Recreational Water Quality Guidelines and Aesthetics

Recreational water refers to surface waters that are used primarily for activities in which the user comes into frequent direct contact with the water, either as part of the activity or incidental to the activity. Examples include swimming, windsurfing, waterskiing, white water sports, scuba diving, and dinghy sailing. Secondary recreational uses include boating, canoeing, and fishing, which generally have less frequent body contact with water.

General Requirements

Health and Safety

Water used primarily for recreational purposes should be sufficiently free from microbiological, chemical, and physical hazards, e.g. poor visibility, to ensure that there is negligible risk to the health and safety of the user. Recreational water quality guidelines, summarized in Table 1, were prepared by the Federal–Provincial Advisory Committee on Environmental and Occupational Health and published by Health and Welfare Canada (1992).

These guidelines deal mainly with potential health hazards related primarily to recreational water use, but also relate to aesthetics and nuisance conditions. Health hazards associated with direct recreational contact with water include infections transmitted by pathogenic microorganisms and injuries resulting from impaired visibility in turbid waters. The determination of the risk of infection is based on a number of factors, including results of environmental health assessments, results of epidemiological studies, levels of indicator organisms, and the presence of pathogens. Sampling and enumeration of microbiological indicators and pathogens in recreational waters are also discussed. New guidelines for safe recreational water environments are currently being prepared by the World Health Organization with the assistance of Health Canada.

Aesthetics

The local setting of recreational water bodies is also important, as the surrounding countryside has a strong visual effect on the enjoyment of lakes and rivers, whether the activity is physically active or passive, such as gazing on the scenery.

In northern waters, swimming is not a major recreational activity, and factors other than microbiological are major components when determining the suitability of lakes and rivers and their environments as recreational areas. Visual impact of the whole area is as important as the quality of the water.

Impacts on a water source come from many activities. These include logging, mining, drainage of wetlands, dredging, dam construction, agricultural runoff, industrial and municipal wastes, land erosion, road construction, and land development. These factors all have to be considered in areas of natural beauty that are used for the many recreational activities engaged in by Canadians and visitors to Canada.

References

Health and Welfare Canada. 1992. Guidelines for Canadian recreational water quality. Cat. No. H49-70/1991E. Minister of Supply and Services Canada, Ottawa.

Moody, R.P., and I. Chu. 1995. Dermal exposure to environmental contaminants in the Great Lakes. Environ. Health Perspect. 103(Suppl. 9):103–114.

Summary — Guidelines for Canadian recreational water quality.

Parameter	Guideline
Microbiological	
Escherichia coli (fecal coliforms)	The geometric mean of at least five samples taken during a period not to exceed 30 d should not exceed 2000 *E. coli* per litre. Resampling should be performed when any sample exceeds 4000 *E. coli* per litre. See Health and Welfare Canada (1992) for additional information on application of guideline.
Enterococci	The geometric mean of at least five samples taken during a period not to exceed 30 d should not exceed 350 enterococci per litre. Resampling should be performed when any sample exceeds 700 enterococci per litre. See Health and Welfare Canada (1992) for additional information on application of guideline.
Coliphages	Limits on coliphages can not be specified at this time. See Health and Welfare Canada (1992) for additional information.
Waterborne pathogens	The pathogens most frequently responsible for diseases associated with recreational water use are described in Health and Welfare Canada (1992), i.e., *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Salmonella*, *Shigella*, *Aeromonas*, *Campylobacter jejuni*, *Legionella*, human enteric viruses, *Giardia lamblia,* and *Cryptosporidium*.
Cyanobacteria (blue-green algae)	Limits have not been specified. Health Canada is in the process of developing a numerical guideline for microcystin, a cyanobacterial toxin. Water with blue-green surface scum should be avoided because of reduced clarity and possible presence of toxins.
Chemical characteristics	Limits for chemicals have not been specified because of lack of data. Decisions for use should be based on an environmental health assessment and the aesthetic quality. Dermal exposures to environmental contaminants has recently been reviewed by Moody and Chu (1995).
Temperature	The thermal characteristics of water should not cause an appreciable increase or decrease in the deep body temperature of bathers and swimmers.
Clarity	The water should be sufficiently clear that a Secchi disc is visible at a minimum of 1.2 m.
pH	When the buffering capacity of the water is very low,6.5 to 8.5; range of 5.0 to 9.0 is acceptable.
Turbidity	A limit of 50 Nephelometric Turbidity Units (NTU) is suggested.
Oil and grease	Oil or petrochemicals should not be present in concentrations that • can be detected as a visible film, sheen, or discoloration on the surface; • can be detected by odour; or • can form deposits on shorelines and bottom deposits that are detectable by sight and odour.
Aquatic plants	Bathers should avoid areas with rooted or floating plants; very dense growths could affect other activities such as boating and fishing.
Aesthetics	All water should be free from • materials that will settle to form objectionable deposits; • floating debris, oil, scum, and other matter; • substances producing objectionable colour, odour, taste, or turbidity; and • substances and conditions or combinations thereof in concentrations that produce undesirable aquatic life.
Nuisance organisms	Bathing areas should be as free as possible from nuisance organisms that • endanger the health and physical comfort of users or • render the area unusable. Common examples include biting and nonbiting insects and poisonous organisms, for example jelly-fish.

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Reference listing:

Canadian Council of Ministers of the Environment. 1999. Recreational water quality guidelines and aesthetics. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

For further scientific information, contact:

Health Canada
Environmental Health Directorate
Health Protection Branch
Tunney's Pasture, Postal Locator 1912A
Ottawa, ON K1A 0K9
Phone: (613) 957-1505
Facsimile: (613) 952-2574
Internet: http://www.hc-sc.gc.ca

For additional copies, contact:

CCME Documents
Toll Free: 800-805-3025
Adresse Internet : http://www.ccme.ca

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