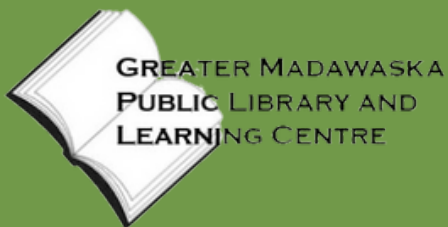


NATURE DISCOVERY LEARNING WORKBOOK

CONNECTING WITH NATURE



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ACKNOWLEDGEMENTS

This workbook was created together by Watersheds Canada and Greater Madawaska Public Library and Learning Centre (GMPLLC) with the common goal to educate students and families about the benefits of healthy waterways, lakes, and the surrounding environment for our collective future. This book is linked to the Ontario curriculum for grades K-8. Additional photography is provided by Simon Lunn and Dr. Mary Ann Perron.

The Greater Madawaska Public Library and Learning Centre library was founded in 1978 by four women dedicated to literacy: Mrs. Eileen Brydges, Mrs. Karen Cockwell, Dr. Catherine Downing, and Mrs. Margaret Norton. GMPLLC has since evolved to deliver accessible programs and services focused on literacy and learning for all ages, and is a registered charity (867320319RR0001). 2023 is GMPLLC's 45th year of service.

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.

Greater Madawaska Township, located in the Ottawa Valley, is the most picturesque and diverse tourist destination area in Eastern Ontario, offering opportunities for four seasons of outdoor adventure.

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



TD Friends of the Environment Foundation



Pickerelweed (*Pontederia cordata*)

GETTING READY TO EXPLORE NATURE



We are so excited for you to explore the Madawaska River watershed. You will learn about different local species and how to protect the health of our local rivers, lakes, and beyond!

You can keep this workbook! This workbook will give you tips to safely explore nature, as well as information about different animals and plants that are found in this region. You will learn about watersheds and understand the role of the riparian zone. The workbook will teach you what you can do to help nature, with fun activities along the way!

Please return to GMPLLC 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:

- Bring a hat, snacks, reusable bottle with water, sunscreen, and bug spray. Make sure to bring back your garbage so that 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 for disposal!
- Tell someone where you are going and when you will be back.
- Watch wildlife from a safe distance. Do not try to handle wild things!
- Please leave nature for everyone to enjoy. Do not pick any wildflowers, fungi, or plants.
- **There are ticks in the area. 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 each lens is 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).



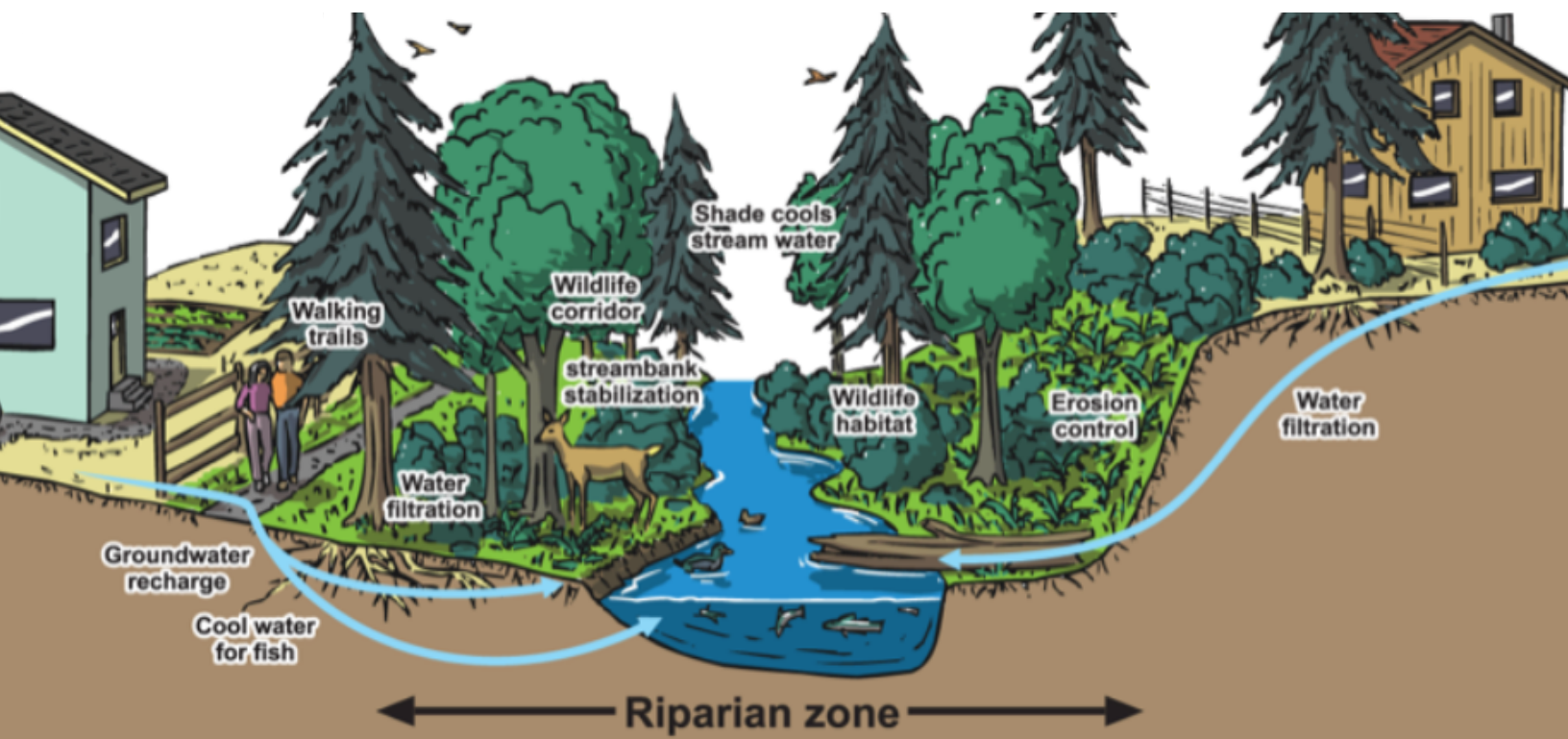
Identification Guides

Use the identification guides and books to learn more about different types of local biodiversity, including species of trees, birds, mammals, reptiles, amphibians, dragonflies, and damselflies. Each type of guide shows photos and information about each species like their size and where they live (their habitat). You can also learn about constellations with the Night Skies guide!



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.



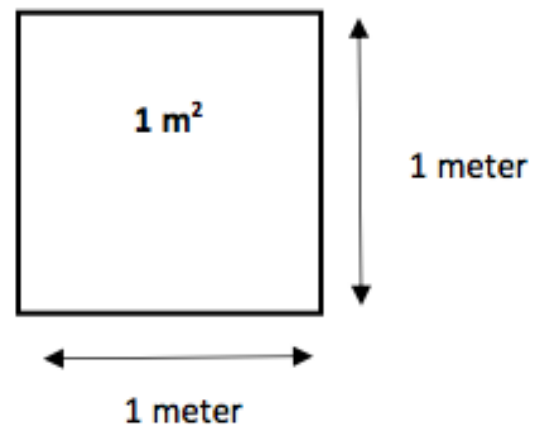
Watersheds
CANADA

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. Use your identification guides to label what you have found.

If you do not know the name of a species or rock, snap a picture and try to find it online using a website like [iNaturalist](https://www.inaturalist.org/). Or, ask a trusted adult.

Date: _____ **Time:** _____

Air temperature (use your thermometer): _____

Water temperature, if you are near water (use the thermometer):

Weather conditions: _____

Location: _____

Follow-up questions:

1. How would you describe the diversity of your spot: high or low? Did you find LOTS of different things (high diversity), or just a few (low)?

2. What non-living (abiotic) factors might affect what lives in this spot (e.g., rocks, water, slope, pollution)?

WHO LIVES HERE?



Pileated Woodpecker



Marsh Wren



Monarch Butterfly



Painted Turtle



Common Milkweed



River Otter



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

DRAGONFLIES & DAMSELFLIES

AMPHIBIANS AND REPTILES

ANIMAL TRACKS

BUGS & SLUGS

ACTIVITY #3: 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 Apps:



Merlin Bird ID (a free App)



ACTIVITY #4: POETRY

List 6 things that describe what you love about nature using the first letter of each line. This will make an acrostic poem. Lines do not have to rhyme.

N _____

A _____

T _____

U _____

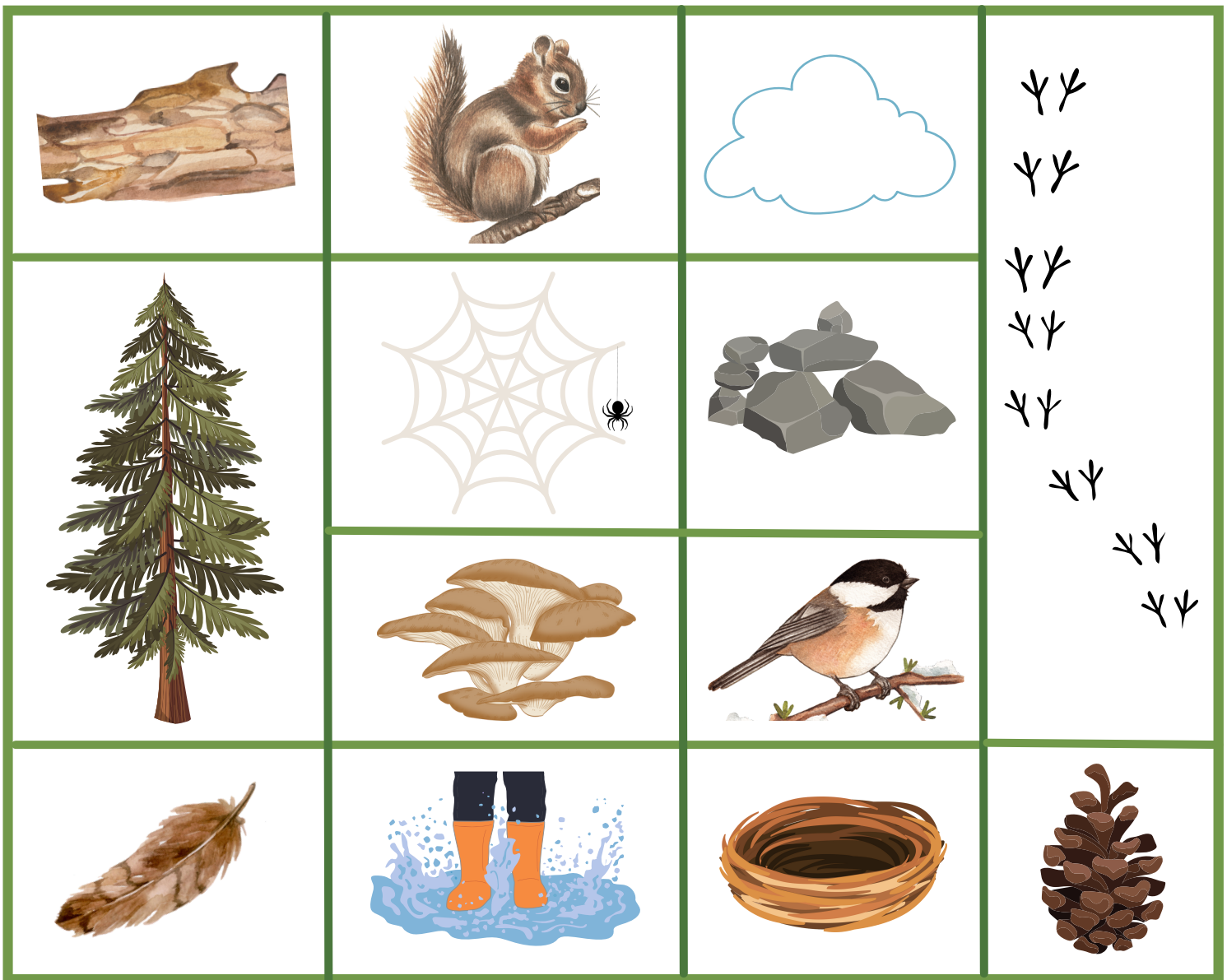
R _____

E _____



ACTIVITY #5: NATURE SCAVENGER HUNT

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



Illustrations: Canva

ACTIVITY #6: COLOURING TIME!

One way Watersheds Canada works with communities to restore their local fish habitat is by building and putting brush piles back in the water. Woody debris piles (brush bundles) made up of branches, snags, and root balls give fish like pike, bass, perch, and sunfish a safe place to eat, lay eggs, rest, hide from predators, and find shade from the sun.

Colour in this pike in its new home!



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 a Common Milkweed plant which is a native wildflower species in Canada.



ACTIVITY #7: BECOME A COMMUNITY SCIENTIST

Using the information you gathered in activities #2 and #3, 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 QuébecOiseaux.



ACTIVITY #8: FOLLOW IN THEIR FOOTSTEPS

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

Here are some tips for finding animal tracks:

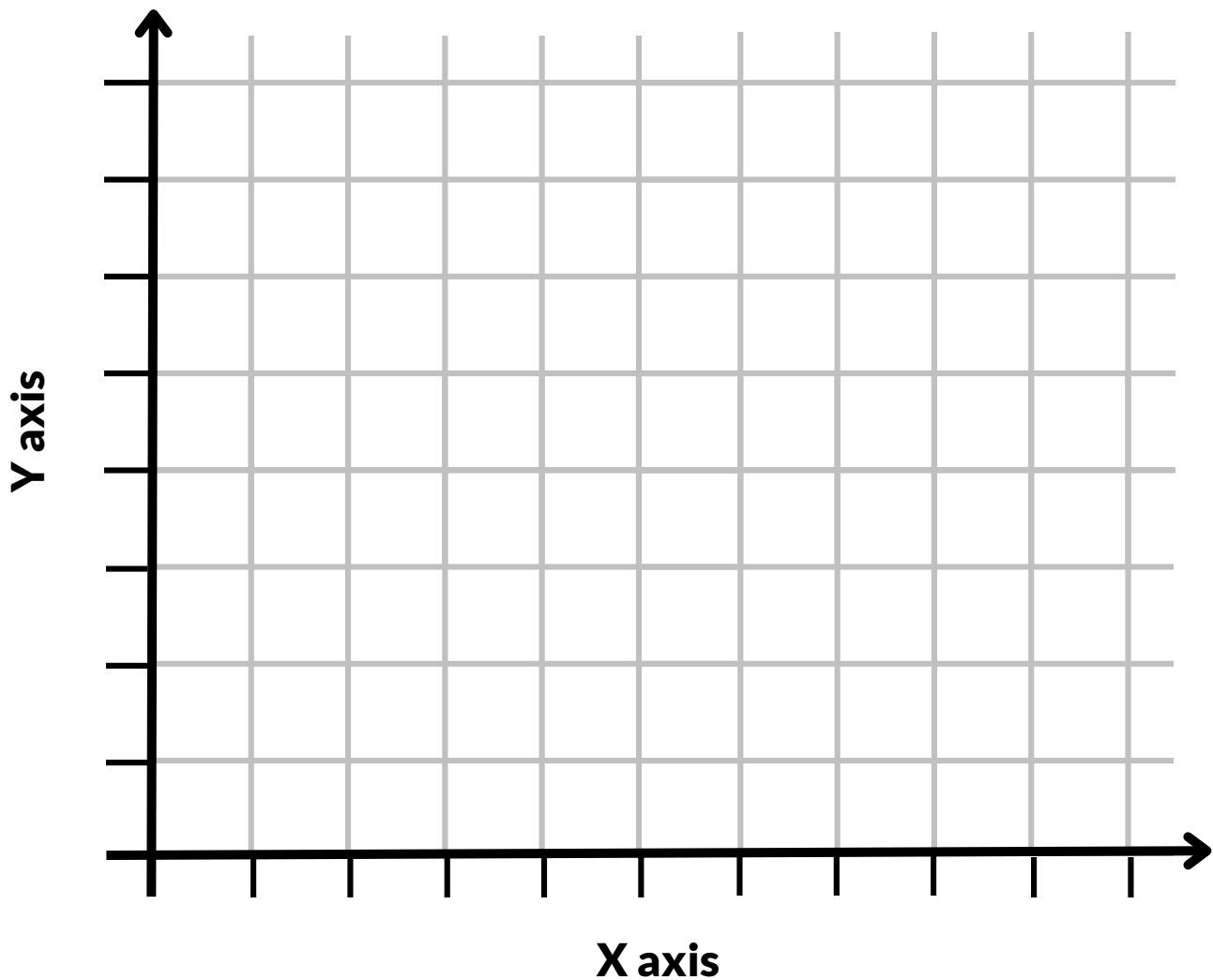
- Look for tracks in areas with wet sand and soft mud, like beaches, creek beds, trails, and puddles.
 - Look in the early morning or late afternoon as the sun better illuminates shaded areas.
 - Look off the trail as people's shoe prints will make it hard for you to find animal tracks.
- 
- If you have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

ACTIVITY #9: CREATE A CONSTELLATION

A constellation is a group of stars that form a shape and has a name (Orion, Ursa Major/Big Dipper, etc.). Many cultures use constellations to tell the stories of their ancestors and their beliefs. Constellations can be used to navigate the globe, and they connect us to the place we live.

Create your own constellation on the grid below, making sure to put your dots where two lines come together!



What is the story, teaching, or meaning behind your constellation?

Next, take your field guide out at night and along with a trusted adult, see how many constellations you can find. Make a list of the ones you find:*

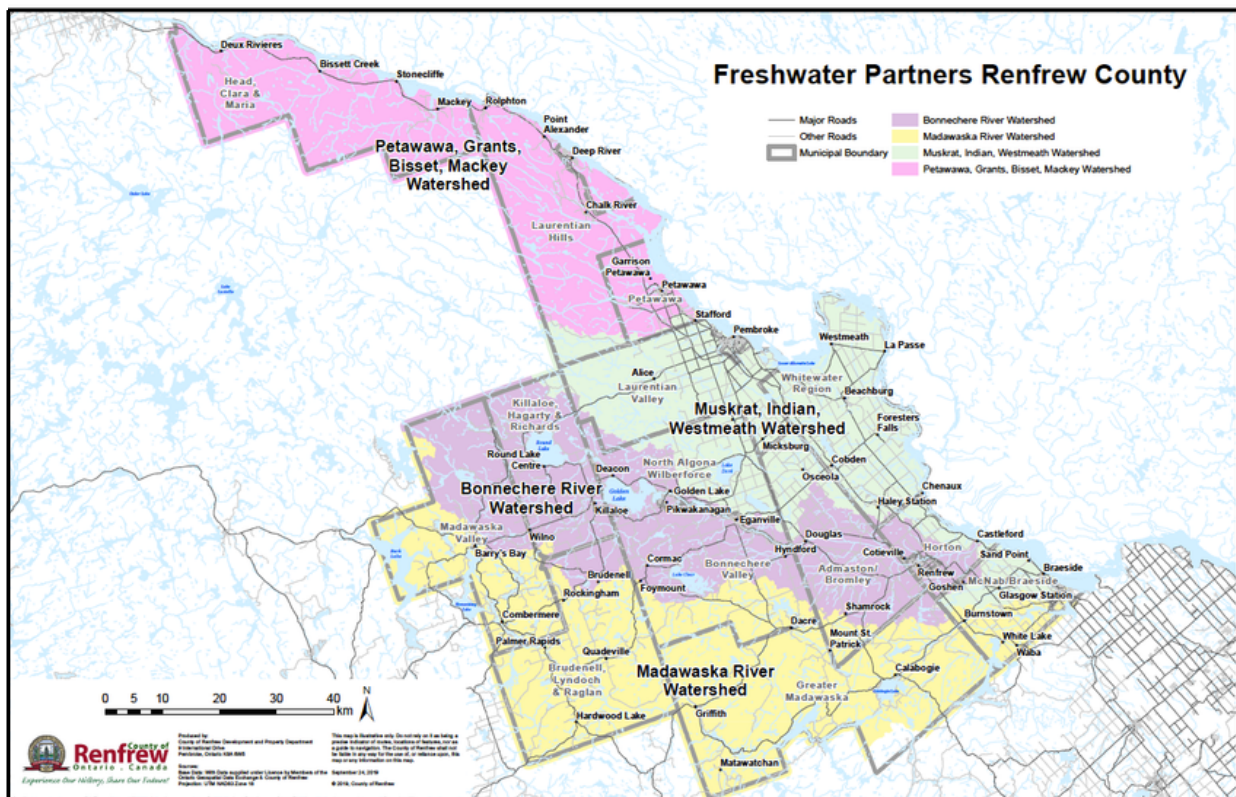
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Eyes to the skies: Watch for the Perseid meteor shower from mid-July to September. Peak viewing is August 11-13, 2023.*



THE MADAWASKA RIVER WATERSHED

- The Madawaska River is 230 kilometres long! It is a part of the Madawaska River watershed. 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.
- The word Madawaska may have come from the Algonquin word "Madoueskak" which means "land of the porcupine" (credit: Bill Graham, former editor, Madawaska Highlander).



Source: "Watershed Map" (2023). Bonnechere River Watershed Project, <https://www.bonnechereiver.ca/watershed-map>

HOW ARE PEOPLE IMPACTING NATURE?



As shorelines become more developed, humans are changing the way shorelines look 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 and stop things like fertilizers and pesticides from entering the water. Plant roots also help keep soil together in heavy rainstorms which prevents erosion.



ACTIVITY #10: 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 (e.g., road salt, car wash soap).

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

Open your Water Rangers test kit. Take out a water test strip. Look at the pH chart. Before you begin testing, guess the pH levels of your water sample (make a hypothesis - an explanation of what you think will happen). Do you think the sample will be preferred by life in the water?



Where and why do you think you will find different conditions for air temperature, water temperature, and pH?

Record your findings each time on the Water Rangers data sheet in the test kit, or below on this page. What did you find?

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

ACTIVITY #11: 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:

- Make sure that you are with an adult.
- Wash your hands before handling any creatures as sunscreens, lotions, and bug spray can be harmful to them.
- Fill up your containers with water before starting. Use your dip net to capture aquatic creatures. Gently transfer the creatures into your water container. Do this as quickly as you can. Observe the creatures.
- Once you are done looking at the creatures, slowly and gently pour them back in the water where they came from. 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 (e.g., dragonfly nymph and adult, tadpole and frog)?
- Is your freshwater body biodiverse? Do you think that means it is healthy?

WAYS TO HELP NATURE

- Gather data.** 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](#). You can also submit these to GMPLLC (email: gmpllc.staff@gmail.com) - we would love to see them!
- Get involved.** Volunteer with a local lake association or nature group to learn more about local wildlife and spend time in nature with like-minded people. Local organizations like Watersheds Canada, GMPLLC, and lake associations or fish and game clubs can assist with educational materials on enhancing your shoreline.
- Be natural.** 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. Learn more about native plants: naturaledge.watersheds.ca/plant-database
- Keep it clean.** Prevent invasive species like invasive phragmites from spreading by cleaning all equipment after boating and staying on trails while hiking.
- Be respectful.** This land is the ancestral territory of the Algonquin Nation. It is special. It is beautiful. It is important. Please take care of it. Bonnechere Inòdewiziwin Abinòdjìnjish Kikinàmàgan (BIAK) provides EarlyON indigenous programming that includes indigenous teachings, Algonquin language, themed activities, and services. Contact GMPLLC to learn more.
- Explore.** Learn more about why we should protect wild places. Borrow a provincial park day pass (nearby parks: Bonnechere River, Algonquin, and Fitzroy) from GMPLLC. These are beautiful places to spend time outdoors and try activities like canoeing, birding, hiking, and education programs.

ACTIVITY #12: NATURE JOURNALING

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 a professional artist to journal!



Photo: Canva



Source: John Muir Laws

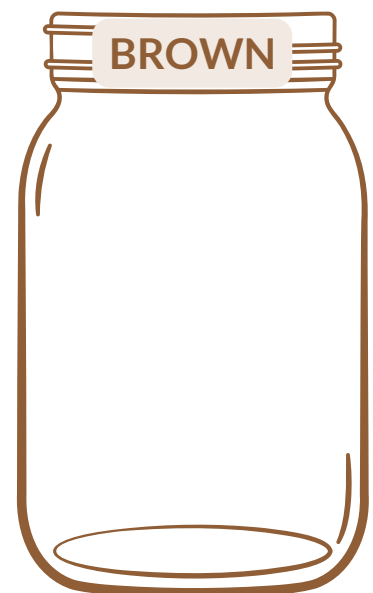
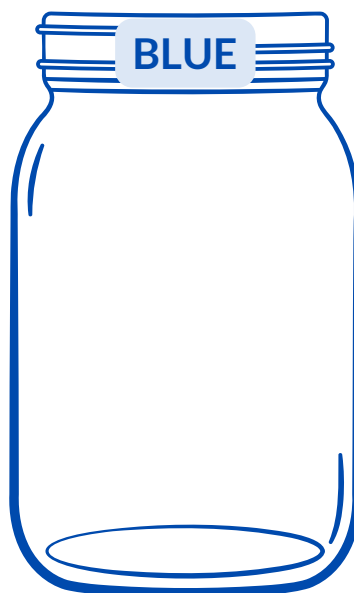
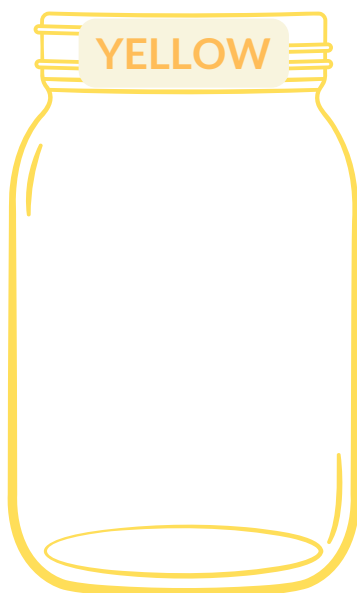
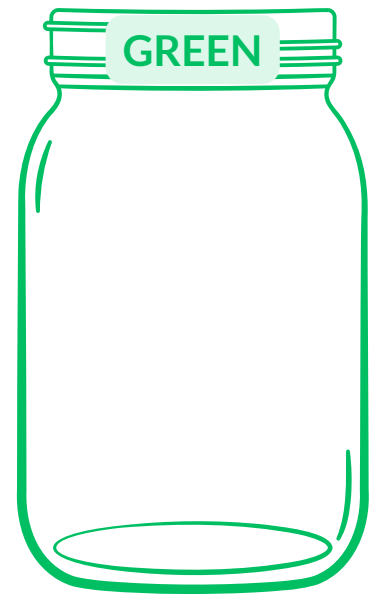
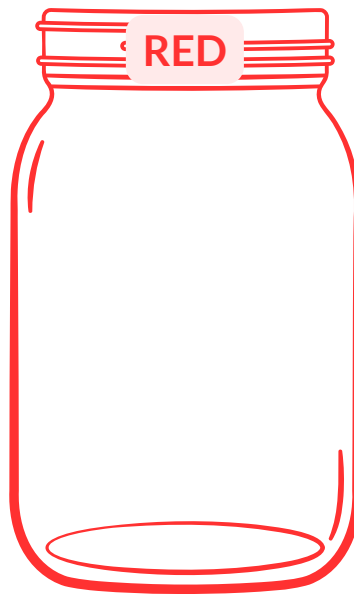
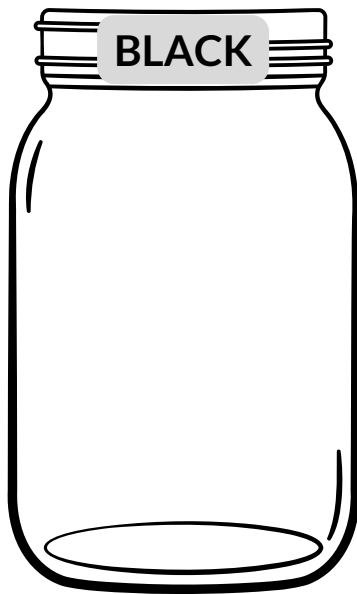
You can journal anything that is interesting to you. Add diagrams, maps, numbers, or sketches. Count the number of species you see, and the time, weather, and date.

Interested in learning more about nature journaling?

Visit: johnmuirlaws.com

ACTIVITY #13: BUGS AND SLUGS

Watch the bugs and slugs around you and draw them or write their names in the jar that matches their colour. Can you find one of each colour?



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.



Invasive species in Greater Madawaska Township

For information about invasive species and how to control them, please visit the Government of Ontario's site for invasive species: <https://www.ontario.ca/page/invasive-species-ontario>

What to do? <https://www.ontario.ca/page/invasive-species-action-plans>

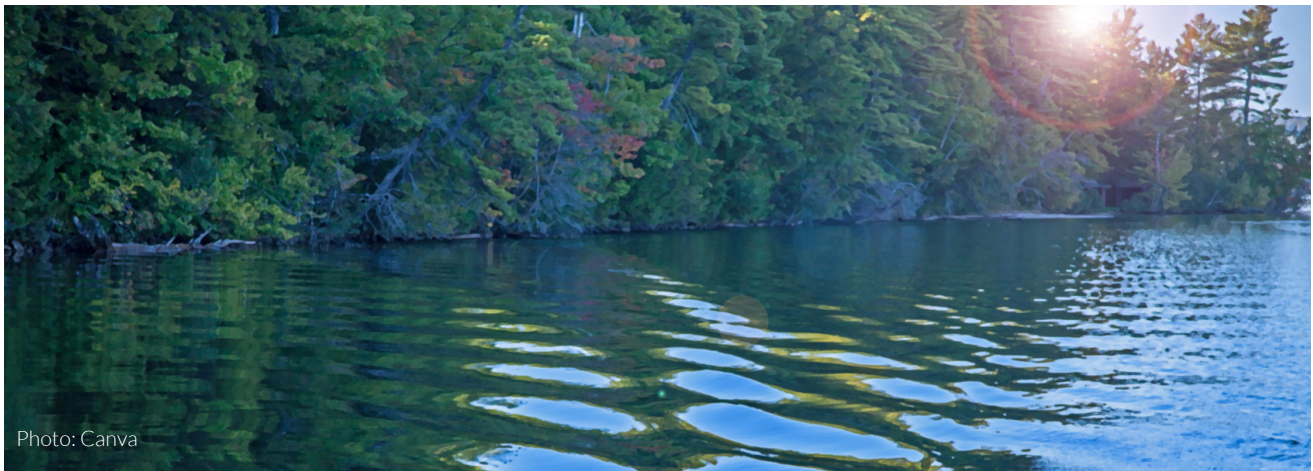
Some (not all) species known to be in our lakes and rivers are: Zebra Mussels, Spiny and Fishhook Water Flea, Grass Carp, Fireweed, and Millfoil.

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.

Dam safety

There are several dams in the area. Stay clear, stay safe. For information about dam safety, please visit: <https://www.opg.com/building-strong-and-safe-communities/keeping-communities-safe/water-safety/>

All of the waters that leave Calabogie Lake leave via the Calabogie Dam which is located in the village at the bridge that goes over Highway 511 near Madawaska Street. These waters are diverted at the dam to feed the generating station located across the street from Heritage Point.

Free family fishing times

Four times a year, Canadian residents can fish in Ontario for free. This means you do not need to buy a fishing licence if you fish during:

- Family Fishing Weekend (February 18-20, 2023)
- Mother's Day Weekend (May 13-14, 2023)
- Father's Day Weekend (June 17-18, 2023)
- Family Fishing Week (July 1-9, 2023)

Learn more: <http://www.ontariofamilyfishing.com>

There are many lakes in this region, and many fish species. Calabogie Lake is one of Greater Madawaska's largest and most heavily trafficked lakes. Common fish in Calabogie Lake are: largemouth bass, smallmouth bass, pickerel/walleye, pike, and sunfish. Channel catfish have also been reported. Other lake inhabitants to watch for include crayfish, water snakes, turtles, freshwater clams, otters, and muskrats.

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. Copies are available for purchase at GMPLLC.
- Visit loveyourlake.ca/project/shoreline-lighting/ to find out how shoreline lighting impacts wildlife.

SHORELINE LIGHTING

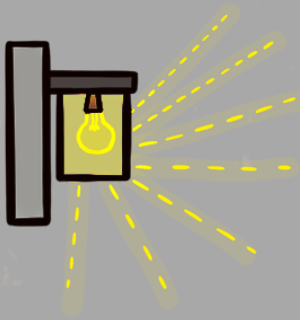
Many of us have likely sat out at night and noticed the lights at properties across the way. Take a moment to reflect on how this made you feel and consider if light from your property is also trespassing. This does not mean we have to get rid of all our outdoor lights, though! Perhaps we simply do not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

Ask yourself:

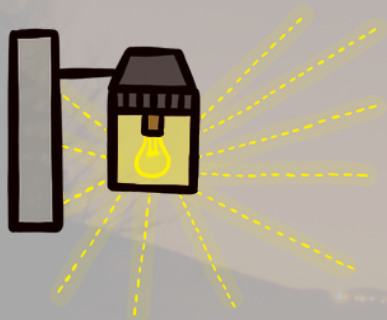
- Does this specific area on my property really need to be lit?
- Does it need to be this bright?
- Is the light transmitted further than it needs to be?

Not Recommended: Glare Lights

Typical 'Wall Pack'



Typical 'Yard Light'

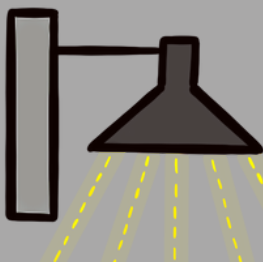


Flood Light

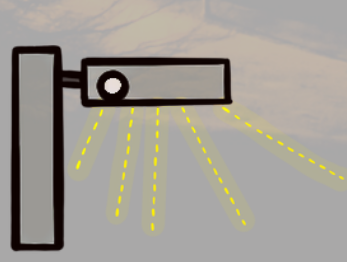


Recommended: Shielded Lights

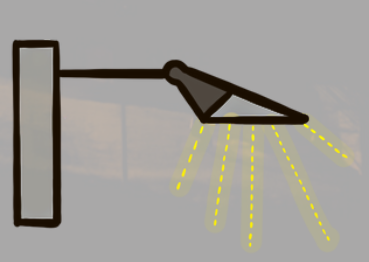
Opaque Reflector



Typical 'Shoebox'



Flood Light with Hood





Watersheds
CANADA

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

watersheds.ca



Great Blue Heron

Ardea herodias