

NATURE DISCOVERY LEARNING WORKBOOK

CONNECTING WITH NATURE



Watersheds
C A N A D A

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ACKNOWLEDGEMENTS

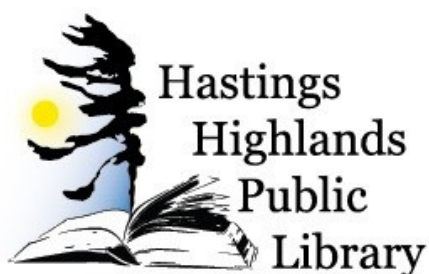
This workbook was created together by Watersheds Canada, Lake St. Peter Property Owners Association, and the Hastings Highlands Public Library for the common goal to educate students and families on the benefits of healthy lakes and the surrounding environment for our collective future. This book is linked to the Ontario curriculum for grades 1-6. Additional photography is provided by Simon Lunn and Dr. Mary Ann Perron.

Hastings Highlands Public Library is an Accredited Ontario Public Library and strives to inspire lifelong learning, to advance knowledge, and to strengthen our community.

The Lake St. Peter Property Owners Association is a non-profit, community-based, and volunteer-driven organization dedicated to the support of, and advocacy for, conservation of Lake St. Peter and Boulter Lake, their waterways, and surrounding lands for present and future generations through responsible environmental stewardship.

Watersheds Canada is a federally incorporated charity (863555223RR0001) committed to providing education and stewardship programs to communities and individuals across the country to enhance and protect the health of their lakes, rivers, and shorelines.

This Nature Discovery Backpack program is made possible because of support from:



TD Friends of the Environment Foundation



GETTING READY TO EXPLORE NATURE



We are so excited for you to explore your local nature as you learn about different local species and how to protect the health of your local lakes and beyond!

You get to keep this workbook! This workbook will give you tips to safely explore nature as you learn about different animals and plants that are found in Hastings Highlands. You will discover what a watershed and the riparian zone are, and see ways you can help nature, all with some fun activities along the way!

Please return to the library all field materials in the backpack.

If you are interested in learning more about Watersheds Canada, please visit watersheds.ca or scan this QR code!



STAYING SAFE



Here are some things to keep in mind when exploring outside:

- Stay home if you feel sick.
- Bring your own mask, hat, snacks, reusable bottle with water, sunscreen, and bug spray. Make sure to bring back any garbage you have so you can properly get rid of it at home. With the help of an adult, you can also pick up any garbage you find in nature and bring it home to safely get rid of!
- Tell someone where you are going and when you will be back.
- Watch wildlife from a safe distance and do not try to handle them.
- Do not pick any wildflowers, fungi, or plants - please leave nature for everyone to enjoy.
- Wear long sleeves and long pants if walking in a wooded area. Learn more about tick safety: <https://www.ontarioparks.com/parksblog/how-to-protect-yourself-from-ticks/>

WHAT IS IN MY BACKPACK?

Water Rangers tiny test kit

- This water quality test kit is a perfect introduction to water testing!
- The kit includes:
 - a thermometer to measure water and air temperature
 - test strips to measure pH (how acidic or basic the water is)
 - guides to understand test results



Binoculars

- What do the numbers of binoculars mean? For example if binoculars are 8x21mm, they will help you see things 8 times closer and the lens are 21mm wide.
- Turn the knob to make it clearer to see.
- Use a cleaning cloth if you need to clean the lenses (glass).



Observation Tools

- Use the collection jar and magnifiers to closely look at insects and small aquatic invertebrates (fun fact: they have no backbone!).
- To find invertebrates, try dragging the net along the surface of the water or just below the surface (not through the mud bottom).



Identification Guides

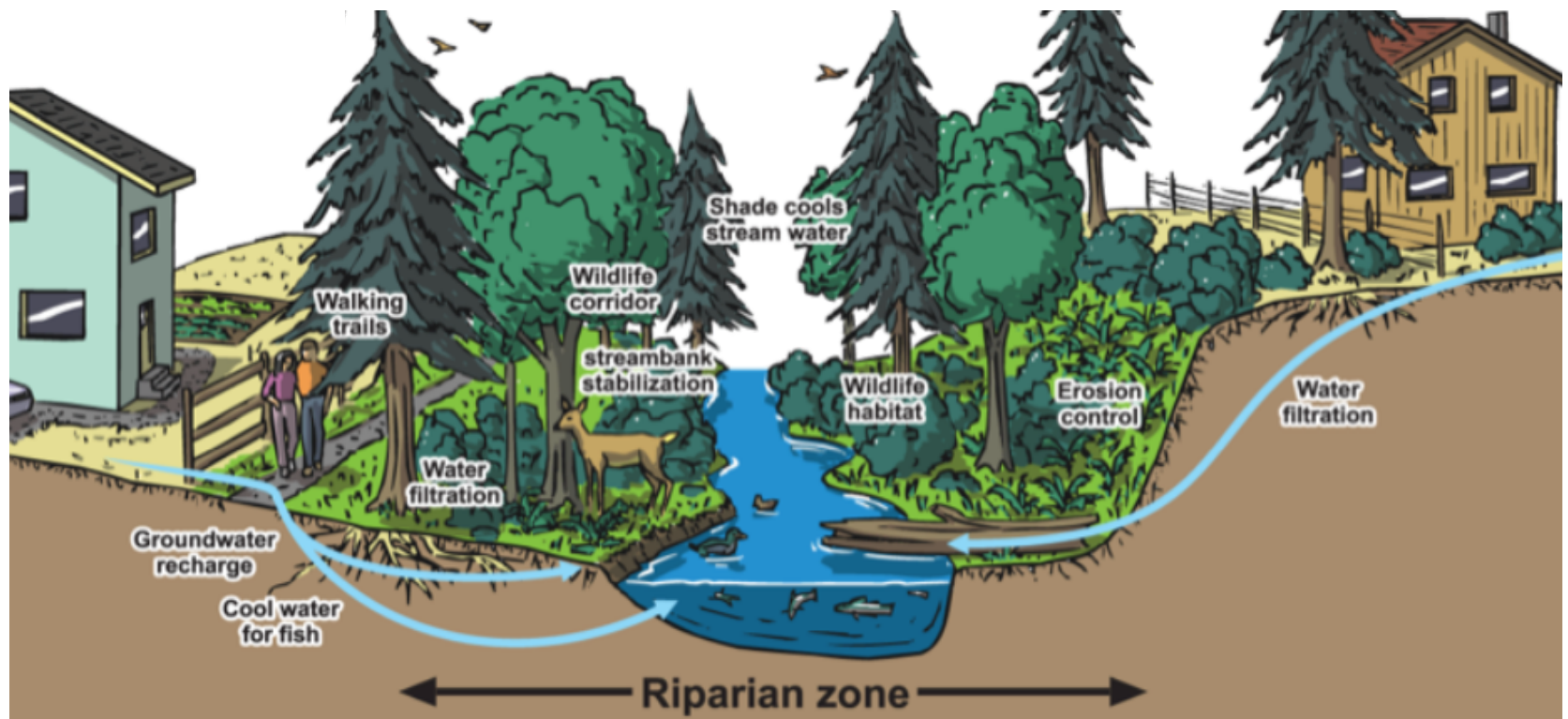
Use the identification guides and books to learn more about different types of local biodiversity like trees, birds, insects, reptiles, amphibians, lichens, mammals, and mushrooms. Each type of guide shows photos and information about each species like their size and where they live (their habitat).

See how many you can find and identify around Hastings Highlands!



THE RIPARIAN ZONE

- Shoreline ecosystems, or riparian zones, are very important and are valuable habitat for land-based and water-based wildlife.
- The shoreline area includes the first 30 metres of land around a lake or river. It is considered the “ribbon of life” because it supports 70% of land-based wildlife and 90% of aquatic species at some point in their lifetime.
- Native wildlife species like birds, mammals, insects, fish, reptiles, and amphibians depend on shoreline habitat for food, water, shelter, and breeding.



RESILIENT SHORELANDS

The **Littoral Zone** extends from the water's edge to where sunlight no longer penetrates to the bottom of the water. This is where docks are built and people swim. However, we share this area with an incredible array of biodiversity as up to 90% of lake species (e.g., pike, ducks, otters and turtles) are born, raised, fed, or live in the littoral zone.

The **Shoreline** is the edge where the land and water meet. The mix of plants, shrubs, and trees form an intricate web of roots, foliage, and fallen limbs that hold the waterfront together and fend off erosion from wind, rain, boat wakes and ice.

The **Riparian Zone**, also known as the Ribbon of Life, extends inland from the shoreline for at least 15 metres and may be flooded during high water periods. It is a natural buffer protecting the shoreline, water quality, and natural habitat both on land and in the water. It is made up of trees, shrubs and grasses that absorb excess nutrients (e.g., fertilizers) and pollutants (e.g., seepage from septic systems, oil, gas and pesticides) before they can contaminate the water.

The **Upland Zone** is a drier forested area with better drainage compared to the riparian zone. The deep roots of trees stabilize the slope, the foliage buffers the effects of wind, the canopy cools its surroundings, and plants provide habitat for deer, birds, porcupines, grouse, rabbits, and many other creatures.

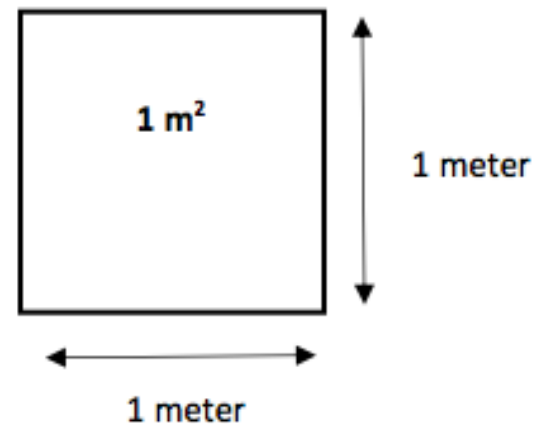


ACTIVITY #1: LIFE IN A SQUARE

In this activity, you will discover the diversity of living (biotic) species and non-living (abiotic) factors in a specific spot.

Find an area that seems to have a lot of biodiversity present. Your area should be about 1-meter (m) square in size.

On the next page, draw a top view of the area. Draw in any plants, rocks, insects, pollution, leaves, and other features you find.



Kneel next to one side of your spot, and look around carefully. As you draw what you find, label what you can using your identification guides.

If you do not know the name of a species or rock, snap a picture and try figuring it online using a website like [iNaturalist](#) or by asking a trusted adult.

Date: _____ **Time:** _____

Temperature (use your thermometer): _____

Weather conditions: _____

Follow-up questions:

1. How would you describe the diversity of your spot: high or low?
2. What non-living (abiotic) factors might affect what lives in this spot?

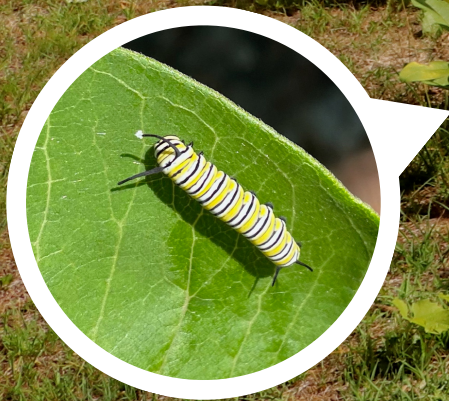
WHO LIVES HERE?



Pileated Woodpecker



Marsh Wren



**Monarch Butterfly
caterpillar**



Painted Turtle

Common Milkweed



Common Loon



White Water Lily



Dragonfly nymph



Northern Leopard Frog



Snapping Turtle

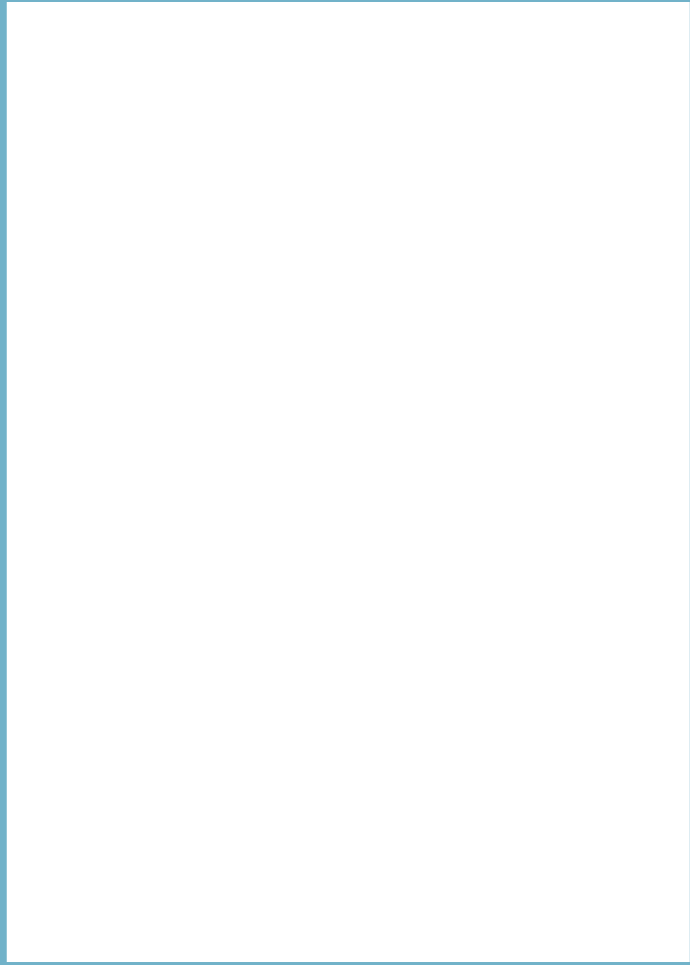


ACTIVITY #2: DO A BIO-BLITZ

A BioBlitz is a volunteer-led count of the biological species found in an area. Using your identification guides, you can get a "snapshot" of the species and biodiversity found in your area.

What can you find in 30 minutes? An hour?

BIRDS



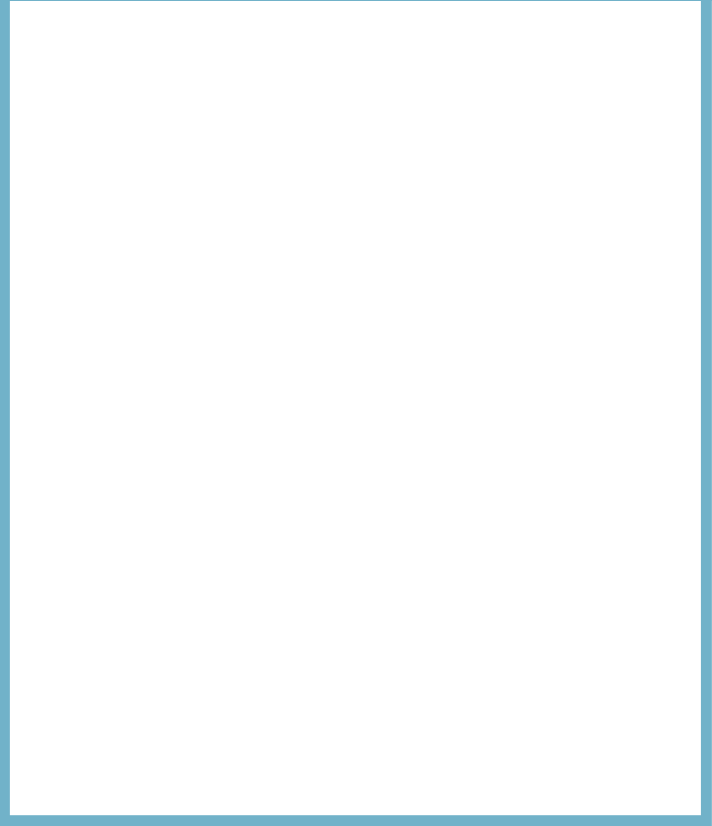
TREES



FUNGI AND LICHEN



AMPHIBIANS AND REPTILES



ANIMAL TRACKS



BUGS AND SLUGS



ACTIVITY #3: FUNGI AND LICHEN DETECTIVE



Fill in the blanks with an adjective that describes the fungi and lichen in the photos below. Then, head outside and see what types of fungi and lichen you can find in your own backyard. Remember, do not pick or eat them!



ACTIVITY #4: POETRY

Write an acrostic poem to describe what you love about nature.

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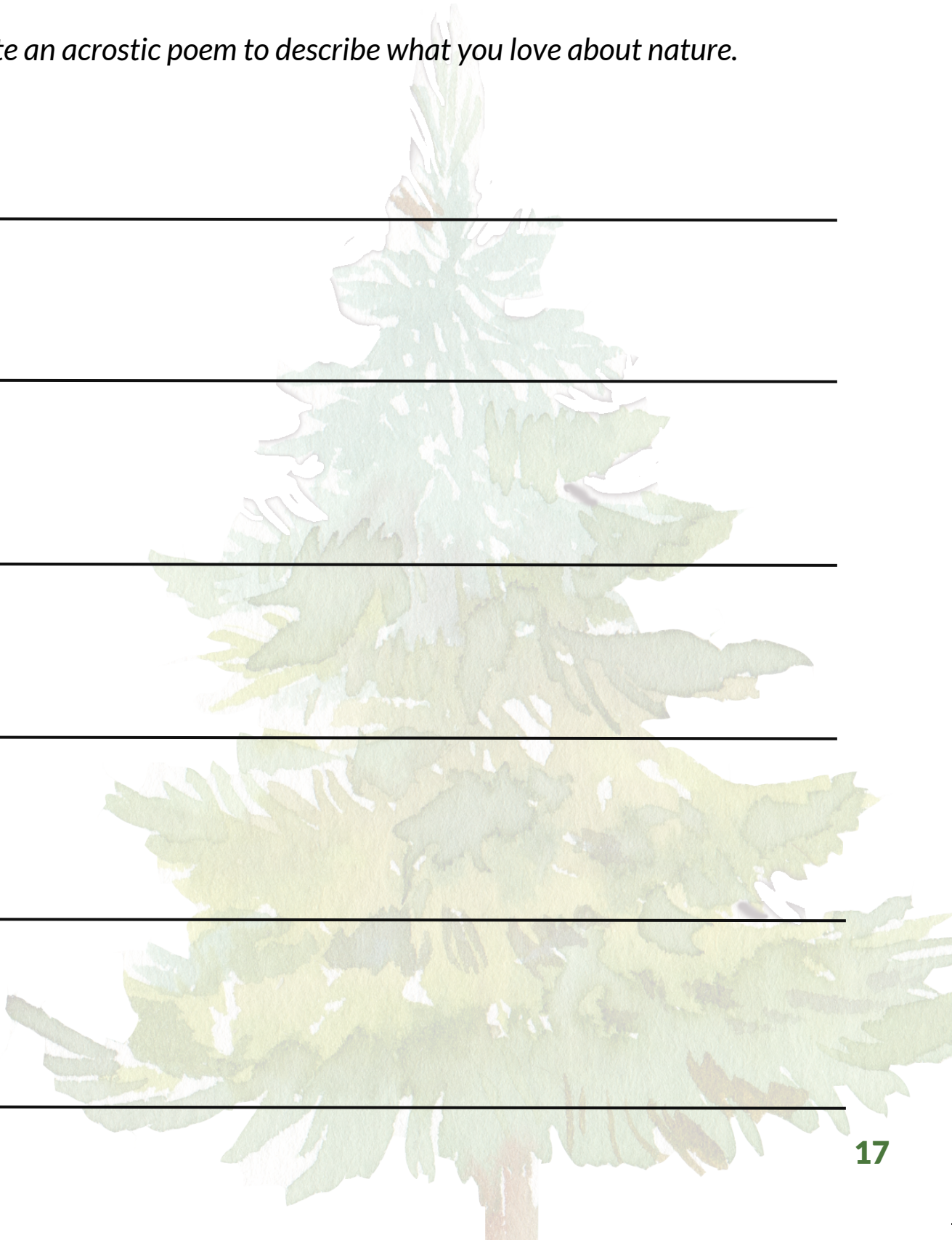
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ACTIVITY #5: TALK TO THE BIRDS

You may hear birdsong in a forest or your backyard, but have you ever tried to have a conversation with these birds?

Try to whistle and mimic (copy) their noises and use your binoculars to see if anyone comes to see you!



Red-breasted Nuthatch

- Small blue-gray bird with strongly patterned heads. They have a black cap and stripe through the eye broken up by a white stripe over the eye.
- Their bellies are rusty-brown in colour.
- Habitat: mainly coniferous woods and mountains.
- Songs and calls: a fast series of nasal, hornlike notes that sound like "yank-yank".



Common Raven

- Entirely black, large bird with a thick neck.
- Habitat: open and forest habitats across western and northern North America.
- Calls: make many different kinds of calls, varying from a low gurgling croak, to harsh grating sounds, to shrill alarm calls.

Belted Kingfisher

- Stocky, large-headed bird with a shaggy crest on the top and back of the head and a straight, thick, pointed bill.
- Habitat: near streams, rivers, ponds, lakes, and estuaries.
- Diet: feeds almost entirely on aquatic prey, diving to catch fish and crayfish.
- Call: similar to a rattle.



Pileated Woodpecker

- Large woodpecker with a long neck and chisel-like bill. Triangular red crest that sweeps off the back of the head.
- Calls: typically make a high, clear, series of piping calls that lasts several seconds.
- Habitat: forests with standing dead trees and downed wood.



Black-capped Chickadee

- Small bird with a short neck and large head. Their black (on cap and bib), white (on cheeks and underside), and grey (on back, wings, and tail) colours are distinctive.
- Call: "chicka-dee-dee-dee".
- Songs: pure 2 or 3-note whistled "fee-bee" or "hey, sweetie".



Keep practicing your bird call identification skills with these websites:

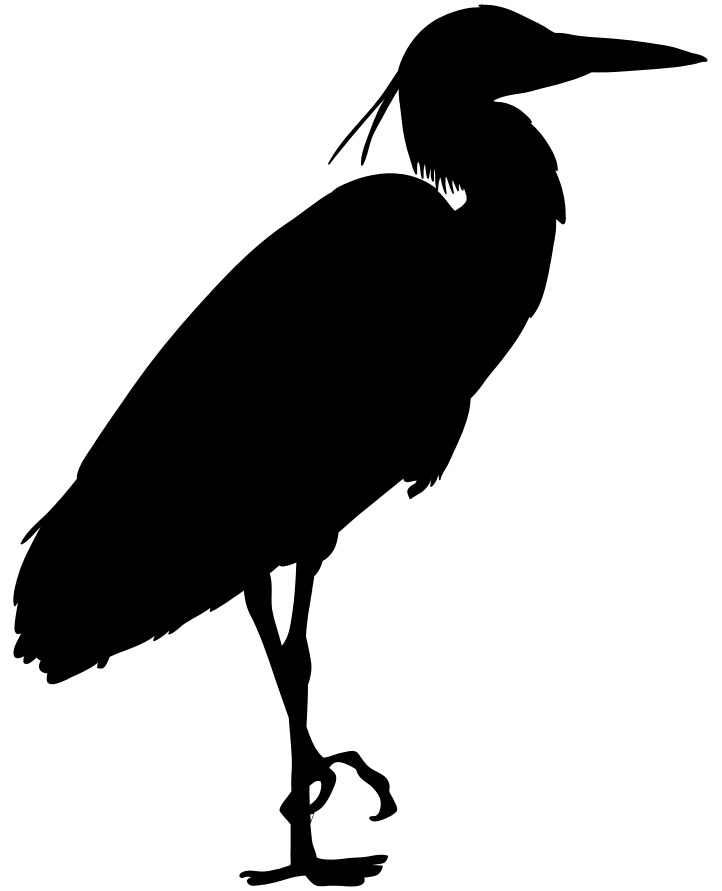
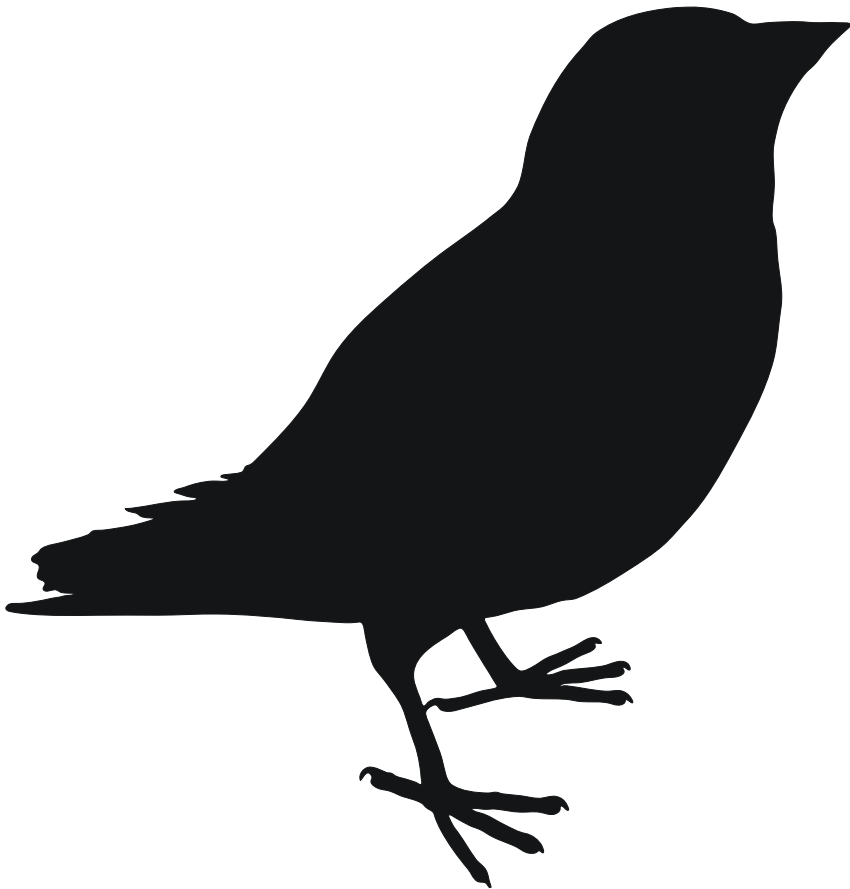


Merlin Bird ID



Because windows and glass deck railings often reflect images of open sky or vegetation, birds perceive this as a continuation of their habitat. This causes bird collisions with the reflective surfaces. Help your local birds by cutting out the bird decals below and putting them on your window to help stop collisions.

Draw your own on more paper to cover even more window space!



ACTIVITY #6: NATURE SCAVENGER HUNT

Circle the items as you find them in a local nature area!



HOW ARE PEOPLE IMPACTING NATURE?



As shorelines become more developed, humans are changing the way shorelines have looked and the species that can live there.

Some threats to wildlife and water health include: plastic pollution, introducing non-native (invasive) species, road mortality, and habitat removal and fragmentation.

One way to help is to replant a shoreline with native plants along the edge. This buffer helps to filter sediment and stop things like fertilizers and pesticides from entering the water. Plant roots also help keep soil together in heavy rainstorms which prevents erosion.



Photos: Lake St. Peter Property Owners Association planting native species along the shoreline.

ACTIVITY #7: GEMS AND ROCKS

Approximately 90% of all types of minerals found on earth are located in North Hastings! Bancroft is a popular destination for rockhounding and the area is known as the “Mineral Capital of Canada”. In this activity, learn new vocabulary that is used in the describing of gems, minerals, and rocks!

S I A G E M H S R
L P A M B O A H O
C G E O L O G Y C
R O I C S U P L K
U O T L K D J T B
M U F A L L U E U
B L L A I I E L B
L E J A G G E D L
Y B S M O O T H R

Geology
Jagged

Speckled
Gem

Rock
Crumbly

Dull
Smooth

For more information about rockhounding, visit www.hastings.ca/rockhounding. To learn about your local minerals visit [The Bancroft Mineral Museum](#) and the [Princess Sodalite Mine](#).

ACTIVITY #8: BECOME A COMMUNITY SCIENTIST

Using the information you gathered in activities #2 and #5, consider submitting your sightings to one of the many free and open access community science programs.

When you enter your animal or plant observations online, it can help scientists and nature groups keep track of different populations over time as they see local and regional impacts from climate change, increased human development, and pollution.

Here are just a few community science programs you can pick from:



Merlin Bird ID



The Canadian Lakes Loon Survey is a program of Birds Canada, delivered in partnership with Québec Oiseaux.

ACTIVITY #9: SKETCH AND COLOUR IT!

Brook Trout live in cold water creeks across Hastings Highlands. Shade from trees makes the water colder and helps Brook Trout have a nice place to live, eat, and lay eggs. Draw trees around the creek to make a perfect home for Brook Trout!



Monarch butterflies are a type of pollinator species that need milkweed plants for their food and for a place to lay their eggs! This page features a Monarch Butterfly and Common Milkweed plant which is a native wildflower species in Canada - time for you to get colouring!



WHY IS FRESHWATER IMPORTANT?

Everyone's actions affect the freshwater and animals around us. We all have to do our part to help keep them healthy, including in Hastings Highlands! Our lakes, rivers, wetlands, and creeks are special because:

- They provide clean water for us to drink and swim in, and support recreational activities like birdwatching, fishing, boating, and paddling.
- They are home to a wide range of native species of plants and animals.
- Certain fish species, like Lake Trout, depend on deep cold water lakes. Only about 1% of Ontario's lakes now contain Lake Trout.
- Freshwater areas give many benefits to human well-being and the economy. For example, they provide great opportunities for tourism, and cottage or residential living.

There are seven cold water trout lakes that are currently 'at capacity' for development in the Municipality of Hastings Highlands. Learn more in the [Lakeshore Capacity Assessment Handbook: Protecting Water Quality in Inland Lakes](#) and the [Hastings Highlands Planners Report](#).



THE MADAWASKA RIVER WATERSHED

- Located in the Madawaska River watershed, Lake St. Peter is 234 hectares in size and has a maximum depth of 28.7 metres!
- A **watershed** is an area of land that water flows through or across on its way to a particular water body, like a stream, river, wetland, lake, or coastline. It is the land where precipitation – like rain – falls and flows to a common, watery place.
- Lake St. Peter discharges to Papineau Creek which eventually meets the York River, then goes into the Madawaska River, and then into the Ottawa River.



Source: "Fisheries Management Zone 15: Background Information" (2019). Government of Ontario, https://prod-environmental-registry.s3.amazonaws.com/2022-07/FMZ-15-Background-Master_June15_2022.pdf

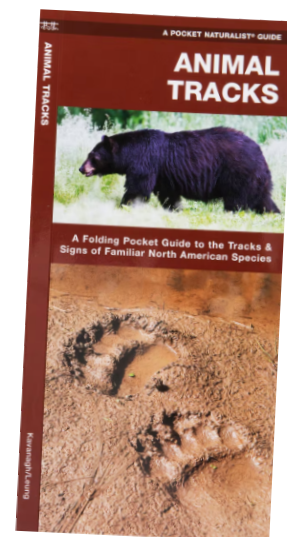
A horizontal line with several black paw prints of various sizes on the left and several black arrows pointing to the right on the right side.

ACTIVITY #10: FOLLOW IN THEIR FOOTSTEPS

Not seeing any wildlife? You may have just missed them!

Here are some tips for finding animal tracks:

- Look for tracks in areas with wet sand and soft mud, like beaches, creek beds, trails, and puddles.
- Look in the early morning or late afternoon as the sun better illuminates shaded areas.
- Look off the trail as people's shoe prints will make it hard for you to find animal tracks.



- If you have never tracked an animal before, a good way to get started is to watch an animal make a track and then go look at the track right away.
- Remember that you will not always come across a track that perfectly matches what is shown in your guide! You will have to do some detective work to figure out which animal left the track.

Want more practice before you go in the field? Try this Scout Life animal track quiz: <https://scoutlife.org/quizzes/6662/>

HOW CAN I HELP?

Take photos and observations of different animals and plants you see in nature and submit them to an online database like [iNaturalist](#), [eBird](#), [MonarchWatch](#), or [Water Rangers](#).

Local organizations like Watersheds Canada, Bancroft Area Stewardship Council, and your local lake associations or fish and game clubs can assist with educational materials on enhancing your shoreline.

If you have a shoreline property or live in town, consider adding native plants to provide habitat, food, and stabilization to your property for pollinators, mammals, and birds. This is especially important along a shoreline. Learn more about native plants: naturaledge.watersheds.ca/plant-database

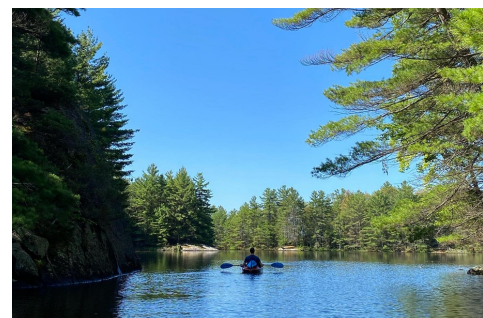


Volunteer with a local lake association or join a nature group to learn more about local wildlife and spend time in nature with like-minded people.

Prevent the spread of invasive species, such as invasive phragmites, by cleaning all equipment after boating and staying on trails while hiking.

Book a tour at the North Hastings Community Fish Hatchery to learn about building secure, healthy, wild brook trout and lake trout populations in the region. Learn more: fishhatchery.ca

Explore local parks like [Algonquin Provincial Park](#) and [Lake St. Peter Provincial Park](#) to spend time outdoors and try new activities like canoeing, birding, educational programs, and hiking. You can borrow a park pass from the Hastings Highlands Public Library!



ACTIVITY #11: WATER QUALITY EXPERIMENT

The guideline for pH (potential Hydrogen) is a range of 7.0 to 10.5 in finished drinking water.¹ Generally a range of 6.5 to 8.2 is preferred for most life in the water. Different things can affect the pH of the water like an algal bloom or increased pollution.

Some aquatic animals are very sensitive to changes in pH, and are often used as living indicators ("bioindicators") of an ecosystem's health. One example is dragonflies because they have a biphasic lifecycle, meaning they spend part of their life in the water as aquatic nymphs and part of their life in the terrestrial environment as adults.



Common green darner (*Anax junius*).



Band-winged meadowhawk (*Sympetrum semicinctum*).

¹Health Canada (2015). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – pH. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (Catalogue No H144-28/2016E-PDF).

Getting started

To compare results, use your water test kit in 5 different spots. If you cannot get to five different natural areas, use tap water and add different things to each container that might end up in our freshwater sources, like salt (road salt) and soap (car washes).

Before you begin testing, make a hypothesis – an idea that proposes a possible explanation about what will happen. Where and why do you think you will find different conditions for air temperature, water temperature, and pH?

Record your findings each time. What did you find?



Want to learn more about the non-profit organization Water Rangers? Visit their website for videos, resources, and more: waterrangers.ca

The Lake Partner Program

Several lakes in Hastings Highlands participate in the Lake Partner Program. This is a volunteer-based, water-quality monitoring program, and is the largest and longest standing program of its kind in North America. The Ontario Ministry of the Environment, Conservation and Parks (MECP), coordinates this program in partnership with the Federation of Ontario Cottagers' Associations.



Photos: Volunteers conducting water testing on Lake St. Peter for the Lake Partner Program.

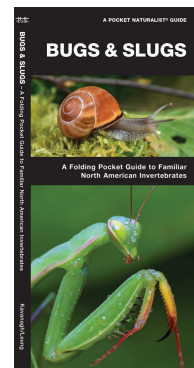
ACTIVITY #12: POND STUDY

*Your goal is to find as many different creatures as possible
and identify them using your identification guides.
An added bonus if you find animal tracks in the mud, too!*

Materials: dip net, observation containers, magnifiers, identification guides

Some tips for a successful pond or lake study:

- Fill up your containers with water before starting. You are pulling aquatic creatures from the water so make sure they stay in water!
- Make sure to wash your hands before handling any creatures as sunscreen, lotions, and bug spray can be harmful to them.
- Once you are done looking at the creatures, slowly and gently pour them back in the water. Refill your container with fresh water for your next discoveries!



What did you find?

Some things to think about:

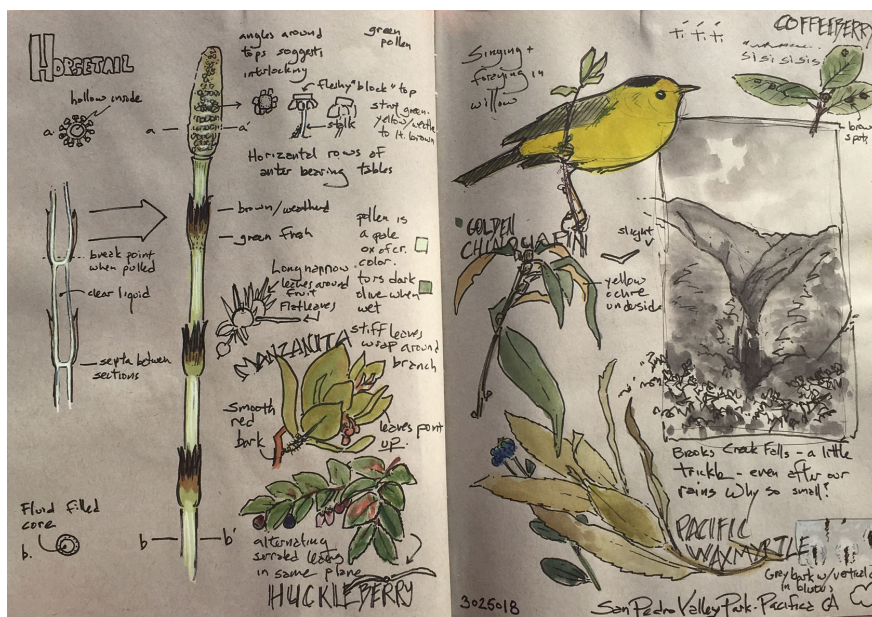
- Did you find many creatures? Did you find or see different life stages of the same creature (ex: dragonfly nymph and adult, tadpole and frog)?
- Is your freshwater body biodiverse? Do you think that means it is healthy?

ACTIVITY #13: NATURE JOURNALLING

Nature journaling is a way for you to document and organize what you see, smell, and hear while outside. You will collect your observations, explanations, and questions using words, drawings, and numbers (data). You do not need to be an professional artist to journal!



Photo: Canva



Source: John Muir Laws

You can journal anything that is interesting to you. Add diagrams, maps, numbers, or sketches. Count the number of species you see, and the time, weather, and date.

*Interested in learning more about nature journalling?
Visit: johnmuirlaws.com*

RESOURCES FOR PARENTS

Fireworks

Although fireworks create a spectacular visual show, enjoyable to many as the colourful explosions reflect on the lake surface, there are risks to this activity.

Noise and light from fireworks can have a negative impact on wildlife, including nest desertion. The particulate left in the sky after a firework explodes contains heavy metals, including lead, which can land directly on the lake or be washed into the lake following a rain storm. This has harmful effects on the aquatic food chain. Also, fires and injuries to people and pets are possible.



Resources about fireworks

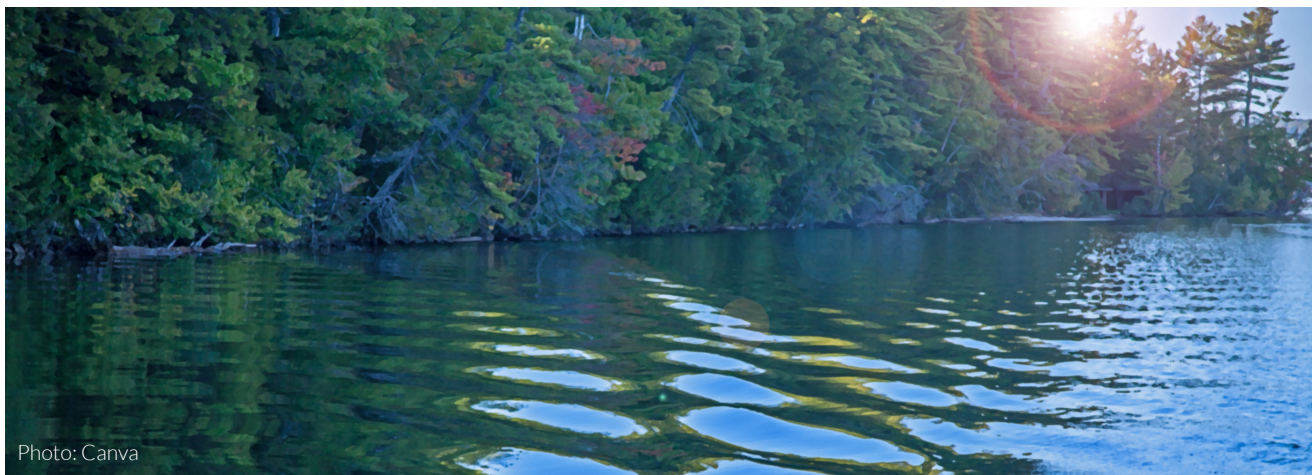
- Learn about the [Hastings Highlands Noise and Fireworks Bylaw](#) (Bylaw 2020-062). Also, read about how the [use and sale of fire lanterns](#) are banned in Hastings Highlands (Bylaw 2020-047).
- Read The Land Between's '[Environmental, Wildlife, and Property Issues Related to Typical Fireworks](#)' article to learn more about how fireworks affect wildlife.

Be 'Wake-Aware'

Lakes and rivers are fragile environments. Fish, wildlife habitat, shorelines, and docks are vulnerable to damage from boat wakes.

How you can help!

- Be aware of the size of your wake while operating a boat. Adjust your speed and directions to minimize your impact on shorelines.
- Distribute passengers throughout the boat to reduce time spent in transition speed.
- Wakeboard and water ski away from shorelines.
- If boat shopping and a motor-free boat is not an option, opt for an outboard motor which gives the driver more control over the amount of water being forced downwards.



Resources about the impacts of boat wakes

- Read the Watch Your Wake brochure by Muskoka Watershed Council for tips about how to be 'wake wise' on the water.
- Watch the 'Be Wake Aware' video made by Muskoka Lakes Association, Safe Quiet Lakes, and Federation of Ontario Cottagers' Associations.

Light Pollution

Plants and animals have evolved to rely on Earth's natural cycles of light and dark. These daily cycles manage important behaviours, including reproduction, eating, protection from predators, and sleep. Light pollution has a negative impact on lake property owners and local wildlife. Glare and light trespass can reach great distances to unintended destinations.



Photo: Victor Rueda

Resources about light pollution

- Read the [Lake Protection Workbook](#) by the Lake Links Planning Committee to learn more about actions you can take to prevent light pollution.
- Visit loveyourlake.ca/project/shoreline-lighting/ to find out how shoreline lighting impacts wildlife.

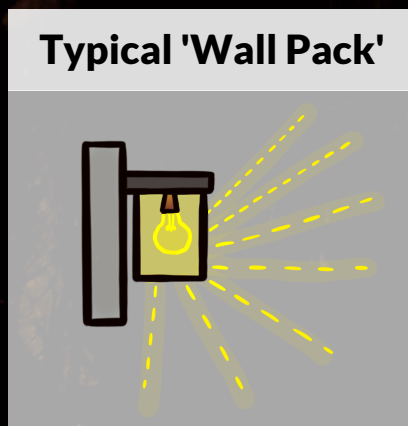
SHORELINE LIGHTING

Many of us have likely sat out at night and noticed the lights at properties across the way. Take a moment to reflect on how this makes you feel and consider if light from your property is also trespassing. This doesn't mean we have to get rid of all our outdoor lights, though! Perhaps we do not need as many or they can be retrofitted to reduce the glare.

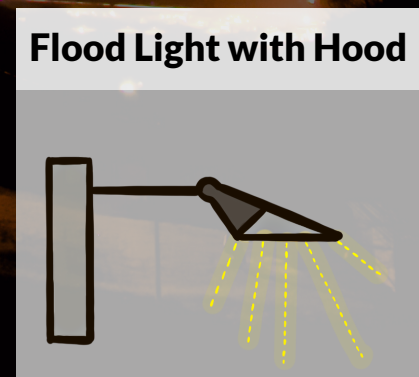
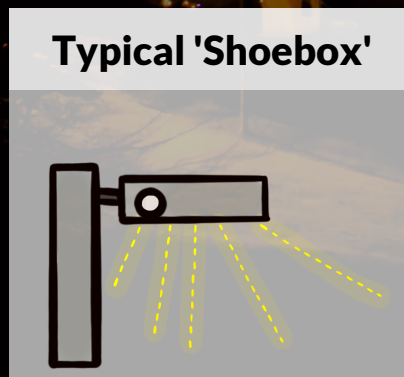
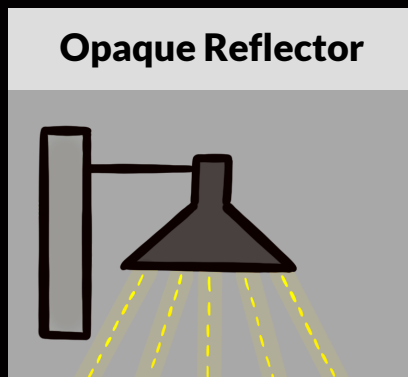
Ask yourself:

- Does the area on my property really need to be lit?
- Does it need to be this bright?
- Is the light transmitted further than it needs to be?

Not Recommended: Glare Lights



Recommended: Shielded Lights





Watersheds
C A N A D A

115-40 Sunset Blvd, Perth, ON, K7H 2Y4

watersheds.ca



Great Blue Heron

Ardea herodias