



Beach Water Quality Notification Campaign

Information Package for Beach Owners

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Project Understanding

In British Columbia's central interior, myriad freshwater lakes, rivers, streams, and hot springs provide ample recreational opportunities year-round for residents and visitors alike. Swimming, boating, and fishing are just a few of the many water-related activities that contribute to the region's overall social and economic well-being. In fact, an evidence paper entitled *The Core Components of a Recreational Water Management Program for British Columbia* reports that, "during the summer months this region likely experiences the highest levels of freshwater recreation in the province."

Ideally, public beaches and their adjacent waters should be free of microbiological, physical, and chemical hazards. But in reality, some of the interior's busiest public beaches harbour elevated levels of microbiological contaminants during the hotter summer months. If ingested, these microorganisms can cause gastrointestinal illness, skin infections and rashes, and eye, ear, nose, and throat infections.

In keeping with Health Canada's *Guidelines for Canadian Recreational Water Quality (GCRWQ)*, Interior Health (IH) public health inspectors sample for *E. Coli* or fecal coliform bacteria weekly throughout the summer at about 25 public beaches. This compares to the Vancouver Coastal Health Authority, which monitors 76 public beaches; the Northern Health Authority, which samples at 80 sites; The Fraser Health Authority, at 60 sites; and the Vancouver Island Health Authority, at 52 sites.

The GCRWQ state that bathing water must not exceed a count of 200 *E. coli* or fecal coliforms per 100-millilitre sample. Beach water that exceeds this level of fecal contamination poses an increased public health risk, particularly for at-risk populations such as the very young, the very old, and people with weakened immunity. In response to elevated bacteria levels, the GCRWQ calls for public notification (see bold text in sidebar on next page).

Understanding Beach Water Contamination...

- Disease-causing microorganisms in water include bacteria (e.g. *E. coli*), viruses, and parasites (e.g. *Giardia* and *Cryptosporidium*). These disease-causing organisms can be discharged directly to water bodies or transported with surface runoff. Sources are numerous and include discharge of untreated sewage, runoff from agricultural activities, and wastes from waterfowl and wild and domestic animals. Fertilizers, pesticides, and garbage can also contaminate beach water.
- Beach water quality is typically poorer in summer when the warmer water escalates bacterial growth and swimmers stir up bacteria-containing sediments. Contamination is also more likely to increase during and after rainstorms.
- *Escherichia coli* (*E. coli*) belongs to a group of bacteria called fecal coliforms that originate in the digestive tract of warm-blooded animals. *E. coli* do not normally cause illness themselves, but when present in large numbers are often associated with more harmful disease-causing organisms. Thus, they are known as indicator bacteria.
- Disease-causing organisms that are present with *E. coli* bacteria can cause ear, nose, and throat infections, as well as stomach upsets. The very young, the very old, and people with weakened immunity are the most susceptible to infection.
- The risk of infection is directly related to bacterial counts in the water.
- The allowable maximum number of bacteria in recreational water — as outlined in the *Guidelines for Canadian Recreational Water Quality* — is 200 *E. coli* per 100-millilitre sample.
- Interior Health plans to use risk assessments (see page 7) to determine frequency of sampling and if a beach has risks other than from microorganisms.

While public notification is common in all of B.C.'s other health regions, sampling results for beaches within IH boundaries have not been routinely reported to the public. Starting this summer, however, IH will request that beach owners share this information with potential beachgoers, as recommended in the GCRWQ. This practice is also supported by *The Core Components of a Recreational Water Management Program for British Columbia*, which states that "...source control or pathogen removal is not viable..." therefore, "preventing exposure to hazards through beach closures or risk communication is the most feasible health protection strategy."

Notification Campaign

The Beach Water Quality Notification Campaign was developed by IH with input from a working group including affected local governments and community organizations. Initial discussions highlighted the need to inform beachgoers of the risks associated with elevated bacterial counts, while minimizing the potential negative impacts this information could have on tourism and business development.

The resulting risk messaging was developed by Alliance Communications and then reviewed by IH and working group members.

The intent was to create clear, concise, and user-friendly messaging that would inform beachgoers when bacterial counts exceed those recommended in the GCRWQ. The resulting wording — which can be used equally effectively on signage or websites, or in printed materials — indicates that:

Beach Water Quality is POOR

Swimming is not recommended.

Bacterial counts exceed Health Canada guidelines.

Beach water is monitored by Interior Health.
For more information visit www.interiorhealth.ca

Guidelines for Canadian Recreational Water Quality

The following are excerpts from the 1992 edition of the *Guidelines for Canadian Recreational Water Quality*.

- Recreational water use is "any activity involving the intentional immersion (e.g. swimming) or incidental immersion (e.g. water-skiing) of the body, including the head, in natural waters."
- Water used for recreation "should be sufficiently free from microbiological, physical, and chemical hazards to ensure there is negligible risk to the health and safety of the user."
- "In freshwater, *E. coli* is the best available indicator of fecal contamination from warm-blooded animals...The maximum acceptable concentration of 2000 *E. coli*/L (200 per 100-milliliter sample) can be used to enumerate this organism..."
- "Sampling should be conducted during the bathing season...samples should be collected in sterile containers...sampling sites should be representative of the water quality throughout the whole bather exposure area...samples should be collected at random intervals and at times of greatest user activity...sampling depths should be 15 to 30 cm below the surface in both deep and shallow waters...the minimum recommended sampling frequency for routine investigation is five samples in not more than 30 days from each sampling site..."
- ***"When the appropriate authority has determined that a beach or body of water is not suitable for recreational use, the public should be notified. Normally this involves placing one or more signs in conspicuous places along the beach or shoreline. These signs should be clear and concise as to the health risk and recommended course of action. They should be written in simple understandable text and symbols. The authority making the determination should be clearly indicated on the signs. The signs should be left in place only as long as necessary and promptly removed when the health hazard no longer exists."***

Campaign Stakeholders & Audiences

The campaign's primary stakeholders are IH and the provincial, regional, and municipal governments responsible for public beaches situated within IH boundaries.

Interior Health:

Interior Health's primary targets for communication are beach owners and the media. **Beach owners** will be informed regularly of beach water quality results, and contacted by phone and email if water quality deteriorates (i.e. when the *E. coli* or fecal coliform count approaches, hits, or exceeds 200 per 100-millilitre sample).

Media responses will be arranged on a case-by-case basis by assistant directors of operations in each of IH's three regions.

Beach Owners:

Beach owners' primary targets for communication are elected officials and staff (e.g. parks, administration, water quality, and frontline employees), beachgoers, tourism organizations, and the media.

Elected officials and employees should first receive a copy of this information package. Ongoing internal communication could be facilitated through existing channels such as intranet, council presentations, and staff meetings.

To protect public health, **beachgoers** must be informed of beach water quality that exceeds the GCRWQ. IH requests that beach owners:

- 1) erect signage at affected beaches (see page 6); and
- 2) post beach water quality information on their websites.

IH Beach Water Quality Program Policies and Procedures

The following policies and procedures ensure that beach water quality is assessed in a consistent method across IH.

- Samples of recreational water will be tested for *E. coli* if they are analyzed at CARO Environmental Services (i.e. samples from the Okanagan, Thompson, and Shuswap areas). Samples analyzed by the B.C. Centre for Disease Control are tested for fecal coliforms.
- Sample results will be entered onto the Excel spreadsheet for the Health Service Delivery Area, currently on the F drive. When a database for beach results is created in Hedgehog, the results will be entered there, instead, with historic results migrated if possible.
- For moderate- and high-risk beaches that are sampled weekly, where a minimum of five samples have been taken in a 30-day period, the logarithmic mean will be calculated using the spreadsheet, and entered in the appropriate column alongside the date for the fifth sample result and on an ongoing basis. Each week, the newest result(s) will be added on for the calculation, and the earliest result(s) in the series, that are older than 30 days, will be left out of the calculation, so it is always based on the last 30-day (maximum) period. If it has not been possible to collect a minimum of five samples in the 30-day period, then the PHI should attempt to bring the number of samples up to a minimum of five as time and priorities permit. If a logarithmic mean is calculated on fewer than five samples and exceeds the limits, then it can be used as an indicator of trends, but not to request posting of signage at the beach.
- Logarithmic means and/or individual results will be communicated to the appropriate beach owner. Contact by phone and email will be made if water quality is deteriorating (i.e. when the *E. coli* or fecal coliform count approaches, hits, or exceeds 200 per 100-millilitre sample. This communication should include the date, specific beach, and results.
- Sampling results that exceed 200 *E. coli* or fecal coliforms per 100-millilitre sample will trigger public notification. In addition to posting signage, beach owners will be requested to post beach water quality information on their websites.
- If a beach is associated with an outbreak of disease, or presents a significant microbiological, chemical, or physical safety hazard, closure may be recommended.

In addition, an affected beach owner could:

- Distribute news releases to the local media;
- Include beach water quality information in newsletters, bills, annual reports, etc.;
- Create automatic, subscription-based reporting for interested parties; and
- Introduce a beach water quality hotline.

Beach owners could also provide ongoing beach water quality information to local **tourism organizations**. This would help minimize any potential negative impacts to tourism.

Information from beach owners to the **media** should be distributed swiftly and updated regularly. Building solid relationships with key media contacts will help ensure proactive rather than reactive responses.

Beach owners are welcome to contact their public health inspectors or Alliance Communications (250-766-1777 or jdevries@silk.net) with any questions regarding the campaign.

Campaign Evaluation

Project outcomes will be determined via feedback from IH and affected local governments and their constituents. A follow-up workshop in the fall with working group members will fine-tune the campaign for subsequent years.

IH Beach Water Quality Sampling Guidelines

Beach water quality sampling in some areas of IH has been sporadic and inconsistent. To ensure consistent and quality testing, a working group reviewed existing processes and then recommended a set of guidelines to direct all future risk assessments and sampling.

- Beaches should be assessed for risk using the tool on page 7. Low- and high-risk beaches should be assessed every 730 days.; moderate-risk beaches should be assessed every 365 days. (The rationale for lengthier reassessment periods for low- and high-risk beaches is that conditions are less likely to change quickly.)
- Low-risk beaches should be sampled once monthly for *E. coli* or fecal coliforms. Moderate- and high-risk beaches should be sampled every week with no fewer than five samples in a 30-day period, as work priorities permit.
- The sampling regime is as follows:
 - **Sampling depth:** Samples should be taken at the point in the water where bathers would be wading. The actual sample should be taken at 15 to 30cm in depth.
 - **Sampling technique:** The bottle should be pushed ahead, underwater, and not be completely filled, to allow for the specimen to be shaken during testing.
 - **Timing:** Sampling is best undertaken when the beach is in use, with many bathers present. This will present a worst-case scenario, and mirror the risk to which the bathers are exposed. Experience in the Okanagan has indicated the time of sampling can influence results. That is, samples taken in the early morning, when the water is calm and there are no swimmers, will result in low bacterial counts. Samples taken later in the day when the wind is blowing, and/or bathers are present will result in higher numbers.
 - **Sample points:** For large beaches, more than one sample location is appropriate, in accordance with the GCRWQ. Sources of contamination such as storm drains, streams, and waterfowl habitats will help determine how many sites should be established and where. Where there is more than one site along one beach, the sites should be recorded separately and receive a separate geometric mean calculation.
- Every effort should be made to have samples analyzed within 30 hours of collection. Samples should be placed in coolers with ice packs and shipped by courier to either CARO Environmental Services or the BC Centre for Disease Control. Shipping and receiving times should be checked periodically; if they're not less than 30 hours, other shipping and analysis options should be considered.
- Every effort should be made to have samples from all IH areas analyzed for *E. coli*.
- When the results are received from the lab, they are recorded on the Excel spreadsheet on the F drive (page 8). The logarithmic mean should be calculated each week for the five samples (minimum) of the previous 30 days (maximum). When the mean is calculated, only the samples for the previous 30 days (maximum) are considered, on an ongoing basis, so it is a running mean. If fewer than five samples were taken in the 30-day period, then the mean should only be considered an indicator of trends, and not for posting. Every effort should be made to get the minimum number of samples to five in any 30-day period for beaches that are moderate or high risk.
- Test results and/or logarithmic means will be communicated to beach owners.

SIGNAGE FOR POSTING AT AFFECTED BEACHES

Beach Water Quality



POOR

Swimming is not recommended.
*Bacterial counts exceed
Health Canada guidelines.*

Beach water quality is monitored by
Interior Health. For more information, call
(250) 888-8888 or visit www.interiorhealth.ca.

BATHING BEACH RISK ASSESSMENT

Facility Category	Risk Category	Risk Description	Risk	Date	Date	Date
Bathing Beaches	Sewage, stormwater & combined overflow/outfall	Known overflow/outfall, no treatment	15			
		Known overflow/outfall with treatment	9			
		No overflow/ outfall	0			
	Fecal Influence e.g. Water fowl, Septic	Known contamination sources	15			
		No known contamination sources	9			
		Protected watershed	3			
	Bather Density	High volume	15			
		Moderate volume	9			
		Low volume	3			
	Microbiological History (based on past 3 years)	Geometric mean >200 indicator bacteria	15			
		10% of samples >400 indicator bacteria	9			
		Geometric mean <200 indicator bacteria	3			
	Rainfall/Wind Effects	High runoff and/or strong deleterious effects	10			
		Moderate runoff and/or moderate deleterious effects	6			
		Low runoff and/or low deleterious effects	2			
	Water Mixing & Dilution	Low mixing and dilution	10			
		Moderate mixing and dilution	6			
		High mixing and dilution	2			
	Sanitary Facilities	No sanitary facilities available	10			
Toilet and hand washing facilities available		6				
Toilet, hand washing & shower facilities available		2				
Substrate	Mud	5				
	Sand	3				
	Rock & Gravel	1				
Facilities & grounds maintenance	Poor attention to maintenance	5				
	Moderate attention to maintenance	3				
	Excellent attention to maintenance	1				
			Risk Total =			

Risk Level:

Low Risk (17 - 44)

Moderate Risk (45 - 72)

High Risk (73 - 100)

Inspection Frequency:

730 days

365 days

730 days

Sampling Frequency:

Monthly

Weekly

Weekly

EXCEL REPORTING SHEET

Beach/Site 1					Beach/Site 2				
Month	Day	Weather	Fecal/ <i>E. coli</i>	Log5 Mean	Month	Day	Weather	Fecal/ <i>E. coli</i>	Log5 Mean
June					June				
June					June				
June					June				
June					June				
June				#NUM!	June				#NUM!
July				#NUM!	July				#NUM!
July				#NUM!	July				#NUM!
July				#NUM!	July				#NUM!
July				#NUM!	July				#NUM!
July				#NUM!	July				#NUM!
August				#NUM!	August				#NUM!
August				#NUM!	August				#NUM!
August				#NUM!	August				#NUM!
August				#NUM!	August				#NUM!
August				#NUM!	August				#NUM!

Note: Undetectable results listed as “1” to allow calculation of mean.