

The Vital Organs of our Lakes and Rivers



Hands-On
Activities for
Teachers



> The Beginning of a River

The headwaters provide important insects, freshwater shellfish, and organic matter to the fish and animals that live farther downstream. The headwaters also provide clean and cold water for wildlife and people downstream, and are usually located in forested lands. Protecting headwaters from damaging forestry practices is essential for maintaining clean water and aquatic habitat for wildlife species.



> Wetlands

Wetlands include marshes, bogs, fens, and swamps, and they are often found around lakes, ponds, and rivers. Wetlands are sensitive to destruction of surrounding forests, because it can change the water levels, increase air temperature, and alter nutrients in the wetlands. Fast changes in wetland habitats occur too quickly for species to adapt. Worst even still is when wetlands themselves are directly destroyed and developed by people.



> Vernal Pools

Vernal pools are really important breeding sites for many amphibian species. Vernal pool sites, however, cannot be seen once they have dried up and can be easily destroyed by logging and forest road building. Significant vernal pools must be identified, mapped, and protected year-round for the benefit of species that rely solely on them for breeding habitat.



> Streamside Vegetation

The trees, shrubs, and all other vegetation that grow in riparian forests are generally species that grow well in wet conditions. Riparian forest also shades the water, provides food for wildlife, holds the riverbank and prevents erosion, and moderates flooding. When trees in the riparian zone are cut, many of these important functions are ruined. Maintaining wide untouched riparian zones (called buffers) between water and logging, agricultural activities, or land developments is essential to protecting water quality and wildlife habitats.



> Cold Springs and Shaded Pools

Cold shaded pools are made when cool streams and springs feed into the river, and from lots of overhead tree shade. Logging, agricultural activities (like ploughing fields and spraying herbicides), and urban development (like building homes and stores, paving parking lots and roads) can ruin cool springs and streams by turning them into warm flowing mud, and can reduce shade over pools. To protect sensitive fish species, important cold pools should be identified, and the springs and streams that keep them cool should be protected from destruction.





Building a Model Watershed

Class Activity

The following activity demonstrates how watersheds drain into streams, rivers and eventually, the sea, and how pollutants are carried from watersheds to bodies of water. The activity also demonstrates the relationship between small and large watersheds.

Procedure



1. Divide students into groups of three or four. Each group will need a container, two sheets of newspaper, one sheet of plastic, one book, some baby powder (or soil) and one spray bottle filled with water and a few drops of blue food coloring.



2. Crumple each sheet of newspaper separately and place them next to each other at one end of the container. Try to vary the shape of the two. Place the sheet of plastic over the crumpled newspaper, causing it to form hills over the high places, and valleys in the low places. Put a book under the end of the container with the newspaper, which will allow water to flow

down the valleys as streams and rivers and collect in the lake at the front of the container. The sides of the plastic sheet should be placed down into the container.



3. The plastic sheet represents the ground surface covering the watershed. Looking at the watershed model, try to guess where the main rivers will flow. Now, it's time to put the model to the test. Spray several pumps of blue water from the spray bottle on the model. Notice that each stream has its own watershed (the area that drains into it) and that the entire model is a larger watershed because all the water eventually flows into the pool at the bottom of the container. Count the number of small watersheds.



4. The model now represents a clean watershed. Let's add some pollutants. Sprinkle a little baby powder over the model. The baby powder represents a variety of pollutants, including oil, road salt, animal manure, excess fertilizers, pesticides, tiny particles of soil and other harmful materials. Rapidly spray nine pumps of water over the upper portion of the watershed. Observe the way in which the pollutants are carried by the water and the end condition of the lake. Repeat if necessary.

Materials (for each group)

1. One container at least 22 cm wide, 33 cm long and 6 cm deep. A metal baking pan will work fine.
2. Two sheets of newspaper.
3. One sheet of thin plastic at least 20 cm larger in all dimensions than the container.
4. One spray bottle.
5. One book.
6. Baby powder. (Some very fine soil will also work).
7. Blue food coloring.

Student Objectives

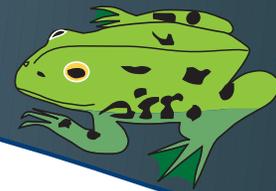
1. The student will recognize that bodies of water are the end product of drainage from watersheds.
2. The student will predict where the water and pollutants will flow.
3. The student will observe the watershed in action and record observations.
4. The student will see the end results of pollution within a watershed and how it impacts bodies of water.

Questions

1. Describe the relationship between small and large watersheds.
2. What are some possible solutions to keep bodies of water clean?
3. Who pollutes watersheds?
4. Think about the watershed(s) in which you live. What likely pollutants exist there?

Watershed modeling activity is adapted from <http://www.teachingtools.com/H20/Activity-Watershed.htm>

More Class Activities



- 1** Write *job descriptions* (as in a job advertisement) for some of the organisms that play a key role in our environment.

These organisms help **provide the ecosystem services that sustain human life**, such as soil formation, air filtering, water purification, pollination and wild food production, and climate regulation. Organisms could include soil bacteria, earthworms, mosses, wood-rotting fungi, ladybugs, bees, insect-eating birds and barn owls.

- 2** Send a message to an alien planet illustrating 10 New Brunswick plants and animals.

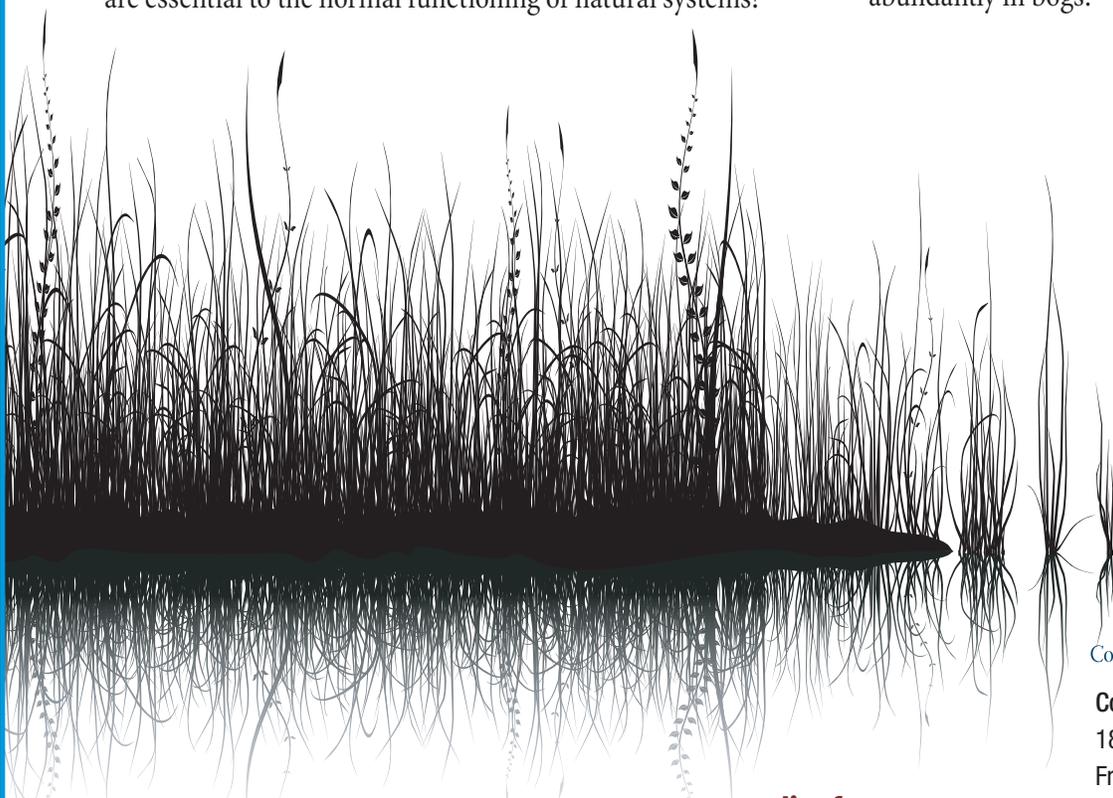
Discuss which species to choose to best represent the varied nature of the New Brunswick countryside. Don't forget some of the lesser-known or invisible species that are essential to the normal functioning of natural systems!

- 3** Find pictures of and compare two New Brunswick landscapes.

Compare one picture where **unwise land management** is leading to a heightened risk of flooding (unsustainable forestry practices, destruction of wetlands, removal of river vegetation, river straightening, development of natural flood zones, etc.), to another picture where **natural ecosystems are being used as buffers** to reduce flood risks (including the maintenance of wetlands, intact riparian zones, and natural floodplains).

- 4** Make an imitation bog from a loofah sponge.

Have students make a loofah bog by layering paper towel on top of a soaked loofah in a deep tray. Try growing alfalfa or mustard seeds on top to represent the sphagnum moss and other plants that grow abundantly in bogs.



Adapted from educational materials from Scottish Natural Heritage and the Scottish Wildlife Trust

www.acadianforest.ca



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