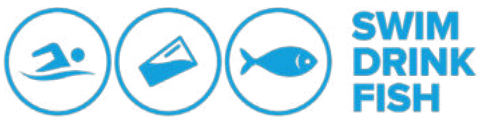


# Making a Splash in Community Science

VANCOUVER COMMUNITY-BASED WATER  
MONITORING PROGRAM REPORT

2022





This report was produced by Swim Drink Fish.

For more information visit:

[www.swimdrinkfish.ca](http://www.swimdrinkfish.ca)

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This report is dedicated to the volunteers, staff, supporters, partners, and members of the movement who are all working towards a swimmable, drinkable, fishable future for everyone.

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# EXECUTIVE SUMMARY

Water is our lifeline, which makes the protection and restoration of our waters the heartbeat of our communities. Vancouver's community exemplified this by showing up in full force in 2022, with over 200 volunteers contributing over 400 hours of time towards creating swimmable, drinkable, fishable water for everyone.

Swim Drink Fish's hub in Vancouver is one part of a network of community-based water monitoring programs across Canada, established to help communities connect to, protect, and restore their waters through community science and outreach.

Participation in community science has been on the rise as both an engaging way for communities to connect to their natural environment and a powerful tool for data collection that can lead to its protection and restoration. Each year our hub is learning and growing in the ways we work together with our community to make the most meaningful impact on the long-term protection and restoration of our waters for everyone.

This report forms part of a series of reports for each of Swim Drink Fish's hub locations. The purpose of these reports is to highlight each hub's work and any significant findings or contributions made in working toward connecting people to and protecting local waters through community science and outreach initiatives over the last year.

This report contains only our results and updates relevant to 2022. To view information about the Vancouver Hub including site locations and descriptions, our standard operating procedure for recreational water quality monitoring, our protocols, regional water quality issues and the regional water quality standards visit our website here: [www.swimdrinkfish.ca](http://www.swimdrinkfish.ca)

In this report, we provide a summary of our community-based water monitoring work throughout the 2022 calendar year. We discuss our monitoring results, comment on performance, identify gaps, and conclude with suggesting ways for us to improve and direct the future of our work together as a community in Vancouver. Our goals and recommendations that have come out of this year's work include:

1. **Continue water monitoring and increase water monitoring in Metro Vancouver.**
  - Re-strategize water monitoring site plans to maximize our effort.
  - Increase the number of partners and collaborators who monitor waters in Metro Vancouver.
2. **Improve water literacy in Metro Vancouver.**
  - Improve public awareness concerning water pollution in Metro Vancouver.
  - Increase public access to water quality data for Metro Vancouver.
  - Increase the impact of the data we collect.
  - Incorporate traditional ecological knowledge into our work.
3. **Increase access to 'Swimmable' waters.**
  - Identify and work towards the restoration of potential open water swimming locations.
  - Work with our community partners to advocate for clean and accessible waters.

Any questions regarding this report can be directed to:

Swim Drink Fish Vancouver  
[vancouver@swimdrinkfish.ca](mailto:vancouver@swimdrinkfish.ca)

# ACKNOWLEDGMENTS

## Land and Water Acknowledgment

Embraced by water, including the Salish Sea to the west, Burrard Inlet to the north, and the northern arm of the Fraser River to the south, Vancouver is a coastal community defined by its proximity to the ocean, river, and mountains.

The Swim Drink Fish Vancouver Hub was founded and operates on the traditional, ancestral, and unceded homelands and waters of Xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and Səlililwətaʔt (Tsleil-Waututh) First Nations. Since time immemorial, First Nations have been stewards of this land and water.

We acknowledge and respect the elders and ancestors past, present, and emerging whose histories, knowledge, and cultural traditions have shaped the land and water of the Greater Vancouver Area and enrich practices around its stewardship.

In the spirit of reconciliation, we affirm our commitment to practice ongoing good relations with the land and water and with sovereign Indigenous nations that caretaker them. Our work endeavors to support First Nations rights and free access to swimmable, drinkable, and fishable waters.

**“Water is the most life-sustaining gift on Mother Earth and is the interconnection among all living things. Water sustains us, flows between us, within us, and replenishes us. Water is the blood of Mother Earth and, as such, cleanses not only herself but all living things. It is the giver of all life. Without clean water, all life will perish.”**

Assembly of First Nations of Canada

## Diversity, Equity & Inclusion

As we advocate for our waters, we are committed to building relationships and interconnectedness with all communities through consultation, collaboration, and partnership in the sharing of stories, voices, and values that connect us all to the water. Our work endeavours to celebrate, share, and support everyone’s rights to free access to swimmable, drinkable, fishable water.

This report is dedicated to all our volunteers, staff, partners, supporters, and members – past, present, and new – who tirelessly work toward a swimmable, drinkable, fishable future for everyone.

## With Our Thanks

We couldn’t do the work we do without the generous donations of our supporters who give their time, labour, funds, and so much more to see us succeed. Because of this support, Swim Drink Fish can expand its reach to new audiences. Our movement is growing and a large part of our success is because of our amazing network of our supporters to whom we extend our heartfelt thanks.

We'd especially like to acknowledge the contributions of the following supporters this year:

**Canada Summer Jobs**

Funder, Vancouver Hub Staffing

**City of Vancouver**

Leader, Healthy Waters Plan Project Advisory Group

**Dentist on Demand**

Funder, Seabin Pilot Program

**Dragon Boat BC**

Collaborator, Community Outreach

**False Creek Friends Society**

Collaborator, the protection of False Creek

**False Creek Residents Association**

Collaborator, the protection of False Creek

**Metro Vancouver**

Leader, Liquid Waste Management Plan Advisory Group

**Ocean Wise**

Partner, Ocean Pathways Internship Program

**RBC Tech for Nature**

Donor, Vancouver Hub Operations

**Sitka Foundation**

Donor, Vancouver Hub Operations

**Swim Wild Squamish**

Collaborator, Water Quality Monitoring

**Tsleil-Waututh Nation**

Leader, Burrard Inlet Water Quality Monitoring Advisory Group

**Vancouver Open Water Swim Association**

Collaborator, Community Outreach

**Vancouver Plastic Cleanup Coalition**

Collaborators, Seabin Pilot Program

City of Richmond, City of Vancouver, Dentist on Demand, Granville Island – CMHC, Granville Island – Maritime Market & Marina Ltd., The Great Lakes Plastic Clean-Up, Pollution Probe, Poralu Marine, Sea Village Marina, The Searial Cleaners, Skookum Yacht Services, Smart Marine Co., Surfrider Foundation, University of Toronto Trash Team, Water Products & Solutions, Whitewater West

**Our Volunteers**

All Around Supporters, Vancouver Hub

**Whitewater West**

Funder, Seabin Pilot Program



# INTRODUCTION

Swim Drink Fish is a national environmental not-for-profit and registered charity that was born as Lake Ontario Waterkeeper in 2001 and changed names in 2017 when multiple smaller initiatives and teams of passionate water stewards across Canada – starting with Lake Ontario Waterkeeper in Toronto and Fraser Riverkeeper Society in Metro Vancouver – banded together to grow the water protection movement across Canada out of increasing concern for the complex problems facing our waters.

Swimmable, drinkable, and fishable waters are common standards identified by the Clean Water Act and Drinking Water Act for designated drinking and recreational water bodies in North America. Swim Drink Fish bears the name of the vision of its work: to restore and protect our waters from pollution (and other threats) and reverse the “no swimming, no drinking, and no fishing” signs that have become all too commonplace.

The purpose of Swim Drink Fish’s core work at its hubs is to inspire and empower our communities to connect to and protect their local waters through community science and outreach. We accomplish this through a dedicated team of staff and community scientists who spend countless hours engaging in two primary initiatives aimed at increasing water literacy in our community:

1. Monitoring local recreational waters (water sampling and analysis) and sharing water quality information with the public
2. Initiating educational conversation and leading workshops

In Vancouver, Swim Drink Fish has been monitoring recreational water quality, sharing water quality data, and spreading water literacy since the initiation of its Vancouver hub in 2018.

From 2018 to 2022, our work has concentrated on water monitoring along False Creek, a high use recreational water body currently without regulations necessary to protect its water quality to a standard that is safe for getting into the water.

See our 2022 water monitoring sites below. To see our current water monitoring sites, visit this page: [www.swim-drinkfish.ca/vancouver-hub-sites](http://www.swim-drinkfish.ca/vancouver-hub-sites)



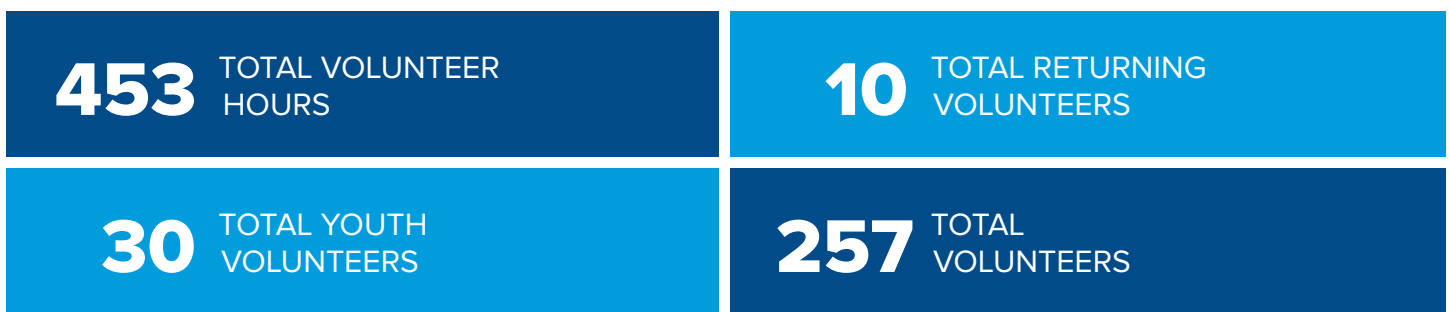
# COMMUNITY CONNECTIONS

It takes a community working together to advocate for, and protect, community waters. We work together with our community to build capacity to address local water quality concerns and empower Vancouverites to connect to and protect their local waters. We have seen the impact – real long-term solutions that increase knowledge and skills – benefitting both individuals and communities.

## Our Volunteers

Volunteers participate in the hub’s work as community scientists. Volunteers participate in the community-based water monitoring program by collecting water samples, conducting environmental surveys, and supporting our water sample processing and analysis work in the lab. By volunteering in the community-based water monitoring program, community members build water literacy skills, become advocates for their local waters, and support the collection of scientific data that we use to inform the restoration of our waters.

In 2022, the Vancouver Hub had:



**“By volunteering, I feel I am contributing to society in a different and more meaningful way. I strongly believe we have to do whatever possible to preserve the preciousness of Vancouver (and our Earth) for future generations.”**

Veronica Stamm, Volunteer

## Our Partners & Collaborators

A diverse range of partners and collaborators work together with the Vancouver Hub in connecting others with their waters and in taking action to protect them. Highlights of our partnership and collaboration work for this year are outlined below.

### BURRARD INLET WATER QUALITY ROUNDTABLE

Swim Drink Fish occupies a seat at the Burrard Inlet Water Quality Roundtable – a team of municipal, provincial, and federal government, local First Nations, and not-for-profit organization representatives engaged in water monitoring for the region. It is a collaborative effort led by Tsleil-Waututh Nation with the Province of BC to inform water quality management and protect the water values associated with the marine waters of Burrard Inlet and its freshwater tributaries.

### CITY OF VANCOUVER – HEALTHY WATERS PLAN

Swim Drink Fish is a member of the Project Advisory Group of stakeholders to help inform, advise, and shape the city’s [Healthy Waters Plan](#) led by the City of Vancouver. The Healthy Waters Plan is a long-range sewage and rainwater management plan – initiated by Vancouver City Council and the Vancouver Park Board – to address key water management issues including updating the city’s sewer system infrastructure and eliminating combined sewer overflows that threaten the city’s water quality by 2030.



## FALSE CREEK RESIDENTS ASSOCIATION

False Creek Residents Association is a volunteer-run neighbourhood group dedicated to improving the quality of life for everyone that lives around and visits False Creek, the heart of the City of Vancouver. A large part of Swim Drink Fish's water monitoring work takes place in False Creek. Swim Drink Fish meets with the False Creek Residents Association to hear from the community and exchange knowledge and feedback about the community our work serves.

## FALSE CREEK FRIENDS SOCIETY

False Creek Friends Society is a volunteer-led environmental not-for-profit organization dedicated to advocating for the protection and restoration of False Creek. A primary initiative of this group's work involves documenting marine life in False Creek to inspire the community to connect with their water and protect it. This year, Swim Drink Fish joined False Creek Friends Society volunteers for a BioBlitz to help them track and characterize the biodiversity of False Creek, where a large part of Swim Drink Fish's water monitoring work takes place.

## METRO VANCOUVER LIQUID WASTE MANAGEMENT PLAN

The [Liquid Waste Management plan](#) is a coordinated and innovative approach to address liquid management waste in the Metro Vancouver region. It sets out goals, strategies, and actions for Metro Vancouver and its member jurisdictions to work together in helping ensure the protection of public health and the environment from liquid waste products, minimize treatment costs, and explore creative ways to use liquid waste as a resource. The plan was first established in 2011, however a three-year community engagement process to update the plan was initiated in 2021. Swim Drink Fish sits on the public advisory committee for the development of the updated plan.

## VANCOUVER PLASTIC CLEAN-UP COALITION

Led by Swim Drink Fish, the Vancouver Plastic Cleanup Coalition is an alliance of environmental stewards working together to reduce and eliminate plastic pollution, with a special emphasis on mitigating plastics from entering our waters. Plastic pollution is currently a major threat to Vancouver's water quality. The coalition was formed in 2021 in conjunction with Swim Drink Fish's three-year Seabin (trash skimmer) pilot program in False Creek, where a large part of Swim Drink Fish's water monitoring has taken place.

The Vancouver Plastic Cleanup Seabin pilot program was built on the successful legacy of a similar program in the Great Lakes region, initiated by Pollution Probe and the Council of the Great Lakes Region with the primary aim of characterizing and analyzing waste that enters our waters, specifically different types of plastic, to help inform and work with local communities to develop and implement strategies that reduce and eliminate substantial waste offenders.

In 2022, we conducted bi-weekly waste characterizations and ran 11 water pollution literacy workshops with the help of volunteers and eight organizations within our community. Our waste characterization data from our 2022 water monitoring season is outlined in the below results section.



# WATER MONITORING RESULTS

## Vancouver Water Monitoring Sites and Season

In the 2022 season, Vancouver regularly monitored three monitoring sites: Vanier Park, Brokers' Bay, and Olympic Village. Each site was usually monitored once a week. The monitoring season is summarized in the table below:

SITE	MONITORING SEASON	NUMBER OF SAMPLING EVENTS
Brokers' Bay	Jan 2 - Oct 16 2022	34
Olympic Village	Jan 13 - Oct 16 2022	33
Vanier Park	Jan 13 - Oct 16 2022	33

The monitoring sites are colour coded for the rest of this results section. Refer to these colours when reading the graphs to see which site is which!



Brokers' Bay



Olympic Village



Vanier Park

## E. coli Results

The Vancouver Hub has revoked its 2022 Total Coliform and *E. coli* data due to concerns regarding quality control identified by staff members; from approximately early 2020 until the spring of 2022 our *E. coli* data had been over counted, making some of our historical data not up to our standards for publication. All of our other baseline data is still applicable and will be represented accordingly. For more information, please visit our [webpage addressing this issue](#).

## Who is Using the Water?

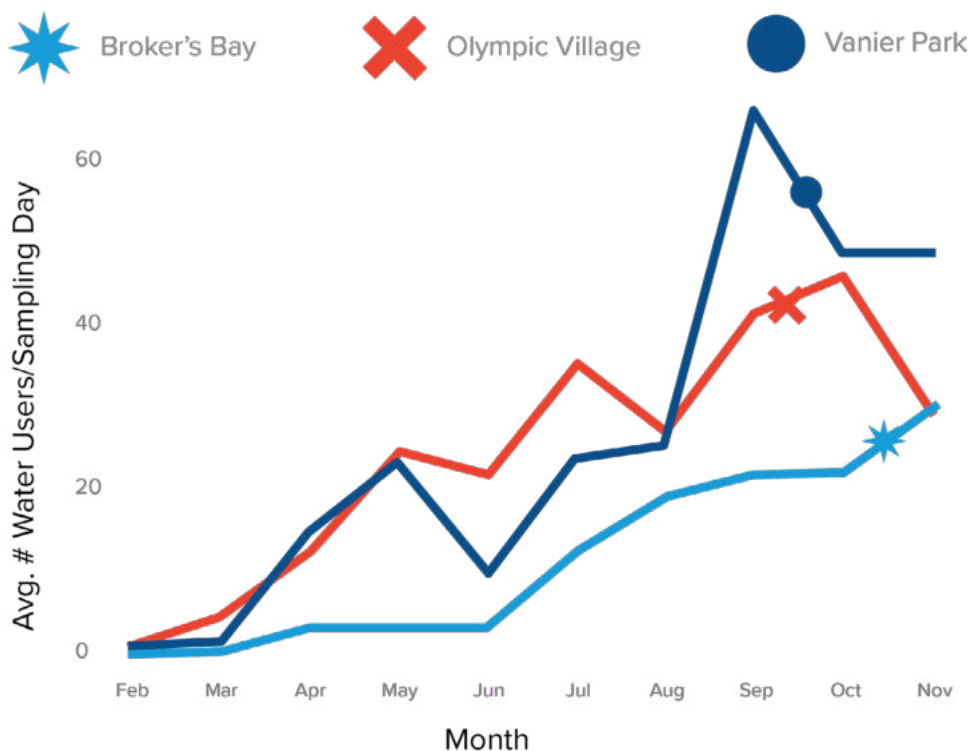
### SWIM GUIDE

The most viewed Swim Drink Fish monitored site on Swim Guide this year was Olympic Village. Across all sites there were a total of 3755 views; this was a slight decrease from previous years.

SAMPLING SITE	2020 TOTAL VIEWS	2021 TOTAL VIEWS	2022 TOTAL VIEWS
Brokers' Bay	1655	1113	909
Olympic Village	1063	1419	1504
Vanier Park	1426	1583	1342
<b>Total</b>	<b>4144</b>	<b>4115</b>	<b>3755</b>

## MONTHLY OBSERVATIONS

Recreational water users were observed across all sites, which is a great reason why we should monitor the water! The graph below displays the number of water users viewed on an average sampling day each month.

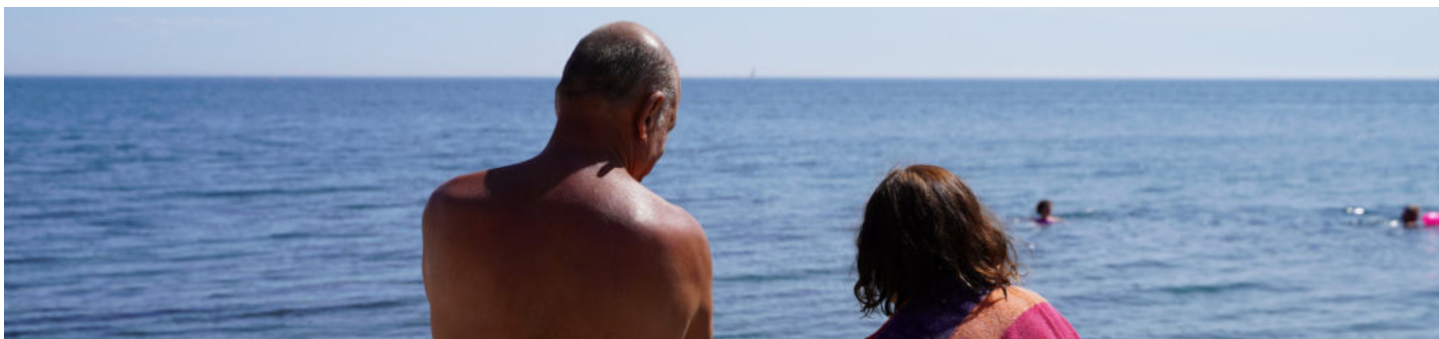


Are you wondering why there were more water users in September than any other month? Read our rain data [here](#) to discover it was one of our driest months!

**Brokers' Bay had the least amount of site usage overall in 2022.**

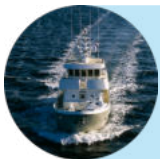
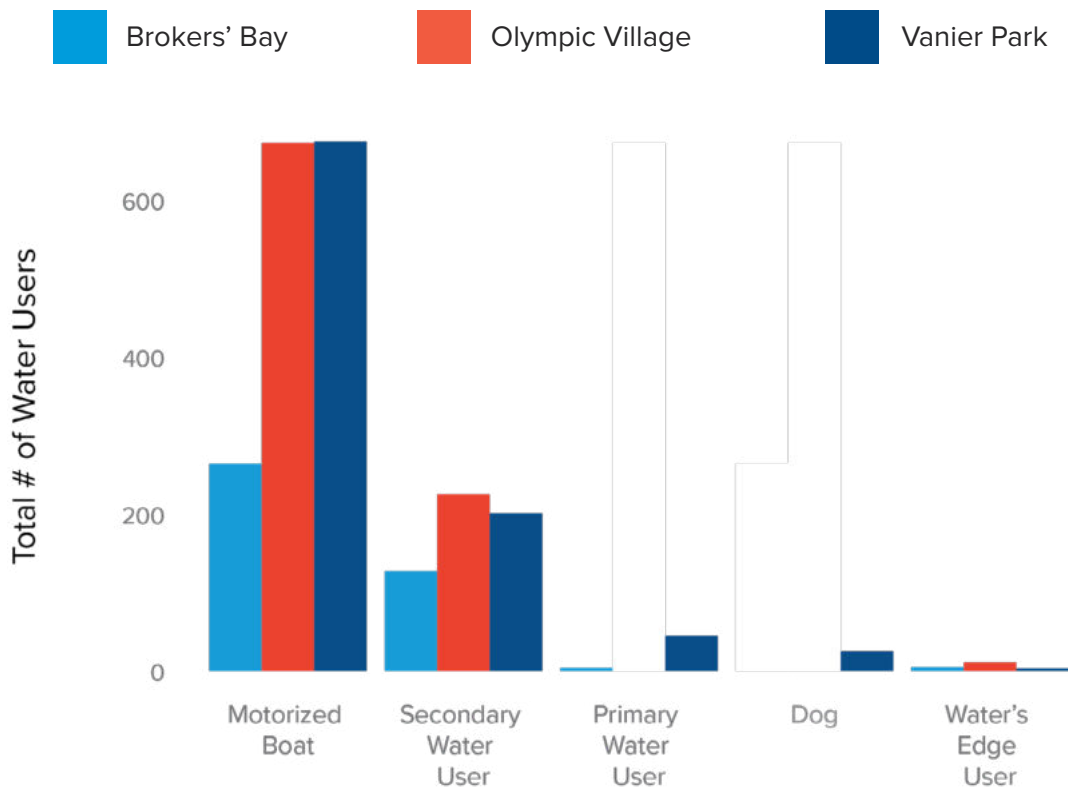
**Olympic Village was the only site without any primary water users.**

**Vanier Park had the most recreational water users of all types in the summer months! It also had many swimmers observed, totalling 36 in 2022. Interestingly, it also had the least amount of trash.**

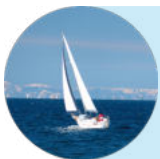


## WATER USER TYPES

Different types of water users have different effects on the sites and are exposed to different levels of risk for contracting a waterborne illness. The graph displays the total number of water users observed at each site in 2022, separated by the type of water user.



**Motorized boat:** Motorized boats have important effects on wildlife. The sounds of the engine can interfere with the echolocation of marine mammals, preventing them from communicating and finding prey. The engine itself can additionally destroy habitat by slicing through it.



**Secondary contact recreational water user:** Where contact with water is only made through incidental immersion (e.g. canoeing, fishing, sailing).



**Primary contact recreational water user:** Where the whole body or face and trunk are frequently immersed and/or when it's likely some water will be swallowed (e.g. swimmers, surfers, waders, bathers, windsurfers, water skiers).



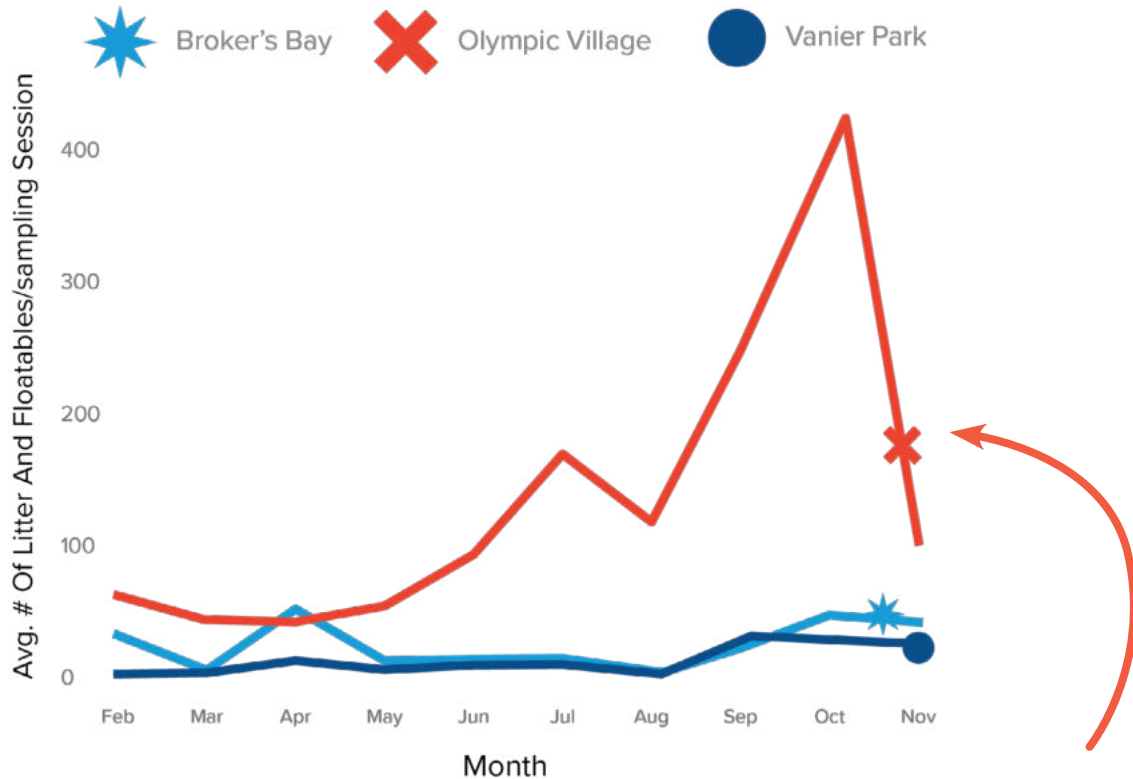
**Dog:** Dogs can be important contributors to poor water quality, especially if owners forget to pick up after them.



**Water's edge user:** People interacting with the site but not the water itself (e.g. picnicker, beach sitter, dock go-er).

## Litter and Floatables: By Month

This litter data is collected by counting all of the trash we observe at each monitoring site during a sampling session. This litter data was collected by completing a visual, land-based survey of each monitoring site. This graph displays the number of litter / floatables we observed during an average sampling session each month. For example, if we went sampling five times in May, we added up all of the litter and floatables observed in that month and divided it by five. This helps us discern monthly litter and floatables trends at our monitoring sites.

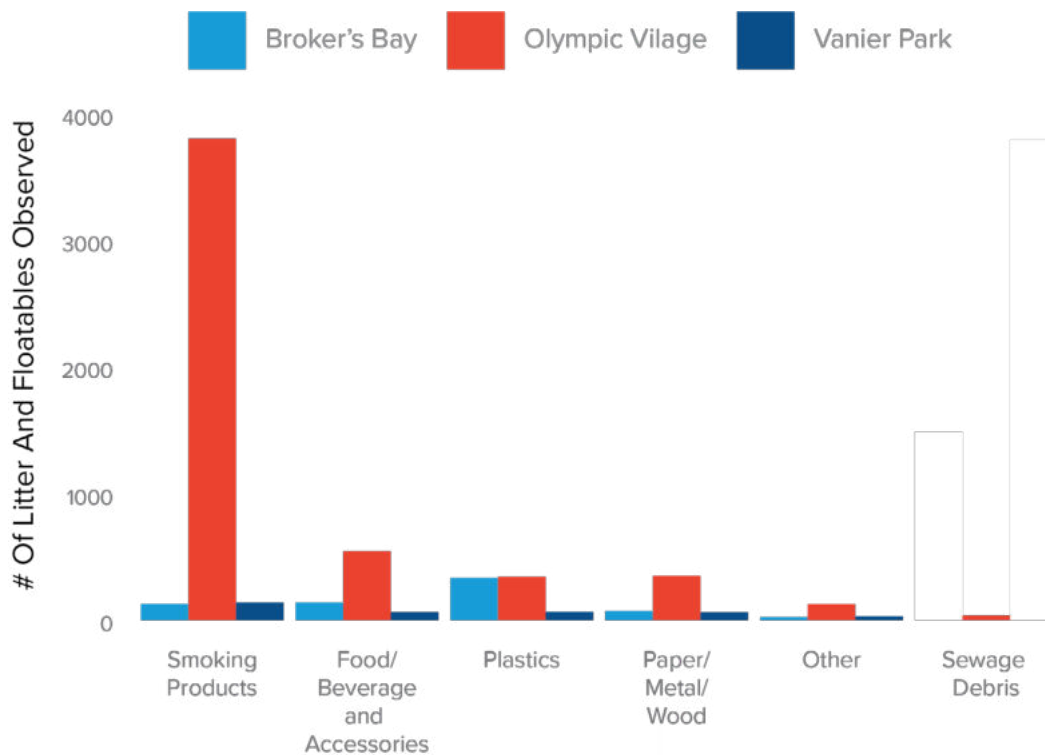


**There was much more trash in Olympic Village than the other sites!  
This was true particularly in September and October.**



## Litter and Floatables: By Category

This data is collected by counting all of the litter and floatables we observe at each monitoring site during a sampling session. This litter data was collected by completing a visual, land-based survey of each monitoring site. The below graph displays the number of litter / floatables our team observed in 2022, separated by category. Determining the common types of trash on the ground helps to determine the best strategies for waste reduction.



The most common type of litter was smoking products. This includes cigarette butts, cigarette boxes, and vaporizers.



Food / Beverage and Accessories includes food, cups, lids, drink bottles, takeout containers, takeout cutlery, food wrappers, and others. These products are made out of various material including plastics, organics, and paper.



In Vancouver alone, an average of 71 fires are caused by cigarette butts, creating 15 million dollars in losses between 2011 and 2017!



Cigarette butts are toxic to wildlife and take 25 million years to decompose!

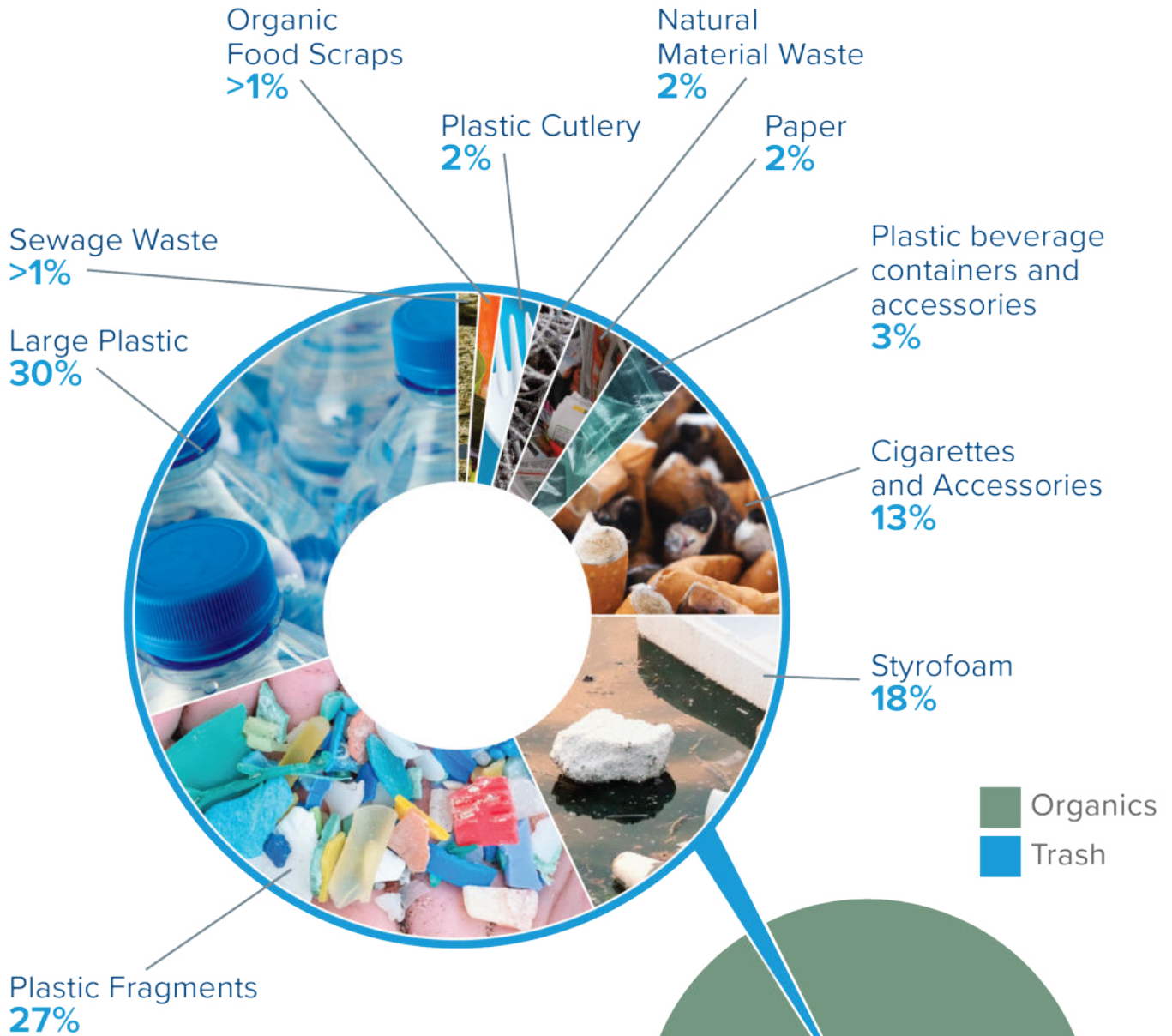


If you're a smoker, look for pocket ashtrays at your local drugstore. These serve as on-the-go ashtrays, reducing litter, saving wildlife, and preventing fires!

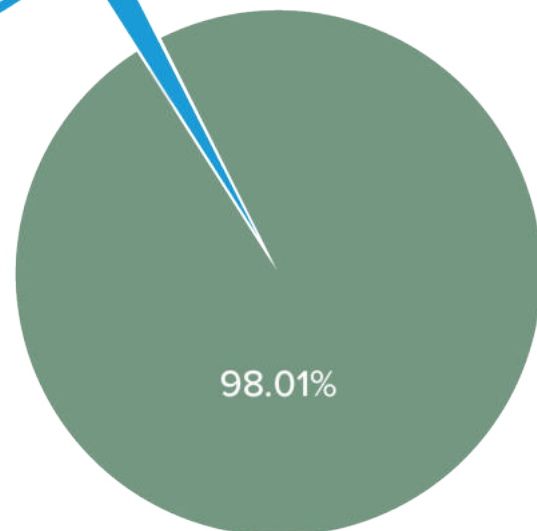
## Vancouver Plastic Cleanup Seabin Pilot

### WASTE CHARACTERIZATION DATA

This litter data is collected from our Seabin project. Seabins are a type of trash skimmer that uses an electric pump to skim the surface of the water, filtering it 24/7 and gathering floating debris. We found that in the False Creek our trash skimmers collected a lot of natural, organic debris. Have a look at the data below.



Although cigarette butts are the most common type of litter in Vancouver and was the most common type of litter found in our beach surveys, they only comprised 13% of trash in the trash skimmers.

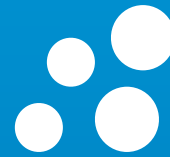


# In total our 3 trash skimmers cleaned up



**4,137 kg**

**Total Trash**



**18,030**

**Pieces of  
Microtrash**

## Top Trash Items



**Large Plastic  
Items**



**Foam**



**Plastic  
Fragments**



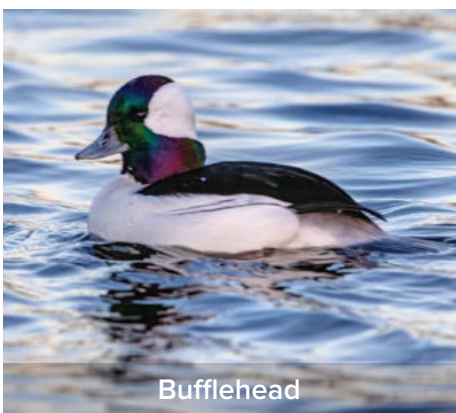
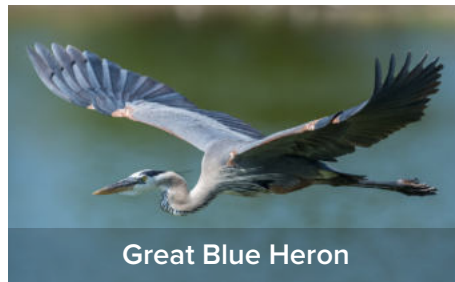
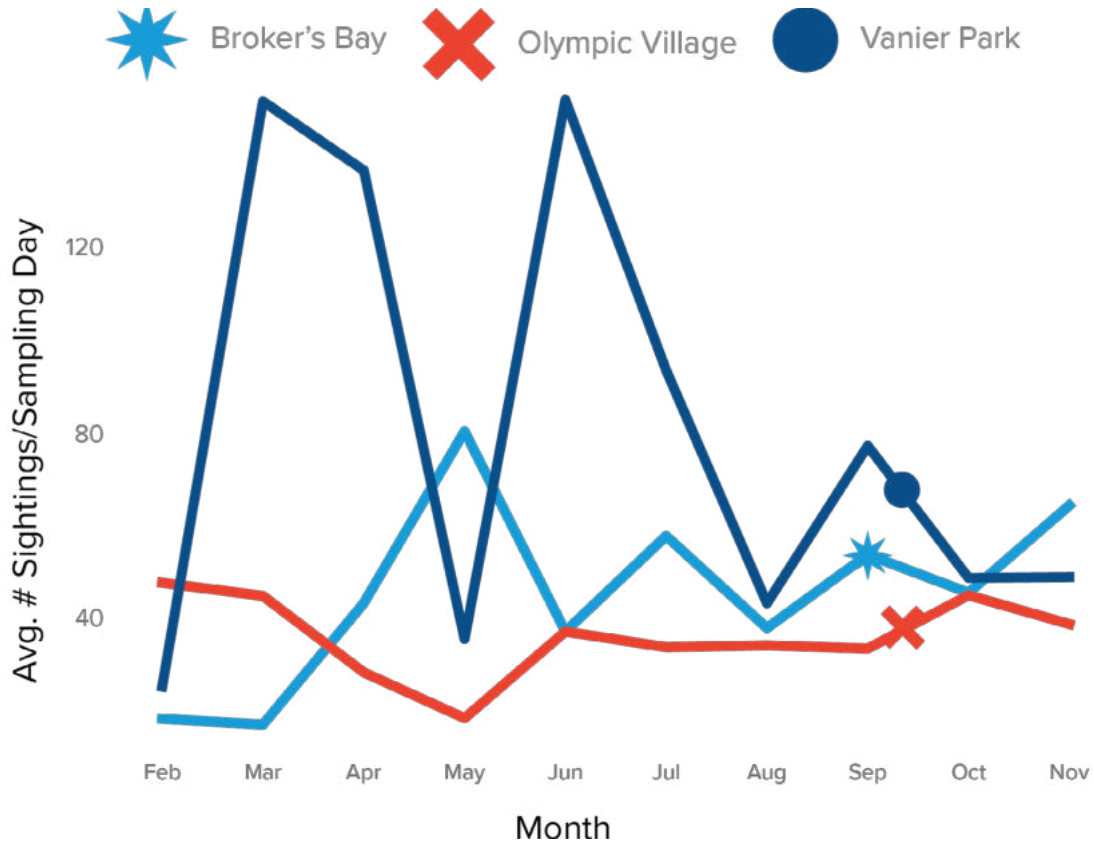
**Cigarettes &  
Accessories**



## Wildlife Trends

### BIRDS

The below figure displays the trends in observations of birds as an average number of sightings in a sampling session each month. For example, if we sampled five times in June, we added up all of the wildlife observations that month and divided it by five. Pay attention to the differences in the Y-axes, indicating the average number of species observed!

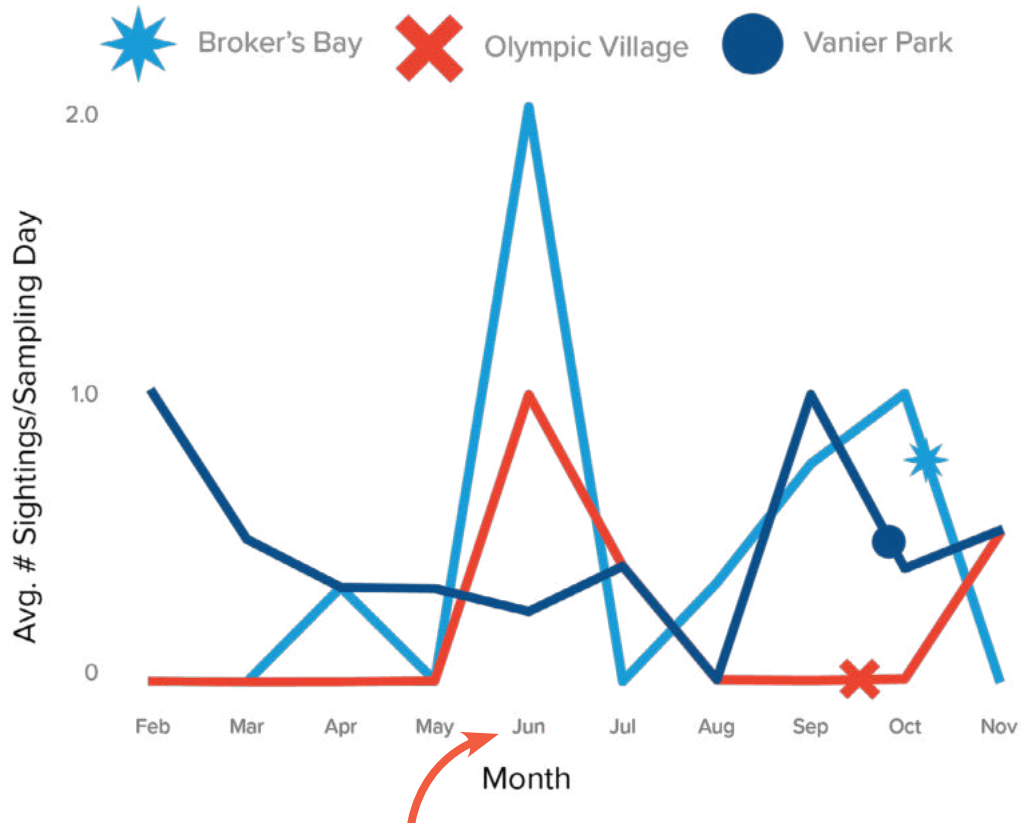


### Bird species sighted included:

- American Coot (*Fulica americana*)
- Bufflehead (*Bucephala albeola*)
- Common Goldeneye (*Bucephala clangula*)
- Double-Crested Cormorant (*Phalacrocorax auritus*)
- European Starling (*Sturnus vulgaris*)
- Great Blue Heron (*Ardea herodias*)
- \*This is a species of Special Concern
- Northern Flicker (*Colaptes auratus*)
- Red-winged Blackbird (*Agelaius phoeniceus*)

## MAMMALS

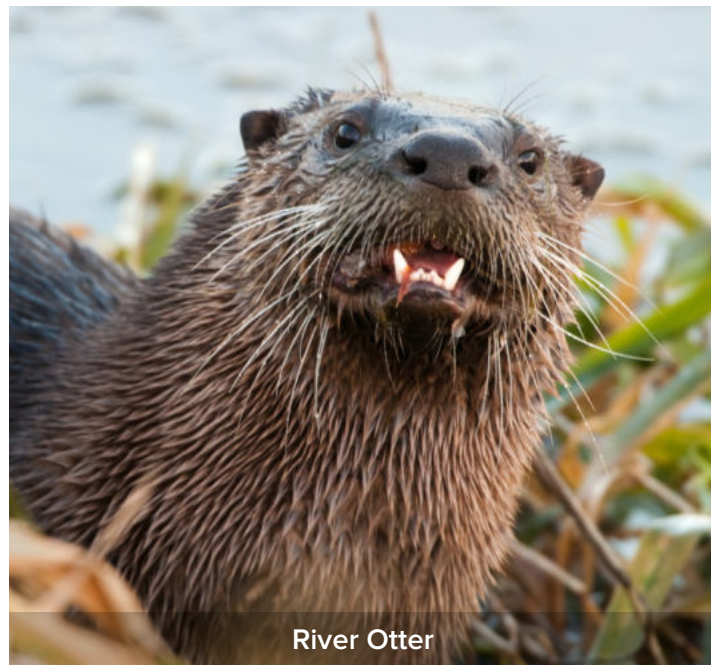
The below figure displays the trends in observations of mammals as an average number of sightings in a sampling session each month. For example, if we sampled five times in June, we added up all of the wildlife observations that month and divided it by five. Pay attention to the differences in the Y-axes, indicating the average number of species observed!



**The number of birds and mammals observed varied greatly from month to month, but notice how they both spike in June!**

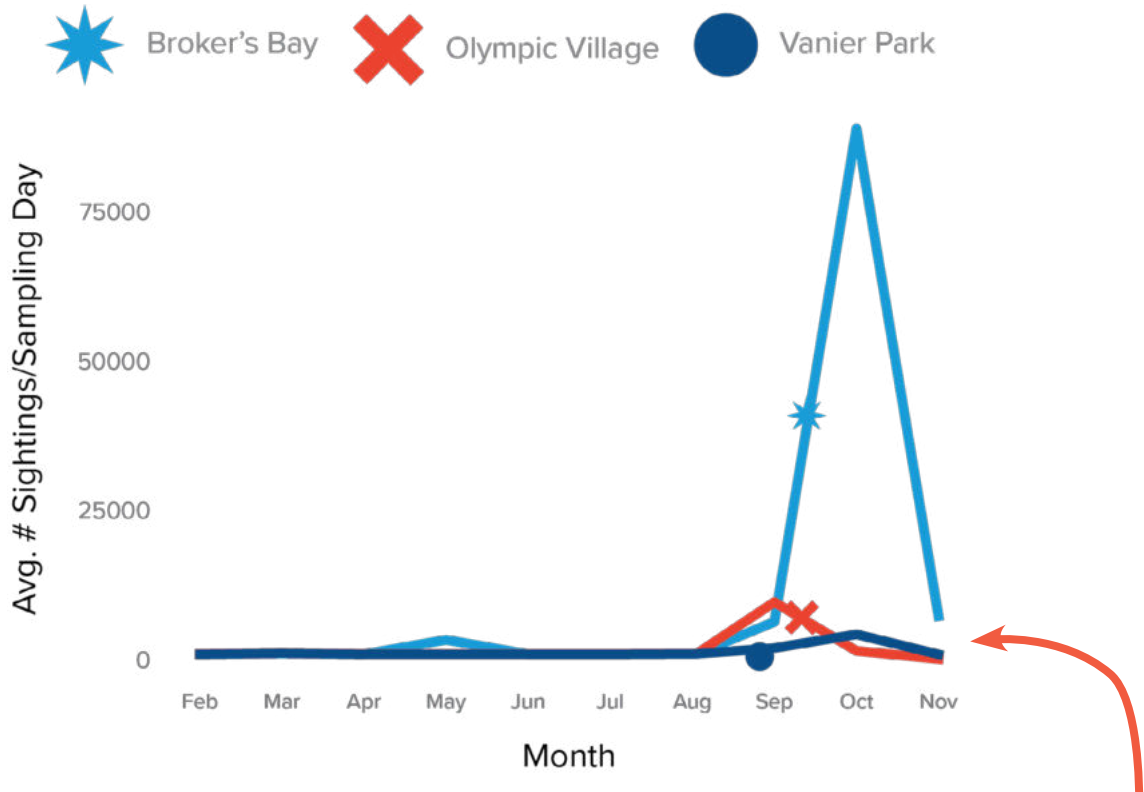
### Mammal species sighted included:

- River Otter (*Lontra canadensis*)
- Harbour Seal (*Phoca vitulina*)



## FISH

Aquatic species have varied tolerances for water quality, as such, they can be an important water quality measurement themselves! Although we do not enter the water to observe aquatic species, we do look into the waters from our sampling sites to view them. The below figure displays the trends in observations of fish as an average number of sightings in a sampling session each month. For example, if we sampled five times in June, we added up all of the wildlife observations that month and divided it by five. Interestingly, the spike in fish population occurs much later than that of mammals and birds. The fish are in large populations around September, whereas mammals and birds spike in May.



**Notice Olympic Village! It has the fewest wildlife sightings and the most litter found in 2022.**



### Fish species sighted included:

- Northern Spiny Dogfish (*Squalus griffini*)
- Northern Anchovies (*Engraulis mordax*)
- Pacific Salmon (*Oncorhynchus spp.*)
- Three-spined Stickleback (*Gasterosteus aculeatus*)



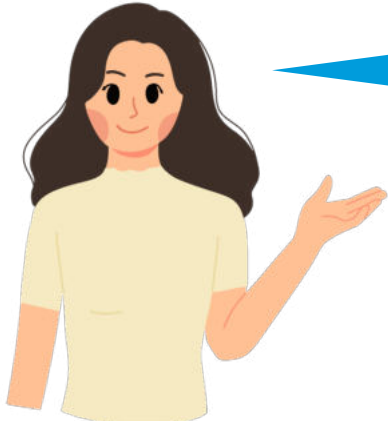
## AESTHETICS

Aesthetics are determined based on four measurements: water colour, water odour, surface appearance, and turbidity. Water colour was the lowest ranked category, which was often green-brown or brown. Water odour ranked the highest, as it often did not have one.

SAMPLING SITE	AVERAGE AQI SCORE	AESTHETIC CONDITION
Brokers Bay	7.5	Fair
Olympic Village	7.15	Fair
Vanier Park	7.75	Fair



What is an AQI score?



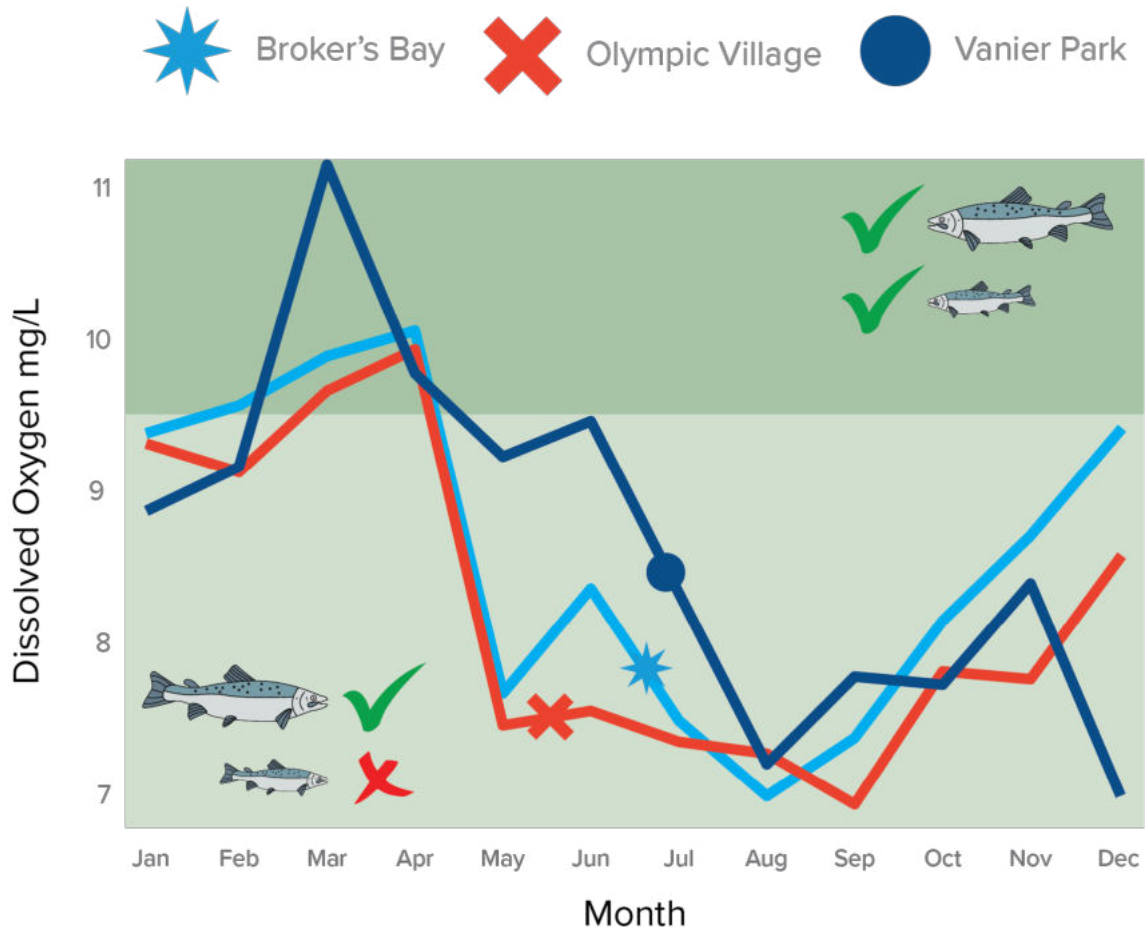
Aesthetic Scores are calculated using the Aesthetic Quality Index (AQI) established by the Toronto and Region Conservation Authority (TRCA). The index scores water clarity, water colour, water odour, and surface debris out of 10. The scores are summed and divided by four.

# TRENDS IN WATER QUALITY PARAMETERS

The below figures display the results of various water quality parameters throughout the year. Pay attention to the Y-axes as the units and measurements will change based on what is measured!

## DISSOLVED OXYGEN

If the dissolved oxygen (DO) in waterways is too low, animals will die from suffocation, making dissolved oxygen a great measurement of water quality. In polluted systems, overgrowths of certain organisms cause this, but dissolved oxygen levels are also dependent on other factors such as temperature, wave action, and algal growth<sup>2</sup>. In this graph, the light represents dissolved oxygen levels where certain species of fish survive, but not all. The dark green area is healthy dissolved oxygen levels for all fish.



**Dark green means healthy dissolved oxygen levels, where all species and life stages of fish can survive!**

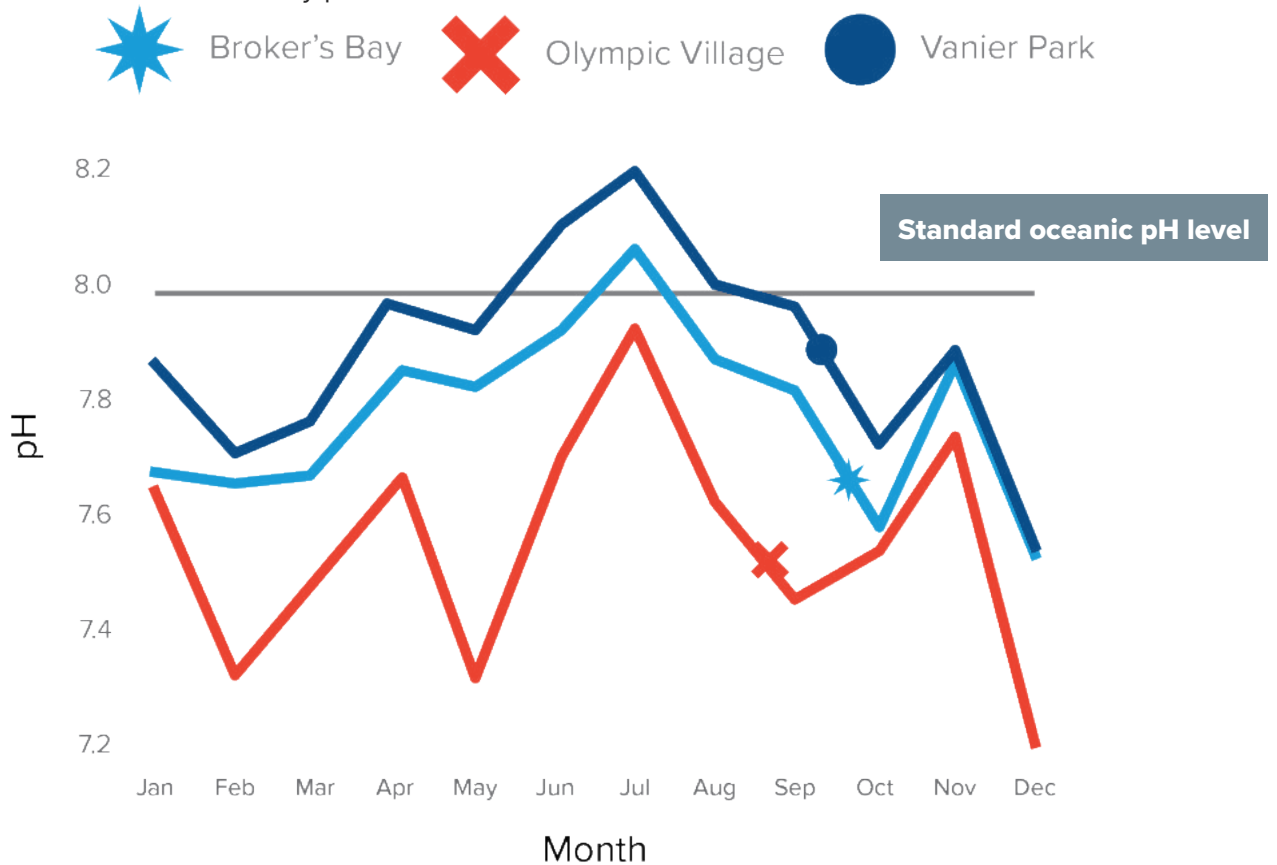
**Light green means certain species of fish can survive. Although the survivability of fish is species dependent, the larger ones tend to survive better in lower dissolved oxygen.**

**Again, notice Olympic Village. It has the lowest dissolved oxygen, the least amount of wildlife, the lowest number of recreators, and the most trash.**



### POWER OF HYDROGEN (pH)

The pH of water is indicative of how acidic or how basic it is, from 1 = very acidic, to 14 = very basic<sup>3</sup>. Seawater usually hovers around pH 8, and healthy pH for fish is anywhere from pH 6.5 - pH 9<sup>3</sup>. The below figure shows all three sites have a slightly lower average pH than typical for oceanic systems. This is indicative of another water source entering the water. The other source may be rainfall, the Fraser River outflow, or pollution. The good news is that it never deviates from a healthy pH for sea life.

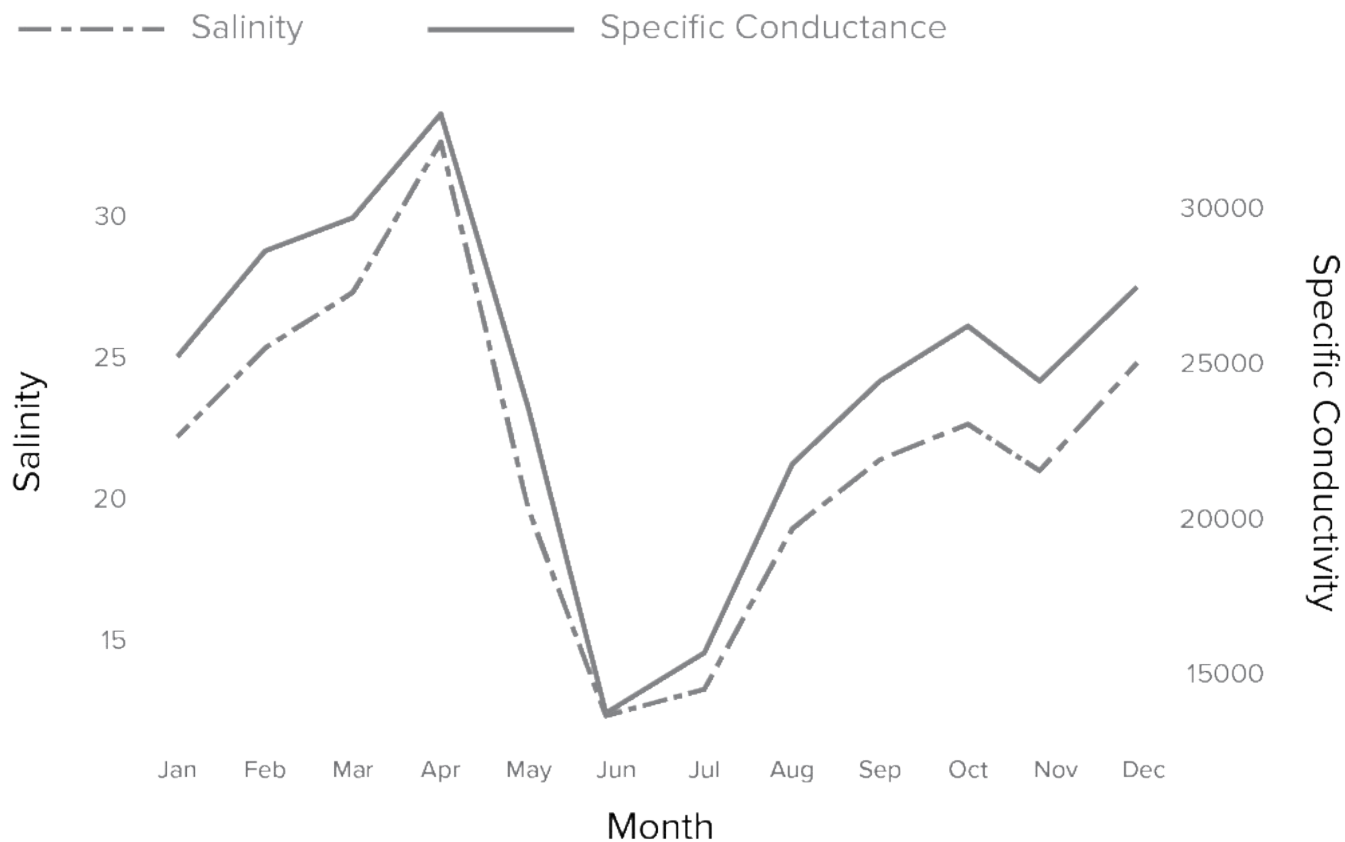


**Although the pH is below standard oceanic levels, it is still within a healthy range for fish!**

**Olympic Village continues to perform poorly, with the lowest pH of all three sites.**

## SALINITY, SPECIFIC CONDUCTIVITY, AND TOTAL DISSOLVED SOLIDS: OUR DATA

- **Specific conductance** is a measurement of how quickly an electrical current passes through water. The speed of the electrical current is affected by the number of ions inside the water<sup>4</sup>.
- **Total dissolved solids (TDS)** is the total number of ions in the water. The ions are made up of salts and other organic compounds. The TDS measurement is determined by multiplying specific conductivity by a constant. Due to the inter-relatedness of TDS and specific conductance, TDS is omitted from this graph<sup>4</sup>.
- **Salinity** is the number of salt ions inside the water<sup>4</sup>. Marine species can survive anywhere from 0-35 ppt salinity<sup>4</sup>.



In this figure, all sampling sites are averaged together. This is for two reasons: (1) there was little variation between the sites, and (2) it is much easier to see the difference between salinity and specific conductivity when they are combined. If you are interested in site readings, we invite you to download the data from our website:

<https://www.swimdrinkfish.ca/opendata>

## SALINITY, SPECIFIC CONDUCTIVITY, AND TOTAL DISSOLVED SOLIDS: OUR DATA EXPLAINED

### What do these measurements mean for water quality?

If the water is pollutant free, the speed of the electrical current will be determined entirely from the salts in the water, therefore salinity and specific conductivity will be the same.<sup>4</sup> If there is pollution in the water, there will be organic compounds as well as salts, making conductivity higher than salinity.<sup>4</sup> This may indicate that there is some pollution in the waters around Vancouver, since the salinity is slightly higher than specific conductivity.<sup>4</sup>

### Why are all of the measurements so varied from month to month?

Variation in salinity, total dissolved solids, and specific conductivity changes is indicative of another type of water entering the system. This may be rainwater, river outflows (the Fraser River outflow sometimes can come all the way into False Creek), or it may be it may be pollution from sewage or agriculture runoff.

<https://www.swimdrinkfish.ca/blog/detective-freshwater-sources-in-vancouver>

# GENERAL DISCUSSION

## Key Findings

### RECREATIONAL WATER USERS

Our results illustrate that recreational water use is low for secondary contact recreational water sites and suggest that the use of the [Swim Guide](#), declines as a community's interactions with its water decrease.

All False Creek sites had few primary contact recreational water users. This is in line with the current designation of False Creek as a secondary contact recreational use water body only. Of these primary contact recreational water users, the highest use was at Vanier Park which is closest to areas that are designated and protected for primary contact recreational water use (e.g. English Bay Beach, Kitsilano Beach).

Our Swim Guide views were lower than for the previous two years and these results are largely unexpected. We suspect this result is due to the COVID-19 pandemic which brought a surge in people spending time outdoors and at the water's edge in 2020 and 2021 compared with later years. Reduced interaction with the water would decrease the need to use our Swim Guide.

We hope that as the Swim Drink Fish movement grows, the number of recreational water users will increase.

### LITTER AND FLOATABLES

Our results suggest that the water quality and amount of interactions with water at a site decrease with increasing litter and floatables for both recreational water users and wildlife.

Although we are confident that the trends in our litter data are correct, we have noted that there are biases in this year's data collection methods that could have skewed our results – the largest of these biases being undefined site area boundaries for observations and counts. Site area boundaries were not explicitly laid out for observers, creating the possibility for reporting discrepancies between observers. Our data collection methods will be updated for the next monitoring season with the aim of reducing this bias.

### WATER QUALITY PARAMETERS

Our results indicate that there is an external water source entering False Creek, causing water quality results to waiver from the expected values for this environment. In order from most to least impacted: Olympic Village, Broker's Bay, Vanier Park. The amount of litter recorded, from highest to lowest, followed this same order of sites while the amount of water users and wildlife recorded followed the reverse order (highest for Vanier Park and lowest for Olympic Village). These results suggest that poor water quality may be correlated with lower biodiversity and abundance of wildlife.





## Goals and Recommendations

Each year, Swim Drink Fish sets and adjusts goals and recommendations based on the results, trends, and lessons learned from our water monitoring program, advocacy work, work with our community, and evaluation of the progress made in previous years. Our goals and recommendations help to inform the next steps for both Swim Drink Fish and our community with the ultimate purpose of working toward enhancing overall water quality and access for everyone to swimmable, drinkable, fishable waters in Metro Vancouver.

Below are the goals and recommendations we've set out for the upcoming year(s):

### 1. CONTINUE WATER MONITORING AND INCREASE WATER MONITORING IN METRO VANCOUVER.

Water monitoring is the core of our work – since Swim Drink Fish was founded, we have been collecting water quality samples to advocate for the protection and restoration of our waters. Building on the success of our water monitoring program in Vancouver over the past five years, Swim Drink Fish will continue its year-round community-based recreational water quality monitoring program in Vancouver. We will also explore new pathways to increase our water monitoring program's impact and have identified the following areas to focus this effort:

- i) Metro Vancouver is fortunate to be surrounded by water, and many of its inhabitants interact with the water year-round for a variety of reasons. This large amount of water, interactions with the water, as well as the fact that recreational water quality changes as frequently as the weather, make it a momentous effort to monitor the water quality of all the waters the region's communities use and rely on throughout the year. Many locations aren't currently monitored or aren't monitored all year-round.
- ii) Many organizations work to monitor and safeguard our waters though historically we haven't always been aware of the details of each other's work which can and has resulted in the duplication of our efforts.

Swim Drink Fish will work toward the following goals to increase our impact:

#### Re-strategize water monitoring site plans to maximize our effort.

Specifically, we will:

- Avoid overlap of sampling site locations between our organization and others monitoring our waters.
- Provide water quality data in the winter season for high-use sites not currently monitored throughout the winter.
- Work with other organizations also monitoring our waters to exchange data and information to prevent redundancy and gain a better big picture understanding of our collective efforts.

#### Increase the number of partners and collaborators who monitor waters in Metro Vancouver.

Specifically, we will:

- Promote and implement Swim Drink Fish's adopt-a-site program in Metro Vancouver that empowers communities to set up their own water monitoring program for locations that aren't currently monitored.



## 2. IMPROVE WATER LITERACY IN METRO VANCOUVER

Water literacy is knowledge and understanding about water sources, water management, and water-related issues. A growing body of research supports that improved water literacy results in improved water quality. Water-related knowledge and understanding improves people's attitudes and behaviours toward caring about and protecting their waters.

The average British Columbian doesn't know about where they get their water from or where it goes afterward, how their wastewater is treated, laws that govern their waters, or issues that threaten them.<sup>5</sup>

Improving water literacy has always been a part of Swim Drink Fish's work and we continue to explore pathways to strengthen our efforts. Our next steps will focus on improving water literacy with our partners and collaborators in the following ways:

### **Improve public awareness concerning water pollution in Metro Vancouver.**

Specifically, we will:

- Continue to offer water monitoring and water literacy workshops to Metro Vancouver communities and beyond.
- Explore ways to increase the accessibility of our water monitoring and water literacy workshops to wider audiences.
- Continue waste characterization data collection with our community partners and collaborators.
- Increase and diversify our community outreach efforts.

### **Increase public access to water quality data for Metro Vancouver.**

Specifically, we will:

- Advocate for real-time sewage overflow alerts from Metro Vancouver, including combined sewer overflows, and on a platform that is easily accessible to the public.
- Work with other organizations monitoring our waters to advocate for and facilitate sharing their water quality data on Swim Drink Fish's [Swim Guide](#) platform.

### **Increase the impact of the data we collect.**

Specifically, we will:

- Re-strategize what environmental observations we collect and how to produce the most helpful and meaningful dataset to achieve our goals.
- Explore collaborations with other organizations monitoring our waters to increase the collective impact of our data.

### **Incorporate traditional ecological knowledge into our work.**

Traditional Ecological Knowledge (TEK) is a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment. It is a holistic knowledge or worldview which parallels the scientific disciplines of ecology.

Specifically, we seek to:

- Meet with our local First Nations.
- Learn about Traditional Ecological Knowledge from our local First Nations.
- Respectfully integrate traditional ecological knowledge into our water monitoring work.

### 3. INCREASE ACCESS TO 'SWIMMABLE' WATERS

Swimmable waters are clean waters and accessible to all. Vancouver is surrounded by water with much potential for increased access to swimmable waters. However, current water use and water quality management decisions among stakeholders prevent this access.

We focus on creating swimmable waters because they protect the health of humans and the environment. By leveraging public health concerns to support environmental protection, we work two-fold to connect our community to the water (thereby making them advocates for the water) and protect the waterbodies themselves. We'll focus on the following objectives to increase access to swimmable waters:

#### a. Identify and work towards the restoration of potential open-water swimming locations.

To increase access to swimmable waters, we must find places where increased access is possible and necessary. Moving forward, we will continue our work to identify potential open-water swimming locations in Vancouver. We prioritize monitoring sites on the east side of Vancouver for equity-deserving residents for whom the means to travel is a barrier to accessing their waters.

We will use the data from our water monitoring program to identify site-specific restoration needs and which stakeholder collaborations are required to restore these water bodies as recreational waters. .

#### b. Work with our community partners to advocate for clean and accessible waters.

We currently work with several community partners and sit on several advisory boards. Through these collaborations, we aim to support the advocacy work of our partners and provide recommendations on best practices for improving recreational water quality and accessibility. We are currently focused on two significant advocacy efforts:

##### 1. The designation of the west portion of False Creek as a primary contact water body.

In 2017, the City of Vancouver approved a motion to undertake key actions to improve water quality in False Creek with the ultimate goals of making False Creek swimmable and restoring shellfish harvesting, historically traditional of the area, once again (currently, water quality in False Creek is not deemed safe for harvesting). While water quality has improved since efforts have been made to restore the area, the water remains unprotected.

Our partners, Friends of False Creek and False Creek Residents Association, are spearheading advocacy work on making False Creek swimmable. We will continue to support their advocacy efforts and work towards making False Creek a swimmable creek.

##### 2. Advocating for improved water and wastewater infrastructure.

A community's water infrastructure includes all the man-made and natural features that move and treat water. Effective water infrastructure systems help safeguard public health and our environment from waterborne and sewage-related infectious bacteria, viruses, parasites, and toxic chemicals.

Swim Drink Fish will continue to work with the City of Vancouver as an advisor to the Healthy Waters Plan and with Metro Vancouver as a member of the public advisory committee for the Liquid Waste Management Plan to continue advocating for improved water and wastewater infrastructure.

# OUR COMMUNITY, OUR WATER

Water is a vital part of life, community, and well-being. Clean water is necessary for drinking and sanitation, providing for our crops, livestock and industry, cultural values, and creating and sustaining the ecosystems on which all life depends. All communities need swimmable, drinkable, fishable water to thrive.

Through community science and outreach, our Swim Drink Fish Vancouver Hub is committed to empowering and bringing our community together to help protect the places and people we love, now and for future generations to come.



# REFERENCES

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# GLOSSARY

## **Aesthetic Score**

A value assigned to water condition based on a ranking of its aesthetics: colour, clarity (turbidity), surface appearance, odour.

## **Aesthetics**

Characteristics of water that concern the way it is perceived (e.g. the way it looks or smells).

## **Climate-Resilient Infrastructure**

Infrastructure that is planned, designed, built, and operated in a way that anticipates, prepares for, and adapts to changing climate conditions.

## **Collaborator**

An individual or organization that works jointly on a project.

## **Combined Sewer**

A sewer system that collects rainwater runoff (stormwater), domestic sewage, and industrial wastewater into one pipe.

## **Combined Sewer Outfall**

A pipe that receives wastewater and stormwater from a combined collection system (e.g. sewer system) and carries it to a point of ultimate or final discharge into the environment.

## **Combined Sewer Overflow**

When a combined sewer exceeds its water carrying capacity, untreated wastewater is discharged into the environment – usually the nearest body of water – instead of being processed at a wastewater treatment plant.

## **Community Outreach**

The practice of conducting awareness activities through targeted community interaction.

## **Community Science**

Science conducted by, or in partnership with, individuals without professional science training. Community science involves community members in any or all aspect of the scientific process, from creating the question or hypothesis, to project design, to collecting and analyzing data.

## **Community-Based Water Monitoring**

Scientific water health data collection that is led and driven by citizens or non-governmental organizations and seeks to increase direct community involvement in research and monitoring program design.

## **Dissolved Oxygen**

A measure of how much oxygen is dissolved in the water – the amount of oxygen available to living aquatic organisms.

### **Diversity, Equity, Inclusion (DEI)**

A framework seeking to promote the fair treatment and full participation of all people, particularly groups who have historically been underrepresented or subject to discrimination on the basis of identity or disability.

### **Donor**

An individual or organization who gives a gift with no strings attached.

### **E. coli**

Short for “*Escherichia coli*”, a large and diverse group of bacteria commonly found in the lower intestine of warm-blooded organisms and subsequently food, and the environment. Most strains are harmless, but some can cause serious illness in humans.

### **Environmental Observation**

The act or instance of collecting information about the environment by noticing or perceiving something. Key pieces of information (data), put together, help build understanding of the changing environment.

### **Floatables**

Any foreign matter that may float or remain suspended in the water.

### **Green Infrastructure**

A term used to describe a water management approach and components that mimic natural water systems, cycles, and benefits.

### **Litter**

A term used to describe waste products that have been discarded incorrectly.

### **Microtrash**

Microtrash refers to small bits of trash such as broken glass, bottle caps, can tabs, and other smaller, broken down pieces of trash.

### **Open Water Swimming**

Refers to swimming that takes place anywhere that isn't a man made swimming pool.

### **Partner**

An individual or organization that has a shared interest in the outcome of a not-for-profit's work and invests with money and more to help support the work.

### **pH**

A measure of water chemistry – specifically, how acidic or basic water is.

### **Pollution**

The presence or introduction of a harmful substance into an environment.

### **Primary Contact Recreational Water/User**

Recreational activity in which the whole body or the face and trunk are frequently immersed or the face is frequently wetted by spray, and where it is likely that some water will be swallowed. Examples include swimming, surfing, waterskiing, whitewater canoeing/rafting/kayaking, windsurfing or subsurface diving.

### **Recreational Water**

Refers to rivers, lakes, and coastal waters that are used for recreational purposes.

### **Salinity**

The amount of salt dissolved in a body of water.

### **Secondary Contact Recreational Water/User**

Recreational activity in which only the limbs are regularly wetted and in which greater contact (including swallowing water) is unusual. Examples include rowing, sailing, canoe touring, or fishing.

### **Specific Conductivity**

A measure of water's ability to conduct electricity.

## Supporter

An individual or organization who supports a not-for-profit's work in any way.

## Swim Guide

A free beach and recreational water information service that can be accessed via a website or smart phone app.

## Total Coliforms

The total amount of bacteria classified as Coliforms in a water sample. Coliforms are bacteria that are found in soil, in surface water, and in animal waste (they include *E. coli*). Most are harmless, but they are often referred to as "indicator organisms" because they indicate the potential presence of disease-causing bacteria in water.

## Total Dissolved Solids (TDS)

The amount of organic and inorganic materials, such as metals, minerals, salts, and ions, dissolved in a particular volume of water.

## Traditional Ecological Knowledge (TEK)

A cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

## Trash

A general term for all types of discarded matter.

## Volunteer

An individual who freely offers to take part in an enterprise or undertake a task.

## Waste Characterization

The process of analyzing the composition of trash in an environment to help determine how to reduce it.

## Water Literacy

The culmination of water related knowledge, attitudes, and behaviours.

## Water Quality Parameters

Measures of the physical, chemical, and biological properties of a water body.

