

THIS IS JUST V1

If you have any feedback, on what works and what could work later, please email us at info@waterrangers.ca



SUMMER FIELD GUIDE FOR THE WATER RANGERS TEST KIT (2016)

Water Rangers is all about getting people out there testing our waters! Through our platform you can add your own observations, and explore others. All the data is public and shareable.

Are you a visual learner? We have a training video:
<http://waterrangers.ca/training>

WHY SHOULD I TEST WATER? Everyone has their own reasons for wanting to test water. You may be curious about the science, or you may live near a body of water you love and want to protect it. Citizen science is great for the professional scientists too: we can help them narrow down where they should study next and address issues that you've noticed.

WHO: Anyone! This kit is designed to be used by people with no scientific background. Please make sure you watch the video (go to <http://waterrangers.ca/training>) in full or read through all of these instructions so you can help us keep our data accurate.

Bring a friend! Testing is done best by 2 or more people. You have lots to do: conduct the experiments, record the results, and keep the boat steady and stationary. One person can do it, but we prefer sharing responsibilities with a friend.

WHERE: On the water! Choose a spot you'd like to monitor and you think you can return to later. Site locations could be based on interesting findings, set protocols by an organization or just because you think it's great.

WHEN: Observations are great anytime, but the most meaningful results are done over time. We create mini-graphs of your data so try and be consistent. That might mean you try and test every week or month during your area's testing season (usually late spring through to early fall). If you can't revisit a spot often, don't worry. Once off or once a year can, over time, tell us a story.

DURATION: Most reporting takes between 5-10 minutes, but if you want to add more details, add more observations, you are free to do so! While conducting the tests, try and remain as stationary as possible.

It fails whenever I try and submit an observation.

Sometimes if reception isn't good, try and submit without a photo. You can add the photo when you get back on wifi.

I made a mistake or I forgot to add something!

You can edit your observations at any time by clicking on 'edit observation on the left of each one). From there, you can access the form to change the date, numbers, notes or details.

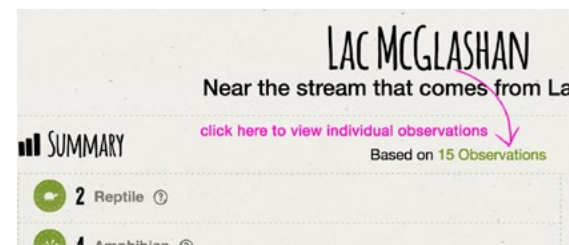
Contact us if you need to change the actual location position.

I've noticed a mistake, or it's not working as expected.

Our whole platform is in beta, so we're looking for people like you to help us make it better.

Please email us the details and what

went wrong. Be sure to include what device you were using and the operating system if you know it. Email details and/or screenshots to info@waterrangers.ca



I'm stuck or frustrated!

We don't want that! If you're frustrated, please contact us. We can phone you to work things through, or come visit you. We want to fix things that are broken, so please tell us!

I have ideas!

Great! We love feedback. Let us know. We record all ideas. We are a small team, so we do our best to work on things that people are asking for. Email us on info@waterrangers.ca.

FAQS



How do I know what protocol the user has followed?

When you're logged in, you can view a person's profile to see if they are associated with a group. Click on the group name to view their testing protocol.

How do I create my own group?

Right now you have to ask us to add in a new group. Email us at info@waterrangers.ca and we can get you set up. We don't want to open it up to everyone quite yet.

How do I associate an observation with a group?

When you're a member of a group, you'll see their name in the dropdown menu on the observation form. You can go back to old observations to associate them with a group.

I asked to join a group but I don't see it on the drop-down when I create my observation.

You have to get approved by the administrator before you can assign observations to that group. Once you're approved, you can go back and add the group to any observation.

How do I view all observations of a certain type?

Right now we don't have the ability to filter the map, but we will do soon. You can view all the locations associated with a group by visiting the group's profile page.

I'm not getting any reception. What do I do?

There's some notepaper in your pack. If you've already marked the location, you can record your readings when you get home. If it's a new location, take some photos for reference.

WHAT: WE'D LIKE YOU TO RECORD...

- Air temperature (Page 4)
- Water temperature (Page 5)
- Conductivity for Fresh water (Page 6-7)
- Salinity for Oceans (Page 8-9)
- pH (Page 10-11)
- Secchi depth (if in deep enough water), or water depth if in shallow water (Page 12-14)
- Some kits contain other items, such as test strips for Alkalinity or Hardness. Follow the directions on the bottle.

These are recorded in the "Water Quality Tests" section of the form of Water Rangers (<http://app.waterrangers.ca>).

For observational data, include:

1. Major weather events in the past 48 hours
2. Current weather and wind conditions
3. Note-worthy wildlife
4. If you've spotted any invasive species
5. Issues such as algae blooms, dumping or shoreline alterations
6. A photo to give us some context!



AIR TEMPERATURE

Air temperature lets us understand a bit more context for the other observations. It's also fun to see how air temperature and water temperature tracks over the year.

How to

1. Take the thermometer out.
2. You can take this measurement from shore if you have nowhere shady on your boat but try and take this measurement as close to the time you take the other measurements
3. Hang it in a tree or other shady spot near where you're conducting your test
4. Leave there for at least 5 minutes
5. Take your reading.



ADDING CONTEXT

Add photos and notes. Things you'd like to record:

- Any weather events that happened in the last 24 hours
- Wind and current weather conditions
- If you have test equipment that records things we don't have fields for yet, put it in the notes area.
- Take a photo to show any issues.

A screenshot of a web form for data entry. The form has a light gray background and a white border. It contains several sections: 'WILDLIFE >', 'CONDITIONS >', 'INVASIVE SPECIES >', and 'WATER QUALITY TESTS >', each followed by a dashed line. Below these is an 'Upload and image' section with a 'Choose File' button and 'No file chosen' text. The 'Notes' section has a text area with the placeholder 'Enter additional information about the observation here...'. At the bottom, there is a small text link 'If we've missed a test we record regularly, let us know' and a dark blue 'SUBMIT' button.





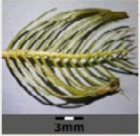

NOTICE SOMETHING FISHY?

There are two areas for you to record issues: "Conditions" and "Invasive Species". Check the appropriate value. Put any additional information in the "Notes" area below.

CONDITIONS ~

- Wildlife Death ?
- Shoreline Alterations ?
- Trash ?
- Foam ?
- Algae blooms ?
- Poor Water Quality ?

INVASIVE SPECIES ~

 <input type="checkbox"/> Phragmites ?	 <input type="checkbox"/> Loosestrife ?
 <input type="checkbox"/> Zebra Mussels ?	 <input type="checkbox"/> Other Invasive ?
 <input type="checkbox"/> Eurasian Milfoil ?	 <input type="checkbox"/> European Frog-bit ?

WATER TEMPERATURE

Water temperature can have effects on things like pH, conductivity and salinity, as it affects water's density but also its abilities to support life or absorb CO2 or other nutrients. For example, cold water absorbs more CO2 than warm water, one of the reasons oceans in the arctic are becoming acid more quickly. Depending on your kit, you may have a thermometer, or one built into your conductivity meter.

How to

We're testing the surface temperature, so dip the thermometer into the water. Wait until the value stays at a certain rate for a minute. Take the value. PLEASE NOTE: You should not take water temperature from a sample container. Take the temperature right in the water. Wait until the temperature regulates and remains steady for at least 30 seconds before taking your reading. Measure in °C.



FRESH WATER ONLY

CONDUCTIVITY

Conductivity is a way to measure inorganic materials (such as calcium, bicarbonate, nitrogen, phosphorus, iron, sulphur and other dissolved minerals) in a water body.

Conductivity is an early indicator of changes in a water body and can also be an indicator of pollution. Generally, rates over 500 are detrimental to fish reproduction. Some ecosystems have naturally high conductivity based on their bedrock, so context is important.

E.g. Most readings for the Ottawa river are below 100 μS , but near a storm sewer we're getting conductivity rates of over 2,000 μS .

Distilled water	0.5 - 3 μS
Melted snow	2 - 42 μS
Has effects on fish reproduction	over 500 μS
Tap water	50 - 800 μS
Potable water	30 - 1500 μS
Freshwater streams	100 - 1,000 μS
Industrial wastewater	10,000 μS
Sea water	55,000 μS

What about ocean water?

A regular conductivity reading for ocean water is about 55,000 μS , or 55mS. This conductivity meter won't record that high. Use your refractometer meter instead.

Viewing trends over time

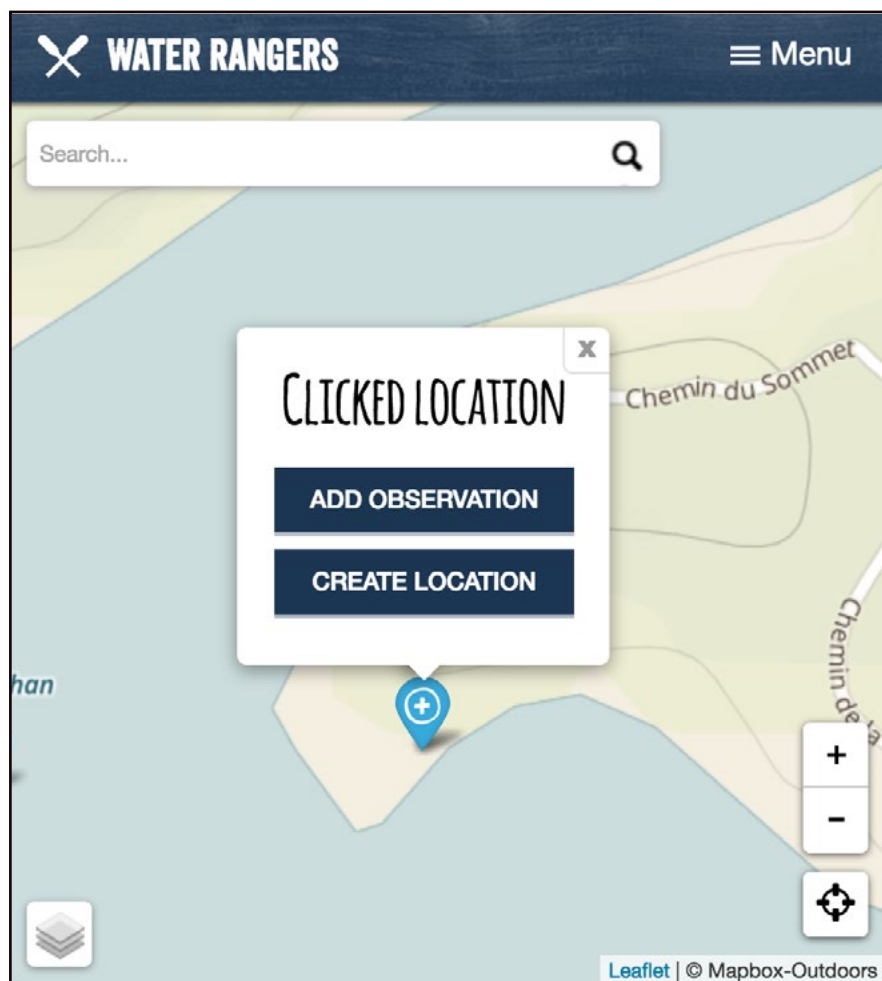
Every ecosystem is different, and has different levels of normal. So, the best way to find out if things have gone wrong is to notice trends over time. We encourage you to visit the same spots once a week or once a month to record more observations using the same parameters. We automatically graph water quality tests, and you get a 'summary' of what's there. It'll help you get a feel for seasonal fluxuations and then notice when things have changed.



Locating yourself

We use gps to find your current location. Click the button in the bottom right corner to locate yourself! If it's not quite in the right spot, click on the map in the right spot. You can also use your fingers to zoom in and out or pan around.

- Add a new location to record observations to later
- Choose your testing locations so they're easy to find next time. Use a landmark like a rock.



How to

Conductivity is measured by placing a conductivity probe in the sample and measuring the flow of electricity between the electrodes. Put rope around your neck or tie it to your wrist.

1. Turn on the conductivity meter.
2. Dip conductivity meter into the water. Do not dunk the whole device in as the battery is near the top. Hold in the water for at least 2 minutes, swishing it around lightly for a minute or two. Continue until temperature and conductivity remain steady for about 30 seconds.
3. Press the 'hold' button (lowermost button).
4. Pull up meter and read the conductivity and temperature readings. We record in μS , so check the units. If you get a reading like 1.3, it is doing it in mS and you'll need to multiply that by 1000 to get 1300.



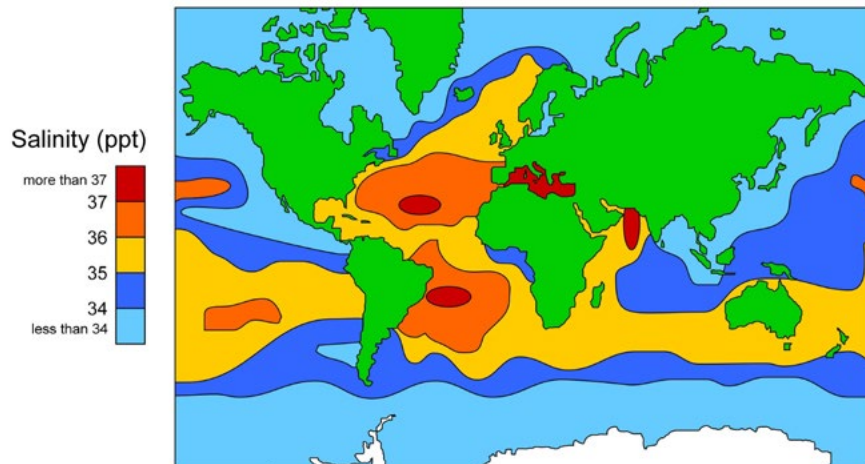
SEA OR OCEAN WATER ONLY

SALINITY (REFRACTOMETER)

There are two factors that affect ocean water density. The most important one is temperature, and the second most important is salinity.

Salinity is salts dissolved in water. They come from rocks and soil. The average salinity of the ocean is 35 ppt (parts per thousand). But, things like melting ice and rivers dilute the salty water, so many coastal areas have lower readings.

Our oceans vary in salinity too: Near the shores, rivers dilute the ocean to reduce salinity. In the arctic, melting icecaps also affect salinity.



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Click on "Login" or "Register". You can use Google or Facebook to login. We only take your email address. If you register by Facebook or Google, no more steps are required; you're logged in and ready to go!

If you'd prefer to register on our system the form is just below those buttons. Passwords need to be at least 8 characters long. Check on "I'm not a robot" before you submit the form. If you register by email address, you'll need to confirm your account. We will send you an email and you'll need to click on the link. Then enter in your login details.

SIGN UP

Login with Google

Login with Facebook

Or

Full Name

Riverwatcher

Email

kat+1@waterrangers.ca

Password

.....

Confirm new password

.....

I have read and agree to the [Terms Of Service](#) & [Privacy Policy](#)

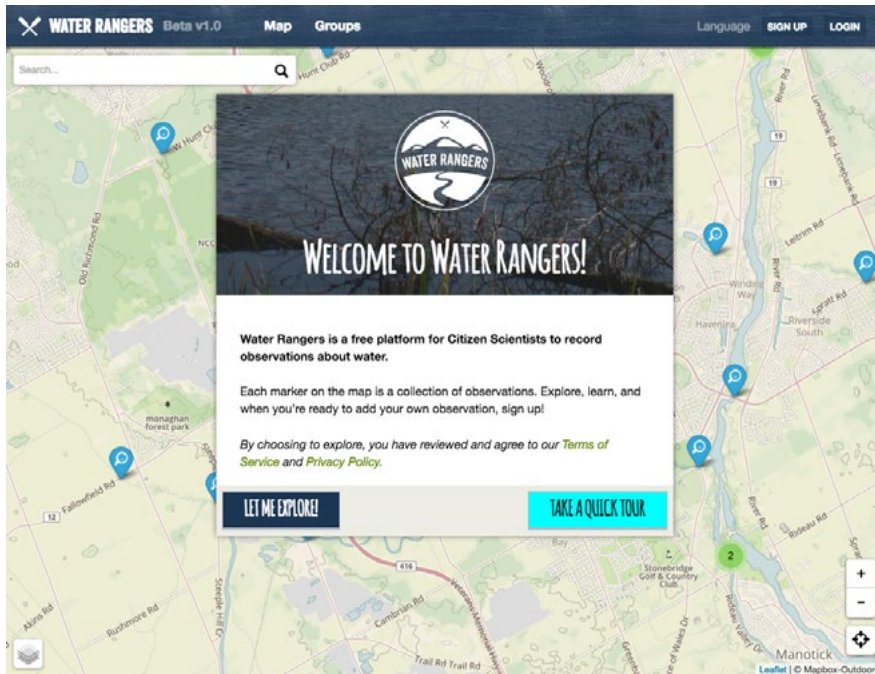
I'm not a robot

SIGN UP

USING THE APP

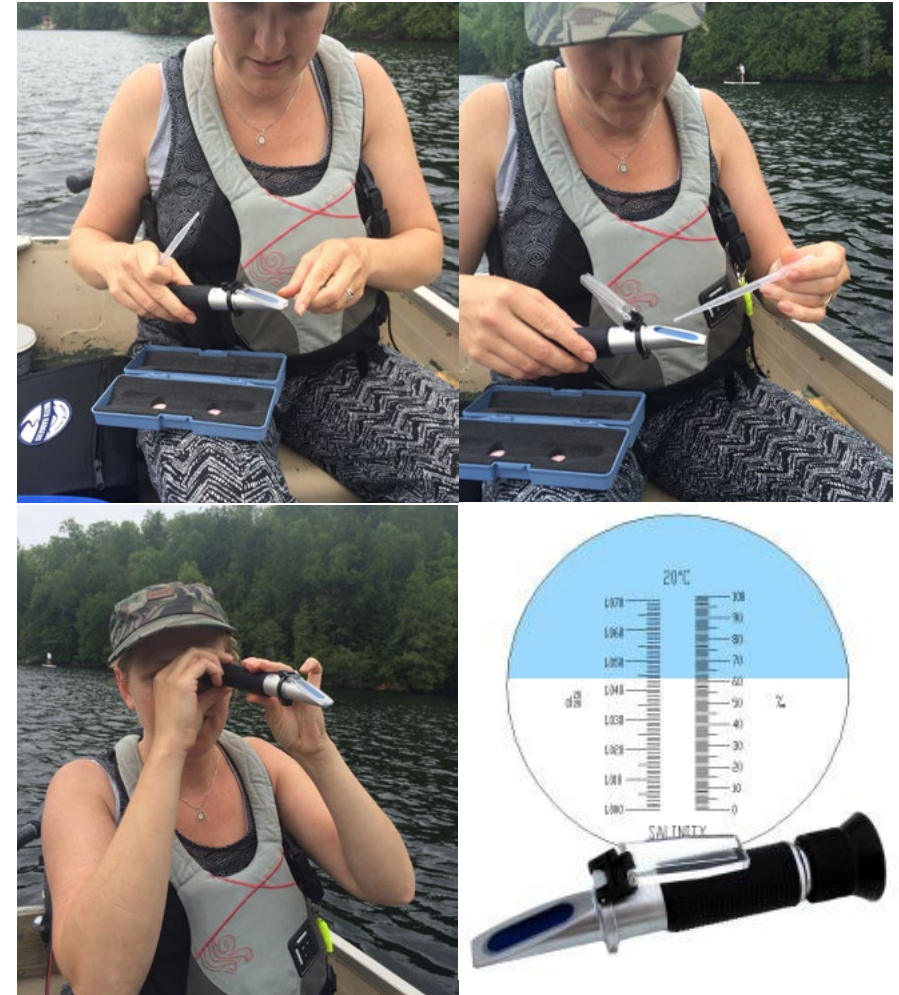
Water Rangers is a web app. Right now it works on computers and phones using your web browser. We're hoping to have an offline app within the next few months. It works on computers and your phone so long as you have an internet connection.

Go to <http://app.waterrangers.ca>



How to

Using the eye dropper, put a couple drops onto the slide, making sure to fully cover the surface. Peer inside and determine the measurement. Record this in ppt. The average for the ocean is 35 parts per thousand. Be sure to use the cloth provided to clean off the screen when you're finished.



PH

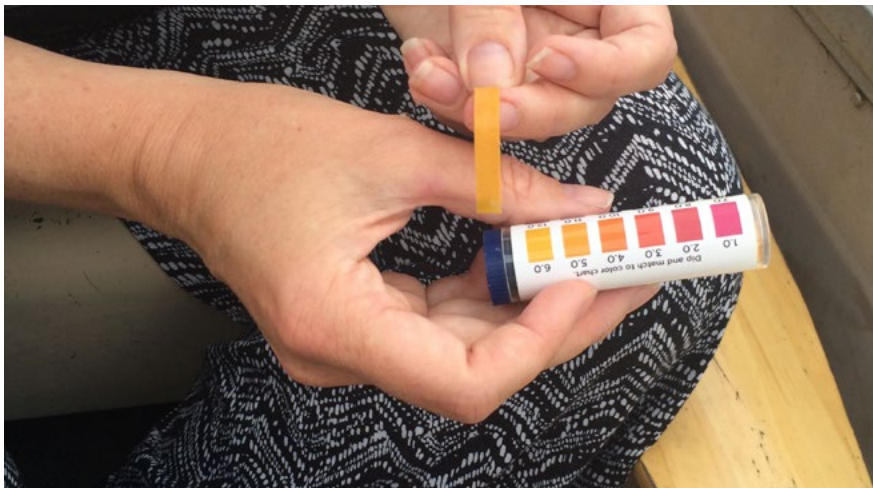
Normal ranges for freshwater ranges between 5 (acidic) to 9 (basic), depending on the composition of the rockbed and other factors. PH is a great indicator of when something is going wrong. You'll need to create a baseline for what's normal for your body of water.

Effects with pH

- Algae blooms
- Human influence through dumping other contamination
- A fish die-off could be caused by a shift in pH

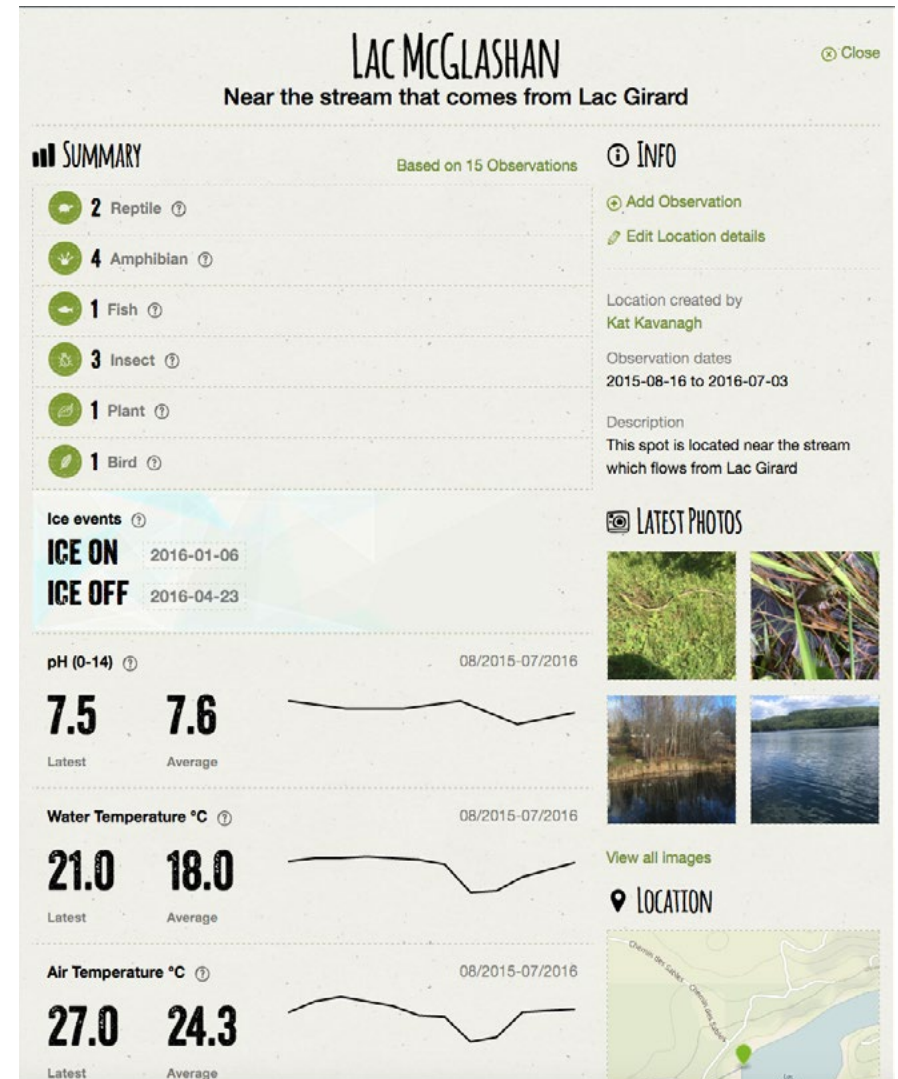
How to

- Make sure your hands are dry
- Take out 1 test strip.
- Close bottle
- Dip half the strip in the water
- Immediately compare its colour with those on the bottle
- If the colour appears to be mostly one value, record it. If it is right in the middle of the two, you can record a half measurement (6.5 or 7.5 for example)



NOTES, PHOTOS & TAGS

There's lots of ways to give people an understanding of a location over time. Use sections like tags to describe wildlife, photos and notes to give people a great picture of your spot.



WATER DEPTH

We only record water depth in this kit for when you can see the bottom in your test location. Use your secchi disc.

How to

- Lower your secchi disk until it touches the bottom, making sure the rope is straight up and down and there's no slack in the rope.
- Tie a small knot at the top of the water and then raise the rope up.
- Calculate the water depth using the 1/2 meter intervals.
- Record in the "Notes" section as we don't currently have this field available for you.

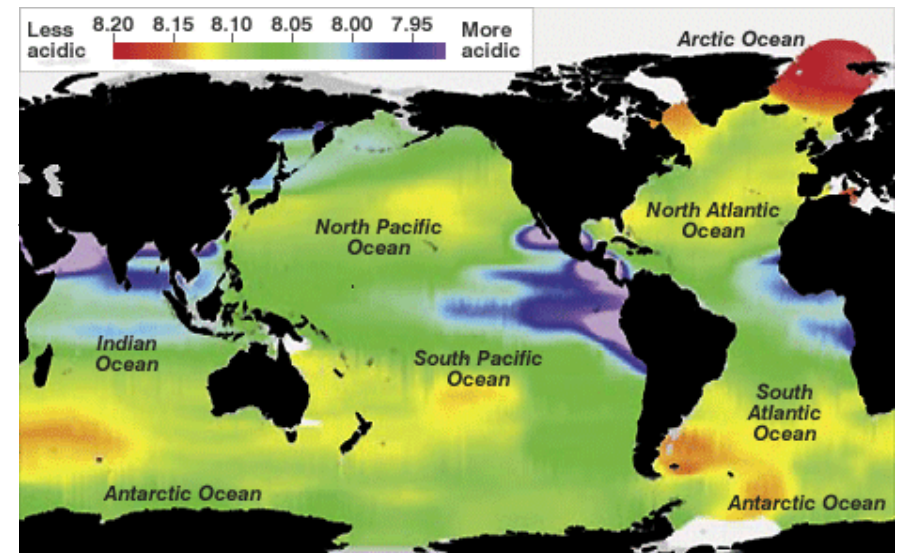


pH in oceans

The average pH for the ocean is 8.1, slightly basic on the scale. pH in oceans fluctuates naturally: things like wind, sunlight, temperature and salinity can have an effect. pH is also affected by CO₂ absorption, which can cause ocean acidification. To get a real idea on its effects, we need to create a baseline.

Acidification can affect how calcified species (e.g. molluscs, clams, corals) form shells. For example, fishermen in B.C. have noticed thinner, smaller, and less plentiful scallops, which has been linked to a lower pH.

Here's a map of typical pH values for different regions around the world.



SECCHI DEPTH

Secchi readings help determine water clarity. It is an effective way to monitor water clarity in lakes and oceans, but not so helpful for shallow areas or streams. Suspended sediments in the water column affect how far you can lower the disk down and still see it. Some very healthy lakes will have very low readings if they are naturally muddy. Recording in the same place over time will give you a more accurate picture.

How to

- Lower the disk slowly into the water, letting it drop straight down.
- Once you can't see it any longer, raise it back up a little bit until you can see it again, and then lower it back to the point where you can't view it any more.
- Grab the rope at the water and tie a little knot to mark your spot.
- Pull the rope up and then determine the depth. The rope is marked on half meter intervals.
- Once you have recorded your reading, remove the knot so it doesn't kink the rope.



Tips

- Tie the end of the rope to your boat. If you lose grip of the rope, it will sink to the bottom (believe us, we know people who have lost theirs! Wet ropes are slippery!)
- Don't wear sunglasses while conducting this test as polarized lenses affect your vision.
- Position your boat to block waves and lower the disk into the shade created by the boat. This will give you the most accurate reading.
- Keep your boat steady!
- Try and get the secchi disk to drop straight down as much as possible.

