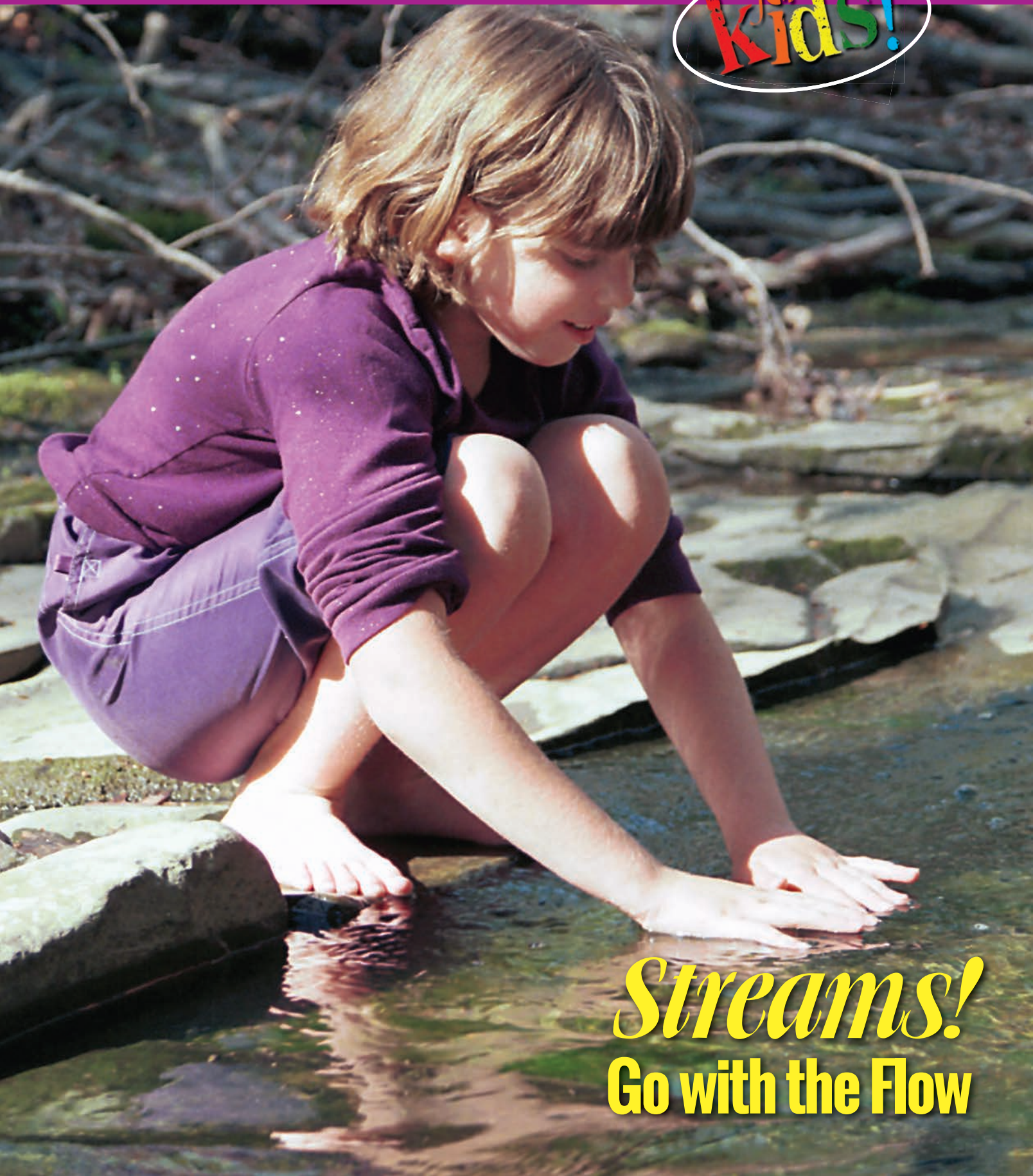
NEW YORK STATE
Conservationist
for Kids!



Streams!
Go with the Flow

Welcome to

NEW YORK STATE

Conservationist for Kids!

In This Issue

Streams are an important part of the physical landscape and provide important habitat for many animals. In this issue, we will learn more about what streams are, the role they play in the environment, and ways that they are impacted, both positively and negatively, by humans.

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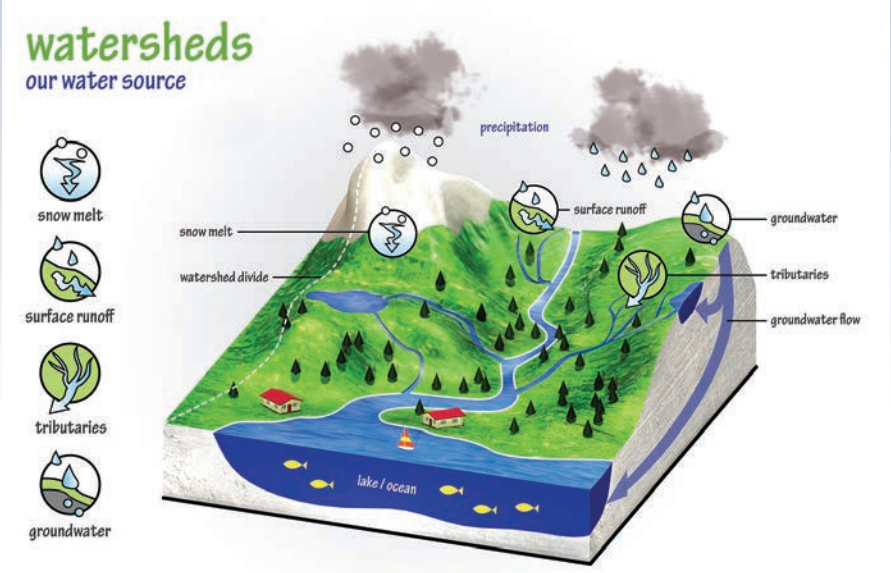
What is a Stream?

A stream can be defined as a body of water with a current that normally flows through a channel.

Some streams flow all year, while others flow only part of the year, such as after snowmelt or heavy rain. Streams that flow only part time are called “intermittent.” Many big rivers begin as mountain streams at higher elevations, flowing downhill and increasing in size as they go. Streams are an important part of the environment for a number of reasons. For example, they provide water for irrigation and habitat for wildlife. As streams merge, they increase in size and volume, often becoming rivers. Streams are also important to people in other ways, as places for fishing, boating, hunting, and other recreational activities. In addition, streams are essential to manufacturing and farming and can be used to provide energy for our homes, too.



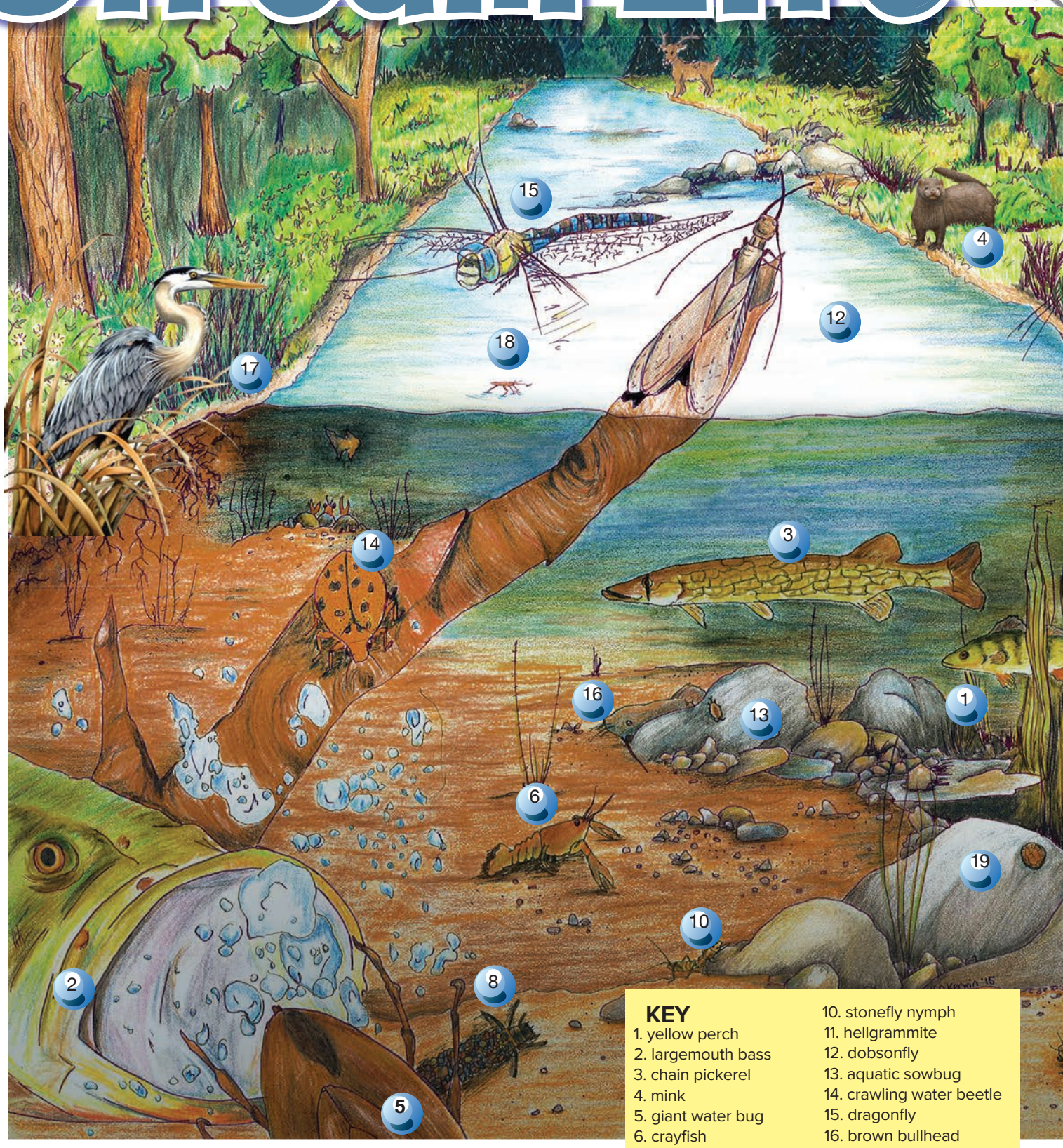
Streams are an important part of watersheds

A watershed is the land area whose waters drain into a stream, lake, or other body of water. Large watersheds can drain thousands of square miles of land to feed large rivers, while small watersheds drain less land and feed intermittent streams. Streams flow into lakes, ponds and rivers, and often the water from a stream ends up in the ocean.

For more information about watersheds, see the winter 2009 issue of *Conservationist for Kids*, “Exploring New York’s Rivers,” and the “We All Live in a Watershed" page, both on NYSDEC’s website.

Streams support many different kinds of life, from bugs to birds

Stream Life



KEY

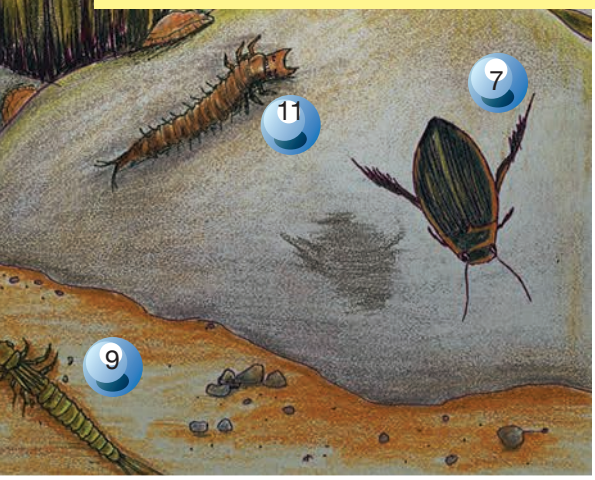
1. yellow perch
2. largemouth bass
3. chain pickerel
4. mink
5. giant water bug
6. crayfish
7. diving water beetle
8. caddisfly larva
9. damselfly nymph
10. stonefly nymph
11. hellgrammite
12. dobsonfly
13. aquatic sowbug
14. crawling water beetle
15. dragonfly
16. brown bullhead
17. great blue heron
18. water strider
19. water penny larva

Coldwater versus warmwater streams

Streams contain a wide range of animal life, including fish and a number of different macroinvertebrates. Macroinvertebrates are creatures large enough to see (macro) that don't have a backbone (invertebrates). They include young insects (larvae or nymphs), mussels, crayfish, worms, and snails.

Different animals will be found in different streams, depending on the temperature of the water and how fast or slow it is moving. Cooler streams are typically faster moving, have rockier bottoms, have more riffles (areas with ripples, where the water is moving faster), and have higher levels of oxygen in them. Warmer streams tend to be slower moving, deeper, have silty bottoms and lower oxygen levels. The cooler streams are typically shadier, while the warmer streams are heated by exposure to sunlight.

Coldwater streams support fish such as trout, and some of the more commonly seen macroinvertebrates are caddisfly nymphs, mayfly nymphs, stonefly larvae, snails, water pennies, hellgrammites (Dobsonfly larvae), and crayfish. In warmer water, common fish species include bass, pike, and panfish such as sunfish. Common macroinvertebrates include clams, dragonfly and damselfly nymphs, and worms.

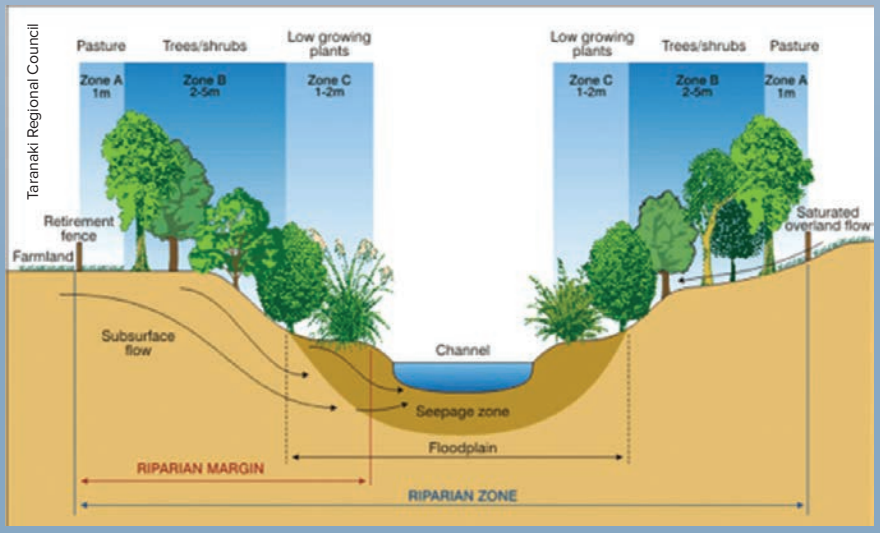


Streams and riparian zones are important to many kinds of wildlife.

Mammals such as mink, river otters, muskrats, and beavers spend much or all of their time in and near the water, using the riparian vegetation for shelter and food. Animals such as raccoons dine on aquatic organisms such as fish, frogs, and crayfish, and also use the riparian zones as means of travel from one habitat or location to another. Many different birds use the riparian areas for shelter, food and nesting sites. Kingfishers, waterfowl, osprey, bald eagles, herons, and many songbirds are just some types that rely heavily on this habitat and the streams that the riparian zones protect. Reptiles and amphibians such as turtles, frogs, and salamanders spend much of their lives in or near the water. Salamanders and frogs lay their eggs in the water, often using the rocks in the stream bed or the vegetation along the edge to secure their eggs to. Their juvenile forms are fully aquatic until they transform into adults. Turtles often nest in the soil near the streams, and primarily feed upon fish and other animals found in the water. As so many animals depend on streams in one way or another, they are a critical part of the environment.

What is a riparian zone?

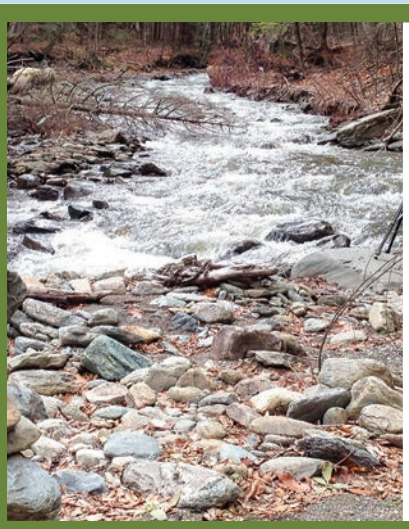
The area on both sides of a stream is known as the riparian zone. This is the area where the stream interacts with the land and the vegetation growing along the stream. It is also known as the stream corridor. Riparian vegetation includes specially adapted plants that can withstand flooding. Streams are healthiest when they are surrounded by forests and wetlands.



Streams are Dynamic!

Dynamic means they are always changing. Streams can go from slow and shallow or even dry, to powerful and fast within days or just hours after a major snowmelt or storm. Streams have a natural rhythm and flow that changes seasonally, with summer normally being lower than spring, fall and winter. They can be beautiful, but they also can be destructive. While streams are very important to the environment and are great places to fish, play, and explore, they are not good places for houses or other buildings to be built near. Without warning, a stream can wash away a bank or change direction after a major storm, hurricane, rapid melting of deep snow, or ice blockages, often harming people and structures. This happened in several towns and cities in upstate New York after Hurricane Irene and Tropical Storm Lee.

When a stream channel can no longer hold the water flowing from upstream, it overflows the stream's banks and spreads onto the floodplain. A floodplain is an area of land around a stream or river that is likely to flood during times of high water levels. Floodplains are nature's way of reducing stress on streams, and we should avoid building on or near them.



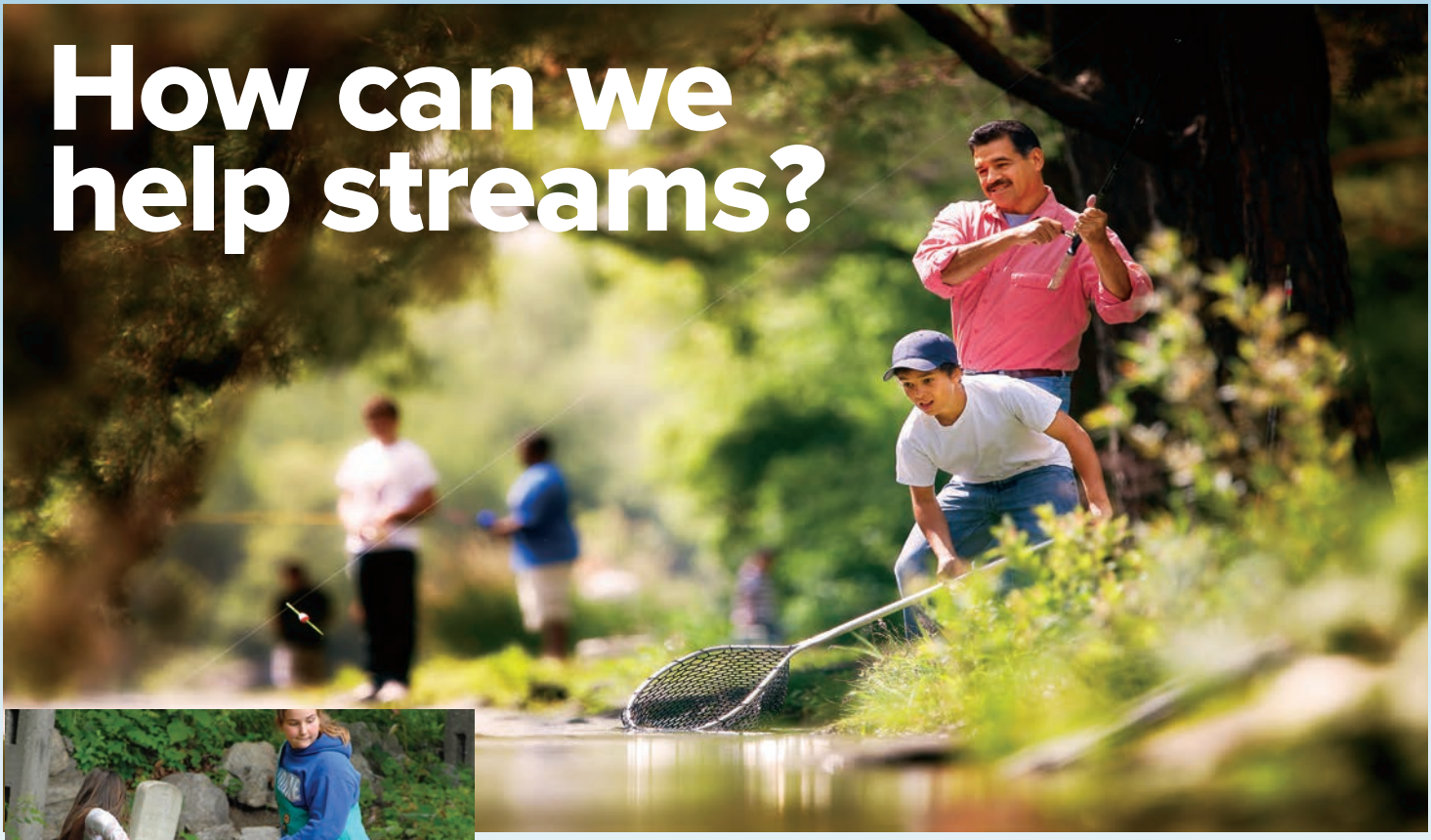
Normal low flow

Normal high flow

How have we harmed streams?

We can negatively affect streams, the habitat surrounding them, and the wildlife that depend on them. We polluted streams in the past, through agricultural runoff, waste from factories and other industrial uses, runoff from roads and buildings, and through litter. Sometimes we took too much water from streams, making them go dry. We built near them, we straightened them, and we built dams to create lakes or to generate electricity through hydropower. Streams are critical to the environment and to our own health and wellbeing. The New York State Department of Environmental Conservation (NYSDEC) has programs in place to help keep our streams healthy.

How can we help streams?



We can help streams and the wildlife that depend on them in many ways. We can remove trash, clean up (and prevent) pollution, build things in a way that will reduce erosion (the washing away of soil) and we can restore habitat by planting trees and other vegetation to help prevent erosion. Trees and other riparian vegetation can also provide shade for smaller streams, keeping water cool enough for coldwater species such as trout.

Trees for Tribs

A project designed to help restore trees and other vegetation near streams and rivers is Trees for Tribs. Tribs stands for tributaries, which are streams or rivers that flow into larger bodies of water, such as lakes or bigger rivers. Through the Trees for Tribs Program, NYSDEC's Saratoga Tree Nursery donates trees and shrubs for planting along streams. This helps prevent erosion and restores the riparian zone. The plants also act as filters, removing some pollutants out of runoff and groundwater before they reach the stream. To learn more about this program, visit NYSDEC's website at **www.dec.ny.gov**

Visit the *Conservationist for Kids* webpage at **www.dec.ny.gov/education/40248.html** for links to more information about: Macroinvertebrates, Monitoring NY's Waters, DEC's WAVE program, Water Quality, Watersheds, Where to fish: rivers and streams, Trees for Tribs, Hudson River Estuary, Trout in the Classroom, and US Environmental Protection Agency's stream and watershed information.

The OUTSIDE Page

Exploring Your Own Environment

Exploring streams and riparian zones and studying the animals and plants found there can be a fun way to pass a warm spring day!

Look around the stream to see what animals you see, or what animals you see signs of. Do you see the remains of crayfish? A raccoon was probably eating there. Are there trees that are chewed down? Look for beavers! Turn over rocks, logs, and leaves both in and near the water, and see what you see. A variety of macroinvertebrates can be found in these types of habitats, and you might even see things like salamanders, small fish, and frogs. Certain types of macroinvertebrates such as mayflies, stoneflies, and caddisflies need cleaner water than others, so if you see them, then you know your stream is doing ok.

Just remember that the animals live there, and be careful not to disturb the habitat too much. Always turn rocks and logs back over, leaving them the same way that you found them. Take photos of what you find, write notes in your journal, and share your discoveries with your family, friends, neighbors, and classmates – they might be surprised to learn what lives nearby!

mayfly

crayfish

For a photographic guide to the freshwater macroinvertebrates of New York, visit DEC's webpage at **www.dec.ny.gov/animals/35772.html**.

Go Fishing!

Streams make great habitat for fish and great places for fishing! For more information about fishing in New York State, visit the NYSDEC Fishing webpage at **www.dec.ny.gov/outdoor/fishing.html** and see the spring 2010 issue of *Conservationist for Kids*, online at **www.dec.ny.gov/education/63922.html**.

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Conservationist for Kids

Supplement for Classroom Teachers – Streams! Go with the Flow

Understanding Streams

As this issue of *Conservationist for Kids* discusses, streams are a vital component of a healthy environment. Many species of plants and animals depend on streams. Streams are also important to humans for a variety of reasons, from recreation and drinking water to irrigation and manufacturing. How we treat streams can greatly impact the health of the environment and the health of humans as well.

Students should understand that streams are constantly changing and can be unpredictable. Following heavy rain, a normally shallow, slowly moving stream can turn into a raging torrent. Building close to a stream, however scenic the site, is often unwise. With little warning, a stream can overflow its banks and wash away everything in its path during a high-water event.

This Issue's "Outside Page"

The "Outside Page" in this issue of *Conservationist for Kids* encourages students to explore the streams near where they live. They should be reminded of the ethics of such activities—that is, to treat all wildlife with respect and to leave the habitat as they found it, such as by not taking rocks or turning over logs. The only exception should be to remove any trash they find. The "Outside Page" also talks about the importance of streams to recreation, specifically fishing. Students can learn how to fish and much more from the I Fish NY section of DEC's website at www.dec.ny.gov/outdoor/89362.html.

Teacher Workshops

For teachers who have participated in an **Aquatic WILD** or a **Project WET** workshop, the activities listed below complement this issue of *Conservationist for Kids*. Visit www.dec.ny.gov/education/1913.html for information about workshops and about how to obtain curriculum and activity guides.

Aquatic WILD: Where Does Water Run?
Urban Waterway Checkup
Water Canaries

Project WET: Macroinvertebrate Mayhem
Rainy Day Hike
Seeing Watersheds

***Conservationist for Kids* and an accompanying teacher supplement are distributed to public school fourth-grade classes in New York State three times each school year (fall, winter and spring).** If you would like to be added to or removed from the distribution list, if your contact information should be changed, or if you have questions or comments, please e-mail the editor at **KidsConservationist@dec.ny.gov** or call 518-402-8047.

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Supplemental Activities for the Classroom

Macroinvertebrate Studies

After teaching your students about streams, take them out to see the real thing! Many environmental groups and local nature centers offer lessons for school groups and will lead students on a tour of a local stream. Have your students work with the volunteers to collect and identify different macroinvertebrates, and then see whether they can determine something about the quality of the water based on what they find. Certain macroinvertebrates need cleaner water, so if they are present, the water quality must be fairly good. See the online resources section below for more information about macroinvertebrate studies. A statewide list of nature centers can be found on DEC's website at www.dec.ny.gov/outdoor/1826.html.

Trout in the Classroom

"Trout in the Classroom" is an educational program of Trout Unlimited, run in New York State through a partnership of several organizations, including DEC. As part of the program, students raise trout in their classrooms for eventual release into approved waters around the state. Students learn to monitor water quality, learn about stream and watershed health, gain a better understanding of ecosystems, and are taught about conservation. To learn more about Trout in the Classroom in New York State, visit their website at http://www.troutintheclassroom.org/teachers/state-specific-resources#NY. In addition to learning how your class can participate, there is a wealth of information you can incorporate into lesson plans.

Do you have an interactive white board in your classroom?

If you use a SMART Board or similar interactive white board or projection system in your classroom, consider downloading a PDF of *Conservationist for Kids* and using it along with the printed copies enclosed in this mailing. This issue and *all of our back issues* are available at: www.dec.ny.gov/education/40248.html. **New – We now have an index to all back issues available online at www.dec.ny.gov/education/100637.html.

Online Resources

DEC's Freshwater Macroinvertebrates of NY webpage www.dec.ny.gov/animals/35772.html

DEC's Water Assessments by Volunteer Evaluators (WAVE) www.dec.ny.gov/chemical/92229.html

DEC's Water Quality Information webpage www.dec.ny.gov/chemical/8459.html

DEC's Watersheds webpage www.dec.ny.gov/lands/26561.html

Friends of Five Rivers Stream Life School Lessons www.friendsoffiverivers.org/node/47

4-H Stream Teams: *How to Complete a Kick-Net Stream Study* http://bit.ly/1KJBbij

Arkansas State Parks *Stream Study Guide and Activity Book* http://bit.ly/16UjsFW (PDF, 1.5 MB)

Audubon Naturalist Society *Stream Science* http://bit.ly/1An5iZH

Hoosier Riverwatch *Volunteer Stream Monitoring Training Manual* http://bit.ly/1Fzv2SR

NYC Parks: Wetlands of the Bronx River Watershed http://on.nyc.gov/1AnikXf

USEPA's Streams webpage http://water.epa.gov/type/rsl/streams.cfm

Limited quantities of *Conservationist for Kids* back issues are available upon request. Go to **www.dec.ny.gov/education/40248.html** to preview back issues online before requesting printed copies. From each issue's lead page, use the link "read the entire issue, cover to cover" to access an eight-page PDF of the print version. To request printed copies (individual or bulk), e-mail the editor at **KidsConservationist@dec.ny.gov** or call 518-402-8047.