

Update of the Guidelines For Canadian Recreational Water Quality: *Highlights and Status*

Gordon Yasvinski
Microbiological Assessment Section
Water, Air and Climate Change Bureau
Health Canada

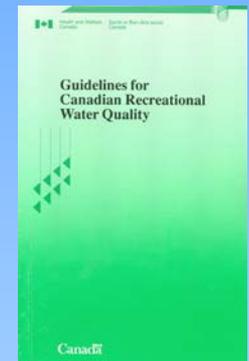


**Health
Canada**

**Santé
Canada**

Background – Guideline Development

- **Recreational Waters**
 - “any natural fresh, marine or estuarine body of water used for recreation”.
 - Not intended to address: Treated recreational water facilities (swimming pools, water parks, hot tubs).
- **Health Canada the steward for these Guidelines – works closely with the provinces and territories**
 - Provinces/Territories
 - Responsible for ensuring waters are safe.
 - Health Canada
 - Provides coordination, expertise and guidance.
- **Federal-Provincial-Territorial Working Group on Recreational Water Quality formed. Members include:**
 - Members of the Water, Air and Climate Change Bureau, Health Canada (Secretariat)
 - Provincial representatives (Ministries of Health, Environment)
 - Invited members from Environment Canada and the U.S. EPA.



Background – Guideline Development

Objectives:

- Protection of human health from hazards that can interfere with the safe enjoyable use of recreational waters.
- Provide Guideline values, guidance, information, tools.
 - Directed to Provincial-Territorial authorities
 - Used by jurisdictions as basis for developing own policies.



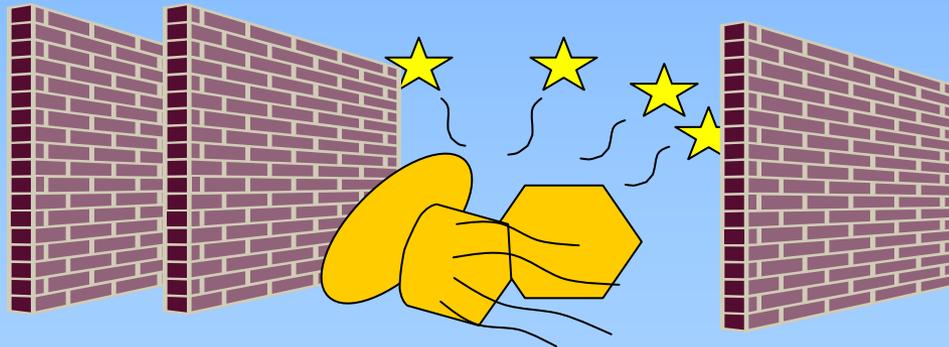
Guidelines for Canadian Recreational Water Quality

- Guidelines 3rd Edition (Draft)
 - Working Group consensus most appropriate approach
 - Based on best evidence and needs specific to Canada
 - Not legally enforceable – Provinces-Territories decide how best to implement.
- Part I: Management of Recreational Waters
 - Guidance on hazard assessment, monitoring, possible actions.
- Part II: Guideline Technical Documentation
 - Outlines Guideline values.
 - Provides technical information on parameters and hazards.
- Consultation anticipated Fall 2009
- Will be posted on Health Canada's website:
(www.healthcanada.gc.ca/waterquality).

The screenshot shows the Health Canada website interface. At the top, there are logos for Health Canada and Canada. Below the logos is a navigation menu with links for Français, Contact us, Help, Search, and Canada Site. A secondary menu includes A-Z Index, Consultations, Media Room, It's Your Health, and Home. The main content area features a banner for 'Environmental & Workplace Health' with a large, stylized yellow text overlay that reads 'Draft 3rd Edition'. Below the banner, there is a sidebar with a list of categories: About Health Canada, Consumer Product Safety, Diseases & Conditions, Drugs & Health Products, Emergencies & Disaster Preparedness, Environmental Health, Environmental Health Assessment, Noise, and Occupational Health & Safety. The main text area contains introductory text about recreational water quality, mentioning the need for a concerted effort from government, businesses, and industry. At the bottom, there are links to download the guidelines: PDF Part I (pages 1-48) and PDF Part II (pages 49-101).

Part I: Management of Recreational Waters

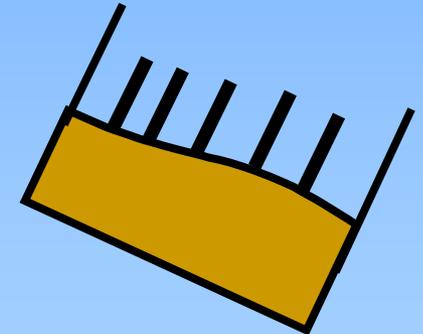
- Central principles consistent with ideas in the “Annapolis Protocol”, and directions taken by other jurisdictions (WHO, US EPA, EU, Australia/NZ)
- Recommending a balanced, total management approach.
- The “Multi-barrier approach”:
 - Integrated system of actions, guideline values, policies, communication strategies
 - Collectively reduce risk of human exposure to hazards.



- Advantages:
 - More barriers = greater risk reduction
 - Improved management – tailored to area needs, hazards better understood.

Part I: Management of Recreational Waters

- Fecal indicator monitoring as sole indication of water safety:
 - Single barrier
 - Reactive strategy
- Limitations:
 - Few jurisdictions have resources to monitor intensively.
 - Information comes 24 hours after sampling.
 - Fecal indicators do not index all hazards.
- Leecaster and Weisberg, 2001
Number of exceedances detected:
 - 5 days/week 80%
 - 1 day/week 25%
 - 1 day/month 5%
- Whitman and Nevers, 2004.
 - # samples required for 70% accuracy in catching exceedances
 - Intensive (single location) 6 samples
 - Extensive (across transects) 24 samples
- Guideline values are one important component of the overall risk management strategy.



Part I: Management of Recreational Waters

First Step: The Environmental Health and Safety Survey

- “Knowing your Beach”
- Conducted at start of each season.
- Search for hazards; review of all aspects of beach’s operation.
- 3 steps:
 1. Pre-survey preparations – review of historical data
 2. On-site visit – confirmation of potential hazards and facilities
 3. Assessment report – summary of findings and recommendations
- ‘Blueprint’ upon which to base management strategies



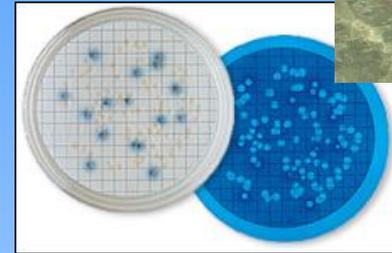
Part I: Management of Recreational Waters

- Second Step: Implement Barriers for Protection
- Barriers = activities or interventions to reduce risk
 - Reduce sources of contamination
 - Restrict human contact in times/areas of risk.

Areas where barriers can be identified

1. Monitoring

- Information contributing to understanding of safety of water.
- Use of guideline values for water quality parameters.
- Guidelines point out tools having potential to overcome some limitations:
 - Predictive models; composite sampling.



2. Public Health Advice

- Resource – provide valuable information to operators and the public on hazards and actions to be taken.



Areas where barriers can be identified

3. Public Awareness and Communication

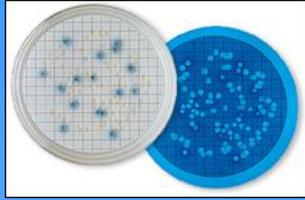
- Communication tools: reduce potential for illness/injury; increase public confidence.
- Examples:
 - Signs for warnings/closures.
 - Posters, information sheets, TV/radio spots, websites.
 - Other: award schemes, educational activities, volunteer days.



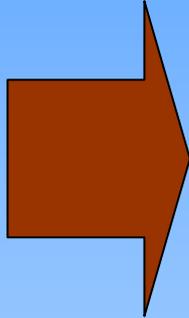
4. Control Strategies

- Actions to reduce the impact of the hazard.
- Large and small scale actions.
- Small (local) scale examples:
 - Beach grooming and grading.
 - Wildlife deterrents (animal-proof trash bins; fences).





Unsafe for
24hrs
Due to
Heavy
Rainfall



Part II: Guideline Technical Documentation



Recommended Indicators of Fecal Contamination: Primary-Contact Use

Fecal Indicator Organism	Guideline Value	
	Geometric mean concentration (minimum 5 samples)	Single sample concentration
<i>E. coli</i> (fresh)	≤ 200 <i>E. coli</i> per 100 mL	≤ 400 <i>E. coli</i> per 100 mL
Enterococci (marine)	≤ 35 enterococci per 100 mL	≤ 70 enterococci per 100 mL

- Based in part on U.S. EPA original epidemiological research
- Notes on Assessment:
 - Risk management decision balancing potential health risks and benefits of recreational activity.
 - Format preferred for Canadian waters.
 - No substantial evidence to suggest revision necessary.

Part II: Guideline Technical Documentation



Recommended Indicators of Fecal Contamination: Secondary-Contact Use

Fecal Indicator Organism	Guidance Value
	Geometric mean concentration should not exceed a value of 5 times the value for primary-contact recreation
<i>E. coli</i> (fresh)	$(5 \times 200 \text{ } E. coli / 100 \text{ mL}) = \mathbf{1000 \text{ } E. coli / 100 \text{ mL}}$
Enterococci (marine)	$(5 \times 35 \text{ enterococci / 100 mL}) = \mathbf{175 \text{ enterococci / 100 mL}}$

- Notes on Assessment:

- Some waters where secondary use designation may be acceptable
- Risk management decision given expected exposure scenarios and potential health risks
- Intended to provide some level of protection until epidemiological-based values derived.



Part II: Guideline Technical Documentation

New

Cyanobacteria and their Toxins

Parameter	Guideline Value
Total Cyanobacteria	$\leq 100,000$ cells / mL
Total Microcystins (as Microcystin-LR)	≤ 20 μg / L

- Notes on Assessment:
Working Group favours two-pronged approach:
 1. Value for cell density to protect against contact with blooms.
 2. Value for toxin concentration to protect against risk of exposure to microcystins.
- Guidance provided on reasons for development; species of interest; managing health risks.



Part II: Guideline Technical Documentation



Physical, Aesthetic and Chemical Parameters

Parameter	Guideline Value
pH	6.5 to 8.5 (5.0 to 9.0 for waters of low buffering capacity)
Temperature	Thermal characteristics should not cause an appreciable change in deep body temperature.
Turbidity	50 NTU
Clarity	Secchi Disc visible at a depth of 1.2 m.
Colour	100 Pt-Co units; not to be increased more than 30 units above natural value.
Oil and Grease	Should not be present in concentrations that can be detected as a visible film, sheen, discolouration or odour; or that can form deposits on shorelines or bottom sediments that are detectable by sight or odour.
Litter	Areas should be free from floating debris as well as materials that will settle to form objectionable deposits.
Chemical Hazards	Insufficient information to support the establishment of guideline values for specific chemical parameters. Risks associated with specific chemical hazards should be assessed on a case-by-case basis.

Part II: Guideline Technical Documentation



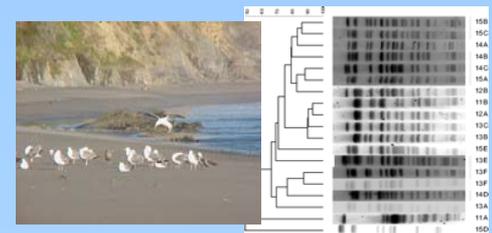
Fecal Contamination and Beach Sand

- Finding of fecal indicators in beach sand – raises concern for health authorities and public.
- No conclusive evidence of link between sand contact and illness.
- Use barriers to reduce risk of exposure – sanitation and grooming; public education; animal control.



Other Topics:

- Pathogenic Microorganisms (Bacteria, Viruses, Protozoa)
- Other organisms that can interfere with the safe, enjoyable use of recreational waters:
 - Swimmer's itch
- Sample Collection and Analysis
- Information on Faecal Pollution Source Tracking



Part II: Guideline Technical Documentation

Tools:

- EHSS Checklist
- Sample Collection and Reporting Forms
- Examples of Informative Beach Signs

Microbiological Hazards

Potential Sources of Fecal Contamination

Municipal Sewage Discharges Combined Sewer Overflows (CSOs)
 Stormwater Drains/Discharges Septic Waste Systems
 Wastes from Animal Feeding Operations

Other Discharges Containing Fecal Wastes (List): _____ Other Sewage Collection/Disposal/Treatment Systems (List): _____

Stormwater Runoff From:

Agricultural Areas Areas Receiving Sewage Sludge
 Beach and Surrounding Facilities (e.g. parking) Other: _____

Other Environmental Sources:

Discharging Rivers/Streams/Creeks
 Birds (e.g. gulls, ducks, geese, other) [W]: None Low Med High (circle one)]
 Other wild animals [W]: None Low Med High (circle one)]
 Pets [W]: None Low Med High (circle one)]
 Bathing [W]: None Low Med High (circle one)]
 Other: _____

Appendix E: Example: Sample collection and reporting form

Beach Name: _____ Address: _____
 Responsible Authority: _____ Contact Information: _____
 Person Collecting Sample: _____

Site	Indicator Counts □ F. coli □ Enterococci	Wind Direction: □ None □ Offshore □ Onshore □ Parallel to Shore
		Sunlight: □ Sunny □ Overcast □ Partly Cloudy □ Rainy
		Bather Density: □ None □ Low □ Medium □ High Approximate Number: _____
Geometric Mean:		Birds: □ None □ Low □ Medium □ High - gulls - ducks - geese Approximate Number: _____
Period Covered:		Litter: □ None □ Low □ Medium □ High
Air Temperature (°C):		Seaweed/Algae (on beach): □ None □ Low □ Medium □ High
Water Temperature (°C):		



Next Steps

- Draft Guidelines – public comment period.
- Will be posted on our website: www.hc-sc.gc.ca/waterquality
- Interested individuals - join our listserv to receive notifications and latest news on Health Canada's water quality publications.
(www.hc-sc.gc.ca/ewh-semt/water-eau/water_list-liste_eau_e.html)



The screenshot shows the Health Canada website interface. At the top, there is a navigation bar with the Canadian flag, 'Health Canada / Santé Canada', and the 'Canada' logo. Below this is a menu with links for 'Français', 'Contact us', 'Help', 'Search', and 'Canada Site'. A secondary menu includes 'A-Z Index', 'Consultations', 'Media Room', 'It's Your Health', and 'Home'. The main content area features a banner for 'Environmental & Workplace Health' with a photo of people. Below the banner is a sidebar with a list of categories: 'About Health Canada', 'Consumer Product Safety', 'Diseases & Conditions', 'Drugs & Health Products', 'Emergencies & Disasters', 'Environmental & Workplace Health', 'Air Quality', 'Climate Change & Health', 'Contaminated Sites', 'Environmental Contaminants', 'Environmental Health Assessment', 'Noise', 'Occupational Health & Safety', 'Radiation', 'Water Quality', and 'Legislation & Guidelines'. The main content area displays the breadcrumb trail: 'Home > Environmental & Workplace Health > Reports & Publications > Water Quality > Consultation Documents'. The section title is 'Documents For Public Comment'. The text explains that the Federal-Provincial-Territorial Committee on Drinking Water (CDW) has requested that draft guideline technical documents be available for public comment. It provides instructions on how to access alternative formats (PDF, MP3, WAV) and how to forward comments by email to water_eau. It also states that a letter summarizing the comments received and the decision of the CDW will be sent to all participants and posted to the site along with the revised document. The page concludes with a thank you message for participation.

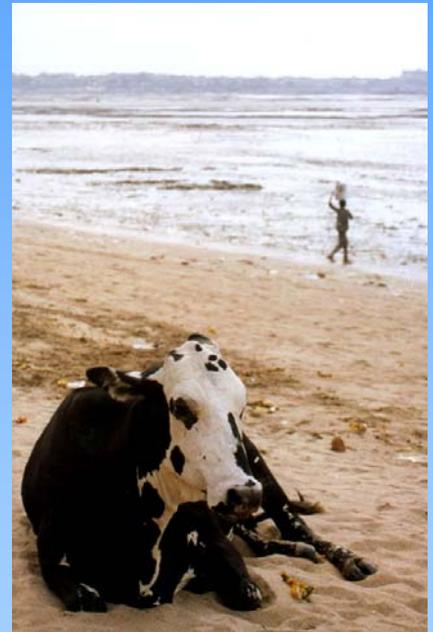
Emerging issues with applicability for recreational waters across Canada

- Beach sand, fecal contamination and fecal indicators
- Cyanobacterial (Blue-green algae) blooms

Beach Sand, Fecal contamination and Fecal indicators.

Issue: Recently published findings:

- Fecal indicator bacteria isolated from beach sand, occasionally in high numbers.
- Evidence to suggest certain fecal indicator strains may be capable of replication if proper conditions are met.
- *E. coli* transferred to hands through contact with contaminated sand.
- Epidemiological study on contact through different sand activities findings on risk of illness.





Beach Sand, Fecal contamination and Fecal indicators.

- What we do know:
 - Microorganisms (bacteria, protozoa, viruses) are known components of sands and soils.
 - Numerous ways sand can be contaminated with fecal material (birds, pets, bathers, waves, runoff).
 - No conclusive evidence of a significant link between contact with beach sand and risk of illness for beach goers.
 - Currently, not sufficient evidence of the necessity for routine monitoring of beach sand and to establish guidelines for sand quality.

Beach Sand, Fecal contamination and Fecal indicators.

Guidelines information – Managing Health Risks

- Actions beach managers can take to manage risks
 - Beach cleanup - removal and storage of litter.
 - Discouraging animals (fences, gull wiring, pet restrictions, other (e.g. Border Collies))
 - Sand grooming and beach grading.
- Actions users can take to minimize exposures:
 - Proper hygiene at the beach (hand washing)
 - Showering after beach visits
 - Use of clean beach towels



Cyanobacterial (Blue-green algae) blooms

- Issue:
 - Cyanobacterial blooms developing sporadically in waters that have recreational uses.
 - Concern for every province in Canada.



Cyanobacterial (Blue-green algae) blooms

- What we know:
 - Cyanobacteria naturally found in aquatic environments.
 - Blooms difficult to predict, can develop rapidly.
 - Certain species and strains produce toxins, but many non-toxic varieties - Not all blooms are toxic.
 - No easy way to tell – requires scientific testing.
 - Most common toxins, if present, localized within bloom
 - Some areas of lake toxic, others not dangerous.
 - Risk of contact sufficient to cause health concerns small – blooms are offensive.
 - No fatalities ever recorded from swimming contact.

Cyanobacterial (Blue-green algae) blooms

Guidelines information – Managing Health Risks:

- Regular monitoring in areas where blooms are known or can be expected to occur.
- Recreational contact in area containing bloom should be avoided until authorities have declared it safe.
- Posting of waters in which bloom exists communicating unsuitability for use.