Canada WaterPortal

Technical report

My Everyday Water Decisions

How your daily water choices add up

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Contents

1.0 Introduction

In a typical day, how often do you think about water? From showering to eating lunch, getting around town, and even investing money, nearly everything we do on a daily basis impacts the water around us and around the globe. The My Everyday Water Decision Quiz (herein referred to as 'The Quiz') and this accompanying report explore the relationship between water and our everyday lives.

A useful starting point in the exploration of water impacts is the concept of the water footprint. Much like the now-familiar carbon footprint, a water footprint tells us how much water is consumed and altered (through water quality impacts) over the lifetime of a product. To produce a single cup of coffee, for example, coffee beans must be grown, harvested, processed, and transported – all these activities require water and produce wastewater that requires assimilation. In fact, The Water Footprint Network estimates the water footprint of coffee is 130 liters per cup[1]! Like with coffee, when you dig into the story behind everyday products and activities, it becomes clear that we can have a significant impact on water.

An important element of the water footprint is the distinction between global and local water impacts. When you pour yourself a cup of coffee, you aren't seeing the 130 liters of water go into the cup along with it, because coffee's water footprint is externalized to the country of production. Most of the products we consume come from around the world, and the water used to bring us these products is sourced from locations around the world. However, we can also have a local water footprint. The water you use for showering or watering your lawn, for example, comes from the watershed(s) in which you live. Your local water footprint may feel more tangible, but it is important to consider both global and local water consumption.

The water footprint concept is a helpful way to understand how your daily activities can use water. However, the impact that we can have on water is not restricted only to the quantity of water consumed, there is also the production, transportation of goods, and associated pollutants. Indeed, our impacts to water *quality* are also important to consider; not only do animals and plants depend on high quality water, but humans do as well, for drinking, cultivating crops, producing goods, and industrial processes.

But the story doesn't end with you and your actions. It is true that, as an individual, you have an impact on global and local water quantity and quality; however, the impact of each decision is amplified by every person who makes the same choices as you. Known as the *cumulative effect* of water decisions, it is important to consider how decisions, either water-conscious or not, can add up to produce significant consequences for global and local watersheds. For example, imagine you cut back your coffee intake to reduce your global water footprint. By cutting out one coffee on Saturdays, you are saving about 6,760 liters each year. While this is a great step to take as an individual, what if 500 people did the same thing? Or one thousand? If one thousand people reduced their coffee intake by one cup per week, that would save the equivalent of almost three Olympic sized swimming pools worth of fresh water, each year – and this is only one thousand people, drinking one less cup! When you account for cumulative effects, the positive impact that we can have as individuals with our routine choices can be staggering.

[1] Water Footprint Network, N.D. Product Gallery – Coffee. Retrieved form http://waterfootprint.org/en/resources/interactive-tools/product-gallery/

We will explore the purpose behind each question in the Quiz in Section 2, and indicate why each question is significant in the context of water stewardship. In Section 3, we explain how user inputs are translated into a final water stewardship score using mathematics and available data. Throughout the entire report, we will highlight key opportunities for users to reduce their water impacts.

Taking the Quiz and reading this report are great first steps to learn more about our water impacts, but these are only a starting point! There are many online resources available where you can learn more about water stewardship and water in general. There are also communities and organizations you can join online and in person to learn more, share the message, and take positive actions to protect and improve our water resources (See Appendix A). With the Quiz as inspiration, we encourage you to seek out ways to become a better water steward!

2.0 Understanding the Quiz

In this section, we will explore the underlying significance of each question and its relevance for water stewardship. In addition, we will highlight water stewardship lessons that you can apply in your everyday life. For more information about how your answers are turned into water stewardship scores, see a description of the math and mechanics of the Quiz in Section 3. While reading Section 2, you may be surprised to learn the ways in which simple actions can have drastic impacts on local and global water quantity and quality!

2.1 Do you have a low flow toilet?

This question gets users thinking about simple, yet significant, ways they can save water. Simply by installing low flow toilets, you can reduce water consumption by up to 60% per flush[2], which will not only conserve local water supplies, but also help reduce your water bill each month.

2.2 When you shower, do you…?

This question is another example of quick changes that users can make to drastically reduce their water impacts. An easy way to reduce your local water quantity impact is to replace existing shower heads with low flow models. This alone will reduce the water consumption of your showers by about 60%[3]. In addition, reducing the duration of your showers will further lower your water consumption. Try using a timer to see how long your typical shower is, then challenge yourself to shave time off every time you shower.

2.3 In an average week, how often do you consume bottled water?

This question highlights the fact that the plastic products we use everyday can require great quantities of water to produce. When you consume water from a plastic bottle, your water footprint is actually three times the volume of what is in the bottle, simply because of the plastic involved[4]. Therefore, consider using a re-usable water bottle; many workplaces, campuses, and public areas will provide access to clean drinking water through taps and fountains – you just need a bottle to fill!

Beyond plastic water bottles, this question speaks to the water consumption involved in producing all kinds of plastics, from grocery bags to beverage containers. Where possible, re-usable containers or bags should replace plastic, and when necessary, canned beverages are better to consume than plastic, since they are much easier to recycle[5].

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[2] Claire Moloney, Poplar Network, 2014. Payback Period for Low Flow Toilets: Is the Cost Offset by the Water Savings? Retrieved from https://www.poplarnetwork.com/news/payback-period-low-flow-toilets-cost-offset-water-savings

[3] Low Flow Showerheads, 2016. Low-GPM Shower Heads: Water Conservation Statistics. Retrieved from http://lowflowshowerheads.info/water-saving-stats/

[4] The Pacific Institute, 2007. Bottled Water and Energy Fact Sheet. Retrieved from http://pacinst.org/publication/bottled-water-and-energy-a-fact-sheet/

[5] The Aluminum Association, 2017. The Aluminum Can Advantage. Retrieved from http://www.aluminum.org/aluminum-can-advantage

2.4 Do you have a rain barrel, rain garden, or any other low impact development on your property?

Low Impact Developments (LID) include landscaping features, such as rain gardens and bioswales, help to reduce stormwater run-off in urban settings and allow infiltration into the ground. Similarly, rain barrels help collect water during rainfall events, which reduces stormwater runoff as well as potable water use for watering gardens and lawns. Reducing stormwater runoff is valuable, since stormwater typically drains directly through storm sewers to local water bodies, with whatever debris and contaminants it collects along the way. Reducing stormwater volumes can reduce the amount of contaminants reaching local water bodies, helping to reduce the strain on stormwater sewer systems (and associated frequency of localized flooding). Using collected rainwater for landscaping can also reduce the amount of potable water consumed. You can learn more about LID and the broader discussion of green and grey infrastructure here and from organizations like the Alberta Low Impact Development partnership[6].

2.5 How would you water your lawn or garden, assuming there was no rain that week?

There are many techniques which can help improve water use efficiency, but reducing your lawn and garden's water footprint is related, first and foremost, to the choices you make in watering.

For example, although green lawns can be aesthetically pleasing, you should consider this before turning on your sprinkler – how much do you value that perfect green lawn? Reducing watering frequency or changing the nature of your lawn can be powerful ways to reduce your water impacts. Local, native plants will tolerate the swings in climate and moisture with less watering, fertilizer, and maintenance than typical lawn grass. As the climate changes and water resources become less predictable, the practice of xeriscaping will also become an increasingly valuable way to reduce individual water footprints and increase community resilience to droughts. Xeric plants require far less water and moisture to survive, and are beautiful additions to any outdoor space. Suitable plants for xeriscaping will vary by location, so contact a local landscaping business for local options.

Growing and consuming food in a home garden is an effective (and delicious) way to reduce the impacts of conventional, large scale agriculture on our soils, ecosystems, and water supplies. However, not every climate provides enough rain to maintain a lawn and garden every season, and irrigation can be a necessary part of the growing season. Traditional irrigation systems, like sprinklers or the garden hose, are common and easy to set up, but are often only 50-70% efficient. Compare that to drip irrigation systems, which often exceed 90% efficiency, if set up properly. Generally, non-drip irrigation sprinklers can use about 130 times more water per minute than a drip irrigation system[7]. Setting up your landscape watering system correctly takes an initial investment of time and effort, but the benefits to your water footprint (and water bill), lawn health, and increased drought resiliency will be long lasting and well worth it.

[6] Available online at: http://www.alidp.org/
[7] Water – Use it Wisely, N.D. Efficient Irrigation. Retrieved from http://wateruseitwisely.com/100-ways-to-conserve/landscape-care/principles-of-xeriscape-design/efficient-irrigation/

2.6 How often do you eat meat?

This question highlights the fact that producing meat (and all food), can consume a significant volume of water. While all foods require water, a serving of meat consumes far more water than the equivalent serving of grains, fruits and vegetables, dairy products and even some prepared foods[8]. Every animal that contributes to a serving of meat, whether it be chicken, beef, pork, or other, receives water and food throughout its lifetime. The feedstock for such animals must, in turn, be grown – these grains and other crops require vast volumes of water to produce, which is linked to the significant water footprint of meat. Consider substituting vegetable-based proteins and fish for meats a few nights a week to significantly reduce your water footprint.

2.7 How often do you (or your landlord/the homeowners) check your household plumbing (toilets, faucets, piping) for leaks?

This question invites users to consider the simple things around their house that they can do to prevent wasting potable water. Household leaks can come from a range of sources, and many of them are relatively easy to identify and correct. Namely, toilets, faucets (including bathtubs and showers), and hot water heaters are easily accessible and can contribute to household leaking of as much as 38,000 liters per year[11]. For more challenging leaks, such as those associated with buried and inaccessible plumbing, it is recommended to pay for a professional assessment. Identifying and fixing leaks either by yourself or with the help of a professional should occur twice a year for maximum leak prevention[12]. However, we recognize that professional plumbing services can be expensive, and this step need not occur as frequently as performing easier checks by yourself. By doing so, you are helping to protect local water supplies and can also save money on your monthly water bill!

Did You Know?

Checking for leaks in your toilet is easy - just follow these simple steps!

1) Add food colouring to your toilet tank and wait 10 minutes
2) If the water in your toilet bowl changes colour, you have a leak
3) Repair the leak to save water and money

[8] Vanham, D., Mekonnen, M. M., & Hoekstra, A. Y., 2013. The water footprint of the EU for different diets. Ecological indicators, 32, 1-8.
Water Footprint Network, 2010. Water footprint of crop and animal products: a comparison. Available online at: http://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products/

[9] World Wildlife Foundation, 2012. Google Helps WWF Stop Wildlife Crime. Retrieved from https://www.worldwildlife.org/stories/google-helps-wwf-stop-wildlife-crime

[10] Beverage Industry Environmental Roundtable, 2017. Home Page. Retrieved from http://www.bieroundtable.com/

[11] United States Environmental Protection Agency, 2017. Fix a Leak Week. Retrieved from https://www.epa.gov/watersense/fix-leak-week

[12] City of Calgary, 2017. Take the Leaky Toilet Test. Retrieved from http://www.calgary.ca/UEP/Water/Pages/Water-conservation/Indoor-water-conservation/Water-leaks-and-basic-repairs/Leaky-Toilet-Test.aspx

2.8 How do you wash your dishes?

In this question, another routine yet high water intensity activity is investigated. While everyone's styles vary, the best way to conserve water while washing dishes is to use an eco-star dishwasher and ensure that it is only run when full to maximize the value of every liter of water consumed. If this isn't an option, consider trying to reduce the amount of time the kitchen faucet is running while washing dishes – save up several dishes for a rinse and then turn off the tap, rather than leaving the tap running throughout the dishwashing session.

2.10

2.9 What are your driving habits?

This question highlights the fact that driving a car has an environmental impact beyond just greenhouse gas emissions. Indeed, a significant part of your vehicle's environmental footprint relates to water, since as many as eight liters of water are needed for every liter of gasoline consumed while driving[13]. Beyond just consuming water, driving your car can also impact local water quality. Oils and grease, as well as heavy metals and other particulates, can accumulate on roads due to traffic. These contaminants are then washed into local water bodies by stormwater, and can cause adverse impacts to aquatic ecosystems[14]. Although this local water quality impact is not quantified in the Quiz, the cumulative effects can be significant, and everyone can reduce their water footprint by substituting alternative transportation methods for driving whenever possible.

2.10 How do you typically dispose of common household waste?

This question is meant to inform users that not all waste products can be dumped down the sink or toilet. It may seem convenient, or perhaps even more palatable, to dump certain wastes down the drain, but doing so can have serious consequences, and there are more appropriate locations for waste disposal, depending on the type of waste. The table below indicates the preferred disposal location for several typical wastes, while the worst location for disposal for each waste type is down the sink or toilet. This question challenges users not to do what may be easy, but rather what is best for their local water quality and wastewater infrastructure. In addition to reducing impacts on local water quality, properly disposing of typical wastes can help save users money, since they won't need to pay for costly plumbing repairs caused by clogs and blockages. South Australia Water Corp has released a game to help people learn about what should and should not get flushed – give it a try to learn more!

[13] East Central Illinois Regional Water Supply Planning Committee, N.D. Water Use by Ethanol Compared to Other Industries. Retrieved from http://www.rwspc.org/documents/wateruse_otherindustries_0608.pdf

[14] Junaid Aslam, Saeed Ahmad Khan, Sheba Haque Khan, 2013. Heavy metals contamination in roadside soil near different traffic signals in Dubai, United Arab Emirates. Retrieved from http://www.sciencedirect.com/science/article/pii/S1319610311000846

Waste	Preferred disposal location	Explanation
Medicine	Pharmacy[15]	Medicine dissolves in water and often cannot be easily removed by wastewater treatment facilities; buildup of medicinal substances can harm aquatic species
Sanitary products	Garbage	Sanitary products can cause blockages and damage to plumbing, since they are relatively large, solid objects which do not dissolve like toilet paper
Dental floss	Garbage	Floss can tangle with other items in wastewater lines, especially hair and other floss, to create blockages and cause damage to piping

2.11 How do you typically wash your car?

This question highlights the fact that most storm sewers drain directly into local water bodies (e.g. rivers, streams, lakes), without any treatment. This means that debris, oils, grease, heavy metals, soil, and anything else found on cars, roadways, and driveways, can directly impact local water quality. Car washing can be particularly harmful, since it washes soaps and other man-made products, as well as contaminants from the car itself, into local water bodies. For example, the phosphates in soap can increase algae growth, which reduces the oxygen availability in water bodies, and can lead to the death of other aquatic species, such as fish[16].

Although “eco-friendly” products may be readily available, these are not guaranteed to have a low environmental impact, and labels can sometimes be misleading. In fact, it is against municipal bylaws in some jurisdictions (e.g. Calgary) to wash your car at home with anything but water17. The best way to reduce the water impact of washing your car is to visit a professional car washing facility when it’s time to come clean. These facilities typically use less water than at-home washing, and they usually pipe their wastewater directly into the sanitary system, rather than the storm sewer system, so that it gets treated by a wastewater treatment facility before entering the environment.

[15] Alberta Pharmacists’ Association, N.D. Medication Disposal. Retrieved from http://www.rxa.ca/for-the-public/medication-disposal.aspx

[16] Environmental Protection Agency, N.D. Spring Watershed Tip – The Facts About Car Washing. Retrieved from https://cfpub.epa.gov/npstbx/files/KSMO_CarWashing.pdf

[17] City of Calgary, N.D. Bylaws related to residential car washing. Retrieved from http://www.calgary.ca/CSPS/ABS/Pages/Frequently-asked-questions/Sewers-drainage.aspx

3.0 Understanding the Math

This section provides details about score generation. For questions involving water quantity, assumed values and values from literature are multiplied with a user's inputs to determine their water consumption, in liters per year. For each question, this consumption value, where applicable, is combined with professional judgments regarding water quality effects to produce a user's water stewardship score. These stewardship scores for each question are ranked on an A – E scale, with A being the best and E being the worst. The meaning of each letter score in terms of water quantity and quality impacts is shown in the table below. For a complete list of all possible question responses and their associated water stewardship scores, see Appendix B.

Letter Score	Water Quantity and Quality Impacts
A	Potential to significantly improve water quality and/or conserve water quantity
B	Potential to moderately improve water quality and/or conserve water quantity
C	Potential to have an average, or neutral, impact to water quality and/or quantity
D	Potential to moderately degrade water quality and/or reduce water quantity
E	Potential to significantly degrade water quality and/or reduce water quantity

The A – E scores for all individual questions are tallied to produce the user's *overall* water stewardship score, which falls into one of five categories, presented from best to worst:

- Way to go;
- Nice work;
- Not bad;
- Could be better; and,
- Could be much better.

The criteria for each category are linked to how many times the user scored A, B, C, and so on, where (generally) the more A's a user has, the better their overall water stewardship score, and the more E's the user has, the worse their score. The criteria used to determine which of the five categories users fit into are outlined in Appendix C.

For each overall water stewardship score and associated category, a message is shown to the user (also in Appendix C). This categorization and messaging is based on a user's score relative to the "average water user". The Quiz has been designed so that most typical responses will receive a "neutral" score – most users will not be having above-average negative impacts to water quality and quantity, but there will be plenty for people to do to improve their water stewardship. Similarly, it is challenging for users to

achieve a top water stewardship score – it can take a concerted effort to reduce your impacts on water quantity and quality.

We recognize that being an exceptional water steward may not be easy or first nature, but we hope that the information provided in the Quiz and this report gives you some ideas about manageable ways you can improve your water stewardship. In the sections below, we will explain how the logic for each question works, which values are used to represent typical quantities, and what resources we consulted to justify these values and methods.

3.1 Do you have a low flow toilet?

This question works by multiplying the average water consumption of toilets (in liters per flush) by the average number of flushes per person, per year (estimated to be five flushes per day), resulting in a liters/year consumption value. The user can reduce their annual consumption by indicating they have a low flow toilet, which consumes about 60% less water per flush than a conventional toilet (6.06 L/flush compared to 15 L/flush) [18].

3.2 When you shower, do you…?

This question tallies the total water consumed by users each year taking showers, while accounting for two variables: the typical length of a shower and the type of shower head being used. The user's typical shower length, in minutes (either five minutes or ten minutes), is multiplied by the average flowrate of a low or normal flow shower head, depending on which one they use (where 5.68 L/minute is low flow and 9.46 L/minute is normal flow)[19]. For this question, it is assumed that users shower once per day and do not take baths; this assumption was made to simplify the question, but it is easy to imagine how the frequency of showers and baths can have a dramatic impact on water consumption, especially considering baths use an average of 151 L, which is more than a 15 minute shower using a normal flow shower head[20]!

3.3 In an average week, how often do you consume bottled water?

For this question, it was assumed that producing a plastic water bottle consumes about three times as much water as what is contained in the bottle. In other words, each 500 mL water bottle takes about 1.5 L to produce[21]. Thus, the average consumption of plastic water bottles, on a 500 mL bottle basis, is multiplied by 1.5 to determine the total water consumption of users each year.

3.4 Do you have a rain barrel, rain garden, or any other low impact development on your property?

This question assigns users a score of A if they use rain barrels, bioswales, rain gardens, and/or other low impact development (LID) on their property. Users without these installations are given a score of C, which

[18] Claire Moloney, Poplar Network, 2014. Payback Period for Low Flow Toilets: Is the Cost Offset by the Water Savings? Retrieved from https://www.poplarnetwork.com/news/payback-period-low-flow-toilets-cost-offset-water-savings

[19] Low Flow Showerheads, 2016. Low-GPM Shower Heads: Water Conservation Statistics. Retrieved from http://lowflowshowerheads.info/water-saving-stats/

[20] Charlie Higgins, Hunker, N.D. Capacity of the Average Bathtub. Retrieved from https://www.hunker.com/13400924/capacity-of-the-average-bathtub

[21] The Pacific Institute, 2007. Bottled Water and Energy Fact Sheet. Retrieved from http://pacinst.org/publication/bottled-water-and-energy-a-fact-sheet/

is neutral. Although newly constructed communities are increasingly required to meet strict runoff quality and quantity standards adopted by municipal governments, older properties may require owners to install their own infrastructure. Even in newer developments, there is much individual residents can do to further minimize their impact on stormwater. Given that most residents can take extra steps to address stormwater on their property, taking this step increases a score to the A level.

3.5 How would you water your lawn or garden, assuming there was no rain that week?

The volume of water consumed while watering your lawn or garden is impacted by several factors:

- Lot size;
- Irrigation frequency;
- Irrigation duration; and,
- Type of irrigation tool used (where it is assumed drip irrigation and anything that isn't drip irrigation are the two types of tools).

For this question, it was assumed that all users watered their lawn/garden for 20 minutes per watering event, and that each user has a lot which is small enough that a single sprinkler unit can be used. With these assumptions in mind, the user's lawn watering frequency is multiplied by the water consumed per watering, which varies according to the irrigation tool they use. A **properly** installed drip irrigation system consumes 0.14 L/minute of water, while alternative irrigation methods (hose-end sprinklers, buried sprinklers, etc.) use an average of 13.3 L/minute of water. It was assumed that anyone who uses a drip irrigation system is using it correctly; however, a poorly installed and/or operated drip irrigation system consumes the same amount of water as alternative watering methods. If you are contemplating a change in irrigation methods, drip irrigation can be a great approach, especially for your garden, but it must be installed and used correctly!

3.6 How often do you eat a serving of meat?

This question multiplies the frequency of meat consumption with the average water footprint of a serving of meat. A single average value for the water footprints of three kinds of meat was used, on the assumption that users will eat balanced proportions of each meat type. This average value is 645 L/serving, using the government of Canada's suggested meat serving size[22]. This average is based on the estimated water footprints of three types of meats[23]:

- Beef: 1160 L/serving;
- Pork: 450 L/serving; and,
- Chicken: 325 L/serving.

Although not accounted for in this question, it is interesting to note that about 11% of the water footprint of meat is contributed by the distance that it travels from farm to table[24]. Thus, if you seek out meat from local

[22] Government of Canada, 2008. What is a Food Guide Serving of Meat and Alternatives? Retrieved from https://www.canada.ca/en/health-canada/services/food-nutrition/canada-food-guide/choosing-foods/meat-alternatives/what-food-guide-serving-meat-alternatives.html

[23]The Guardian, 2016. How much water is needed to produce food and how much do we waste? Retrieved from https://www.theguardian.com/news/datablog/2013/jan/10/how-much-water-food-production-waste

[24] Lindsay Wilson, Shrink that Footprint, N.D. The tricky truth about food miles. Retrieved from http://shrinkthatfootprint.com/food-miles

sources, your water footprint for meat may decrease by as much as 11%. You can find more information about food footprints here.

3.7 How often do you (or your landlord/the homeowners) check your household plumbing (toilets, faucets, piping) for leaks?

This question links the frequency of checking for household plumbing leaks to the average water wasted annually due to these leaks. It is estimated that as much as 38,000 L of potable water can be wasted per household, per year due to leaks[25]. To address this, it is recommended that homeowners check their house twice per year for leaks[26]. As indicated in the table below, the frequency of checks indicated by Quiz users is used to scale the total water lost per year, assuming that checking for leaks more frequently will reduce the volume of water wasted, but that not all leaking can be completely prevented.

Frequency of checks	Annual water loss (L/year)
Twice per year	7,600
Once per year	22,800
Less than once per year	28,500
I don't know / never	38,000

3.8 How do you wash your dishes?

This question assesses the local water footprint of washing dishes, either by hand or in a dishwasher. It is assumed, on average, users are washing dishes for themselves and one other person (roommate, partner,child, etc.) and one load is washed each day, either in the sink or in the dishwasher. The average water consumption of each dishwashing method is as follows[27]:

- Eco-star dishwasher: 12 L/load;
- Basic dishwasher: 26 L/load;
- Handwashing: 102 L/load; and,
- Handwashing while running the tap 179 L/load

[25] United States Environmental Protection Agency, 2017. Fix a Leak Week. Retrieved from https://www.epa.gov/watersense/fix-leak-week

[26] City of Calgary, 2017. Take the Leaky Toilet Test. Retrieved from http://www.calgary.ca/UEP/Water/Pages/Water-conservation/Indoor-water-conservation/Water-leaks-and-basic-repairs/Leaky-Toilet-Test.aspx

[27] Alina Bradford, CNET, 2017. Dishwasher vs. hand-washing: What saves more water. Retrieved from https://www.cnet.com/how-to/how-much-water-do-dishwashers-use/

3.9 What are your driving habits?

This question accounts for the user's water footprint related to driving, assuming that eight liters of water are used to produce one liter of gasoline [28]. This is multiplied by the typical frequency of tank filling and the size of the user's gas tank to estimate the user's annual water consumption related to driving. For hybrids, compact cars, and sedans, an average tank size of 50 L was used, while the average tank size for vans, trucks, and SUVs was 90 L[29]. The implications of driving an electric car are not considered in this question, since the water footprint of driving an electric car depends on how the electricity was produced (e.g. coal plants and solar farms would consume water differently). The water quality impacts of driving and gasoline consumption are also not directly contemplated in this question, but are important for users to consider when making transportation choices. For example, did you know that oils, heavy metals, and other contaminants can accumulate on roads and be washed through storm drains to local water bodies?

3.10 How do you dispose of common household waste?

This question assigns users a water stewardship score based on where they choose to dispose of typical household waste, grouped into two categories:

1. Old medicine – includes off the shelf products (e.g. Advil) as well as prescription drugs; and,
2. Household waste – includes floss and sanitary products, such as tampons, sanitary wipes, and napkins.

Any response indicating that users dispose of old medicine into the water system results in an E score; as noted in Section 2.11, releasing medicinal products into local water bodies can have severe negative impacts. Instead, old medicine should be brought to your local pharmacy for disposal[30]. Similarly, household waste, such as floss and sanitary products, should be thrown into the garbage, rather than down the drain. Disposing of both types of waste in the preferred location results in an A score – throwing things out in the right place is an easy way to have a significant positive water impact.

[28] East Central Illinois Regional Water Supply Planning Committee, N.D. Water Use by Ethanol Compared to Other Industries. Retrieved from http://www.rwspc.org/documents/wateruse_otherindustries_0608.pdf [29]

Meg Michelle, It Still Runs, N.D. What is the Average Size of an Automobile Gas Tank? Retrieved from https://itstillruns.com/average-size-automobile-gas-tank-6787985.html

[30] Alberta Pharmacists' Association, N.D. Medication Disposal. Retrieved from http://www.rxa.ca/for-the-public/medication-disposal.aspx

4.0 Limitations of the Quiz

While we hope the Quiz was fun and informative, we recognize it's not perfect. Although it contains useful information, the Quiz has limitations, and it is important to understand these when considering your results and how we can improve water stewardship in general. The Quiz was primarily constrained by the amount of detail and specificity that could be incorporated into the range of questions, their answers, and associated quantitative measures on water quality and quantity.

One manifestation of this limitation in detail and specificity is that all questions are equally weighted; however, in reality some actions may have more bearing on cumulative water impacts than others. This means that while the responses to each question are given a score A – E, we were unable to distinguish between the "A" of one question and the "A" of another. For example, eating meat regularly consumes much more water than flushing toilets, yet the responses for both question are only ranked A – E for quantity, and the type of toilet you have has a negligible impact on local water quality. Ideally, we would be able to rank all questions on the same scale, to better communicate the impacts of each decision and enable people to focus on what can have the biggest impact.

The concept of cumulative water effects is an area of scientific uncertainty and this limited understanding of the interaction among physical processes that govern cumulative water impacts is also reflected in the Quiz. Ideally, we would scale up the water quality and quantity scores of each user at three levels: a neighborhood, city, and provincial scale. This would give users an idea of the cumulative effects of their decisions. For example, if everyone in Alberta consumed water at the rate of a given user, then a city collectively consume a certain number of Olympic swimming pools each year. Adding this cumulative context can be an effective way to show users that the simple decisions they make each day *do* matter, since everyone around them and around the world is also faced with similar decisions of their own. An extension of this would be to compare the cumulative effects associated with a user to a baseline or base case, to indicate whether their actions are sustainable on a larger scale. An exceptional water steward would produce scaled up effects that would *improve* water resources compared to this baseline, while a poor water steward would produce scaled up effects associated with water use that is *worse* than our current reality. Many of the inter-scale relationships are nonlinear however, so using simple scaling factors would be difficult. More research is needed to determine the most appropriate methods for scaling individual actions-up to various scales.

Finally, we would ideally be able to tune the Quiz by testing it on a large sample audience, to ensure our scoring is truly reflective of the average user. Efforts were taken to perform this tuning with a small group of test users; however, access to a slightly larger sample group for this step would be an ideal way of improving the Quiz. As such, we kindly request your input by contacting the Canada Water Portal.

5.0 More information

For more information please contact:

Canada WaterPortal Society
839 5 Ave SW #605
Calgary Alberta T2P 3C8
www.waterportal.com

Charitable Registration Number: 807121876RR0001

Canada WaterPortal

Appendix A – List of Water Organizations

Check out these organizations to learn more about water stewardship and how you can become involved in local, national, and international water conservation activities.

Organization Name	Link to Organization website
Canada WaterPortal	https://waterportal.com/
River Valley Alliance	http://www.rivervalley.ab.ca/
RiverWatch Alberta	www.riverwatch.ab.ca/
Elbow River Watershed Partnership	https://erwp.org/
Ghost Watershed Alliance Society	http://www.ghostwatershed.ca/GWAS/index.html
Keepers of the Athabasca Society	http://www.keepersofthewater.ca/athabasca
North Saskatchewan Riverkeeper	https://saskriverkeeper.ca/
Alberta Lake Management Society	https://alms.ca/
Calgary River Valleys	http://calgaryrivervalleys.org/
Cows and Fish	http://cowsandfish.org/
Waterlution	https://waterlution.org/
Ducks Unlimited Canada	http://www.ducks.ca/places/alberta/
Trout Unlimited Canada	https://tucanada.org/
Alberta Low Impact Development Partnership	http://www.alidp.org/
Alberta Water Council	https://www.awchome.ca/
Canadian Water Network	http://www.cwn-rce.ca/
Watershed Planning and Advisory Councils (WPACs)	http://aep.alberta.ca/water/programs-and-services/water-for-life/partnerships/watershed-planning-and-advisory-councils/default.aspx

Appendix B – List of questions

Question	Response Options	Water Stewardship Score
Do you have a low flow toilet? If you don't know or are unsure, select "No"	Yes.	A
	No.	D
When you shower, do you…?	Use a low flow showerhead, and limit showers to five minutes or less?	A
	Use a low flow showerhead, but shower for longer than five minutes?	D
	Use a normal flow showerhead, and limit showers to five minutes or less?	B
	Use a normal flow showerhead, and shower for longer than five minutes?	E
In an average week, how often do you consume bottled water (assume 500mL bottles)?	Never.	A
	Once or twice a week.	C
	Every other day.	D
	Every day.	E
	More than one bottle per day.	E
Do you have a rain barrel, bioswale, rain garden, or any other Low Impact Development (LID) on your property?	Yes.	A
	No.	C
How would you water your lawn or garden, assuming there was no rain that week?	Water it once per week or less, using drip irrigation.	A
	Water it once per week or less, using traditional (sprinkler/hose) irrigation.	D
	Water it twice per week or more, using drip irrigation.	E
	Water it twice per week or more, using traditional (sprinkler/hose) irrigation.	F
	I have a lawn or garden that doesn't need to be watered.	B
	I don't have a lawn or garden.	A
How often do you eat meat?	As little as I can	A
	Once per week.	B
	Every other day.	C
	Daily.	D
	2 meals per day.	E

Question	Response Options	Water Stewardship Score
How often do you (or your landlord/the homeowners) check your household plumbing (toilets, faucets, piping) for leaks?	Twice per year or more	A
	Once per year	B
	Every 2 years	C
	I don't know, never	D
How do you wash your dishes?	I have an Energy Star dishwasher.	A
	I have a dishwasher that is not Energy Star.	B
	I wash dishes by hand, but I do my best to minimize water use.	D
	I wash dishes by hand, and leave the tap on between rinses.	E
What are your driving habits?	I don't have use a personal vehicle, I use public transit and carpools.	A
	I have a hybrid, compact, or sedan, which I fill up less than once per week.	B
	I have a hybrid, compact, or sedan, which I fill up once per week or more.	C
	I have a van, truck, or SUV, which I fill up less than once per week.	D
	I have a van, truck, or SUV, which I fill up once per week or more..	E
How do you dispose of common household wastes?	I dispose of old medicine by bringing it to the pharmacy, and I dispose of other items, such as floss and sanitary products, in the garbage.	A
	I dispose of old medicine by bringing it to the pharmacy, and I dispose of other items, such as floss and sanitary products, in my sink or toilet.	B
	I dispose of old medicine in the sink or toilet, and I dispose of other items, such as floss and sanitary products, in the garbage.	C
	I dispose of old medicine in the sink or toilet and I dispose of other items, such as floss and sanitary products, in my sink or toilet.	D
		E

Appendix C – Giving a final score

Number of times user's answer scored in each level A - E					Message to user
A	B	C	D	E	
>5		<2	<2	<2	**Way to go** - you are an excellent water steward and your daily choices are having a tremendous positive local and global water impact. If your whole neighborhood, or the whole province of Alberta, made the same choices as you, there would be a significant reduction to water challenges in Alberta and around the world. Keep up the good work and spread the word to your friends and family to encourage others to be better water stewards!
>3		<4	<3	<2	**Nice work** - you are a good water steward and your daily choices are having a positive local and global water impact. If your whole neighborhood, or the whole province of Alberta, made the same choices as you, there would be a reduction to water challenges in Alberta and around the world. There is still some room for you to improve; think hard about your water habits (and read our report) to see if you can make any changes, and encourage your friends and family to do the same!
			<4	<3	**Not bad** - you are an average water steward and your daily choices are having a neutral local and global water impact compared to most Albertans. However, the province and the world are still faced with water quality and quantity challenges, so there is work to be done. Take some time to review your daily choices (and read our report.) to uncover some habits you can change to become a better water steward, and encourage your friends and family to do the same!
<2	<3	<4			**Could be better** - you are a below average water steward and your daily choices leave you with opportunities for you to improve your water stewardship. If your whole neighborhood, or the whole province of Alberta, made the same choices as you, the current water quality and quantity challenges facing us would be even worse. Talk with your family and friends about ways to improve, and come back to try this quiz in a few weeks. We are all water stewards, and everyone's actions matter!
<2	<3	<4		>3	**Could do much better** - you are well below average in your daily water stewardship and there are many opportunities for you to improve. If your whole neighborhood, or the whole province of Alberta, made the same choices as you, we would face significant and unsustainable water challenges. Talk with your family and friends about ways to improve, and come back to try this quiz after a little while to see if you've improved. We are all water stewards, and everyone's actions matter!

The above table defines the limits for the five main water stewardship scoring categories. These categories and their respective limits were developed to capture the broadest possible range of responses from typical users. However, there are additional possible responses which do not fit the above limits. For example, if a user scores a large number of “A” answers, as well as a large number of “E” answers, they will not fit the top nor the bottom categories from the table above. To account for this, we developed supplementary ranges for these rare cases. If a user’s response doesn’t fit into one of the primary ranges from the table above, it will be sorted into a supplementary range per the table below. As indicated in the table below, responses satisfying the supplementary ranges are categorized within one of the five main categories above.

Number of times user's answer scored in each level A - E					Water stewardship score category
A	B	C	D	E	
>6					**Way to go**
>5				<4	**Not bad**
>2				<3	**Could be better**
>2				>2	**Not bad**