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Freshwater Benthic Ecology and Aquatic Entomology Homepage

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1.0 INTRODUCTION

The Canadian Council of Ministers of the Environment (CCME), which comprises environment ministers from the federal, provincial, and territorial governments, promotes effective intergovernmental cooperation and coordinated approaches to inter-jurisdictional issues such as air and water pollution. CCME's members collectively establish nationally-consistent environmental standards, strategies and objectives. One of the better-known products produced by CCME is a set of environmental quality guidelines (EQGs) that are used to define acceptable exposure levels of various contaminants in air, water, sediment, soil, and tissue matrices. These EQGs set limits for the acceptable levels (i.e., levels that have been determined to not cause an appreciable reduction of biological integrity) of toxic materials, in order to maintain the "chemical integrity" of that environment, that, along with physical and biological integrity, serve as surrogates for ecological integrity (Figure 1). It is important to note that chemical EQGs can be thought of as both stressor-based exposure levels that protect the resident biota (including humans), and also as allowable levels of chemical substances that do not appreciably alter the chemical integrity of a site.

Among the limitations of relying solely on chemical and/or physical parameters to assess ecological health and sustainability is the fact that existing EQGs only consider a toxic response to single chemicals, and therefore cannot account for the cumulative impacts from multiple chemical discharges (a "cocktail" of compounds) which may be coupled with physical changes in the environment. Furthermore, EQGs may not account for lower response thresholds in highly sensitive organisms or life-stages. Single-point-in-time samples can miss, cannot detect, or cannot re-construct periodic events that collectively may influence a biota.

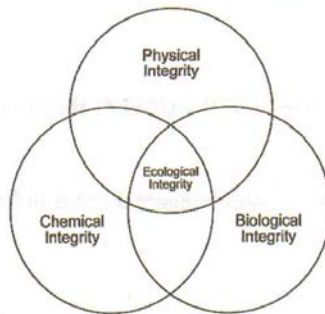


Figure 1. Schematic representation of the relationship between ecological integrity and physical, chemical and biological integrity (from Barbour *et al.* 2000).

CCME, 2006