



# RIPARIAN HEALTH ASSESSMENT

Grade 12  
2 Hours

Thank you for booking our “Riparian Health Assessment” program at FortWhyte Alive. This program is designed to help your students learn hands-on about the function of riparian areas. Students will have the opportunity to use a variety of field research techniques and processes.

## **Appropriate Dress for Your Field Trip**

To ensure that students get the most out of their FortWhyte experience, we ask that they be appropriately dressed for a 2-hour outdoor excursion. All of our programs include time outdoors, regardless of weather. Comfort and safety are key in making this an enjoyable and memorable experience.

## **Suggestions for Outdoor Dress**

Layering of clothing is very important in maintaining body temperature and in remaining dry. Four thin garments may offer the same degree of warmth as one thick overcoat, but the four layers allow much greater flexibility. Layers can be shed or added as temperature, wind, exertion, or other variables dictate.

Waterproof outer layers are also important. Rain may get us wet but so will dew on grass, melting snow on pants and puddles in the spring. Boots in the winter are always important to keep moisture out and heat in.

Young people are very concerned about their appearances; remind them that they will enjoy their field trip more if they are prepared!

**\*Please share this information with other teachers that are coming to FWA with your group.**



## GOAL

Learn about the function of riparian areas through hands-on field research techniques.

## OBJECTIVES

Students will:

1. Define riparian area
2. Complete field research tasks including setting up a quadrat, using transect tape, using a dichotomous plant key, and identifying Manitoba plants and weeds.
3. List functions of riparian areas.
4. Draw conclusions about riparian health at FortWhyte Alive, and make suggestions for riparian management.





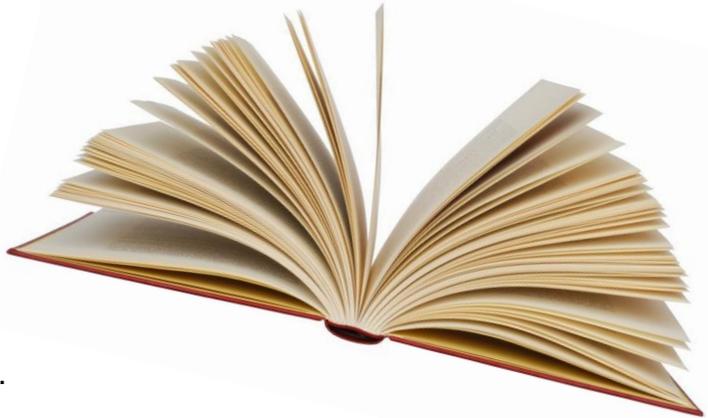
# VOCABULARY

<b>Dominant Species:</b>	The organism that is most abundant in numbers or biomass in a particular sampling area. This species often defines the ecological community (e.g. <u>cattail</u> marsh, <u>aspen</u> parkland).
<b>Identification key (dichotomous):</b>	An identification key is an organizational chart which is used to identify organisms using physical characteristics. A dichotomous key provides two options at each point in the chart.
<b>Invasive species:</b>	An organism (plant, animal, fungus, or bacterium) that is not native (introduced from another region) and has negative effects on our economy, our environment, or our health.
<b>Ecosystem Management:</b>	A process that aims to conserve and restore natural resources while meeting the needs of current and future generations of humans. The principal objective of ecosystem management is the sustainable use of natural resources.
<b>Noxious weed:</b>	A plant deemed a weed by a designating body (country, province etc) because it is harmful to crops, livestock, natural habitats or humans. Often non-native (introduced from another region), grow aggressively and crowd out other species.
<b>Quadrat or plot:</b>	A plot of standard area (often 1mx1m, 5mx5m or 10mx10m) within which one can count and record plants, animals or other ecological factors. This information can be extrapolated to estimate populations of organisms over larger areas.
<b>Riparian Area:</b>	The land adjacent to streams, rivers, lakes and wetlands, where the vegetation and soils are strongly influenced by the presence of water.
<b>Transect:</b>	A transect line is a straight path measured through an area, along which one counts and records particular things of interest (e.g. Plants, Birds, etc).
<b>Water Quality:</b>	The health of water for a particular function: supporting aquatic life, drinking water etc. Water quality is measured by assessing physical (temperature, turbidity), chemical (nutrients, pH) and biological (invertebrate and fish diversity) factors.
<b>Water transparency and Turbidity:</b>	Transparency is how clear the water is, turbidity is a measure of the amount of suspended solids in water based on the transparency. Suspended solids in water include sediment and algae and an increase in solids is a sign of a decrease in water quality.



# LITERATURE CONNECTIONS

All of the books listed below relate to the theme of riparian areas and are available through the Winnipeg Public Libraries and/or the Manitoba Education Instructional Resources Library. You may wish to make these titles available in your classroom surrounding your 'Riparian Health Assessment' field trip.



- > **The Nature of Things: Save My Lake (DVD)** by David Suzuki
- > **Pond Life: A Golden Guide**
- > **A Guide to Freshwater Invertebrates of North America** by J. Reese Voshell, Jr.
- > **Plants of the Western Boreal Forest and Aspen Parkland** by J.D. Johnson
- > **Water and Wetland Plants of the Prairie Provinces** by Heinjo Lahring
- > **Lake Winnipeg: Shoreline Management Handbook** by Manitoba Conservation
- > **Seine River Greenway Study** by The Seine River Task Force
- > **Wildstream: A Natural History of the Free-Flowing River** by Thomas F. Waters
- > **Bird Songs of the North American Prairie** by John Neville
- > **Freshwater Fishes of Manitoba** by Kenneth Stewart and Douglas Watkinson
- > **Riparian Landscapes** by George P. Malanson



# PRE-VISIT ACTIVITIES

## RIPARIAN RESEARCH (1-3 lessons)

### Science

Research riparian areas and their function. Have students prepare examples of how riparian areas can be affected by 1) agriculture, 2) forestry, 3) urban, and 4) recreational practices.



- a. Cows and Fish is a great resource website from Alberta which focuses on the impact of agriculture on riparian areas: [www.cowsandfish.org](http://www.cowsandfish.org).
- b. Information on Manitoba's riparian areas can be found at [https://www.gov.mb.ca/waterstewardship/water\\_info/riparian/riparian\\_areas.html](https://www.gov.mb.ca/waterstewardship/water_info/riparian/riparian_areas.html).

## DATA SHEET REVIEW (1 lesson)

### Science

Review and make sure students understand the Riparian Health data sheet as they will be using it in the field. It is provided at the end of this document (**Attachment #1**).

Learn to identify some common disturbance-caused plants and noxious weeds. Discuss the definitions of disturbance-caused, noxious weed and invasive species.

Have students conduct some searches to find the description of a plant of choice, listed in the Riparian Health Data Sheet, for example, fox-tail barley, sow thistle or purple loosestrife. You can find agricultural weeds at <https://www.gov.mb.ca/agriculture/crops/weeds/index.html> and further information on invasive species at <http://invasivespeciesmanitoba.com/>. Native plants that thrive in disturbed areas can be found in plant guides such as "Plants of the Boreal Forest and Aspen Parkland" (see Literature Connections).

Bird's Foot Trefoil and Clover are common non-native plants which may crowd out native species. These plants are grown by farmers as crops, and seeds were sown at FortWhyte to control soil erosion and improve soil nutrient levels, as these plants both fix atmospheric nitrogen in their roots. For information on the possible impacts of Bird's Foot Trefoil in native grasslands, visit <http://www.dnr.state.mn.us/invasives/terrestrialplants/herbaceous/birdsfoottrefoil.html>





## QUADRAT EXPLORATION (1-2 lessons)

### Science

Get your students thinking like field ecologists by practicing counting density and frequency of plant species within quadrats.

This website provides an online assignment: <http://www.saps.org.uk/secondary/teaching-resources/258-ecology-practical-1-measuring-abundance-and-random-sampling>.

Alternatively, you can head out into the school yard to practice. Use a hula hoop as a plot and count both density (how many per plot), and estimate percent cover (how much of the plot is covered by that species). Have them repeat for 10 quadrats and take an average of these to create graphs of species frequency on the school lawn.



## INVADERS

### Science

Learn more about the invasive species that currently call Manitoba's riparian areas home by visiting the Invasive Species Council of Manitoba at <http://invasivespeciesmanitoba.com/site/>.

You can also learn more about zebra mussels specifically at <http://www.gov.mb.ca/stopthespread/ais/index.html>.

Using the resources available, ask students to create a "Not Wanted" advertisement, in the style of the Wild West, about a Manitoba invasive species of choice. They should include the name of the species, an illustration or photograph, where it originated, where it is now found, how it spreads and how it is impacting the ecosystem.

While Common Carp already impact Manitoba waterways, just south of the US border, the Silver Carp are also pushing their way in our direction. This free online game can help to teach students about the impact of Silver Carp in a fun way. Visit <https://educators.brainpop.com/lesson-plan/invasive-species-lesson-plan-the-invasion-game/>

More lesson ideas are available in FortWhyte's Liquid Assets Invasive Species issue at <https://www.fortwhyte.org/wp-content/uploads/2014/08/SlowTheFlow-LiquidAssets-Fall-2016.pdf>.





# POST-VISIT ACTIVITIES

## RIPARIAN RECOMMENDATIONS (1-2 lessons)

### Science

Use the data collected on the field trip to have each student group prepare a report with their findings and a recommendation for management of FortWhyte Alive's riparian areas. Areas to cover include:

- a. What were the results of your research? Include comparison of the completed Riparian Checklists for lake and wetland riparian areas.
- b. What are the major factors influencing FortWhyte's riparian areas? Include human usage.
- c. What were some of the areas for improvement?
- d. What would your recommendations be, and how could they be implemented?

## COMMUNITY CONNECTIONS (1-3 lessons)

### Science/Social Studies

Research organizations that are advocating for the protection of riparian areas in Winnipeg/Manitoba and how they are going about doing this. You may choose to invite a classroom speaker from one of the following groups:

- a. Lake Winnipeg Foundation, [www.lakewinnipegfoundation.org](http://www.lakewinnipegfoundation.org)
  - b. Manitoba Eco-Network Water Caucus, <http://mbwatercaucus.org/>
  - c. Lake Friendly: [www.lakefriendly.ca](http://www.lakefriendly.ca)
  - d. Manitoba Forestry Association, [www.thinktrees.org](http://www.thinktrees.org)
  - e. Manitoba Conservation Districts Association, [www.mcda.ca](http://www.mcda.ca)
  - f. Manitoba Habitat Heritage Corporation, [www.mhhc.mb.ca](http://www.mhhc.mb.ca)
  - g. Ducks Unlimited Canada: [www.ducks.ca](http://www.ducks.ca)
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## SAMPLING SCHOOLYARD RUNOFF (1-2 lessons)

### Science

Find out where the water from your schoolyard or a local greenspace flows. Is the water leaving your schoolyard with a load of pollutants and sediment?

Take a sample of runoff water and test it.

Good urban test kits such as LaMotte Urban Water Quality Test Kits are available from supply companies such as <https://boreal.com/> or <http://www.hoskin.ca/>.

Discuss options for mitigating any issues with schoolyard runoff – planting trees or rain gardens, capturing water, or changing where water flows. Have teams of students prepare a proposal for what to do.



## RIPARIAN CITIZEN SCIENCE (ongoing)

### Science

If you have a stream or creek nearby, you may wish to set up a monitoring site in for students to test throughout the year.

Choose to participate in a Riverwatch or community-based water monitoring program in a waterway near your school. Equipment and programs are offered by FortWhyte Alive, South Central Eco Institute, and Lake Winnipeg Foundation. Find out more at <https://www.fortwhyte.org/foreducators/teacherpd/watermonitoring/>

Save our Seine and Louis Riel School Division also offer a Waterways program (2015) which also provides resources to get you started: <http://saveourseine.com/?p=558>





## **POLLUTION AND MANITOBA'S WATERWAYS (1-5 lessons)**

### **Science**

Broaden understanding of the impacts of pollution on Manitoba waterways. Have students research a particular human activity and its impact on water quality. Have students create a presentation, poster or model outlining three ways their focus group can protect water quality.

The following ideas are from an Alberta Parks: Kananaskis Freshwater Monitoring Teacher Resource (p. 21) accessed at: <https://www.albertaparks.ca/media/3265639/kananaskis-freshwater-monitoring-teacher-resource.pdf>

### **Focus Groups:**

Urban Wastewater, Urban Lawn and Garden, Crop Farming, Livestock Farming, Forestry, ATV/Offroading, Golf Courses

### **Focus Questions for Research:**

1. What are some potential impacts of this activity on our watershed? (Lake Winnipeg)
2. What measures could be taken to reduce these possible impacts in our watershed?





## Attachment #1

### Lakeshore Riparian Zone – Lake 2 Quadrat (0 meters to 3 meters inland) – 3m x 2m

#### Woody plants and cattails:

1. Is more than 85% of the area covered with vegetation? **Yes No**
2. Are more than 50% of the plants taller than your knees? **Yes No**
3. Are cattails present: **Yes No**
4. Are shrubs/small trees present, with young plants present to replace old plants: **Yes No**
5. What is the dominant shrub species? \_\_\_\_\_ (Use Plant ID)

#### Ground Layer Plants: Plants less than 1 metre tall. Toss your hula hoop within the quadrat area and investigate the area encircled by the hoop.

6. Estimate the number of different plant species: \_\_\_\_\_
7. Identify the dominant plant species (Use Plant ID Key): \_\_\_\_\_
8. Are any of these disturbance-caused plants present (circle) (Use Plant Book):
  - a. Dandelion, Fox-tail Barley, Birds Foot Trefoil, Silverweed, Clover
  - b. Do they represent less than 15% of plant cover? **Yes No**
9. Are any noxious weeds present (circle) (Use Plant Book):
  - c. Sow Thistle, Canada Thistle, Purple Loosestrife
  - d. Do they represent less than 15% of plant cover? **Yes No**

#### Wildlife:

10. Wildlife are present in the riparian area. **Yes No**  
Note any animals (invertebrates, birds, amphibians, mammals etc) or signs of animals (nests, bitten twigs, feathers, shells) observed: \_\_\_\_\_

#### Soil Test: Is the soil holding water?

*Use the soil coring tool. Twist it into the ground until soil reaches the 2" line.*

- a. Soil Type – take soil from the core and use the Soil Texture Key: \_\_\_\_\_
- b. Soil moisture test – fill to 4" line, where handle starts:  
Water was absorbed in \_\_\_\_\_ seconds.

#### General Questions:

11. Riparian area has not been physically reshaped by recreational activities or removal of soil. **Yes No**
12. The riparian area is undisturbed by mowing or grazing. **Yes No**
13. The riparian area has natural soil, without imported sand, gravel or rocks. **Yes No**





**Attachment #1**

**Wetland Riparian Zone – Richardson Marsh**

**Quadrat (0 meters to 3 meters inland) – 3m x 2m**

**Woody plants and cattails:**

1. Is more than 85% of the area covered with vegetation? **Yes No**
2. Are more than 50% of the plants taller than your knees? **Yes No**
3. Are cattails present: **Yes No**
4. Are shrubs/small trees present, with young plants present to replace old plants: **Yes No**
5. What is the dominant shrub species? \_\_\_\_\_ (Use Plant ID)

**Ground Layer Plants: Plants less than 1 metre tall. Toss your hula hoop within the quadrat area and investigate the area encircled by the hoop.**

6. Estimate the number of different plant species: \_\_\_\_\_
7. Identify the dominant plant species (Use Plant ID Key): \_\_\_\_\_
8. Are any of these disturbance-caused plants present (circle) (Use Plant Book):
  - e. Dandelion, Fox-tail Barley, Birds Foot Trefoil, Silverweed, Clover
  - f. Do they represent less than 15% of plant cover? **Yes No**
9. Are any noxious weeds present (circle) (Use Plant Book):
  - g. Sow Thistle, Canada Thistle, Purple Loosestrife
  - h. Do they represent less than 15% of plant cover? **Yes No**

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**Soil Test: Is the soil holding water?**

*Use the soil coring tool. Twist it into the ground until soil reaches the 2" line.*

- a. Soil Type – take soil from the core and use the Soil Texture Key: \_\_\_\_\_
- b. Soil moisture test – fill to 4" line, where handle starts:  
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**General Questions:**

11. Riparian area has not been physically reshaped by recreational activities or removal of soil. **Yes No**
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## Attachment #1

### Checklist Summary - Interpreting Your Scores

WETLAND SCORE: \_\_\_\_\_ Transparency tube value: \_\_\_\_\_ cm

LAKESHORE SCORE: \_\_\_\_\_ Transparency tube value: \_\_\_\_\_ cm

If you answered **YES** to 8 or more of the questions, it is likely that the riparian area is **healthy**, which means it is performing key riparian functions like storing water, trapping sediment, buffering the impact of flooding, providing primary productivity and providing fish and wildlife habitat.

If you answered **NO** to 8 or more of the questions, it is likely that the riparian area is **unhealthy and not functioning properly**.

If you answered **NO** to 3 or more of these questions, the riparian area is likely **healthy but with problems**. Some riparian functions may be impaired.



**START HERE**

