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Water Issues for the 2020 B.C. AquaHacking Challenge

Compiled by Anna Warwick Sears, Okanagan Basin Water Board

The following is a description of the water issues that were selected by the AquaHacking advisory committee from the submissions received. Some of the issues initially submitted were combined and further refined in this document, and all have been screened to verify that there are data and Water Issue Leaders to support them.

Note: We have described data sets that are available in the Okanagan region, and on the internet. Participants may have other sources of data from other regions that may also be applied to address the water issues. We anticipate that participants will have unique approaches to solving the issues that may draw upon other forms of data than are listed here. Organizers of the B.C. AquaHacking Challenge and Water Issue Leaders are open to ideas and will assist participants with acquiring data as we can.

1. Contaminants in stormwater

How can we improve water quality in our lakes and streams by reducing stormwater contamination?

Hydrocarbon, metal and pathogen contaminants run off of roads, sidewalks and driveways and flow through the stormwater system into our lakes and streams. The pollutants degrade drinking water, harm fish, and the quality of swimming beaches. These contaminants can also accumulate in sediments to concentrations exceeding guidelines set to protect aquatic life, even if the quality of the surface water meets these guidelines. Stormwater pollution is a serious problem in B.C., where many communities rely on surface drinking water sources, but the problem is widespread throughout North America and the world.

Water Issue Leader: **Heather Larratt**, heather@larratt.net Aquatic Biologist, Larratt Aquatic Consulting Ltd.; with **Marta Green**, greenm@ae.ca, Senior Geoscientist, Associated Environmental Consultants Inc. as additional mentor on pathogens and nitrates.

Available Data & Resources: Kelowna stormwater and sediment chemistry data, with biological sampling. Many other time-series data sets are available for other Okanagan waterways.

2. Residential/commercial outdoor water use

How can we reduce the amount of water used outdoors by B.C. homes and businesses?

Canadians are some of the highest water users in the world, and much of the water use is in the summer. In the Okanagan, residential outdoor watering is the second highest use after agriculture, primarily on lawns, created for mostly cosmetic purposes, and gardens. While there are many efforts with outreach and education, it has been difficult to modify human behaviour, and there are persistent myths about water availability – especially because of B.C.'s seemingly abundant lakes and rivers. Residential outdoor water use creates an economic burden on communities for the costs of piping, storage and infrastructure to service the high summer water demand. Salmon spawning streams compete with consumer water use during summer low-flow periods. Most technological solutions have focused on reducing indoor water use, such as smart appliances and low-flow toilets. Technology to reduce outdoor use could be widely applied throughout the North American west.



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Water Issue Leaders: **Ed Hoppe**, EHoppe@kelowna.ca, Water Quality and Customer Care Supervisor, City of Kelowna; and **Jennifer Miles**, jennifer.miles@rdno.ca, Water Sustainability Coordinator, Regional District of North Okanagan.

Available Data & Resources: City of Kelowna will have data from their pilot deployment of ‘smart meters’ available for app development – this is live data, without long-term history. They are deploying 3 kinds of meters: Sensus, Neptune, and Badger. The City of Kelowna also has decades of historical data to look at trending, but only collected every two months. The Regional District of North Okanagan has smart meter data for urban water use by customer, with remote read capability allowing hourly data to be accessed. The Okanagan Basin Water Board’s Okanagan WaterWise outreach program has a website focused on outdoor water conservation: www.MakeWaterWork.ca.

3. Flood damage in communities and the need to communicate flood risk

How can we reduce damage to homes, businesses and infrastructure and better communicate the risk of flooding to communities?

There are many present-day flood hazards in B.C. communities – ranging from spring snowmelt, and ice-damming to tsunamis and groundwater seepage. Now that climate change has increased the intensity of storm events, it has further increased the risk of catastrophic flooding. While more data and models are becoming available to estimate flood hazard, there is a great need to develop better methods to mitigate the effects of flooding, both structurally (for example, upgrading infrastructure) and non-structurally, through changes in policy. We also need better ways to communicate flood risk to residents and businesses so that we can better prepare for flood risk.

New technology to improve the way we reduce flood hazards in communities and communicate flood risk would be valuable to local and senior governments, the insurance industry and to consumers across North America and internationally. It would also be excellent to have solutions that are feasible in a range of regions – from data-rich to data-poor.

Water Issue Leaders: **Steve Litke**, slitke@fraserbasin.bc.ca, Senior Program Manager, Fraser Basin Council, and **Heather McGrath**, heather.mcgrath@canada.ca, Geospatial Scientist, Natural Resources Canada.

Available Data & Resources: National-level data are available from NRCan on their geospatial data portal: <http://geogratis.gc.ca/>. Users can search and select core datasets by area from the Geospatial Data Extraction wizard or by keyword via the Open Government Search.

For the Lower Mainland, the Fraser Basin Council has a decent topographic model and a fairly sophisticated lower Fraser River hydraulic model to estimate flood depths and extents for a variety of Fraser River flood scenarios (including climate change). FBC may also have some relevant data developed through the recent Thompson Watershed flood and debris flow assessment. For the Okanagan, the Okanagan Basin Water Board has a very high quality LiDAR data set, giving the topography, and should have preliminary hazard maps available for use by participants.



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4. Preventing and mitigating the effects of invasive zebra and quagga mussels

How can we prevent an infestation and potential damage from invasive mussels?

Invasive zebra and quagga mussels were introduced in the Great Lakes region in 1986, and have been leapfrogging from one body of freshwater to another across Canada (as of 2019, as far west as Manitoba) and the United States. Prevention is the first line of defense, as they have not yet reached British Columbia. Prevention efforts include water testing, boat inspections, and communication campaigns. Should they arrive, they will cause huge environmental damage, block water intakes and encrust water infrastructure, at a cost of tens of millions per year to manage. There is no feasible way to eradicate these mussels in the large lakes and rivers of B.C. Technology is needed to improve prevention methods, and also to develop ways to minimize the damage the mussels do to boats, intakes and other infrastructure. Such technology would have a market across most of North America.

Water Issue Leader: **James Littley**, james.littley@obwb.ca, Operations and Grants Manager, Okanagan Basin Water Board

Available Data & Resources: The Okanagan Basin Water Board's Okanagan WaterWise outreach program has a website focused on preventing invasive mussels: www.dontmoveamusel.ca. There are many publicly available resources on the internet related to invasive mussel prevention and mitigation.

5. Access to potable water in Indigenous communities

How can we improve access to clean drinking water for Indigenous communities in B.C.?

Indigenous communities throughout Canada lack access to clean and safe drinking water. These diverse communities (urban and rural) rely on water systems that are vulnerable to pollution and contamination from resource development, upstream industry use, agriculture, resource extraction, septic, or other pollutants. Problems with water quality testing and treatment are also common throughout Western Canada. Each community and water system is different, but the critical issue of living with on-going boil water advisories is shared. Solutions need to be found to improve water testing and treatment in order to realize basic human rights for Indigenous Peoples in Canada and address the disproportionate lack of clean drinking water.

Water Issue Leaders: **Tessa Terbasket**, tterbasket@sylix.org Natural Resources Research and Policy Coordinator, and **Sarah Alexis**, salexis@sylix.org, Project Coordinator and Researcher, Okanagan Nation Alliance

Available Data & Resources: Okanagan Indigenous Communities have data sets of water monitoring and testing on community members wells. First Nations Health Authority may have data from across B.C., as may Indigenous and Northern Affairs Canada.