

The logo features a black circle on the left containing the text "5 RIVERS" in white. To the right of the circle, the word "TRIBUTARY" is written in a large, black, serif font. The "T" in "TRIBUTARY" is partially overlaid by the circle.

5 RIVERS TRIBUTARY

Fall 2005

Five Rivers Environmental Education Center

www.dec.state.ny.us/website/education/5rivers.html

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How To Know the Lichens

Lichenologists are extremely patient people. They have to be, to study a plant whose lifespan is measured in decades and whose annual growth rate is measured in millimeters. There aren't a lot of lichenologists, and there aren't a lot of books about lichens, but there's an illustrated field guide I've discovered, confidently titled *How To Know the Lichens*. In it are two photographs of the same tundra lichen, taken at twenty year intervals; you can imagine the lichenologist hiking up a remote Adirondack peak, and carefully photographing the lichen, then hiking back down, and going about his life: maybe getting married, having kids, and changing quite a lot in the course of two decades, after which he hiked back up the mountain and meticulously measured and photographed the exact same lichen. It had grown a sixteenth of an inch.

There's a lot of unanswered questions about these strange, slow-growing plants--or are they plants at all? Scientists debate. Each lichen is actually made up of two distinct organisms: a species of fungi and a species of algae intertwined in an intimate relationship--an alliance, or more descriptively, a marriage, between two distinct kingdoms, plant and fungus. Lichens

have caused a good deal of head-scratching among biologists seeking to classify them; they're the duck-billed platypuses of the plant/fungus world, not fitting into the usual neatly-ordered categories. In the end, lichens are usually classified and named on the basis of the fungal part. But they're really two unrelated organisms that are quite literally living on top of each other.

But the two organisms work together. Like true partners, they need each other. The fungus can't survive on rock without the food production of the algae. But algae is usually an aquatic plant--it wouldn't stand a chance on bare rock either, without the support and structure of the fungus. The fungus grows to surround the algae completely--picture an apple pie, the crust being the fungal part, the fruit filling being the algae. Especially after a rain, you can see the green gleam of the algal cells through the thin fungus crust.

These intertwined partners are aggressive opportunists; they are the first to move into the most inhospitable habitats you can imagine: a granite boulder, or the top of a church steeple. The fungus hangs on to the rock's surface with rootlike *holdfasts*, which hold on, but suck no nourishment from the rock. The algae creates food where there is no food, using sun, water and air to make the sugars that nourish the pair.

Lichens are pioneers in the sense that they blaze a trail for others, less hardy, to follow. And like all pioneers, they fundamentally change the nature of the place they come to inhabit. Lichens excrete tiny amounts of organic acids that dissolve rock, and create new soil, speck by microscopic speck. As soon as a fragment of soil exists, the new mini-habitat is promptly colonized by a plant, which will eventually shade the lichen out.

Lichens colonize other habitats besides rock. In fact there's almost nowhere lichens *don't* grow. They live under the soil, on the sides of trees, on the backs of slow-moving tortoises. They thrive in the Sahara desert, and they are the dominant species of vegetation in the Antarctic, where they grow even between snow crystals. They cover the stone heads at Easter Island. They're New York State dwellers, too, from the tundra of Mt. Marcy to the suburbs of New York City.

Lichens excel at being inconspicuous. One day, as you rest on a trailside boulder, you observe what looks like a spatter of blue paint among the emerald mosses. Overhead, there are gray crusts covering the pine branch that shades you. Once you start looking, it seems there are lichens on every rock and twig. A single tree may be host to 10 species, each thriving in its own miniature habitat of bark crevices that have infinitesimal differences in light, moisture, wind, and temperature. A whole different species of lichen will live on the underside of a branch than on the upper side of the same branch. Lichens are above our heads, and below our feet. When you die, if you have a tombstone, there will probably be a lichen growing on it.

But the algae/fungus marriage is a stormy one. The partners are literally thin-skinned, their delicate balance easily upset. Lichens are botanically unique in lacking an outside covering, or cuticle, and so they are living blotters that soak up everything they

come in contact with. Unfortunately for lichens, this includes pollutants, such as sulfur dioxide and heavy metals, making them acutely vulnerable to environmental change.

Lichens are therefore the best biological indicators of air pollution, providing data for thousands of air quality studies. They're the proverbial canary in the coal mine. Where pollutants like sulfur dioxide rise from our cars and our factories, lichens vanish. Like the dead canary, the absence of lichens in an environment is a silent cry of warning, nature's subtle smoke alarm. The abundance of lichens in the Adirondacks tells its own tale: when you see a dense mat of lichen on a boulder, or dripping off the stump of an old hemlock, it tells us that the air is clean. Cities are the only places on the planet that are lichen deserts.

So lichens are organisms that are well worthy of our attention, but they're rather difficult to become acquainted with. I studied *How to Know the Lichens*, but found that the title was an empty promise. Most lichens have no common name, only Latin tongue-twisters. I turned to the glossary when wrestling with terminology, but that gave me no help; the glossary would airily state that the apothecia are "the part of the ascomycetes that contain the hymenium." Intimidating words like "paraplectenchymatous" were recklessly bandied about. I closed *How To Know the Lichens* not much wiser than when I opened it.

So how do we get to know the lichens? Maybe we can look for them on suburban branches and wilderness boulders, and see their colors glow after a rain. We can touch the lichens' miniature leaves, and feel their cool velvet. We can watch them, decade by decade, creeping out in their concentric growth pattern, with infinite slowness, on the walls of our houses. Lichenologists are patient people.

Scientists, fascinated by the relationship of these two diverse life forms, have succeeded in separating the two species in a lab, isolating

fungal cells from algal cells, and the two can live apart for a while, each in their own separate Petri dishes. But the scientists have found that they cannot put the two strange bedfellows, once severed, permanently back together. They can't re-create what's been destroyed.

Left alone from prying scientists, algae and fungus are bound in an indissoluble bond, creating a new organism: nature's toehold onto the most barren of habitats. Algae and fungi, 'til death do them part.

—Anita Sanchez

Director's Notebook

If You Build It...

During the school year, The Friends of Five Rivers uses a portion of Goose Lodge to administer the popular guided school lesson program. Goose Lodge, which a 1937 map of the grounds identifies as the "CCC Carpentry Shop," is in failing condition and is not suitable for the modern uses to which it is put.

Earlier this year, The Friends of Five Rivers raised the possibility of replacing this facility. This, in turn, brought up a whole spectrum of other questions: where would the ideal location be? How would it relate to existing and future facilities and uses?

Recognizing a need for professional guidance, DEC brought in architects from the NYS Office of General Services last March to develop a comprehensive master plan for site development. Historic preservation experts from DEC and OPRHP were also brought in to study the historic value of Goose Lodge and the nearby Maintenance Shop. OGS architects thoroughly surveyed the premises and met throughout the spring with reps from DEC and the Friends group to better understand how form should follow function.

In early July, OGS planners unveiled ambitious recommendations for development of new facilities at Five Rivers, including reconfiguration of picnic and parking amenities and removal of non-compliant facilities. These recommendations are being incorporated in the Center's *Draft Unit Management Plan*, which is expected to be available for public review late in 2005 or early 2006.

One For the Books

Please join us for an informal reception and book signing with Bob Budliger following the joint program of the Hudson Mohawk Bird Club and Audubon Society of the Capital Region, scheduled for Thursday, September 8. The program, a travelogue on *The Birds of Trinidad and Tobago* by Sue Adair, will begin at 7PM in the Visitor Center.

Bob recently co-authored a great new guide *The Birds of New York State*, which is available at The Friends of Five Rivers bookstore. Bob and his charming wife Carol moved to Vermont this summer, so make it a point to come celebrate a truly remarkable career which has enriched all of us.

--Craig D. Thompson

Five Rivers Environmental Education Center Fall Program Schedule 2005

Programs are free of charge unless otherwise noted. Participants should dress for the weather! We regret that we cannot accommodate organized youth groups at these programs. Please call to make special arrangements for a group.

We welcome those who have any type of physical challenge to all of our programs. If you call ahead to let us know your needs, we will be happy to learn how we can best serve you.

For further information or for pre-registration, call Five Rivers at (518) 475-0291. In the event of severe weather, programs may be canceled. Please call the Center to confirm.

THE EARLY BIRDER

Walks are held on Thursday mornings: **Sept. 8, 15, 22, and 29.**

The early birder gets the bagels! Plus some great birding in Five Rivers' woods, fields, and wetlands. Birders will get some great coffee, too. We serve **shade-grown organic coffee** at our bird walks. This coffee is grown in a manner that preserves the rainforest canopy which is such an important habitat for so many migratory birds. It is "fairly traded," organically grown, and on top of all that, it tastes great!

Join us at 7:00 AM for refreshments and feeder birding. The outdoor walk begins at 7:30 AM.

Beginners are always welcome! Bring binoculars and bird identification guides if you have them—we have some to lend.

Saturday, September 10 **BERRIED TREASURE** 2:00 PM

Late summer is a great time to go berrying. Small wild fruits provide an important food source for wildlife as well, where it's first come, first served. Join us on an outdoor search for common fruits of fall as we survey the season's crop and see who's eating what.

Saturday, September 17 **ANNUAL FALL FESTIVAL** 12 Noon-4:00 PM

Come join us for our annual Fall Festival! It's a celebration of the season for all ages featuring nature-oriented explorations, hands-on activities, exhibitors and much more. And while you're here, walk the trails and enjoy migrating birds, fall wild flowers and brilliant foliage. Admission and parking are **ABSOLUTELY FREE!** Rain or shine.

Saturday, September 24

PROJECT WILD

1:00-4:00 PM

Join us for a participatory workshop for educators featuring ways to infuse Wildlife In Learning Design (WILD). Participants receive a free Project WILD workbook full of activities for students K-12. In-service credit may be arranged through the Greater Capital Region Teacher Center. Please call to pre-register by September 21. Free.

Programs for Home Schooling Families

These programs are designed to be done in cooperation with parent-teachers and their student-children. These cooperative projects between parents, children and siblings will foster observation and communication skills--and the sharing is fun!

If you have your family journals from past programs at the Center, bring them along. New participants will be given journals and all other materials will be provided.

Price: FFR member families - \$5.00 per program. \$18.00 for the series

Non-member families - \$7.00 per program. \$25.00 for the series

The discount is applicable only if all 4 programs are paid for at once. (No refunds)

Please call to pre-register at least three days before the program. Space is limited.

Wednesday, September 28

WETLANDS

1:30 - 3:00 PM

A discovery walk to a stream and a pond to compare the ecosystems; plants, animals and physical characteristics. Sampling will be done in both areas. Come prepared to get wet!

Wednesday, October 19

TREES

1:30 - 3:00 PM

Leaf collecting and bark rubbings and silhouettes are great ways to identify trees. Families will be encouraged to 'adopt a tree' and keep Tree Journals.

Wednesday, November 9

THE WORLD AT NIGHT 7:00 -9:00 PM

Constellation identification, star stories, exploration walk on the trails, time to write and draw in your journals while warming up in the building with a hot drink: all part of our introduction to the special world after dark.

Thursday, December 29

ANIMALS IN THE COLD 1:30-3:00 PM

Our extensive collection of pelts and skulls will be used indoors to explain adaptations; then we'll take a walk to search for animal signs. Back in the building there will be time for journaling and a hot beverage.

Saturday, October 1

Family Fun: **KEEPING A JOURNAL**

2:00 PM

It's never too early to start a wildlife journal. With the help of an adult, young children can begin to develop the skill needed to record the wonders they find in nature. Drawing, making lists, and collections will be the emphasis of this program for children ages 5 to 8 and their parents. Materials fee: FFR Members \$5.00/family; non-members \$7.00/family.

Sunday, October 2 AQUATIC PROJECT WILD 1:00-4:00 PM

This hands-on workshop for educators will explore ways to enhance classroom instruction using aquatic biology as a touchstone. Participants receive a free Aquatic Project WILD workbook with infusion ideas for grades K-12. In-service credit may be arranged through the Greater Capital Region Teacher Center. Please call to pre-register by September 30.

Saturday, October 8 NUTS ABOUT WILDLIFE 10:00 AM

Nut trees are important food sources both for wildlife and people. Since most nut trees are wind-pollinated, the "mast" crop can vary widely from year to year. Join us on this outdoor foray to monitor the mast crop and investigate the many creatures who are nuts about nuts.

Tuesday, October 11 BIRD SEED SALE ORDERS DUE

This is the last day to pre-order bird seed for Friends of Five Rivers' Annual Bird Seed Sale. This benefit sale not only helps the birds, but also generates supplemental funding for Five Rivers programming. Bird seed pick up date is Saturday, October 22. For more information, call Friends of Five Rivers at (518) 475-0295.

Friday, October 21 NIGHT WALK 7:00 PM

It's getting towards Halloween time, but our night walks aren't scary! Wildlife are often more active at night than in the daytime, so we'll listen for wildlife sounds and use all our senses to find our way around the trails. Join us on our mysterious night exploration, where we'll listen for owls, look for constellations, and enjoy the beauty of the October night.

Sunday, October 29 HALLOWEEN OPEN HOUSE 1:30-3:30 PM

Halloween is a perfect time to discover new things about animals that have a bad reputation: snakes, spiders, bats. Animals of night and animals of story will also be featured at our special Open House, as well as games and prizes, surprises and more. Come any time between these hours. This is an indoor program; come in costume if you wish.

Saturday, November 5 PROJECT WET WORKSHOP 10:00 AM- 3:00 PM

This workshop will introduce "Project WET" (Water Education for Teachers). Participants will receive a manual of activities suitable for teaching about water science, aquatic wildlife, and environmental issues. Pre-register by November 3. Dress for the outdoors. Teacher in-service credit can be coordinated through arrangement with the Greater Capital Region Teacher Center.

Saturday, November 12 *Watchable Wildlife:* WHITE-TAILED DEER 2:00 PM

Mid-November is an excellent time to go "scouting" deer. Deer are very active at this season, fattening up for the winter and chasing prospective mates. Tracks, trails, pellets, rubs, scrapes, beds and mast are all indicators of the season's prospects. Join us for a field study of the natural history of deer and learn what's what.

Wednesday, November 16 FRIENDS OF FIVE RIVERS ANNUAL MEETING 7:00 PM

The Friends of Five Rivers cordially invites members and friends to its annual membership meeting. This year's meeting will feature a slide-illustrated talk. A business meeting reviewing The Friends of Five Rivers' accomplishments and projects of the past year will precede the program.

Friday, November 18 NIGHT WALK 7:00 PM

An exploration of the grounds after dark always holds surprises. During these crisp hours the world abounds with special sights, sounds and aromas. If it's clear, we'll look for constellations overhead.

Saturday, November 26 WILD EDIBLE PLANTS 2:00 PM

Stuffed after eating all that turkey? Find out how well the Native Americans and the Pilgrims feasted during this search for edible wild plants that have been used historically.

Saturday, December 17 SEASONAL DECORATIONS 2:00-4:00 PM

Families and individuals are invited to come make decorations using natural material and recyclables. Materials fee: FFR Members - \$2.00/person; non-members \$3.00/person

Tuesday, December 27 FAMILY ART PROGRAM 2:00 PM

Learn about nature while collecting a winter bouquet, and making the vase to hold it; learn to identify animal signs and draw our mounted animals; or use plaster to cast and decorate animal tracks. Materials fee: FFR Members \$2.00/person; Non-members \$3.00/person.

Sunday, January 1 ANNUAL NEW YEAR'S DAY BIRD COUNT 9:00 AM

Come help us ring out our old annual bird list and ring in the new, as we search high and low for our fine feathered friends. In the 26 years of this annual foray, over 67 different species have been recorded. Bring binoculars and dress warmly.

FALL FESTIVAL
Saturday, September 17 12 Noon-4:00 PM

Come and join us for our annual Fall Festival!
It's a multitude of activities and hands-on crafts, games, and nature explorations.

Environmental exhibits and hands-on activities make the Festival fun for all ages. There are refreshments, a silent auction, and plants, books and birdseed for sale. And while you're here, walk the trails and enjoy migrating birds, fall wildflowers and brilliant foliage. Admission and parking are free! Rain or shine.



**Staff: Nancy Payne, Anita Sanchez, Dee Strnisa, Craig D. Thompson, Lori Whiting
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