



## Did you say biodiversity?

Keep your eyes and ears open—biodiversity is everywhere! It includes all living organisms and ecosystems, as well as their complex and organized relations.

#### AN URBAN ENVIRONMENT WORTH **EXPLORING**

Use our BioKit to help you explore the rich biodiversity of the beautiful Richelieu River Valley. The Biosphere and COVABAR are pleased to present this family activity toolkit for your use.

To improve the water quality of the Richelieu River and its tributaries, the Comité de concertation et de valorisation du bassin versant de la rivière Richelieu (COVABAR), in cooperation with stakeholders in this region, works to inform, educate and raise awareness among all water users in order to preserve this precious resource.

www.covabar.qc.ca

Environment Canada's Biosphere encourages citizens to take action and to become involved in environmental issues. In addition to organizing exhibits and special events, the Biosphere offers education and awareness activities. www.ec.gc.ca/biosphere

Underlined words are defined in the glossary on page 33. In the electronic version of this document, available on the BioKits website, highlighted words are hyperlinks leading to a website.

# Rediscover your environment!

Fishing festival in Richelieu Photo: © COVABAR

## How to use the BioKit

- 1. Select a nearby park or green space (see pages 34–35).
- Gather your equipment (optional): GPS, magnifying glass, binoculars, camera, pocket mirror, clipboard, pencil and blank paper.
- 3. Go to your chosen spot and begin your study of the area by doing the proposed activities.





## Warning

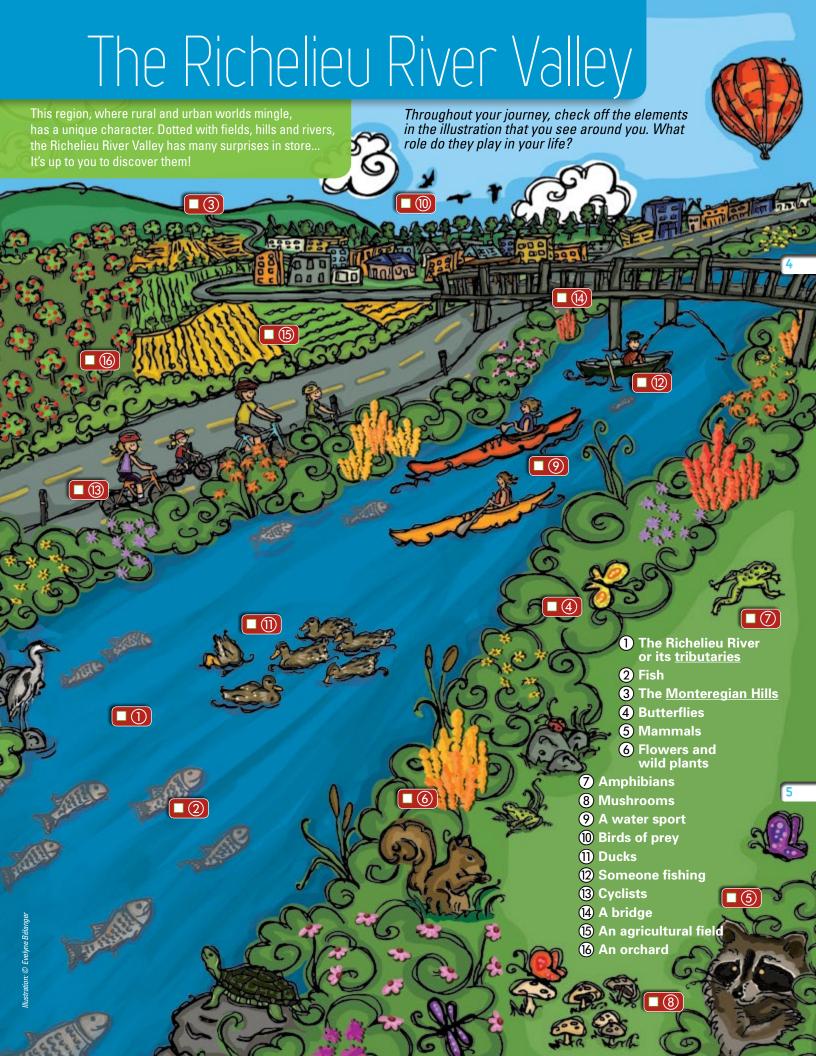
Always be very careful near the river and remain together to avoid accidents!

## Eco-friendly tips for hiking:

- Refrain from picking plants.
- Stay on the paths.
- Observe wild animals from a distance and don't feed them.
- Throw your garbage in a trash container or take it home with you.
- Leave only footprints and take only pictures!



You will see this pictogram throughout the BioKit. It indicates activities that can be done from a boat. Why not try out the activities in the BioKit from a canoe or pedal boat?



#### E

## Today we are visiting



Name of the place:		
Date:	Season:	
Time of departure:	Time of arrival:	
Explorer team:		
GPS coordinates:	Temperature:	°(

#### Across the seasons

The Richelieu Valley offers a feast for the eyes in every season. Retrace your steps at a different time of year and you will discover other aspects of the plant and animal life in the region. So always keep your eyes open!

#### WEATHER







☐ Sunny

☐ Partly cloudy

☐ Cloudy







Rainy

□ Snowy

■ Windy

Illustration: © Environment Canada — Artist: Caroline Brunet

## Eco-friendly tips for boating:

As someone who uses the water, you have an opportunity to change some habits and help save our watercourses:

- Refrain from picking **plants**.
- **Respect** fishing restrictions and quotas.
- Release fish back into the water when they are smaller than the **legal limit**.
- Respect <u>docking</u> restrictions. You could be in a **spawning ground**.
- Try not to walk on aquatic plants to avoid disturbing animal life.
- Don't throw your garbage in the river.

## And we're off!



#### **STOP AND TAKE A BREATHER!**

Breathe deeply and take a look around. What is your first impression?

Share your observations with your companions.

#### **CREAKS, CRACKS AND PEEPS!**

The sound environment has an impact on our well-being.
Close your eyes and listen. Note the noises you hear.
Coming from nature:

Caused by human activities:

What sounds do you dislike the most? Which ones do you like?



Photo: © COVABAR

in water. For instance, dragonflies can spend

WATER IS ESSENTIAL...

**FOR WHAT?** 

Why should we be concerned by water quality?

Name some of your activities that require water.

Our lakes and rivers are home to many organisms. Many microorganisms, macroinvertebrates, plants and amphibians have their habitat in these ecosystems. Though they don't spend their whole life in water, a large number of animals drink or feed in watercourses, which also serve as breeding areas for other species.

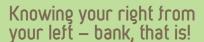
The Aquatic World



# Biological Corridors

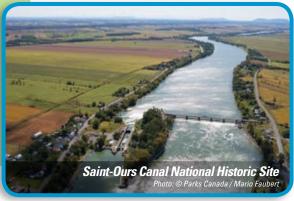
Biological corridors are areas that allow animals and plants to move or propagate from one habitat to another in search of food, a mate or a place to rest. Riparian strips composed of trees, shrubs and grasses make excellent biological corridors. Do you know of any others?

**Nesting site** within a riparian strip



First find the direction of the current by carefully observing the water surface. Stand with your back to the current, which means that if there was an object on the water, you would see it going away from you. The right bank is on your right and the left bank is on your left. It's that simple





If you were a small hare, could you easily move along the riparian strip that you see?













# Scientist for a Day

#### Characterize a riparian strip

A green and varied riparian strip indicates that a watercourse is probably healthy. This next activity will help you assess the health of the strip.



## Instructions

- Select a portion of a <u>riparian strip</u> about 10 metres long. This strip will be your study site.
- Answer the questions on the observer's sheet.
- Calculate the score.
- Use the eye dropper graphic (below) to evaluate the health of your study site.

State of the hank: Does the bank show any signs of human activities (presence of a lawn, a house or a low wall)?

- 3 points No sign of activity
- 2 points
  - A few signs
- 0 points
- Many signs

Land use: What can be seen on the piece of land beside your watercourse?

- ■3 points
- Wild vegetation or forest
- 2 points
- Herbaceous plants and shrubs
- 0 points





Rapids at the Ch'ambly basin Photo: © COVARAR

10 to 12 points 5 to 9 points 0 to 4 points

How does the water look?

- 3 points
- Clear
- 2 points
- Slightly tinted
- 0 points
- Turbid (cloudy)

Is there any garbage in the water or on the hanks?

- ■3 points
- No garbage
- 2 points
- Some small bits of garbage
- 0 points
- Lots of garbage

Very good site offering an excellent habitat for animals and plants.

Site of average quality offering a limited habitat for animals and plants.

Disturbed site offering a poor habitat for animals and plants.

## Animal Diversity

Photo: © Michelle Durant

#### THE BEAVER

The largest rodent in North America has a voracious appetite. A single beaver can cut down up to 216 trees yearly to feed itself and to build its lodge and dam. Although clumsy on land, it is

an excellent swimmer thanks to its webbed feet and its tail, which it uses as a rudder.

If there was a beaver near you, could it find enough trees to get a good meal?

Photo: © Nature-Action Québec

# Play detective. Follow the clues...

Squirrel tracks Photo: © Nature-Action Québec

This versatile animal adapts to a variety of environments. Farmers like it because it eats insects and small mammals that are harmful to crops. Its very fine hearing helps it to accurately locate and catch a small rodent hidden in the tall grass.

What is the smallest noise that you are able to hear?

Most animals are cautious or nocturnal. but they leave clues that they've been there. Like a detective, carefully look for indications of their presence.

THE RED FOX

You don't need to go very far; animals will sometimes be hiding near you...

#### THE DEER

This mammal is quite common in the region. Have you ever seen one? The babies, called fawns, give off no scent during their first week of life. This makes it harder for predators to find them. To warn of danger, white-tailed deer raise their tail, revealing a patch of white fur that is easy to spot.

#### Open your eyes!

Check off the clues that you have found:

- ☐ Animal tracks in mud, sand or snow
- Branch grazed by a deer, or gnawed by a hare or a porcupine
- ☐ Shell of a mollusc
- Claw marks on a tree
- Droppings
- ☐ Squirrel's, bird's or wasp's nest
- ☐ Hole bored by a woodpecker

Note other clues that you have found (burrow or hole, eggs, hairs, feathers, bones, smells).



#### Strange-looking plants

Have you ever noticed a green mass floating on the water? Perhaps you thought it was some form of pollution? Not at all! In fact, these are simply tiny floating aquatic plants! Duckweed is very often found on stagnant bodies of water.

Duckweed, or water lentils. floating on a body of water

Who can find it first?

Plant Diversity

The sugar maple is the one we know best, but there are many other maple varieties in the Richelieu Valley.

Have you seen any of the varieties below?

Striped maple



☐ Silver maple

Photos of maples: © COVABAR

■ Manitoba maple



© Nature-Action Québec

Red maple

Photo: © Pierre Rona

#### Water is essential for the production of maple syrup.

When it grows, the maple tree produces sugars. By absorbing water through its roots, the tree dilutes stored sugars and creates the sweet liquid we call maple sap. All you have to do is boil the sap and enjoy the syrup!

#### **MAKE A TREE BARK RUBBING**

Press your sheet of paper against the trunk of a tree. With your pencil, rub the sheet and patterns will appear. By doing so, you'll be able to see that each tree variety has its own specific bark.

Forgot your sheet of paper? Do this activity upon your return, using the trees near your home.

Plants use various strategies for spreading.

Animals can propagate seeds and fruits unknowingly. Squirrels often bury seeds and sometimes forget about them!

Do you think that humans can propagate seeds?

#### **LOOK AROUND YOU AND UNDER YOUR SHOES. DO YOU SEE ANY SEEDS?**





Cone and burr illustrations: © Isabel Julian Other illustrations: © Isabelle Grégoire

**Parachute** 

Burr (burdock)







Diversity in the Air

identify a bird you don't see?

What's the best way to

By the way it sings!



☐ American Goldfinch
Call: Per-chik-or-ree,
per-chik-or-ree
Photo: ® Mdf



■ Northern Cardinal
Call: Kyo Kyo Kyo
Photo: © Ken Thomas



☐ American Robin
Call: Cheerily cheer-up,
cheer-up cheerily cheer-up
Photo: ® Jacques St-Jean



☐ Red-winged
Blackbird
Call: Conk-a-ree
Photo: © Jacques St-Jean



#### **MIGRATORY BIRDS**

During their spring and fall migrations, birds gather together in large flocks to make their journey.

Have you ever seen any?



Close your eyes and listen to the bird calls.

## Birds of Prey

Majestic birds of prey are present throughout the Richelieu River Valley.

These carnivores at the top of the food chain eat mostly small mammals such as hares and rodents, or even fish. The main difference between birds of prey and other carnivorous birds is their impressive claws that allow them to catch and kill their prey. They also have excellent vision and are able to spot prey the size of a pigeon from a distance of more than one kilometre.

#### Pay attention,

especially when trees are leafless, because you could see a bird of prey perched on a tree awaiting its meal!

#### A Peculiar Foodie

Turkey Vultures are abundant in the region. These birds have a very unusual diet. They are scavengers, meaning that they prefer carrion, or dead animals. You can often see them flying around the peaks of the Monteregian Hills. After sunset, these vultures gather at a spot near the Richelieu River, where it's possible to see them arrive at their roost (see Turkey Vultures' night roost, pages 34–35).





Photo: @ Dori

# An Agricultural Hotspot

Agriculture is at the heart of the Richelieu Valley. Fields create specific <u>ecosystems</u> where a large number of small creatures find food and shelter.

## The watershed and agriculture...

Running water carries soil substances that end up in water bodies and can pollute them. Fortunately, there are solutions. Have you ever noticed trees and shrubs along a ditch in a field? They are the result of initiatives by farmers to improve their riparian strips. Such vegetation acts as a filter and prevents pollutants from directly reaching the water.



While foraging flowers for food,

pollinator insects carry pollen from one flower to another. Over 70% of our crops depend upon pollination. These insects are essential for common fruit and vegetable crops like apples or cucumbers. These pollinators include bees, wasps, butterflies, flies and beetles.

Nowadays, pollinator insects are threatened by :

- elimination of their habitat,
- the use of pesticides,
- monoculture,

- competition with other species (often alien species), and
- diseases and parasites.



**Soya** Photo: © COVABAR



**Wheat**Photo: © Jean-Pierre Guillet



Blueberries
Photo: © Opiola Jerzy



During your excursion, spot the different crops around you...

Who will be the first to complete a line and call bingo?



**Corn** Photo: © USDA photo



Strawberries
Photo: © FoeNyx



Urban agriculture



**Apples** Photo: © Markus Hagenlocher



Combine harvester



Pumpkins
Photo: © Danielle Scott



Ear of corn Photo: © Stescha

# Junior Mycologists



Whether they grow on the ground, on tree trunks or on dead wood, mushrooms speed the decay of abundant organic matter. In this way they contribute to the production of rich soil that contains many nutritional elements for plants. Some mushrooms are edible, but others are poisonous.

So, unless you are an expert mycologist, don't touch them!

Find a mushroom.

Bend over and, with help of your mirror, look delicately under its cap. Does it have lamella (blades), folds or tiny tubes? This is where the <u>spores</u> that allow it to reproduce are found.

Mushrooms come in all shapes and colours. Have you ever found a small brown sac on the ground that gives off dust when someone steps on it? This is a dried mushroom called puffball.

## Three Cheers for Bugs!

All environments are home to insects and other <u>invertebrates</u> that are precious allies for nature and for us. They work constantly to decompose dead leaves and other organic matter. They are also a major source of food for many species.







Monarch butterfly in development

Photos: © Jacques St-Jean

## **OBSERVE A SNAG!**

Look at a snag (dead tree still standing) or gently lift up a log lying on the ground, and you will see that it is teeming with life. How many kinds of insects or small creatures do you see?

Don't forget!

After you've made your observations, be careful to put everything back where you found it.



# Imagine you are a frog: At the spot where you stand, would there be a place to hibernate?

#### **HIBERNATION OF AMPHIBIANS**

The term "amphibian" means that these animals can live in water and on land. Their body temperature varies according to the temperature outdoors. Amphibians have developed survival mechanisms. They need to find a place to protect themselves from the cold.

If you had to protect yourself from winter, what would you do?

Frogs and bullfrogs hide at the bottom of the water and wait until the return of warmer weather.

Tree frogs remain hidden in the forest, among the dead leaves or in an abandoned burrow, and produce their own natural antifreeze!



### WHY DON'T FISH FREEZE?

Fish don't freeze in winter! Since ice floats, it forms an insulating layer on the surface of water bodies. Under that layer, the water doesn't freeze, but remains liquid. This insulation allows fish to survive.

## Can you see evidence that animals have been here?

In winter, we can see tracks in the snow.

Observe the different shapes and how the tracks are placed, and follow the trail.



Raccoon tracks

Draw the tracks you found so that you can identify them when you get home.

#### Answer these questions:

- What is the distance between the tracks?
- How many toes do you count?
- How are they arranged?
- Can you figure out the animal's height by the size of its tracks?

# Species at Risk

Some plants and animal species are at risk. because their habitat is disappearing or is fragmented. When this happens, the animals lose their home, their source of food and their breeding area.

Furthermore, pollution, diseases, invasive species and climate change have a huge impact on animal and plant populations.





**Bobolink** Photo: © Pierre Bonenfant

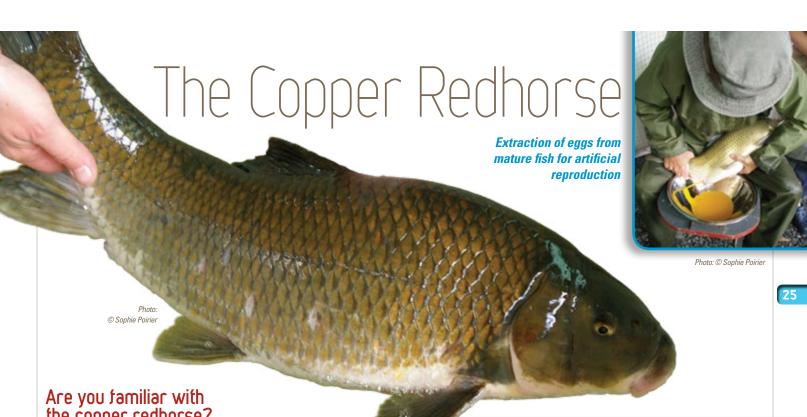


Western chorus frog Photo: © Nature-Action Québec



Shagbark hickory Photo: © Nature-Action Québec

If you were one of these animals, could you move about safely for a distance of IO steps from where you stand? How about 25 steps? 50 steps?



Are you familiar with the copper redhorse?

It's a fish unique to Quebec; it doesn't live anywhere else on the planet! Unfortunately, its survival is threatened. Its name is due to the reddish-copper colour of its scales. Copper redhorses can be found in other Quebec rivers, but the Richelieu is the only one where it breeds.

Many measures have been taken to improve the status of the copper redhorse. The Vianney-Legendre fishway in the Canal-de-Saint-Ours National Historic Site of Canada, the Pierre-Étienne-Fortin wildlife sanctuary at the Chambly rapids, and the Île de Jeannotte and Île aux Cerfs archipelago are good examples of efforts to protect this species' habitat (see the map on pages 34-35).



## Invasive Alien Species

#### Of the species below,

which ones are considered to be invasive alien plants or animals in the Richelieu Valley?

Round goby



Common reed

Multicoloured Asian ladybeetle
Photo: © MAPAQ





European Starling Photo: © Pierre Selim

#### Answer:

Multicoloured Asian ladybeetle: An insect introduced voluntarily into certain types of crops and whose reproduction is impossible to control. European Starling: A bird that lives in flocks and whose reproduction cannot be controlled.

Emerald ash borer

Photo: © Klaus Bolte,
CFS-SCF, NRCan-RNCan

Common reed: Originally from Eurasia, once it appears in an area, this plant leaves no more room for <u>indigenous</u> vegetation.

Round goby: A fish from the Caspian and Black seas, introduced accidentally by ships.

Emerald ash borer: An insect that penetrates under the bark of ash trees and kills them.

Imadi to IIA

## Luropean Water Chestnut

The European water chestnut is a highly invasive aquatic plant that was first observed in the Rivière du Sud, a <u>tributary</u> of the Richelieu. Within a few years, this species managed to completely cover whole sections of the river, replacing many <u>indigenous</u> plant and animal species. This has weakened local biodiversity considerably.



Water chestnut corms
Photo: © COVABAR



#### **INVASIVE AND SPINY!**

When water chestnut invades an area, it prevents light from reaching the bottom and reduces the level of oxygen in the water, making life quite difficult for other species. It also reproduces very quickly: a single plant can produce up to 300 corms per year! These numerous spiny "nuts" can remain underwater for as long as 12 years before they germinate.

A series of campaigns consisting of pulling out the plants by hand or with the help of boats and even floating power shovels has reduced the problem. However, yearly monitoring is necessary to keep this plant under control. You can help by reporting any sightings by email: services@cimehautrichelieu.qc.ca

# My Diagnosis

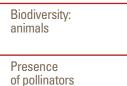
Now that you've gathered an abundance of observations, use them to reach your own diagnosis about the health of your urban environment by filling in the chart opposite. -You can easily complete it on the BioKits website and

compare your results with others! Curious?

Follow the link: www.mybiokit.com

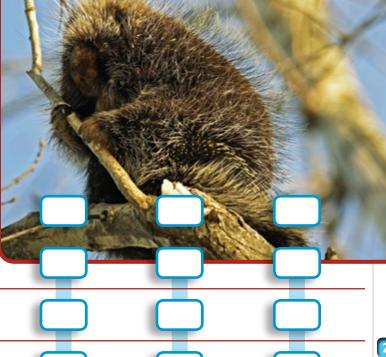
Check the appropriate boxes:	Excellent!	Pretty good, but	Things must improve!
Trees, bushes, balcony planters and gardens providing a biological corridor between your home and the park			
First impression of the place			
Surrounding sounds			
Air quality			
Biodiversity: plants			





Control of invasive species

Waterways, ponds or lakes



#### Recommendations: Enjoy your

help save species at improve and think

Choose an element of a solution that is

Talk to people about

Pink Lady's Slipper

## Back Home

Your excursion is over? It's now time for you to help protect biodiversity! At home and outside, there are lots of things you can do.

Here are some possibilities:



Try eco-friendly gardening., When you grow plants at home, be sure they are not invasive alien species. Choose indigenous species instead. And don't use pesticides!

Don't carry firewood from one place to another.

You could inadvertently transport undesirable travellers like emerald ash borers.

> Plant fruit bushes to attract birds and

provide food for them.



Use a barrel to collect rainwater, and use it to water your flower beds.





Photo: © iStockphoto/jml5571



Take reusable bags and avoid using plastic bags. You could even create your own personalized bag.



Support local farmers and choose food that is in season.

Don't waste potable water. Turn off the tap when you brush your teeth. Don't let the water run just to get a glass of water. Leave a jug of water in the fridge instead.

Tap water comes from the river and returns to the river through the sewer system.

> Be careful of what you pour down the drain. Some substances can't be removed and will therefore end up in the river.

Other resources of local interest

(information available in French only).

- EcoMarché de solidarité régionale
- Centre d'interprétation des énergies renouvelables
- Fondation RHA (Reconstruction harmonieuse de l'agriculture)

Information available in French only.

Think Back on Your Outing

Create a souvenir of your outing in the form of a drawing, text, poem or collage.

Jacob hopes that you had as much fun as he did exploring biodiversity!



#### Docking:

To anchor or berth a boat.

#### Ecosystem:

Biological community composed of organisms interacting among themselves and with their environment.

#### Fragmented:

Divided, separation of a whole into smaller pieces.

#### Herbaceous plants:

Plants whose stem is soft or flexible.

#### Indigenous:

Plant or animal that is native or occurring naturally in a region.

#### Invasive alien species:

Brought into a region accidentally or on purpose, these plant and animal species are a major threat to biodiversity and are very difficult to control.

#### Invertebrates:

Animals without a spinal column.

#### Larvae:

Intermediate form of development among certain animals, between the egg and the adult stage.

#### Macroinvertebrates:

Small organisms without an internal skeleton, visible to the eye, that live at the bottom of water bodies.

#### Microorganisms:

Living beings that can't be seen with the naked eye.

#### Monoculture:

Agriculture based upon a single plant species.

#### Monteregian Hills:

Line of hills in the Montérégie region, in Montréal and in the Eastern Townships.

#### Mycologist:

A person who studies fungi (mushrooms).

#### Riparian strip:

Portion of land beside a watercourse.

#### Spawning ground:

Area where fish reproduce.

#### Spore:

Reproductive element of moss, of some plants and of mushrooms.

#### Tributary:

Watercourse that feeds into another.

#### Watershed:

Territory through which water runs toward a watercourse or a lake.

Map of Places to Visit





#### The end of a great outing

Photo: © COVABAR

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  WWW.crem.qc.ca,
- Mouvement écologique du Haut-Richelieu: www.meh-r.org,
- Nature-Action Québec: www.nature-action.qc.ca,
- Tourisme Montérégie: www.tourisme-monteregie.qc.ca
- 1 Information available in French only.



