REPORT CARD METHODOLOGY

Background Information

The methodology was derived from Ecocheck (2011). Information in the report cards vary from site to site depending on the site goals, pollution concerns, and the type of water body, however consistency was maintained wherever possible.

Sampling Period

This report includes data from June 1st to September 31st. This time frame was selected because it is reflective of when most people are using the water and when we sample the most.

Number of Sampling Sessions

Variability in the number of sampling sessions is dependent on many factors, including: sampling plans, accessibility to the site, safety concerns while sampling, weather conditions, and staff/ volunteer availability. More sampling sessions generates more data, providing a more accurate representation of the site itself.

Water Monitoring Indicators

Swim Drink Fish monitors water quality parameters that vary between sites. These include:

- *E. coli*
- Dissolved oxygen
- pH
- Chlorine
- Conductivity (freshwater only)
- Turbidity

An Introduction to E.coli Geomeans

In this document, there will be references to geomeans. Below is a quick definition:

"A geometric mean is the average value or mean which signifies the central tendency of the set of numbers by finding the product of their values. Basically, we multiply the numbers altogether and take the nth root of the multiplied numbers, where n is the total number of data values."

In other words, a geomean is an average, that is less affected by outliers. Geomean calculations are used in the Canadian Recreational Water Quality Standard.

GRADING SCHEME

Single Threshold: Pass/ Fail for Physical and Chemical Parameters

The single threshold grading scheme assigns each data point a pass or a fail based on a researched ecologically relevant threshold set by Swim Drink Fish. Click on each indicator to view the source information. The passing threshold is the threshold at which the water quality changes from good to bad. For example, when dissolved oxygen is above 6, most aquatic life can survive, but below 6, some start to die. The pass/fail system is beneficial to use when researchers are able to distinguish a clear indicator threshold of a healthy or unhealthy ecosystem.

Indicator	Passing Threshold	Failing Threshold
Dissolved Oxygen	< 6 mg/L	≥ 6 mg/L
pH	6.5-8.5	<6.5 or >8.5
Chlorine	≤ 0.5 ppm	> 0.5 ppm
Conductivity	≤ 500 µS	> 500 µS
Clarity	≤ 1.8 m* ≤ 1.6 m**	> 1.8. m* >1.6 m**

*freshwater
**saltwater

Single Threshold: Recreational Water E.coli

Regional health authorities designate recreational water quality guidelines. These include thresholds, below which, few people get sick from recreating in the water. The table below depicts the pass/fail thresholds for the report card region. For more information on each hub's sampling protocols and methodology, visit our website.

Hub Name	Geomean pass/fail Threshold	Single Sample pass/fail Threshold	Human Marker
Toronto	100 MPN/ 100 mL	N/A	N/A
Vancouver	200 MPN/ 100 mL	400 MPN/ 100 mL	N/A
Victoria	200 MPN/ 100 mL	400 MPN/ 100 mL	N/A
Kingston	200 MPN/ 100 mL	400 MPN/ 100 mL	N/A
Edmonton	N/A	≤ 1280 CCE/ 100 mL	YES
Edmonton	N/A	>1280 < 6400 CCE/ 100 mL	NO

GRADING SCHEME

Multiple Threshold: Environmental E.coli

Multiple thresholds are used to score indicators based on a gradient of healthy to unhealthy conditions. For example, E. coli has a single threshold for recreation set by the region. In reality, however, varying amounts of E. coli can have differing effects on the ecosystem and human health that are not represented in a single threshold approach.

Threshold	Score
<43 MPN/100 ML	5
≥43 < 235 MPN/100 mL	4
≥235 <400 MPN/100 mL	3
≥400 <1200 MPN/100 mL	2
≥1200 <2419.6 MPN/100 mL	1
≥2419.6 MPN/100 mL	0

Aesthetics Score

The aesthetics score uses a methodology developed for the Toronto Remedial Action Plan. It considers the four main categories below. The lower the score, the worse the site's overall aesthetic condition.

Clarity	
Clear	10
Cloudy	7
Opaque	0

Odour	
None	10
Musty	6
Petroleum	5
Sewage	2
Pretoleum (spill)	0
Anaerobic	0

Colour	
Clear	10
Green	7
Yellow/Amber	6
Brown	5
Grey	2
Black	0

Debris	
None	10
Natural	8
Oil film	3
Trash	2
Foam	2
Sewage	0

Sewage Score

Sewage debris includes tampons/applicators, condoms/wrappers, fatbergs, syringes, wipes and dental hygiene products. If sewage debris was present at a site, it is assigned a failing grade. If sewage debris was absent, it is assigned a passing grade.

GRADING SCHEME

Calculating Percentages

Once the data has been assigned a passing or failing grade, percentage grades are calculated. Below are the percentage calculations:

Single Threshold:	(# of passing scores / total number of scores) * 100
Multiple Thresholds:	(average score/ 5) * 100
Aesthetics:	(average score/ 10) * 100
Sewage:	(number of passing scores/ total number of monitoring sessions) * 100

Letter Grades

Each data category is assigned a letter grade based on their percentage score. The scores to the right demonstrate the letter grade associated with each percentage score.

90-100% →	A+
80-89% →	A
70-79% →	B
60-69% →	C
50-59% →	D
<50% →	F

Top Water Users

Top water users were selected based on the highest frequency of users sighted during the entire sampling period. Below are definitions of the types of water users surveyed:

- Primary water user: where the whole body or face are frequently in the water, and likely water will be swalloed. (e.g. swimmers, surfers, paddleboarders)
- Secondary water user: where contact with water is only made through accidental immersion
- Passersby: someone interacting with the site but not the water itself (e.g. walkers, runners)
- Water's edge user: someone sitting at the beach or site (e.g. picnic-er, bench-sitter)
- Dogs: dog feces worsen water quality

Trash

The top five most common trash types were used to determine the relative abundance of trash at the site. Each trash type was assigned a score based on whether it was observed to be absent, in the lowest, middle, or highest abundance category each sampling session. The scores were then converted into percentages and displayed visually using a pie graph.