

P R O J E C T R E P O R T
to Fundy Model Forest

AWARENESS OF FOREST AND STREAM ECOLOGY



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Proponent Name and Affiliation

Robena Weatherley, Washademoak Environmentalists, working within the Canaan-Washademoak Watershed Association.

Partners and Affiliations

- Canaan-Washademoak Watershed Association.
- Environment and Sustainable Development Research Centre, UNB Fredericton.
- Ron Jenkins, Environmental Consultant.
- Let's Talk Science Partnership Program, UNB Fredericton.

Description of Project and Objectives

This project was designed to increase the knowledge of students in the schools throughout the Canaan-Washademoak Watershed about the forest and stream conditions in this geographic area. We hoped to increase the students' awareness of, and foster a stewardship ethic regarding, our valuable natural resources.

We used a hands-on approach where possible in the form of field excursions to selected sites throughout the watershed as well as classroom presentations and activities in all three schools. Teachers at the schools participated enthusiastically at the elementary, middle, and high school levels. The schools are at Cambridge-Narrows, Cole's Island, and Havelock.

Some of the topics addressed were:

- Rationale for the programme and establishment of annual participation in Plant Watch. This activity will continue beyond our project.
- Biodiversity in the Acadian Forest; flora and fauna.
- Broad ecological principles; the interconnectedness of organisms; the web of life.
- Stream ecology; benthic macroinvertebrates; the food chain; indicators of water quality; fish populations.
- Watershed characteristics; riparian zone; stream bank integrity; erosion; best management practices.

Some of the materials we have used were produced within the Fundy Model Forest including those developed by members of our own watershed group. We have involved a team of five people in this

project. Four of them hold higher degrees in biology and environmental subjects. Two of them also hold New Brunswick teacher's certificates and one is a specialist in field technology. We also had the help of a graduate student from the UNB Let's Talk Science Partnership Programme during facilitation of activities at Cole's Island and Cambridge-Narrows schools. An additional member of the Canaan-Washademoak Watershed Association helped with the electrofishing activities.

Activities

- Plant Watch was established at Cambridge-Narrows school with members of a Grade 6 class. This involved numerous trips to the Robinson Conservation Forest and a forested area near the school. Four plant species were monitored and three species were reported. The fourth species was carefully observed and we learned a lot including the fact that larch trees flower very early in the season and we missed it!
- Forest activities were conducted at the Robinson Forest and other mature forest stands. Field trips were arranged for Cambridge-Narrows high school and middle school students, Cole's Island middle school and Havelock Grades 3, 4 and 5. Aspects of the Acadian Forest were shown and discussed.
- Stream activities were conducted at Mill Brook for two separate groups of Cambridge-Narrows middle and high school students. Cole's Island middle school students were taken to MacLean Brook and Havelock middle school students visited Ridge Brook. In all cases electrofishing was carried out to demonstrate the stream fauna. Fish were described, measured, and returned to the stream after the exercise. Students participated in this hands-on activity with great enthusiasm. They also captured and examined benthic organisms and their importance was discussed. Stream bank damage was evident at the sites and we were able to discuss issues of land practice, erosion, regulations, and enforcement.
- Wetlands, their characteristics and importance, were addressed in a class presentation and discussion with a Grade 3 and 4 class at Cambridge-Narrows by one of our team members.
- Water quality and stewardship of local waterways was presented to two separate groups of middle and high school students at Cambridge-Narrows and to the middle school group at Cole's Island. This topic was presented by the Let's Talk Science Partnership Programme from UNB and conducted by one of our team members.
- Watershed characteristics were described and demonstrated to three separate class groups of Grade 3, 4, and 5 students at Havelock. Students were involved in a lively dialogue and encouraged to relate local examples of the topics under discussion. Local geography with reference to New Brunswick geography was emphasized.

- Two members of our team were invited to participate as judges in the Cole's Island Science Fair at the middle school level. This involved in-depth discussion with all the participating students regarding their projects and consultation with the other three judges regarding the ranking of projects.

Details of subject material for all of the above activities are presented in the teaching modules included in the following section of this report.

Teaching Modules

Forest



Field excursion to mature forest (Robinson Forest or other) for hands-on experience, demonstration, and activities.

Topics demonstrated / discussed:

- General land form; tributary streams; river or lake, riparian zone; land practice history; cleared land; natural forest re-establishment on cleared land; succession; mature forest.
- Acadian Forest, mixed coniferous and deciduous species of trees.
- Flora: Predominant tree species (white, red and jack pines, white, red and black spruces, balsam fir, cedar, hemlock, tamarack, red , sugar and striped maples, white, grey and yellow birches, big-leaf poplar and trembling aspen, red and bur oaks, service berries, cherries, etc.); shrubs; mosses; club mosses; lichens; fungi; other small plants. Emphasize biodiversity.
- Fauna: Large mammals (moose, deer, bears, coyotes, foxes, hares, raccoons, bobcats, lynx, skunks, red and flying squirrels, etc.); other small mammals; birds (grouse, ravens, crows, hawks, owls, eagles, woodpeckers, nesting herons, other nesting migratory birds, etc.); amphibians; insects.
- Food and shelter; predator /prey relationships; interdependence of organisms; web of life.
- Implications of forest harvesting practices on biodiversity and interdependence of organisms.

Use of activities for the students to demonstrate predator /prey relationships and essential requirements for life of the various organisms.

Stream



Students gain “hands-on” experience in local fish diversity.

Field excursion to a stream for hands-on experience, demonstration, and activities including electrofishing (conducted only by a licensed field technologist in appropriate restricted season).

Topics demonstrated/discussed:

- Observation of general land form; tributary streams and relationship to main water body; condition of stream bank and riparian zone; presence/absence and composition of vegetation; land use; stewardship and best management practices; water quality; erosion and siltation and consequences for fish survival.
- Electrofishing (when/where possible) to capture fish; hands-on demonstration of fish species; discussion of fish requirements for life (food, oxygen, temperature and clean water); predator/prey relationships; unique adaptations for survival (these include morphology, colour change relative to the environment to avoid predators, etc.).
- Engaged students in capturing benthic organisms and discussed the different species caught and their place in the web of life; benthic organisms as indicators of water quality.



A salmon parr from a local stream.

Watershed Characteristics



Topics demonstrated / discussed in class presentation:

- Boundaries of a watershed.
- Precipitation.
- Drainage.
- Surface and ground water.
- Hydrologic cycle (complexity should relate to the age of the group).
- Riparian zone.
- Ground cover.
- Erosion.
- Related to the above: discussed implications of riparian zone disruption; water quality and its effects on fauna; relationships of local streams to local geography; local land-use patterns / problems or good examples of stewardship.
- Dialogued with students and encouraged them to relate local examples of topics under discussion.
- Involved students in a hands-on model of a watershed and demonstrated the effect of the presence or absence of an intact riparian zone of vegetation on water quality. This model can be as simple as a large baking pan to represent a watershed, with aluminum foil fashioned to represent a stream bank. Kitchen sponges can be used to illustrate the presence of an absorptive riparian zone. The effectiveness of this zone was demonstrated by pouring various applications of coloured water, particulate matter, etc. down the aluminum foil sluice to represent soil and pollution run-off. The sponges were then removed and more materials poured down the sluice and the results compared. This demonstration was followed by dialogue about stewardship and worked well with the class.

Wetlands



This was presented in class but would be valuable as a field excursion.

Items demonstrated / discussed included:

- Where does the water come from?
- Precipitation; drainage; surface water; ground water; water tolerant plants as indicators of wetlands; appearance of the plants in general and in particular their water-storing or conserving adaptations..
- Wetlands contain slow-moving water and may be bogs, marshes or swamps, or transitional areas between land and aquatic environments and are often found beside streams or lakes; may not be filled with water all year but the soils are saturated at or below the surface; frequently have been thought of as waste or unproductive land and people have often drained them and tried to get rid of the wet areas.
- Wetlands provide habitat for a wide variety of interdependent plants and animals (e.g. birds, mammals, fish, amphibians, and insects) and are important to people. Wetlands perform a number of other important functions including: acting as a buffer against flood damage; filtering out sediments and pollutants from storm water; cleaning the water before it enters a stream; recharging groundwater aquifers; discharging water to streams in dry seasons; storing water in soils and plants and releasing it slowly.
- Lakes and ponds may become wetlands as their open water is filled with sediments from erosion and they are colonized by vegetation. This is an important point to emphasize when discussing riparian stewardship with a class.
- Discussion: the best way to protect wetlands is to leave them undisturbed.

Water Quality and Stewardship of Local Waterways



These activities are based on the "Hydration Nation" kit provided by the Let's Talk Science Partnership Program (LTSP) at UNB (www.lts.unbf.ca) but were adapted and augmented by a team member (ESDRC) to have a stronger local focus and greater community relevance. The activities were facilitated by the team member with the volunteered assistance of the LTSP UNB coordinator.

Each class visit lasted 2 hours and followed the format below:

- Review of the previous field excursions: focus on vocabulary; the different stream habitats visited (pools, riffles) and the different organisms (invertebrates, fish) which inhabit them; the different functional feeding groups of invertebrates (shredders, grazers, collectors) and examples of each; overview of the river continuum concept. [5 mins]
- Class quiz on freshwater availability and use worldwide and in Canada. [5 mins]
- Overview of the activities at the in-class stations: Water quality guidelines and pH testing of water samples; Physical properties of water; Oil spills and the effects of water pollution. [10 mins]
- Proceed with activities. [60 mins]
- Wrap-up activities and discuss results. [15 mins]
- Presentation on the activities of the Canaan-Washademoak Watershed Association and the health of local waterways. [10 mins]
- Class quiz and discussion on how the approaches of and the knowledge gained from the day's activities could be applied — "What can you do?" [15 mins]

These particular class visits served to present new material and concepts in a hands-on fashion, using local examples and situations, while integrating the knowledge and experiences gained from the previous class and field visits.

Following the completion of the class visit, each cooperating teacher was invited to fill in an assessment form. Copies of these are attached to this report (see Appendix).

Summary

This has been a gratifying project. Members of our team are now known within the three schools in the Canaan-Washademoak Watershed and have established a comfortable working relationship with teachers and students.

There was evident enthusiasm for, and appreciation of, our efforts and we hope we have made a difference. This is unmeasurable but the fact that we are being encouraged to come back is evidence that our material was well received. One school made a power point presentation of our field trip to a local stream and showed it to the parents' group.

Our teaching modules can be used by us or others in the future and augmented as the needs and topics unfold. We hope that we may be able to continue to contribute to our local schools.

Appendix

Budget

EXPENSES		
Transportation by school buses		418.65
Car rental and gasoline for aquatic biologist x 4 days		453.35
Partial mileage reimbursement for volunteers		252.00
Partial payment for services of aquatic biologist		2,276.00
Partial payment for services of field technologist		1,600.00
Total expenses		5,000.00
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Total grant from FMF		5,000.00
COLLABORATIVE FUNDING	Leveraged cash	In-kind equivalent
<i>Environment and Sustainable Development Research Centre, UNB</i>		
Car rental for aquatic biologist	105.00	
Watershed specialist, 4 lectures and preparation time @ \$250 per day		750.00
Aquatic biologist: Planning and preparation time not reimbursed		1,250.00
<i>Let's Talk Science Partnership Program, UNB</i>		
LTS workshop kits: 3 classes x \$110 per kit		330.00
LTS volunteer: Travel & preparation time		200.00
<i>Environmental consultant</i>		
4 field trips, 3 class visits, travel expenses reimbursed 1600.00, net in-kind		2,000.00
Donated equipment		1,000.00
<i>Members of Watershed Association</i>		
Volunteer #1, 1 day @ \$250 per day		250.00
Volunteer #2, 12 days @ \$250 per day		3,000.00
Volunteer #3, 30 days @ \$250 per day		7,500.00
<i>Donated accommodation for team members</i>		
7 nights @ \$50 per night		350.00
Donated meals for team members		200.00
Total in-kind		16,830.00
Total collaborative funding		105.00
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Total project		21,935.00

Student Correspondence

Cambridge-Narrows School
2158 Lakeview Road
Cambridge-Narrows, NB
E4C 1N8
Oct.12, 2006

Dear Mr. Riddell,

Thank-you for taking our school electro-fishing. I learned a lot about fish and about rivers. I never knew that there were so many different insects in the rivers in September.

Sincerely,


Andrew Baisley

4345 Highway 105
Jemseg, NB
E4C-3M2
Oct. 13,2006

Dear Mr. Riddell,

Thank-you for taking the Cambridge Narrows Middle Level electro-fishing about 3 weeks ago. Our class greatly appreciates you volunteering your time so we could have a fantastic experience that I will never forget.

Sincerely,


Colton Kalynuik

Teacher Evaluations: Cole's Island

Please enter any verbal comments from educators, youth or yourself that you would like to share (use the back of the page if needed)

The students were on task the whole time and really enjoyed it.

Please rate the activity (1=poor; 5=excellent) 5

What part of the activity was MOST enjoyable and why?

They enjoyed the oil activity the most. They liked the problem solving aspect and there was no right or wrong way to do it.

What part of the activity was LEAST enjoyable and why?

They didn't like taping the strips on the paper. They also didn't like the smell of the oil.

How could this activity be improved for you and your class/group?

Additional comments on the activity

It was great!

Please rate the volunteer (1=poor; 5=excellent) 5

Please comment on your rating of the volunteer.

Very enthusiastic about the subject and kept the students engaged in the activities. They also provided encouragement and helped when needed.

Please rate the volunteer's ability as an educator (1=poor; 5=excellent) 5

Please comment on your rating of the volunteer's ability as an educator.

Again, able to keep the students on task. They demonstrated great management techniques!

Did the experience improve your knowledge of the topic?

Yes

Overall rating of the experience

Excellent

Comments on the program

I was very pleased with the material and the ability of the presenters to interact with the students.

Do you plan to use Let's Talk Science Partnership Program services again? Yes

Thank you for taking the time to fill in this evaluation!

Teacher Evaluations: Cambridge-Narrows

Please enter any verbal comments from educators, youth or yourself that you would like to share (use the back of the page if needed)

A great presentation and timely. It fit well with science concepts being taught.

Please rate the activity (1=poor, 5=excellent) 5

What part of the activity was MOST enjoyable and why?

Hands-on experiments - lab work! Real to students who experience life on the lake!

What part of the activity was LEAST enjoyable and why?

Follow-up (students have trouble transferring acquired knowledge - no fault of instructors)

How could this activity be improved for you and your class/group?

Because of scheduling, time was at an overall and time to allow students to discuss their findings was limited.

Additional comments on the activity

A bit rushed because of scheduling - would have been nice to have a bit of a wrap-up for students (middle of next semester).

Please rate the volunteer (1=poor, 5=excellent)

Please comment on your rating of the volunteer.

Fast-paced; helpful; knowledgeable

Please rate the volunteer's ability as an educator (1=poor, 5=excellent) 4

Please comment on your rating of the volunteer's ability as an educator.

Ability to 'draw' answers out of a student a group of students to be practice.

Did the experience improve your knowledge of the topic?

Perhaps not mine as it was basic but certainly served as a reinforcement of concepts I forgot from text.

Overall rating of the experience

Excellent! Students enjoyed lab experience and was relevant to them as they're studying unit pertaining to chemistry and water.

Great opportunity for students!

Do you plan to use Let's Talk Science Partnership Program services again?

Thank you for taking the time to fill in this evaluation!

Please enter any verbal comments from educators, youth or yourself that you would like to share (use the back of the page if needed)

Excellent presentation

Please rate the activity (1=poor, 5=excellent) 5

What part of the activity was MOST enjoyable and why?

Experiments - most students learn best from hands on activities

What part of the activity was LEAST enjoyable and why?

None

How could this activity be improved for you and your class/group?

More hands on activity with time to discuss

Additional comments on the activity

Very informative

Please rate the volunteer (1=poor, 5=excellent) 5

Please comment on your rating of the volunteer.

Very knowledgeable, worked well with the students, very patient

Please rate the volunteer's ability as an educator (1=poor, 5=excellent) 5

Please comment on your rating of the volunteer's ability as an educator.

Made the topic interesting, kept students attention

Did the experience improve your knowledge of the topic?

Definitely

Overall rating of the experience

Wonderful

Comments on the program

A Great resource for teachers. An affordable way to supplement classroom materials

Do you plan to use Let's Talk Science Partnership Program services again?

Thank you for taking the time to fill in this evaluation!



Fundy Model Forest

~Partners in Sustainability~

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Author: R. Weatherley, D. Riddell

Year of project: 2007

Principal contact information: Washademoak Environmentalist

File Name: Education_2007_Weatherley_Awareness_of_Forest_and_Stream_Ecology

***The Fundy Model Forest...
...Partners in Sustainability***

“The Fundy Model Forest (FMF) is a partnership of 38 organizations that are promoting sustainable forest management practices in the Acadian Forest region.”

Atlantic Society of Fish and Wildlife Biologists
Canadian Institute of Forestry
Canadian Forest Service
City of Moncton
Conservation Council of New Brunswick
Fisheries and Oceans Canada
Indian and Northern Affairs Canada
Eel Ground First Nation
Elgin Eco Association
Elmhurst Outdoors
Environment Canada
Fawcett Lumber Company
Fundy Environmental Action Group
Fundy National Park
Greater Fundy Ecosystem Research Group
INFOR, Inc.
J.D. Irving, Limited
KC Irving Chair for Sustainable Development
Maritime College of Forest Technology
NB Department of the Environment and Local Government
NB Department of Natural Resources
NB Federation of Naturalists
New Brunswick Federation of Woodlot Owners
NB Premier's Round Table on the Environment & Economy
New Brunswick School District 2
New Brunswick School District 6
Nova Forest Alliance
Petitcodiac Sportsman's Club
Red Bank First Nation
Remsoft Inc.
Southern New Brunswick Wood Cooperative Limited
Sussex and District Chamber of Commerce
Sussex Fish and Game Association
Town of Sussex
Université de Moncton
University of NB, Fredericton - Faculty of Forestry
University of NB - Saint John Campus
Village of Petitcodiac
Washademoak Environmentalists

