelines for Alberta Surface Waters

July 14, 2014

Environment and Climate Change Canada

Explore the Topics ▾ Acts and Regulations ▾ Resources ▾

Home → Vanadium

Canadian Environmental Protection Act, 1999

Federal Environmental Quality Guidelines Vanadium

Environment and Climate Change Canada
May 2016

British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture

Summary Report

Water Protection & Sustainability Branch
Ministry of Environment

March 2016

Government of Saskatchewan WSA

Quick Search:

Online Services

Saskatchewan Environmental Quality Guidelines

WATER MANAGEMENT

POLICIES
GUIDELINES
PROVINCIAL WATER QUALITY OBJECTIVES
OF THE
MINISTRY OF ENVIRONMENT AND ENERGY

JULY, 1994

Ontario

CCME Guidelines

- **Use the SSD approach to derivation (CCME 2007)**
 - Guidance document could use a revision to provide additional clarity
- **Consensus based approval**
- **Lengthy development process**
- **Public review period**
- **Unsure of rationale behind setting priorities (policy, interest)**

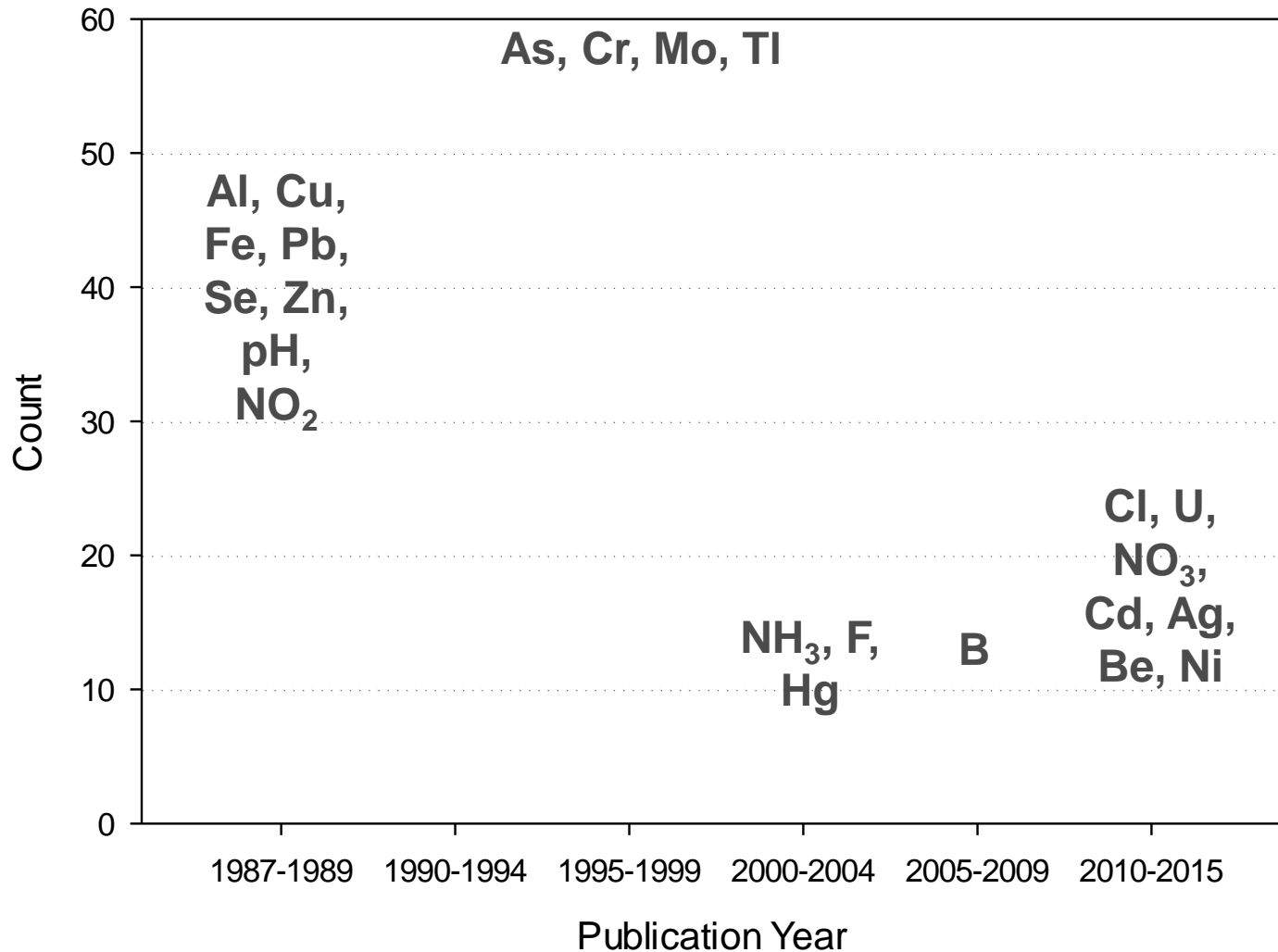


Canadian Council
of Ministers
of the Environment

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de l'environnement

CCME Publications

Number of Freshwater Aquatic Water Quality Guideline Publications by Year



► New approach and research

● Copper – 1987

- CCME guideline based on hardness
- US draft guidelines in 2003 and 2007
- Biotic Ligand Model
- New data available

● Molybdenum - 1999

- Guideline (0.073 mg/L) based on a study that cannot be replicated
- Toxicity tests conducted in support of REACH – OECD dataset
- New evidence to support guideline revision to 26 mg/L

The BLM requires ten input parameters to calculate a freshwater copper criterion (a saltwater BLM is not yet available): temperature, pH, dissolved organic carbon (DOC), calcium, magnesium, sodium, potassium, sulfate, chloride, and alkalinity. The BLM is used to derive the criteria rather than as a post-derivation adjustment as was the case with the hardness-based criteria. This allows the BLM-based criteria to be customized to the particular water under consideration.

US EPA (2007)

Table 1

Overview of reliable chronic EC₁₀ values for molybdenum (as molybdate) in the fres

Freshwater species ^a	EC ₁₀ (mg Mo/L)
<i>Oncorhynchus mykiss</i> (De Schampelaere et al, 2010)	43.2
<i>Pimephales promelas</i> (De Schampelaere et al, 2010; GEI, 2009)	60.2
<i>Ceriodaphnia dubia</i> (De Schampelaere et al, 2010; GEI, 2009)	63.0
<i>Pseudokirchneriella subcapitata</i> (De Schampelaere et al, 2010)	74.3
<i>Daphnia magna</i> (De Schampelaere et al, 2010; GEI, 2009)	89.5
<i>Xenopus laevis</i> (De Schampelaere et al, 2010)	115.9
<i>Chironomus riparius</i> (De Schampelaere et al, 2010)	121.4
<i>Brachionus calyciflorus</i> (De Schampelaere et al, 2010)	193.6
<i>Lymnaea stagnalis</i> (De Schampelaere et al, 2010)	221.3
<i>Lemna minor</i> (De Schampelaere et al, 2010)	241.5

^a Data reported in De Schampelaere et al (2010).

^b Data reported in Heijerick et al (accepted for publication).

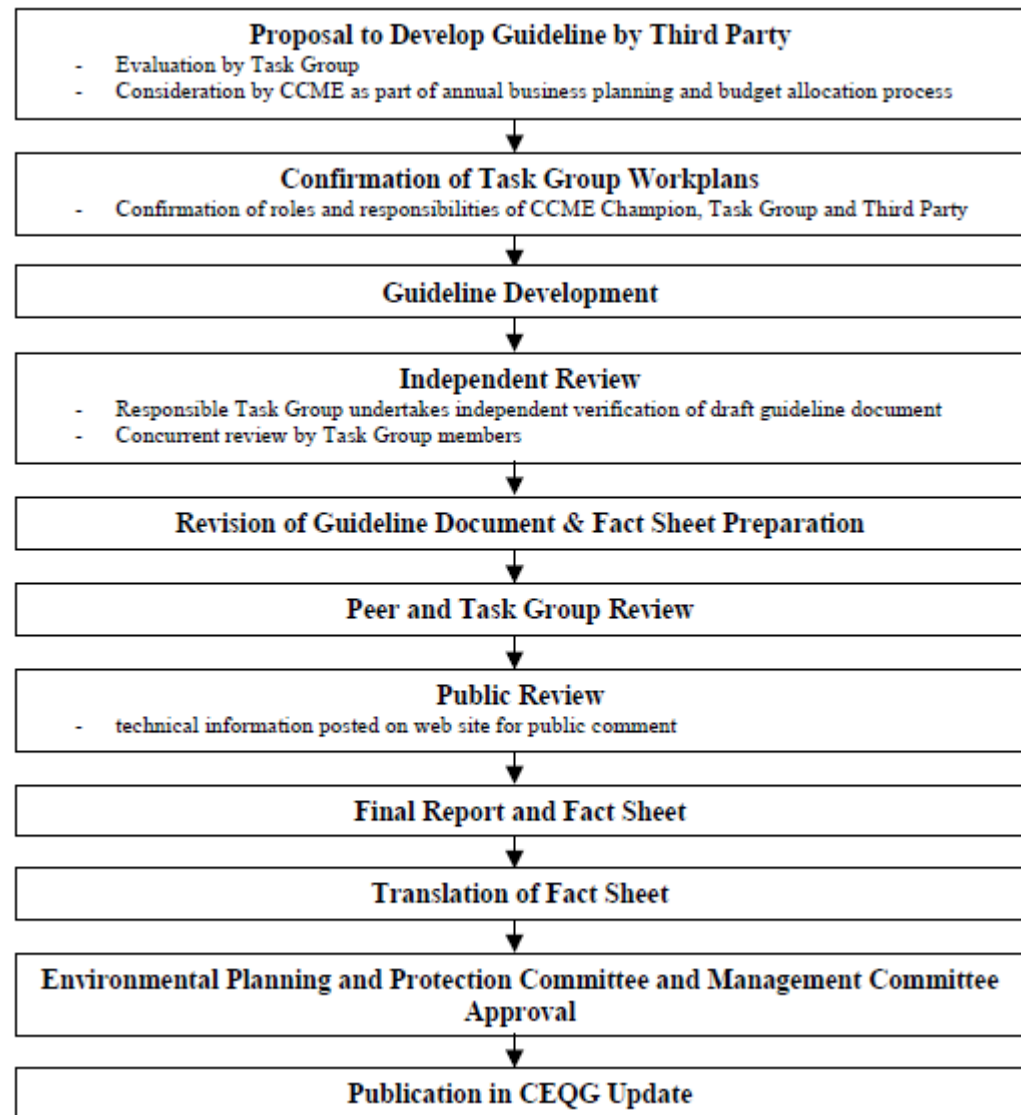
^c NOEC-value.

Heijerick et al. 2012

Contributed CCME Guidelines

- **Contributed guideline process**

- Third party develop a guideline based on current data and methods
- Work with project sponsor and CCME
- Rigorous review
- Same public and approval process
- Lengthy and robust process
- Collaborative



▶ CCME Guidelines

This report is the scientific supporting document for the Canadian Environmental Quality Guidelines for sulfolane. A draft of this report was submitted by Komex International Ltd on behalf of the Canadian Association of Petroleum Producers (CAPP) to the Soil Quality Guidelines Task Group and to the Water Quality Task Group of the Canadian Council of Ministers of the Environment for consideration as Canadian Environmental Quality Guidelines. Environment Canada co-ordinated the peer review of the draft document and provided scientific expertise and technical assistance in its revision on behalf of both CCME task groups. CCME and Environment Canada provided additional funding and in-kind contributions toward this project.

Miles Tindal and Jim Sevigny are acknowledged for their major scientific contribution to the original draft from Komex International Ltd. Kelly Potter, Susan Roe and Jonathan Hill of Environment Canada are acknowledged for their significant efforts in finalising this document. Members of both the Soil Quality Guidelines Task Group and the Water Quality Task Group are thanked for their contributions, as are the peer reviewers: Doug Bright, Peter Chapman, Gordon Craig, John Headley, L.S. McCarty, Stephanie Meakin, and Daniel Nadon.

► Federal Environmental Quality Guidelines (FEQGs)

- Section 54 of CEPA 1999 gives the Minister power to issue guidelines
- Publish fact-sheet like documents, no detailed technical document
- NO public review period, not collaborative, no contributed guidelines, no requirement to follow CCME guidance for derivation
- Support the Chemicals Management Plan

What FEQGs have been published?

[Federal Environmental Quality Guidelines for Alcohol Ethoxylates](#)

[Federal Environmental Quality Guidelines for Chlorinated Alkanes](#)

[Federal Environmental Quality Guidelines for Cobalt](#)

[Federal Environmental Quality Guidelines for Hexabromocyclododecane \(HBCD\)](#)

[Federal Environmental Quality Guidelines for Hydrazine](#)

[Federal Environmental Quality Guidelines for Polybrominated Diphenyl Ethers \(PBDEs\)](#)

[Federal Environmental Quality Guidelines for Tetrabromobisphenol A \(TBBPA\)](#)

[Federal Environmental Quality Guidelines for Vanadium](#)

► Independent Derivation and Publication



Environmental Toxicology and Chemistry, Vol. 33, No. 11, pp. 2621–2627, 2014
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Printed in the USA

DEVELOPMENT OF A FLUORIDE CHRONIC EFFECTS BENCHMARK FOR AQUATIC LIFE IN FRESHWATER

CATHY A. MCPHERSON,[†] DANNY H.Y. LEE,[†] and PETER M. CHAPMAN^{*‡}

[†]Golder Associates, Burnaby, British Columbia, Canada

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Environmental
Toxicology and Chemistry



[Explore this journal >](#)

Toxicity of aqueous vanadium to aquatic organisms relevant of the Athabasca Oil Sands region for use in development of water quality guidelines. Stephanie Schiffer¹, Lorne Doig², Karsten Liber² ¹University of Saskatchewan, ²Toxicology Centre. Bitumen from the Athabasca Oil Sands (AOS) region contains elevated concentrations of the metal vanadium (V). When

Environmental Toxicology

Development of a strontium chronic effects benchmark for aquatic life in freshwater

Cathy A. McPherson, Gary S. Lawrence, James R. Elphick, Peter M. Chapman

First published: 26 August 2014 [Full publication history](#)

DOI: 10.1002/etc.2696 [View/save citation](#)

Cited by: 2 articles [Citation tools](#)



[View issue TOC](#)
Volume 33, Issue 11
November 2014
Pages 2472–2478

- Costs of toxicity tests and derivation relatively low
- Making decisions on outdated science could be expensive

► Site-specific guidelines

The case for deriving site-specific water quality objectives driven by science. Albert Shpyth¹, Don Hart¹, Ron Nicholson¹ ¹EcoMetrix Incorporated. Methods for deriving site-specific water quality objectives (SSWQOs) have been available to Canadian ecotoxicologists (and others) for at least two decades (e.g., USEPA 1985, BCMOE 1997). However, not all regulatory jurisdictions in Canada encourage their use and instead rely on more generic guidelines for the protection of drinking

An evaluation of the effect of water hardness on chronic toxicity of cadmium in support of development of a Site-Specific Water Quality Objective. Brett Lucas¹, Ryan Hill², Emma Marcus¹, Karen Lee¹, Josh Baker¹, Yvonne Lam¹, Jesalin Wijaya¹, James Elphick¹ ¹Nautilus Environmental, ²Azimuth Consulting Group. Chronic toxicity testing was performed using cadmium across a range of water hardness concentrations (50, 100, 250 and/or 500 mg/L as CaCO₃) relevant to a proposed mine using rainbow trout (*Oncorhynchus mykiss*) (96-h LC50 test), *Hyalella azteca* (42-d survival, growth and reproduction test), *Daphnia magna* (7-d survival and reproduction test), *Daphnia magna* (reproduction tests). Interestingly, and contrary

EKATI Diamond Mine Site-specific Water Quality Objective for Vanadium

Integrated Environmental Assessment and Management — Volume 12, Number 2—pp. 371–379
© 2015 SETAC

Development of a Total Dissolved Solids (TDS) Chronic Effects Benchmark for a Northern Canadian Lake

Peter M Chapman† and Cathy A McPherson†*

†Golder Associates Ltd, Vancouver, British Columbia, Canada

► Importance of Updating Water Quality Guidelines

- **Many decisions are made based on guidelines**
 - Environmental assessments
 - Chemical risk assessments
- **Need the BEST TOOL available**
 - Using old standards not acceptable with safety; why okay for guidelines
- **To move forward it will require**
 - Commitment to develop partnerships
 - Openness to industry involvement
 - Public review to ensure robust derivation
 - One set of national guidelines – stick with the CCME

► Questions?

