



Canadian Environmental Quality Guidelines

INTRODUCTION

In 1987, the Canadian Council of Ministers of the Environment (CCME), formerly the Canadian Council of Resource and Environment Ministers (CCREM) released *Canadian Water Quality Guidelines*, which included guidelines for the protection of freshwater life, agricultural water uses for irrigation and livestock, raw water for drinking water supply, recreational water quality and aesthetics, and industrial water supplies (CCREM 1987). This publication represented the first time that national, science-based guidelines were developed collaboratively among provincial, territorial, and federal jurisdictions. It also demonstrated that Canada was a leader in the development of national guidelines for environmental quality. *Canadian Water Quality Guidelines* was regularly updated with newly developed and revised guidelines that were focused specifically on water quality issues.

Environmental concerns have grown over the past 10 years, along with our understanding of the multiple threats to ecosystem health. Canadians have recognized the need to protect components of the ecosystem in a more holistic manner. Consequently, the development of environmental quality guidelines (EQGs) in Canada has evolved to also address the protection of other atmospheric, aquatic, and terrestrial resources, including air quality, marine water quality, marine and freshwater sediment quality, tissue quality for the protection of wildlife consumers of aquatic life, and soil quality for agricultural, residential/parkland, commercial, and industrial land uses.

The CCME, through its *Statement of Interjurisdictional Cooperation on Environmental Matters*, is the principal vehicle for interjurisdictional cooperation on environmental issues of national and international concern (CCME 1990). The council consists of environment ministers from 14 member jurisdictions, including 10 provinces, 3 territories, and the federal government.

CCME task groups on water quality guidelines and soil quality guidelines were established to coordinate and develop nationally consistent EQGs for water, sediment, tissue, and soil quality. Similarly, the Federal-Provincial Committee on Environmental and Occupational Health's (CEOH) Subcommittee on Drinking Water and the ad hoc Federal-Provincial Working Group on Recreational

Water Quality were established to address human health concerns related to water quality. The Canadian Environmental Protection Act/Federal-Provincial Advisory Committee (CEPA/FPAC) Working Group on Air Quality Objectives and Guidelines was established to coordinate guideline activities related to air quality. Overall, these multijurisdictional groups are responsible for setting national priorities for guideline development that are linked to emerging national and regional issues; for cooperating on information needs for guideline development; and for harmonizing the development, review, and approval of national guidelines for the protection of the environment and human health.

Canadian EQGs are nationally endorsed, science-based goals for the quality of atmospheric, aquatic, and terrestrial ecosystems. Environmental quality guidelines are defined as numerical concentrations or narrative statements that are recommended as levels that should result in negligible risk to biota, their functions, or any interactions that are integral to sustaining the health of ecosystems and the designated resource uses they support. Canadian EQGs are recommended for parameters of national concern that are found in the ambient environment. As national benchmarks or indicators of environmental quality, Canadian EQGs are intended to protect, sustain, and enhance the quality of the Canadian environment and its many beneficial uses.

Although the EQGs discussed in this document are nationally endorsed, provincial and territorial jurisdictions may have or may develop their own science-based environmental assessment tools (e.g., criteria, guidelines, objectives, and standards), which may be implemented within their respective jurisdictions. In many cases, the CCME EQGs form the scientific basis upon which further site-specific criteria, guidelines, objectives, or standards are developed within the various jurisdictions. The legislative authority for implementation of Canadian EQGs and other environmental assessment tools lies primarily with each provincial or territorial jurisdiction, with the exception of federal lands.

Since the release of *Canadian Water Quality Guidelines* (CCREM 1987), science-based guideline derivation procedures have been established and approved nationally for specific media and resource uses. These

procedures have been documented as national scientific protocols (CCREM 1987; CCME 1991, 1993, 1995, 1996, 1998; Health Canada 1989; WGAQOG 1996). Regardless of the resource uses to be protected, guideline development for individual substances is founded on the same set of guiding principles and follows a consistent process, although specific elements of these protocols may necessarily differ. Three guiding principles are fundamental to the development and implementation of Canadian EQGs:

- (1) EQGs embody a national goal for environmental quality of no observable adverse effects on atmospheric, aquatic, and terrestrial ecosystems over the long term.
- (2) EQGs are developed for major atmospheric, terrestrial, and aquatic resource uses in Canada.
- (3) EQGs are generic recommendations that are based on the most current scientific information (i.e., they do not directly consider site-specific or management factors that may influence their implementation).

All national protocols include minimum requirements for the quality and quantity of toxicological data to ensure the guidelines derived are protective of specific resource uses. In addition, the use of national protocols ensures consistency, transparency, and scientific defensibility in the guideline development process.

Environmental quality guidelines should not be regarded as blanket values for national environmental quality. Variations in environmental conditions across Canada will affect environmental quality in different ways. Therefore, the users of EQGs may need to consider local conditions and other supporting information (e.g., site-specific background concentrations of naturally occurring substances) during the implementation of EQGs. Science-based site-specific criteria, guidelines, objectives, or standards may, therefore, differ from the Canadian EQGs recommended in this document. For ecosystems of superior quality, impairment to guideline concentrations is not advocated.

EQGs have a number of functional uses within various environmental assessment and management strategies. The general effectiveness and endorsement of such uses, however, are dependent on initiatives at the local, national, and international levels. Applications of EQGs include

- national benchmarks to assess potential or actual impairment of socially relevant resource uses
- the scientific basis for the development of site-specific criteria, guidelines, objectives, or standards
- indicators for state-of-the-environment reporting
- science-based goals or performance indicators for regional, national, or international management strategies for toxic substances
- interim management objectives for persistent, bioaccumulative, and toxic substances to track progress toward their virtual elimination
- scientific tools for assessing risks associated with existing concentrations of persistent, bioaccumulative, and toxic substances in the ambient environment
- indicators of ecotoxicologically relevant concentrations of persistent, bioaccumulative, and toxic substances for the purposes of improving analytical detection and quantification capabilities
- tools to evaluate the effectiveness of point-source controls
- the scientific basis for environmental regulations
- scientific benchmarks or targets in the assessment and remediation of contaminated sites
- science-based assessments and tools for consideration in the development of Canada-wide standards under the *Canada-wide Accord on Environmental Harmonization*.

The *Canada-wide Accord on Environmental Harmonization*, signed in January 1998 by all CCME members with the exception of Quebec, provides the framework and mechanisms for governments to cooperatively achieve the highest level of environmental quality for all Canadians. The accord provides an additional focus for EQG activities primarily through the *Canada-wide Environmental Standards Sub-agreement*. Canada-wide environmental standards encompass qualitative or quantitative standards, guidelines, objectives, and criteria for protecting the environment and human health. The primary focus of this subagreement is on Canada-wide ambient environmental standards for the quality of air, water, soil, biota, other media, and other components

of ecosystems, as well as ecosystems themselves. Standards for products and discharge, as well as performance standards, may also be developed. Therefore, Canadian EQGs will play a key role in the development of priority Canada-wide environmental standards.

Canadian EQGs are used by federal, provincial, and territorial governments to achieve the highest levels of environmental quality across Canadian jurisdictions. Provincial and territorial governments may use EQGs in developing point-source licenses and permits for discharges, while at the federal level, the guidelines support various legislative acts, such as the Canadian Environmental Protection Act (CEPA 1985). In addition, Canadian EQGs have been widely endorsed internationally by the United Nations and the World Health Organization. Canadian EQGs also support international conventions such as the Great Lakes Water Quality Agreement and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (also known as the 1972 London Convention).

This document provides a complete compilation of existing Canadian EQGs to date. It encompasses the development of guidelines for the protection of specific resource uses in various media, including

- air quality for human health and the environment (i.e., human health, animals, vegetation, materials, and aesthetic atmospheric parameters)
- water quality for drinking water supplies, recreational use and aesthetics, freshwater and marine life, and agricultural uses (i.e., irrigation and livestock water)
- sediment quality for freshwater and marine life
- soil quality for human health and the environment (i.e., agricultural, residential/parkland, commercial, and industrial land uses)
- tissue residues for wildlife consumers of aquatic biota

Water quality guidelines for raw water (i.e., water that has not been treated prior to drinking or other uses), however, have not been recommended in this document. The Federal-Provincial CEOH Subcommittee on Drinking Water (formerly the Federal-Provincial Subcommittee on Drinking Water) (CCREM 1987) has advised that water of virtually any quality can be treated using existing technology, and therefore it is not

appropriate to recommend numerical guidelines for raw public water supplies at this time.

In addition to the master summary table of all EQGs in this document, more detailed summary tables of recommended guidelines for the different media and resource uses have been included in their respective chapters. In addition, the protocols used in developing the guidelines, along with their associated implementation guidance, have been reprinted in this document, where possible. Chemical-specific guideline fact sheets that summarize key scientific information and rationale for each substance have been included in most chapters. In the cases of soil and sediment quality, other assessment values (e.g., the probable effect level for sediment quality) have been derived in addition to the guidelines to estimate other levels of risk associated with exposure to substances in that medium.

Water quality guidelines recommended in this document supersede those previously published in CCREM (1987), as most of that material has since been revised according to more recent procedures and current scientific information. For media other than water, the guidelines included in this document are either being published for the first time (i.e., for sediment quality and tissue residues) or are those that have been released under separate publication (e.g., air quality for human health and the environment; water quality for drinking water supplies, recreational use and aesthetics; and soil quality).

This document synthesizes environmental quality guideline activities in Canada over the past decade and provides a comprehensive and practical reference guide for environmental resource managers across Canada. The availability of EQGs for a number of ecosystem components will facilitate the comprehensive management of aquatic and terrestrial ecosystems and will provide a nationally consistent and common scientific basis for making effective decisions regarding the protection of environmental quality in Canada.

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