NATURE DISCOVERY LEARNING WORKBOOK

CONNECTING WITH NATURE

Buffalo Lake Métis Settlement CONSULTATION

Watersheds CANADA

Photo: Buffalo Lake

CONTENTS

ACKNOWLEDGEMENTS

This workbook was created together by Buffalo Lake Métis Settlement and Watersheds Canada with the 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 Alberta curriculum for grades K-12.

Buffalo Lake Métis Settlement (BLMS) is one of eight Métis Settlements in Alberta. The land base of the Settlement comprises approximately 35,356 hectares (3.75 Townships). Buffalo Lake is located in east-central Alberta, approximately 172 kilometres northeast of Edmonton and 50 kilometres southwest of Lac La Biche. The current population sits at 1,236 people.

BLMS is one of 129 Indigenous groups that were consulted on the Trans Mountain Expansion (TMX) Project, which resulted in the creation of the Aquatic Habitat Restoration Fund (AHRF). AHRF was created to respond to concerns about the potential impacts of development and cumulative effects on fish and fish habitat. The goals of AHRF are to increase the capacity of Indigenous groups to protect and restore aquatic habitats that may be impacted by the cumulative effects of development. Within the framework of the AHRF, funding allocated to BLMS was used towards the Nature Discovery Backpack program and its delivery within BLMS.

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:

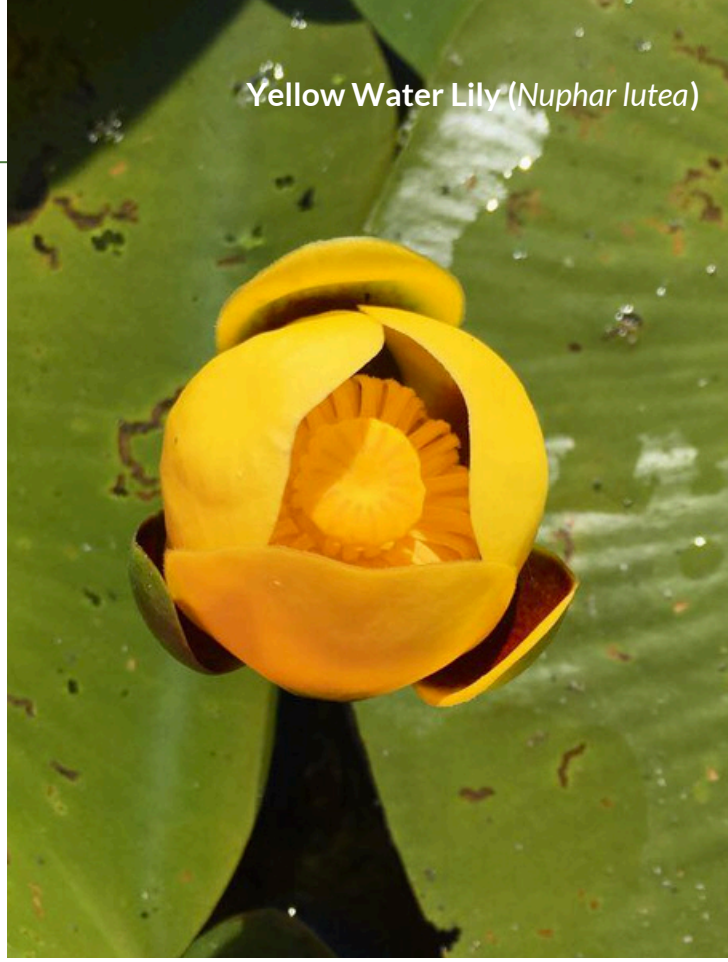
Buffalo Lake Métis Settlement CONSULTATION

AHRF

Watersheds CANADA

Ocean Week Canada

WATER RANGERS


Yellow Water Lily (*Nuphar lutea*)

GETTING READY TO EXPLORE NATURE

We are so excited for you to explore the Buffalo Lake area. You will learn about different local species and how to protect the health of our local lakes, rivers, 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!

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.
- 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.
- 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!
- Please leave nature for everyone to enjoy. Do not pick any wildflowers, fungi, or plants.
- Be tick aware. Wear long sleeves and long pants if walking in a wooded area. Learn more about tick safety: https://www.alberta.ca/lyme-disease-tick-surveillance

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

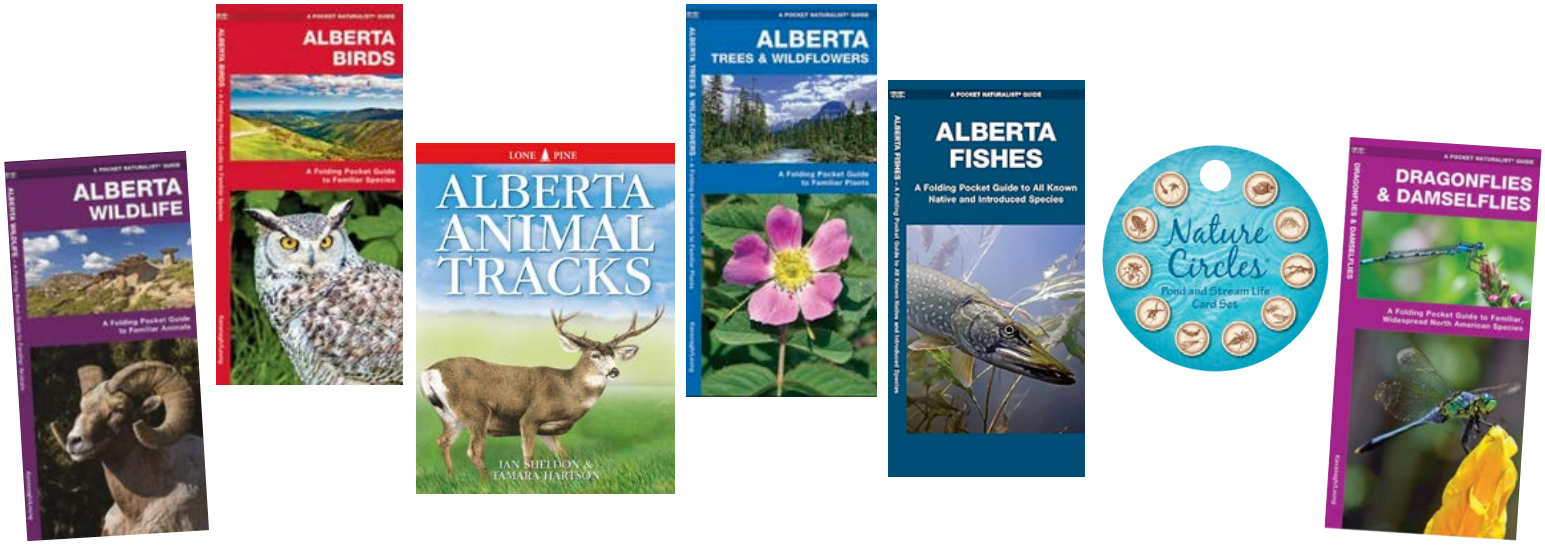
- What do the numbers of binoculars mean? For example, if binoculars are 8x21 mm, they will help you see things 8 times closer and each lens is 21 mm wide.
- Turn the knob to make it clearer to see.
- Use a cleaning cloth if you need to clean the lenses (glass).

Observation Tools

- Use the net and collection jar to catch and closely look at insects and small aquatic invertebrates (fun fact: they have no backbone!).

Identification Guides

Use the identification guides and books to learn more about different types of local biodiversity, including species of trees, wildflowers, wildlife, fishes, dragonflies, damselflies, macroinvertebrates, and birds. Each type of guide shows photos and information about each species like their size and where they live (their habitat).



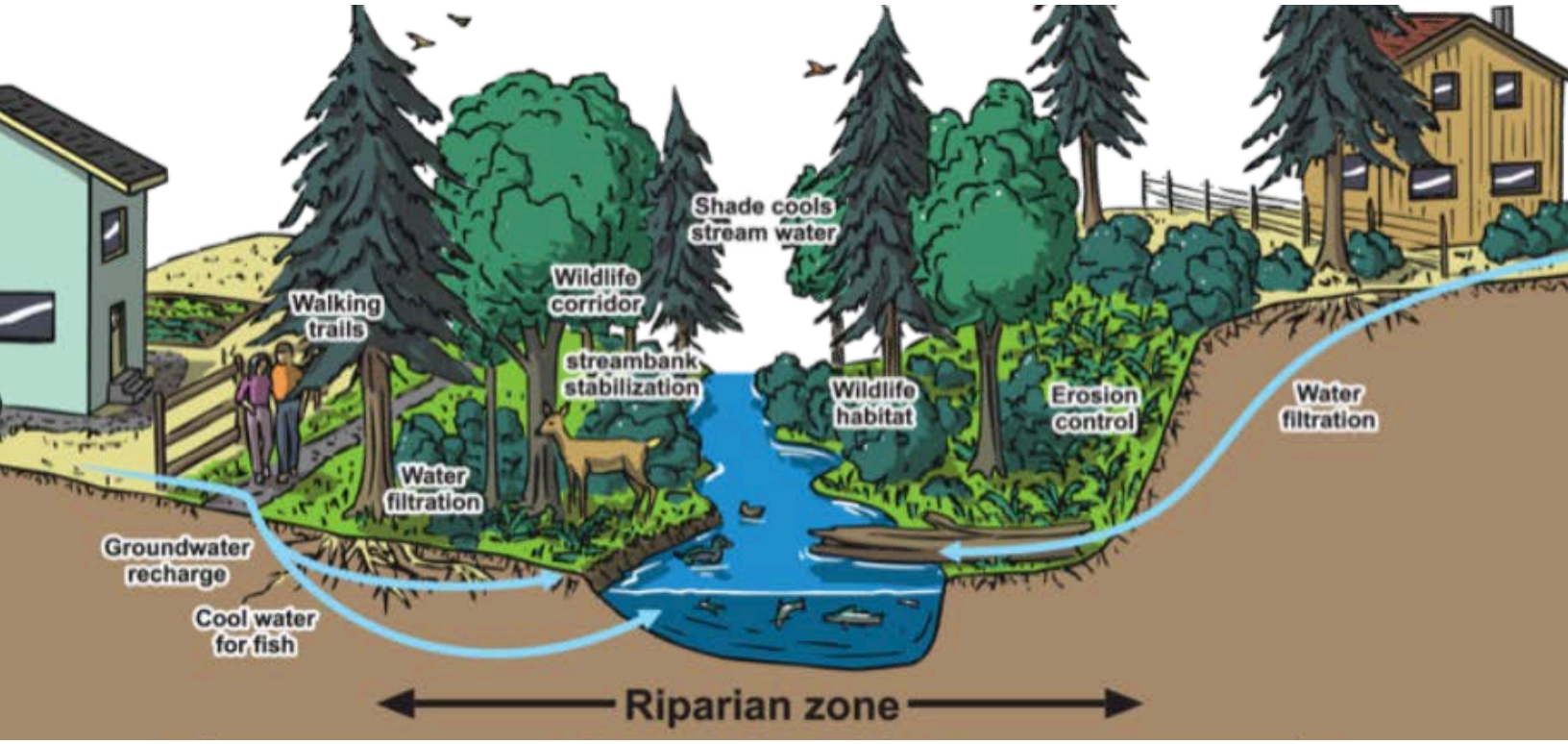
Look for these pictures throughout the book so you know what to pull out of your backpack to help you with each activity!

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.



Source: "Riparian Areas". (2021). Cowichan Lake and River Stewardship Society, https://www.cowichanlandtrust.ca/portfolio-items/riparian-areas/

ACTIVITY #1: SKETCH IT!

Sketch a section of shoreline along Buffalo Lake! Make sure to include the riparian zone - the area of plants between the water and the tree line.

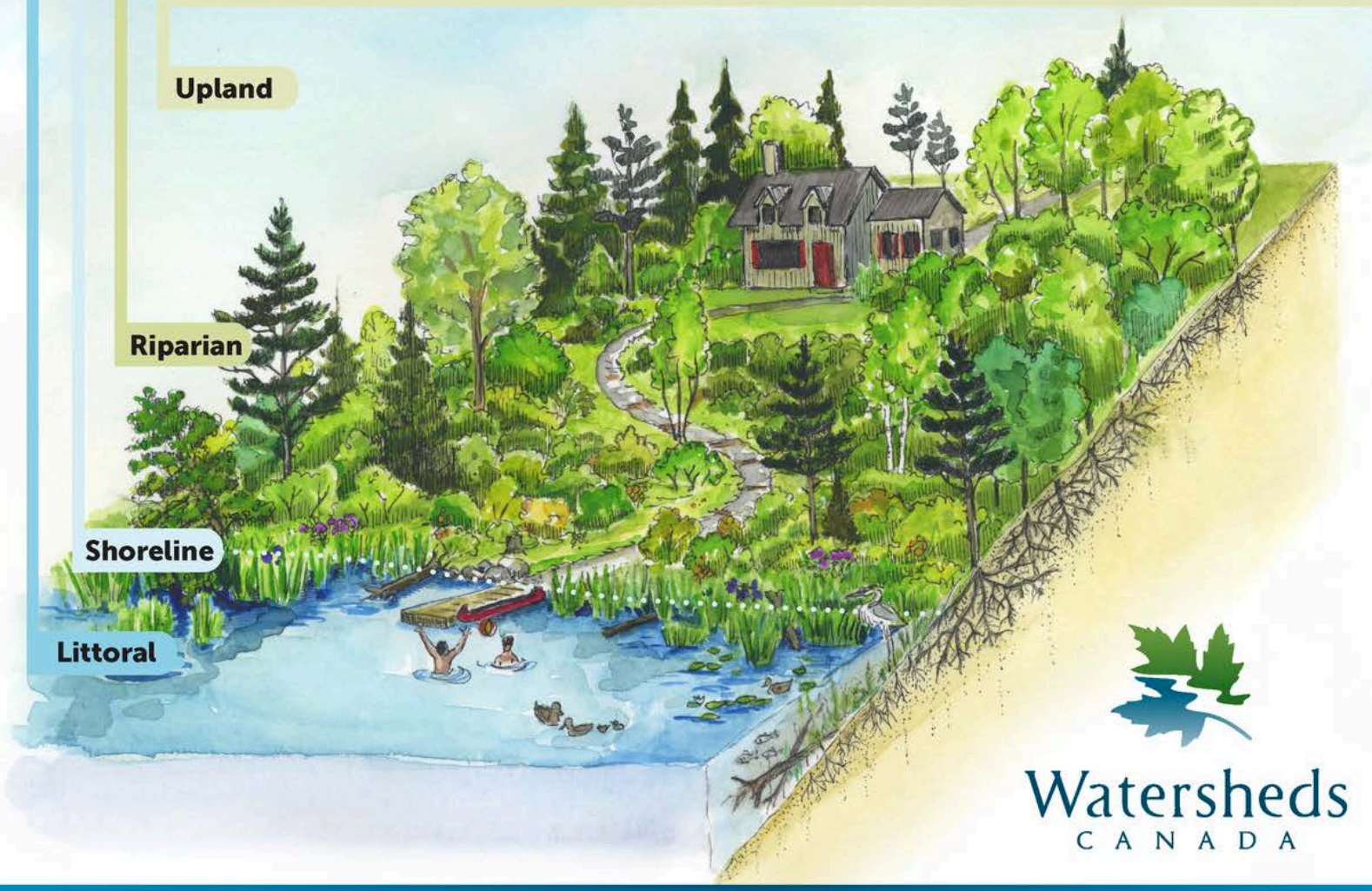
Resilient Shorelands

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 #2: BECOME A COMMUNITY SCIENTIST

Use the information you gather in activity #3 and submit 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

PictureFish

PictureThis

ACTIVITY #3: DO A BIO-BLITZ

A BioBlitz is a volunteer-led count of the species in an area. Use your identification guides to get a "snapshot" of biodiversity found in your area. What can you find in 30 minutes? An hour?

BIRDS	TREES

DRAGONFLIES & DAMSELFLIES

FRESHWATER INVERTEBRATES

MAMMALS AND FISH

WILDFLOWERS

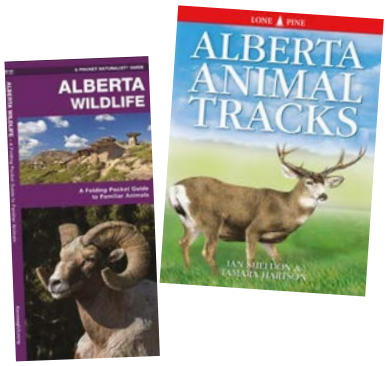
ACTIVITY #4: BIRD BINGO

 American Robin	 American White Pelican	 Song Sparrow	 Sharp-shinned Hawk	 Double-crested cormorant
 House Wren	 Red-winged Blackbird	 Mallard	 Ruffed Grouse	 Black-capped Chickadee
 Northern Flicker	 Red-throated Loon	**FREE SPACE**	 Downy Woodpecker	 Blue Jay
 Common Loon	 Rose-breasted Grosbeak	 American Goldfinch	 Wood Duck	 Gray Catbird
 Eastern Phoebe	 Great Horned Owl	 American Coot	 White-breasted Nuthatch	 Red-necked Grebe

ACTIVITY #5: FOLLOW IN THEIR FOOTSTEPS

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

Here are some tips for finding animal tracks and scat:



- Look for tracks and scat 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 or scat that perfectly matches what is shown in your guides! You will have to do some detective work to figure out which animal left behind the clue.

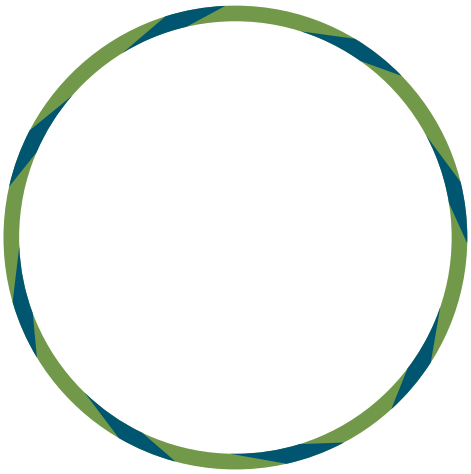
Want more practice before you go in the field?
Try this Scout Life animal track quiz: scoutlife.org/quizzes/6662

ACTIVITY #6: LIFE IN A HULA HOOP

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 the size of a hula hoop.

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, 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:

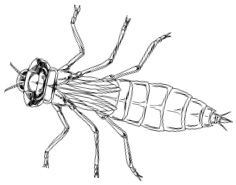
1. How would you describe the diversity of your spot: high or low? Did you find LOTS of different things (high diversity), or just a few (low)?

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

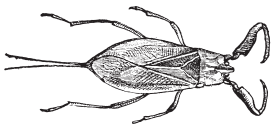
ACTIVITY #7: MAKE THE MATCH

Benthic macroinvertebrates have no backbone (spine) and we can see them with our eyes. They live in and around a waterbody their whole life, so they are living indicators that show us how healthy a waterbody is. Draw a line from the species to their name!

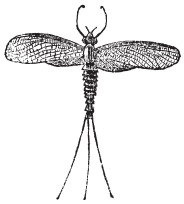
1)



2)



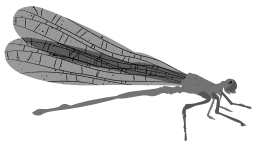
3)



4)

5)

6)



A) Aquatic snail

Fun fact: they usually have a coiled shell but sometimes it can be a short, broad cone shape.

B) Freshwater scud

Fun fact: they have seven pairs of hard jointed legs and the first two pairs have small claws.

C) Dragonfly nymph

Fun fact: they have 3 pairs of hard jointed legs with 2 claws on each leg.

D) Mayfly

Fun fact: they are the only type of insect that has a winged immature stage.

E) Damselfly

Fun fact: there are over 20 different damselfly species found in Alberta.

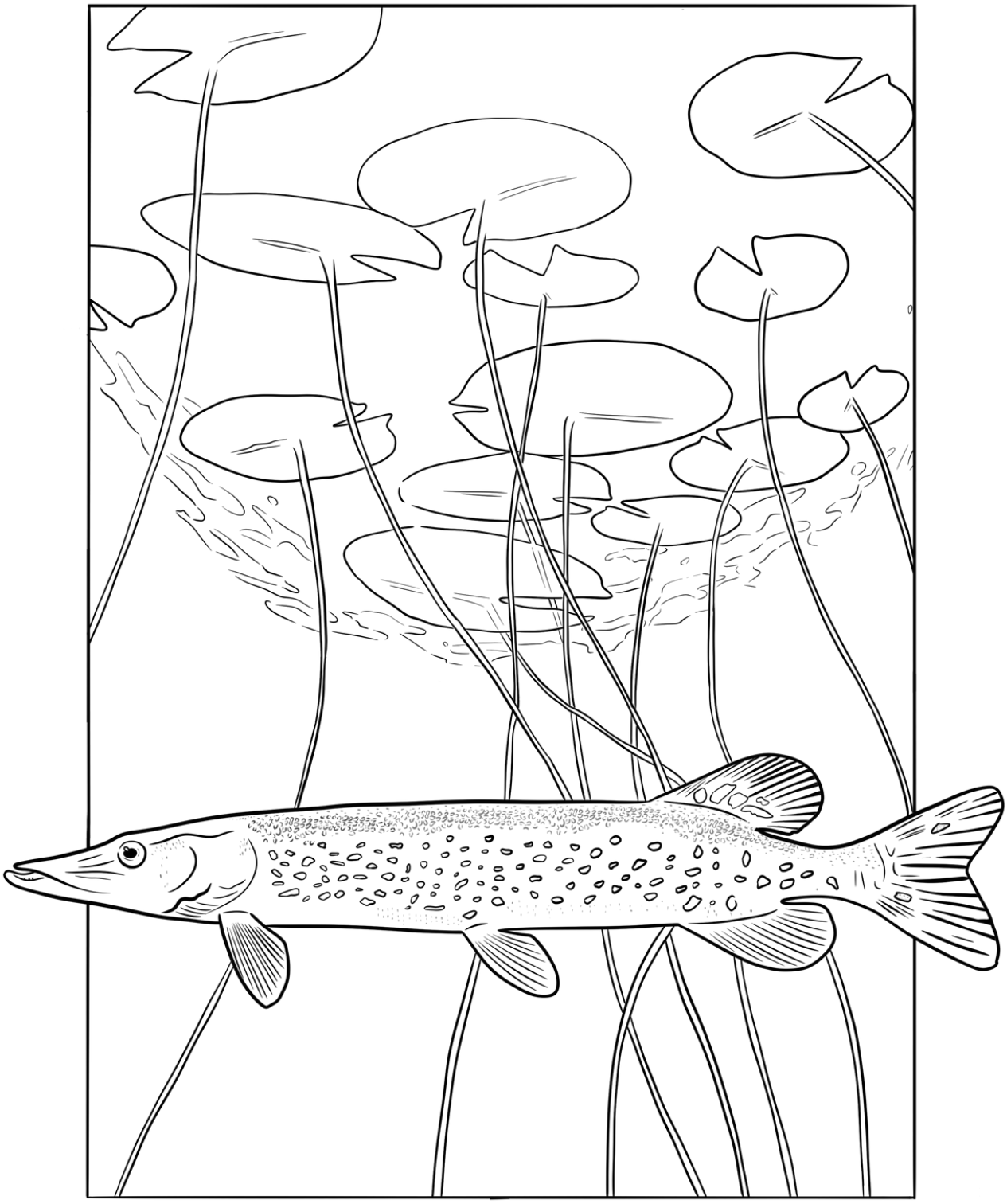
F) Water scorpion

Fun fact: their "tail" is two half-tube structures that can be locked together and used like a snorkel.

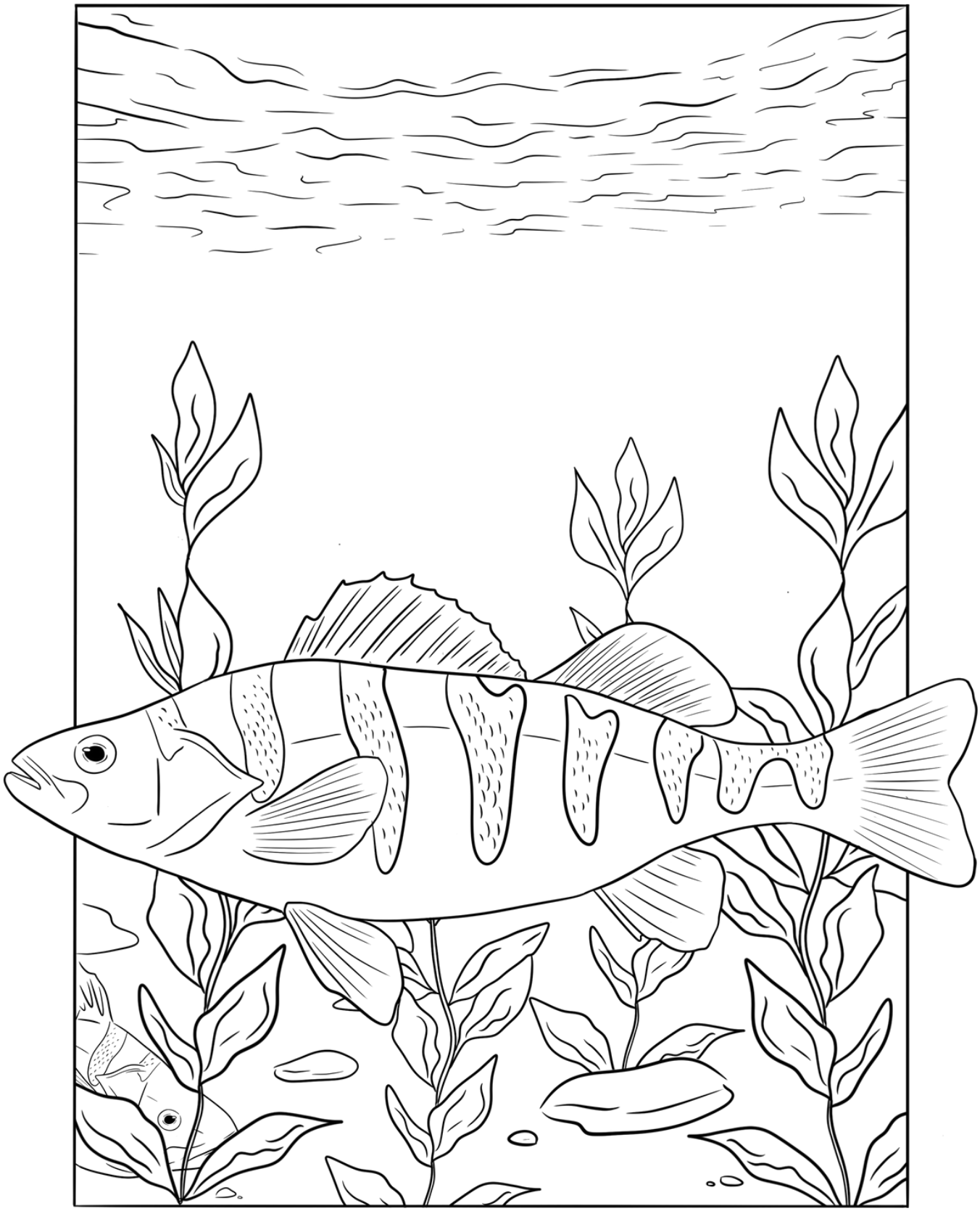
Answers: 1C, 2F, 3D, 4B, 5A, 6E

ACTIVITY #8: COLOURING TIME!

Jackfish



Yellow Perch



FISH HABITAT AND SPAWNING NEEDS

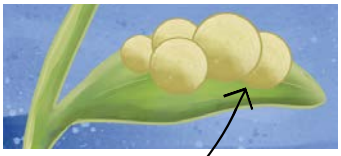
English name: Northern Pike, also known as Jackfish
Scientific name: *Esox lucius*

About Jackfish

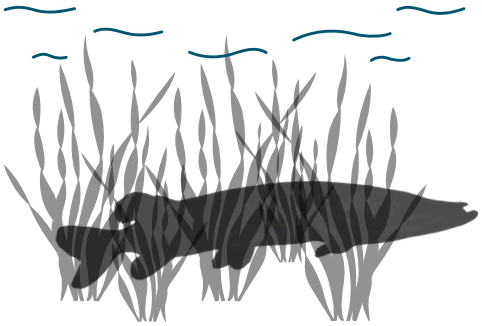
Jackfish are an important species in Buffalo Lake. They have a long, slender head and body, and have sharp, backward-slanting teeth. The back and sides of a jackfish are dark green/olive in colour and have yellow/white coloured spots.

They have been found in Alberta weighing up to 22 kilograms (50 pounds), and they can swim up to 16 kilometres/hour!

How do they reproduce?



- Females and males swim beside each other as they release their eggs and milt into the water. This is called "broadcast spawning".
- Spawning happens in areas that are flooded in the spring and have vegetation. Fertilized eggs stick to vegetation and hatch after 2 weeks.



What do they eat?

Jackfish usually live on their own and are very territorial. They are not picky eaters! They hide in vegetation and wait to eat almost anything that comes near them: frogs, other fish, small mammals, crayfish, or young waterfowl.

English name: Yellow Perch
Scientific name: *Perca flavescens*

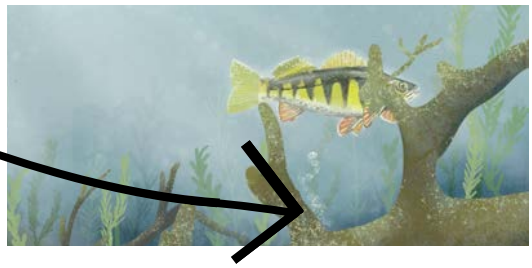
About Yellow Perch

Yellow perch are a common species found in Buffalo Lake. They travel in groups, which are called "schools", and can be found in bays, areas with vegetation, and in shallows. They are able to live in water that has low oxygen levels over the wintertime, and are a popular species to fish for during Alberta's winters.

Perch usually weigh less than a pound (0.5 kilogram) and are smaller than 25 centimetres (10 inches). They have a golden yellow/green coloured body with dark vertical bands on the side. Their dorsal (top of body) fin has needle-like spines.

How do they reproduce?

- Perch lay their eggs in long, jelly-like bands on vegetation or woody debris.
- Spawning happens in the springtime.
- A female can make around 23,000 eggs!



What do they eat?

Perch eat insects, other small organisms, and eggs and juveniles of other fish species. They often choose to eat at dusk.

Did You Know? Bathymetry is the measurement of depth of water. The deepest part of Buffalo Lake is 6 metres in the North Basin.

ACTIVITY #9: RECIPE

Recipe by Georgina Mercredi, as originally included in "Ohci eta Miciwin Mistikowak" ("From the Grub Box") by the Northwest Territory Métis Nation.

Fish Fry

Use desired amount of oil or lard. Remove scales with a spoon. Cut fish from neck down to the tail. Slice cutting knife through the side. Remove spine and head and clean meat. Mix fish with flour mix. Use ½ tsp. of milk and baking powder. Fry fish with desired heating until golden brown. Cool off before serving. Add lemon juice if desired.

Kinosew pemehk ka kīstepohk

pēyak kinosew nikotwāw okāw, iyinikinosew ahpo niso minihkwācikan askipahkwesikan atihkamek pēyak mehkwanis sīwihtakan āpihtaw mekwanis kākominakahk apacihta nahiyikohk pimiy ahpo pīme peyahikinosewewin ohci mehkwanis kinosew ohci Mikwayaw nīhcāyihk esko misoy. Ka taskisaw mōhkomān ohci sāpo eta pimicohci Maninewah māwikan mina mistikwan mina kanācihta wiyas Mamawina kinosew asci pahkwesikan itehikewin apacihta āpihtaw emihkwanis tohtōsapoy mina opihkasikan. Pemehk ka kīstepahk kinosew esko kīsāpiskisa mina osāwsōniyaw nakwahk kīkway. Ka tahkipaw pamāyes micisowin. Asta osāwāpoy kispin kwasta kīya

Fish fry resources

How to Fillet Jackfish

How to Cut Fillets

How to Fillet Perch

How to Know When Fish is Fully Cooked

ACTIVITY #10: WORD SCRAMBLE

Unscramble the words using the pictures to learn about local fish species and their homes (habitat).

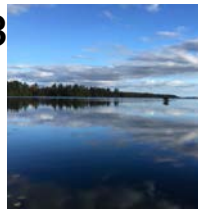
#1

FHAKCIJS

#2

KRECE

#3



EKAL

#4

NNIMOW

#5

KHEFUCIRSS

#6

HRCEP

#7

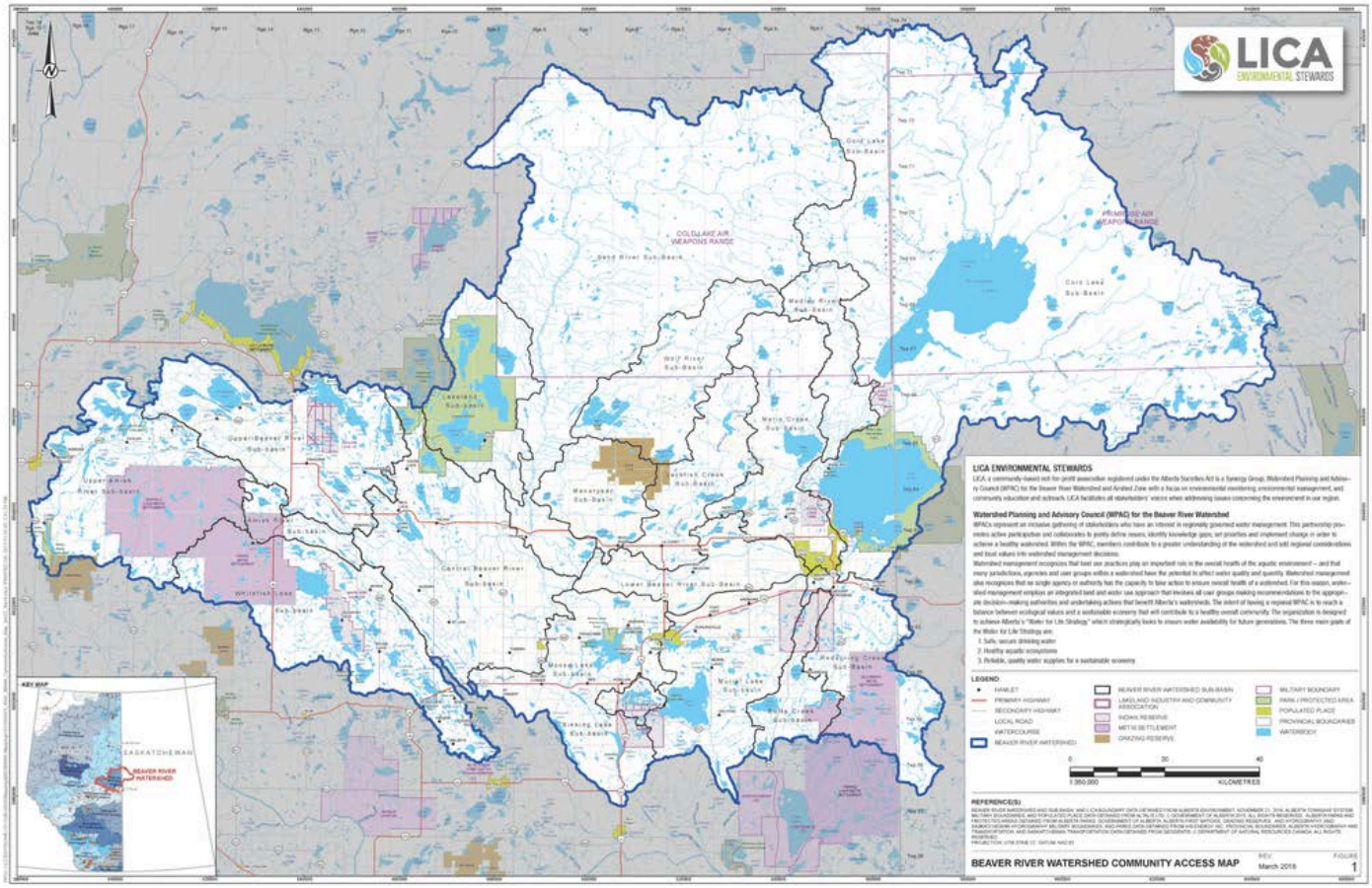
CQATIUA TTAAHBI

Did You Know? A food chain shows how each living thing gets its food by depending on each other.

Answers: #1 JACKFISH, #2 CREEK, #3 LAKE, #4 MINNOW, #5 SUCKERFISH, #6 PERCH, #7AQUATIC HABITAT

BEAVER RIVER WATERSHED

- Buffalo Lake Métis Settlement is located in the Upper-Amisk River sub-basin of the Beaver River Watershed, a watershed that covers the boreal plain of east-central Alberta and west-Central Saskatchewan (map below).
- 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.



Source: "Watershed". Lakeland Industry & Community Association (LICA), https://lica.ca/watershed/

ACTIVITY #11: DRAGONFLIES AND DAMSELFLIES

Create your own dragonfly or damselfly and write four things it needs in its habitat (home).

1 _____

2 _____

3 _____

4 _____

INSECT WITH TRANSLUCENT WINGS

WINGS OPEN AND OUT AT REST	WINGS TOGETHER AT REST
THICK BODY	THIN BODY
EYES CLOSE TOGETHER	GAP BETWEEN EYES
DRAGONFLY	DAMSELFLY

ACTIVITY #12: WATER QUALITY EXPERIMENT

The guideline for pH (potential Hydrogen) is a range of 7.0 to 10.5 in finished drinking water.[1] 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 biological 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*).

[1] Health 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 #13: LAKE SELF-ASSESSMENT

What watershed is Buffalo Lake a part of?

Why do you think is it important to think about how our freshwater is connected?

My 3 favourite lake activities are:

1.

2.

3.

My 3 favourite animals by the lake are:

1.

2.

3.

What are 3 issues or threats to local water?

1.

2.

3.

What are 3 ways you can help Buffalo Lake?

1.

2.

3.

Check Out These Free Resources!

1. http://Watersheds.ca/Our-Work/Resources
2. http://NaturalEdge.Watersheds.ca/Plant-Database

Using the Natural Edge Native Plant Database (linked above)
pick **10** species and explain what benefits they bring to your property.

Ex. red osier dogwood - protects shorelines from erosion even in floods or droughts, and provides food for people and wildlife

1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

ACTIVITY #14: 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 a trained artist!

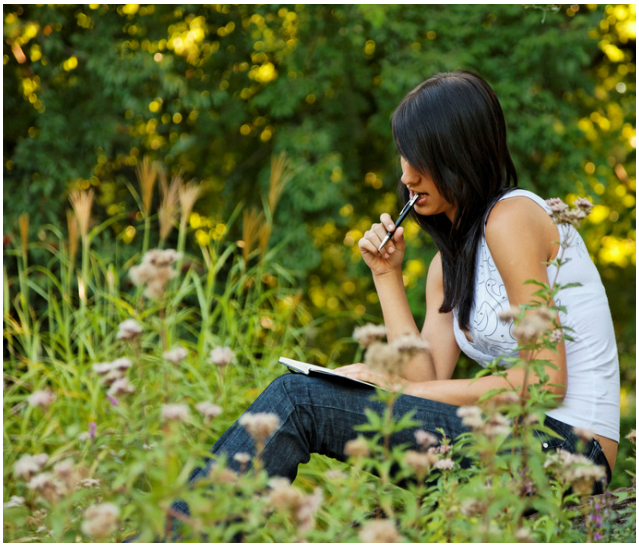
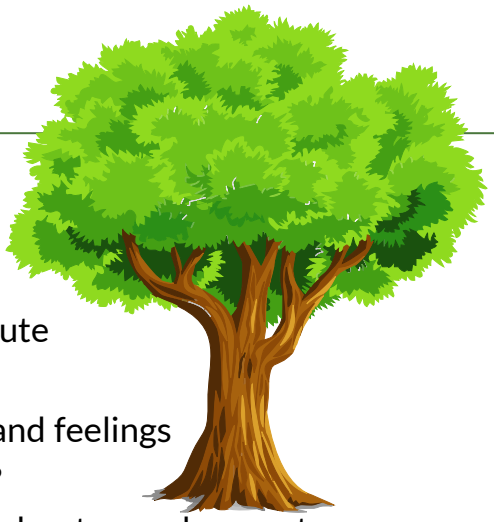


Photo: John Muir Laws

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.



Here are some writing prompts if you want help getting started:

- Find a comfortable spot in nature. Close your eyes for a minute and listen. What sounds do you hear? What do you smell?
- Spend time in a quiet place in nature. Write your thoughts and feelings about being there. Who has lived in this spot before you did?
- Sit beside a tree. Imagine you are that tree and write a story about your day as a tree.

Here are some writing prompts if you want help getting started:

- Draw a comic strip about the animals and plants you see around you.
- Look up! What shapes do you see in the clouds? Write a story about what you see.

Here are some drawing prompts if you want help getting started:

- Find a plant starting to bud and draw it. Guess what the fully in bloom leaf or flower will look like - draw a picture and write a description.
- Imagine you are an inventor and you are making something to explore Buffalo Lake. Draw your invention and write how it works and what you will discover!

- Find a wild mushroom and draw a detailed picture of it. Write any interesting features it has and label your drawing.

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.

Buffalo Lake Métis Settlement

10 WAYS YOU CAN HELP PROTECT AQUATIC HABITATS

1.) Respect Habitat
Healthy habitat and survival go hand in hand. Please treat with care.

2.) Leave Nothing Behind
Remember to leave nothing behind but your footprints and collect and dispose of your trash.

3.) Keep Off Highway Vehicles Out
Driving OHV's (quads, side-by-sides, dirt-bikes, etc.) through water can destroy aquatic habitat by creating sediment in the water and can introduce invasive species that can be harmful to aquatic habitat as well.

4.) Maintain Riparian Vegetation
Healthy riparian areas protect water quality, provide aquatic habitat and can also be effective in removing excess nutrients and sediment from surface runoff and shallow ground water. The riparian area can also provide shade to waterbodies to optimize light and temperature conditions for aquatic plants and animals.

5.) Maintain Fish Passage
Obstructing waterways can change the movement and migration of fish by blocking passage to spawning grounds or available food sources.

6.) Prevent Entry of Deleterious Substances in Water
Pollution such as sewage, oils, hydraulic fluids, pesticides, etc., can impact fish and animal growth, respiration, reproduction, larval survival and can cause abnormal development and destruct aquatic habitat.

7.) Fish Responsibly
If you intend to keep your catch, take only what you intend to use.

8.) Clean, Drain, Dry
Help prevent the spread of aquatic invasive species by cleaning and drying your boat and any boating equipment before moving into another water body. Aquatic Invasive species cause aquatic habitat loss by becoming predators, competitors, parasites and diseases to our native species.

9.) Practice Safe Agriculture
Livestock can trample and erode shorelines which can reduce water quality and can disrupt, degrade and destroy fish habitat such as spawning areas (where fish lay their eggs).

10.) Volunteer
Volunteer your time to conduct shoreline cleanups or even get involved in protecting your watershed and practice these steps.

Government of Canada / Gouvernement du Canada
Canada

Fisheries and Oceans Canada / Pêches et Océans Canada
Natural Resources Canada / Ressources naturelles Canada
Canada

TRANSMOUNTAIN

Buffalo Lake Métis Settlement

AQUATIC HABITAT RESTORATION FUND

- MITIGATING THREATS
- CONDUCTING STUDIES
- BUILDING CAPACITY OF INDIGENOUS PEOPLES
- PROTECTING AND RECOVERING AQUATIC SPECIES
- PROTECTING, ENHANCING, RESTORING AQUATIC SPECIES' HABITAT
- PROMOTING AND SUPPORTING STEWARDSHIP, OUTREACH AND EDUCATION

DID YOU KNOW?

Aquatic Habitat is the natural home or environment of living organisms in or near a body of water.

Aquatic Habitats in Alberta include rivers, lakes, streams, ponds, swamps, wetlands and bogs.

Habitat Restoration is the process of assisting the recovery of an area that has been damaged, degraded or destroyed.

Aquatic Habitats provide habitat to a wide variety of species including fish, amphibians, insects, birds and mammals.

Government of Canada Gouvernement du Canada
Canada

Fisheries and Oceans Canada
Pêches et Océans Canada

Natural Resources Canada Ressources naturelles Canada
Canada

TRANSMOUNTAIN

Project delivered by:

Buffalo Lake Métis Settlement CONSULTATION

buffalolakems.ca

Watersheds CANADA

watersheds.ca

Photo: Simon Lunn

Great Horned Owl

Bubo virginianus