WRWEO WATCH (Vol. 8, No. 1)
January 2011
Newsletter for the Woodens River Watershed Environmental Organization (WRWEO)

Albert Bridge Lake "A river runs through it"

Index	p.

***Our AGM is coming up soon*:** 7:00 p.m. on Wed. March 2 at Tantallon Public Library (Registration & Renewal of membership 6:30-7:00). Theme: **The Future of The Bluff Wilderness Hiking Trail – How To Keep It Wild, Inspiring, and Safe**. Keynote speaker: **Garnet McLaughlin, will talk about how volunteers can work to preserve the wildness and beauty of our trail**. See page 13 for more details.

In this issue: a focus on fish and fish habitat

The Woodens River system encompasses a set of 19 lakes and many streams beginning in the Hubley area and ultimately draining into St. Margaret's Bay at Woodens Cove, below Seabright. It supports at least eight species of larger fish including seagoing species such as alewife and American eel. While much of the river system remains in a near pristine state, there are many challenges to its ecological integrity.

In the 1980s and before, the Woodens River system was especially famed for its brook trout. No longer. Over the years many causes for the decline of the trout population have been proposed, a number of studies have been conducted and some efforts have been made to address specific factors thought to be involved. Some glimpses of recovery have been reported informally, but fishers and others seem to agree that the population at large remains a shadow of its former self.

There is continuing pressure "to do something" about the trout. At this juncture, the WRWEO board & the Water Quality and Aquatic Habitat Committee felt a need to

compile and reflect on what's known about the populations of trout and other fish species and the habitat that supports them. This issue of WRWEO Watch provides an overview of our current perspectives. We seek feedback on these perspectives, input of additional information about the river system and its fish, suggestions on how we might proceed, and participation in WRWEO's Water Quality and Aquatic Habitat Committee .

We begin with an essay by Bob Chambers, a knowledgeable fly fisher and biochemist who has conducted extensive limnological sampling of the upper part of the watershed, where he has lived since the early 1980s.

WHERE HAVE ALL THE MAYFLIES GONE?[1]

(Long Time Passing)

by
Robert W. Chambers, Ph.D
Professor of Biochemisdtry and Molecular Biology
Dalhousie University

Until 1989, the lakes in the Woodens River Watershed provided excellent trout fishing. Every year, huge hatches of Mayflies emerged on all the lakes about the second week in May. The lakes boiled with rising trout as thousands Mayflies fell into the lakes and died.

Mayfly nymphs, which live on the bottom of the lake or stream, are an important source of trout food. In the spring, the numphs mature. They crawl out of the water and sprout wings. The "duns", as they are called, fly up into streamside bushes to dry their wings. Then they fly into the air as "spinners", named for their erratic flight. They mate and fall onto the water where the female lays her eggs. Both the male and female die. This life cycle is critical for survival of trout.

In 1989, something strange happened. Very few Mayflies appeared on the lakes of our watershed. The next year, there was virtually no hatch. Unfortunately, the Mayflies did not recover.

Yellow perch, which were aways present, began to take over. Before the crash, you seldom caught a perch on a fly. Now, in some of the lakes, you can catch a perch on every cast. This is particularly serious because perch multiply very quickly, and trout cannot compete with them for the limited food supply.

---

[1] This report is based on data collected by the author (2000, 2001, 2002), by Stantec Consulting Ltd., and by Nova Scotia Department of the Environment—Nova Scotia Youth Conservation Corps volunteers (Roxanne Bower, Kim Fougere, Mike LeBlanc and Jim Holmes, supervisor). We are indebted to Ken Nickerson for information about the acidity, Mayflies and trout fishery in both the Wooden's River Watershed and the adjacent, Five Bridges Watershed.

Although we do not have quantitative data, fishermen who know the area well, tell us that the Mayfly and the trout declined suddenly at the same time. If the loss of Mayfly was the cause of the trout decline, one would expect the trout decline to be slower than it was, since trout have other sources of food. At the time of the decline, vegetation such as water lillys, also died. The rocks and shoreline of several lakes were coated with a "slippery, green slime".

Loss of the Mayflies was a sign of a significant environmental change. All sorts of things were blamed: Acid rain, lack of oxygen, residential development, highway construction etc. Let us look at these possible causes more closely.

Lake Acidity

The lakes and streams in the watershed are acidic. Acidity is defined as the number of hydrogen ions in a liter of water. Chemists express this in terms of mols/liter, which they abbreviate M. A mol, which is shorthand for molecules, is a very useful unit because it counts molecules or, in the case of acidity, hydrogen ions. A mol of any chemical contains 6.02×10^{23} molecules. Thus, a 1M solution of hydrogen ions contains 6.02×10^{23} hydrogen ions. You don't have to remember these numbers. Just remember that molar concentration (M) counts molecules.

The molar concentration of hydrogen ions is usually expressed in terms of pH[2]. Our lakes range from pH 4.3 (Long Lake) to 5.6 (Ben Miller Lake). However, pH is a compressed, reciprocal scale. As acidity goes up, pH goes down. Furthermore, pH is expressed as a logarithmic scale. If you are not used to dealing with logarithms, it is not obvious how much more acidic Long Lake is compared to Ben Miller. However, if we express acidity as M (molar concentration), we can compare acidities directly.

At left: Pot Lake, a headwater lake on the Woodens

We can make one more simplification. At the acidites of interest in our lakes, the hydrogen ion concentration is one millionth of a mol/liter. Chemists write this as µM, which stands for micromols/liter (µ = micro = one millionth). A micromole of any chemical contains 6.02×10^{17} molecules. Again, you don't have to remember the numbers. A µM is a unit just like pH. In fact, they are interconvertible, but for our purposes, µM is more useful because there is a one to one correspondence between acidity and µM. A 2µM solution of hydrogen ions is twice as acidic as a 1 µM solution. Simple! A 0.3 decrease in pH corresponds to a doubling of the acidity. Not so simple. Let's stick to µM.

---

[2] $pH = 1/\log [H^+]$, where $[H^+]$ = the molar concentration of hydrogen ions. $[H^+] = 10^{-pH}$.

[3] A 2004 report cites a pH of 4.8 for Big Five Bridge Lake and notes presence of a healthy trout population; See: http://gov.ns.ca/fish/sportfishing/reports/big5bridgesum.pdf

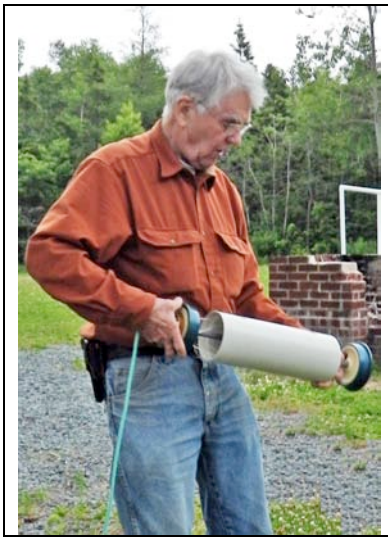
The acidity of Ben Miller Lake is 2.5 µM. Long Lake is 50 µM. Now it is obvious: Long Lake is 20 times more acidic than Ben Miller Lake!

Ben Miller and Long Lake are adjacent lakes in the lower watershed. Ben Miller is a headwater lake. It is slightly higher than Long Lake and about 500 meters away. It it feeds Long Lake. Ben Miller Lake has the lowest acidity found to date. Long Lake has the highest acidity observed to date.

According to the Stantec report, Ben Miller has a healthy Mayfly population, which makes it distinct from the populations found in the other lakes in the lower watershed. It also has a healthy trout population, but according to Ken Nickerson, a very knowledgeable fisherman, the trout are different from those in Long Lake.

According to Ken Nickerson, the Five Bridges Watershed is also acidic.[3] Upper Five Bridge Lake, a headwater lake, has lots of Mayflies and a healthy trout population. Therefore, seems unlikley that acidity, by itself, is responsible for the Mayfly crash and the simultaneous decline of the trout fishery in the Woodens River Watershed.

Incidently, a 1µM solution of hydrogen ions corresponds to pH 6.0. Trout can tolerate this level of acidity. Often, aquatic life begins to deteriorate when the acidity is increases above 10 µM (or drops below pH 5.0). However, over time, some organisms can adapt to high acidities. The trout population in Long Lake has declined drastically, but there are still trout in the lake even though the acidity is 50 µM. This is true of most lakes in the watershed. In fact, the lakes were quite acidic even before the crash. One should not conclude, *a priori*, that our watershed is in trouble because the acidity is > 10 µM in all the lakes studied except Ben Miller.



Editor's Note: WRWEO has been especially fortunate to have the volunteer services of Bob Chambers over the last decade. He has conducted careful, extensive and intensive monitoring of key limnological variables on a number of lakes and streams in the Woodens River Watershed. His reports are available on our website: www.wrweo.ca

Go to the section on Water Quality & Aquatic Habitat and see listings under the Water Quality and Sheldrake Lake tabs for Bob's reports.

Anoxia

Anoxia (lack of oxygen) is also blamed for the decline in the trout fishery. Trout need cool water, which is usually found near the bottom of our lakes. They also need oxygen. In general, the amount of oxygen that can dissolve in a lake depends on the barometric pressure, the solubility constant of oxygen and the temperature. There is plenty of oxygen in the air, and the air is in contact with the surface of the lake. However, oxygen must difuse from the surface to the bottom. Difussion is slow, but given time, oxygen from the air should get down to the bottom.

A lake is a dynamic ecosystem. In addition to fish and aquatic plants that we can see, there are a variety of organisms that we cannot see with the naked eye. The sediment on the bottom is full of bacteria. Some of these are quite versatile; they can live either with or without oxygen. They prey on dead organisms such as decaying algae. Microscopic animals (zooplanckton) are also present. They require oxygen. Algae, which are plants, are important components of most bodies of water. Some forms of algae are visable; they form filimentous, green mats on the suface. Other forms are microscopic. Nomally, we cannot see them. However, under certain conditions, they can form a bloom that turns a lake green.

All forms of algae produce oxygen by photosynthesis. In fact, they are responsible for much of the oxygen in our lakes. However, they too are versatile. If there is insufficient sunlight to carry out photosynthesis, their metabolism changes to respiration, and they use up oxygen just like animal cells. There is a delicate balance between the metabolism of organisms that use oxygen and those that produce it.

In some of our more colored lakes, like Black Point and Sheldrake, the sunlight only penetrates 1.5-2 meters. Below this, even the plants need oxygen. In other words, photosynthesis, which produces oxygen, changes to respiration, which requires oxygen. When oxygen is used up faster than it can be delivered, anoxia occurs. When anoxia develops, trout cannot go down to the cool water because there is no oxygen for them to breath.

Anoxia is a local effect. It only occurs at locations deeper than 5 meters, and even then, there are exceptions. For example, Paradise Cove in Hubley Big Lake has the deepest sampling station that we have encountered. In the summer, its oxygen concentration does decrease with depth, but Paradise Cove never becomes anoxic.

Black Point Lake is a shallow, highly colored lake. It never develops anoxia. Before 1989, it provided excellent trout fishing. Like the rest of the lakes in the watershed, it lost its Mayfly hatch in 1989-1990. The trout fishery crashed at the same time.

The other lakes become anoxic, but that too is a local effect. It only occurs at locations deeper than 5 meters. Clearly, something other than anoxia is responsible for the decline in trout.

Blasting

There has been extensive development in the upper part of the watershed. This includes construction and twining of Highway 103 as well as development of Lake of the Woods and Three Brooks. Some of this occurred before loss of the Mayfly (e.g. construction of Highway 103). Much of it occurred after loss of the Mayfly. There were no houses on Frederick Lake, and only a few on Hubley Big Lake, at the time of the crash so houses *per se* are not responsible for the change in these lakes. The effect of development, however, has not been ruled out.

It has been suggested that blasting that occurred in the development of upper lakes altered the ground water. Fishermen will tell you that some of the lakes had "hot spots" where the fishing was particularly good. Some of these hot spots were fed by underground springs. This provided cold water, which was particularly important in a shallow lake like Black Point. A change in ground water could shut down some of these springs. Alternatively, blasting could have opened an arsenic

deposit. Such deposits do exist in the watershed. If a toxic chemical like arsenic was released into the ground water, it might be carried by the underground springs to the lake and then down the watershed. Also, run-off from construction may have washed toxic materials into the watershed. The DFO Trout Management Plan of 2005 states: "The presence and degree of groundwater influence in lakes has not been adequately measured to incorporate into the lake classification system".

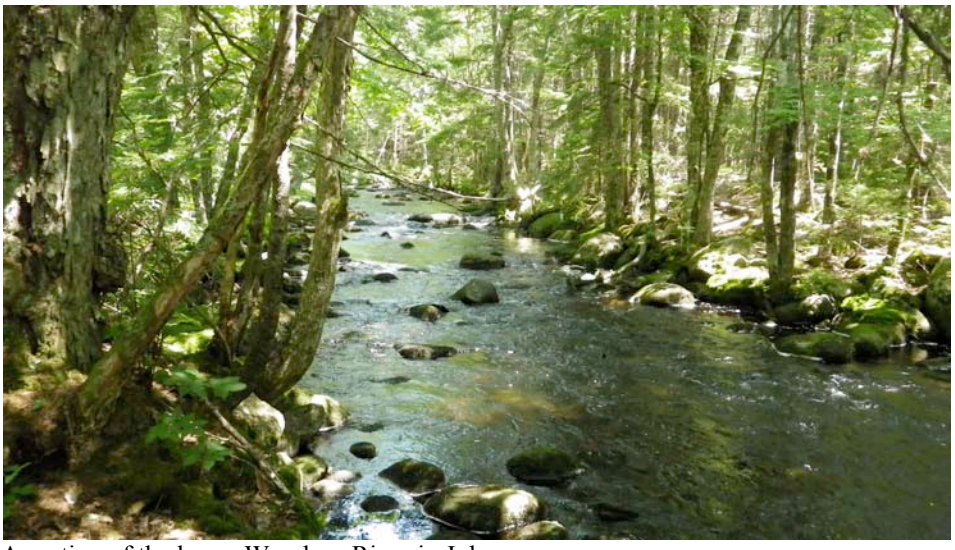
It is interesting that Long Lake is in the main flow of the watershed, but Ben Miller Lake, because of its elevation, is out of the main flow. Thus, toxic material washing down from the upper watershed might have influenced Long Lake, but not Ben Miller Lake.

Conclusion

Clearly, more studies are needed on Long Lake and Ben Miller Lake (adjacent lakes in same watershed, different flow patterns) as well as on Paradise Cove of Hubley Big Lake and Upper Five Bridge Lake (adjacent lakes in different watersheds).

These studies may provide insight about how we should proceed to improve fish habitat in the watershed.

The bottom line is that we don't know what caused the loss of early Mayfly and the decline of the trout fishery in 1989-90 and why trout haven't begun to recover significantly in this watershed. Without that information it is difficult to know what to do about it. Hopefully, we are dealing with a cycle that will, in time, correct itself. Such cycles are common in biology. The environment is remarkably resilient. Taking action without knowing the cause of the problem might make things worse. We are are on the horns of a dilemma.



A section of the lower Woodens River in July

More information about trout and the Woodens River system

It's important to recognize that while the decline of brook trout is a major concern, seven or more other larger species and probably a half dozen species of minnows and sticklebacks occur in this river system and continue to be important as food for wildlife such as frogs, mink, and osprey. The American eel – a COSEWIC species of concern - has been found in even in the highest reaches of the system.

Look under Aquatic Habitat and Water Quality on the WRWEO website for annotated links to documents and websites that provide information about the Woodens River system and its fish populations.

Currently, the links are listed under four categories: Fish and Fish Habitat, Water Quality, Sheldrake Lake and Maps and Flowchart. We want to list all documents and websites that contain information about the Woodens River system, plus a selection of other documents that are highly pertinent, but do not deal specifically with the Woodens.

If you know of appropriate documents that are not listed, please forward them (or the links) to us. We can scan print documents and return the originals.

Please forward comments and even casual observations about the Woodens River system, e.g., to do with algal blooms, mayfly hatch, disturbances, pollutants, interesting nature observations etc. Send materials to wreow@yahoo.ca.

Are algal blooms becoming more widespread in the streams and lakes of the Woodens River Watershed? Please share your observations – see wrweo.ca/algae

Where do we go from here?

Through the summer and the fall, several of us from the Board and the Water Quality and Aquatic Habitat Committee of WRWEO have had lengthy discussions about what we know and don't know about the Woodens River system, and concerning actions that might be taken to address current or potential challenges to its integrity. Bob's essay is one outcome. In that essay, he examines possible cause and effect relationships that would explain the decline of the spring mayfly and trout populations. As a scientist, he is forced to the conclusion that we really don't know the causes, although some possibilities can likely be excluded. Disturbances associated with blasting or road-building in the late

1980s are a possible cause but there's no direct evidence for that right now. Bob suggests that the spring mayfly and trout populations could still recover on their own but we have no assurances of that happening. (It's a bit like waiting for the Atlantic cod to recover after its collapse and the cessation of fishing in the early 1990s.)

Given these uncertainties, we suggest an appropriate strategy is to: (a) protect and improve the ecological integrity of the Woodens River system as possible as that will protect it for all species, including us (we don't want to see slime on the lakes even if there are no trout) and it may help with the trout; (b) pursue scientific studies to test the "disturbance hypothesis", i.e. that the decline of mayfly and trout in the late 1980s was associated with toxins released into the headwaters of the Woodens River system as a result of development and/or road building activities.

The Challenges

Amongst the challenges to the ecological integrity of the Woodens River system are the following:

- **medium to larger scale disturbances** associated with new roads & residential developments in the upper part of the watershed, and logging activity in the lower watershed;
- **steadily growing residential population** in the upper part of the watershed;
- **the sometime precarious conditions of the brooks and streams** that feed the lakes of the system - trout that spawn in these areas may suffer or be trapped and die as temperatures rise and the brooks and streams dry up; this situation has been observed and will get worse with climatic warming;
- **poor construction of culverts** for logging roads and ATV trails which contributes to degradation of trout habitat;
- **salt inputs and other effects of heavy traffic** in the upper part of the watershed;
- **PCBs** – spillage of PCBs into Five Island Lake was identified in 1994; it has now been effectively cleaned up, however catch and release regulations remain in place;
- **perch populations have increased** dramatically in some lakes – this has implications for the survival of trout that cannot compete with perch once the trout numbers becomes small enough because of other factors;
- **continuing acidification** by acid rain (due to the poor buffering capacity of soils developed on the predominantly granitic bedrock) – installation of a lime doser could counter this trend, but is expensive;
- **algal blooms** associated with enhanced phosphorus inputs due to natural or human-related causes may be increasing;
- **invasive species** – not yet reported for the Woodens, but we need to guard against invasion by species such as smallmouth bass, chain pickerel, and some exotic aquatic plants.

Over the coming year, we will be seeking input from fishers and residents of the Woodens River system and from various government and academic personnel on how we might address these and possibly other challenges.

We think that it is important to follow up on the "disturbance hypotheses" for more than just our concern about the Woodens River system: if we don't know what caused the sudden collapse of the mayfly and brook trout on the Woodens, we can't be assured that the same thing won't happen (or hasn't happened) in other watersheds. If there was a large scale toxicity event, there should be evidence of it in the sediments. At the very least we need to look for such evidence. In this regard, we will be seeking help from academic and government researchers.

These are admittedly complex issues, but that is what we face. Much like issues surrounding climatic change, we don't know all of the answers, but we can probably agree that we must do the best we can to protect what's left of the ever shrinking natural world. We are blessed with a large chunk of that world in the Woodens River Watershed.

Join our efforts


Royal ferns on Gates Lake

The Water Quality and Aquatic Habitat Committee of WRWEO has operated rather informally over the past several years while most of WRWEO's efforts were directed towards getting protection for the Five Bridge Lakes Wilderness Area (FBLWA) as well as with maintaining The Bluff Wilderness Hiking Trail. Formal protection of the FBLWA under the N.S. Wilderness Protection Act, expected in 2011, will help to protect a significant proportion, but far from all, of the Woodens River Watershed. Even protected areas are still subject to stresses such as acid rain. We need participation of more people in order to pursue new initiatives related to water quality and aquatic habitat in the Woodens River Watershed. If you have an interest in this area, please join this committee – you don't have to be an expert. At the 2011 AGM , we will announce a meeting date for the spring. It will also be posted on the website. In the meantime, please send a message to wrweo@yahoo.ca to let us know you interested in joining this committee.

Trail Notes

David Patriquin and **Richmond Campbell,** Co-chairs of WRWEO led a nature walk in August on the Pot Lake loop. Richmond talked about the development of the trail and its purpose. David, a retired biologist, talked about the natural history, stopping at five sites along the way to explore and discuss them in more detail: the wetland by the boardwalk, a small barrens, the lakeside at the junction to the Pot Lake loop, an oak forest and an old growth mixed forest stand above Pot Lake. The walk was co-sponsored by the Halifax Field Naturalists and the Nova Scotia Wild Flora Society and was listed as a Nova Scotia Park Event for 2010. The 18 participants included three to four members from each of the organizations cosponsoring the hike, a visiting field naturalist from Australia, an ecologically oriented forester, some newcomers to The Bluff Trail and some experienced Bluff Trail hikers.

Maintenance work on The Bluff Wilderness Hiking Trail is carried out throughout the year but mainly in the fall. In November the two most remote loops, The Bluff loop and Hay Marsh loop, received a "haircut"—clearing away the new growth on the trail to keep a clear path throughout. In addition, dead fall across the trail is removed.

The contract for this work awarded to Cobequid Trail Consulting by WRWEO on the basis of competitive bids. Volunteers Dusan Soudek and his colleagues removed a large set of trees that had fallen across the portage access trail to the Hay Marsh loop from Paradise Cove in Hubley Big Lake. Fortunately WRWEO has obtained insurance for volunteers through the Nova Scotia Trails Federation.

Capital work this year and last has involved the installation of stone tread to make drainage areas easily passable. Stones found nearby are used to create the tread by placing the stones in a stable interlocking pattern that permits water to flow through. The process is inexpensive (no machines are used), durable (unlike boardwalks, stones do not rot), environmentally friendly (no trees to cut), and in keeping with the feel of a wilderness trail.


Hikers on stone tread

We have treated 42 drainage areas this way, 22 of them completed in October on the first two loops. The work was awarded to Cobequid Trail Consulting on the basis of competitive bids. Last year 12 remote drainage areas were treated in this way by Community Forests Canada, employing local workers. Funding for maintenance and capital work is raised through applications to the Halifax Regional Trails Association and to the Province.

Garnet McLaughlin gave a spirited and informative presentation about volunteer trail work to the Board and other WRWEO members on November 23 at the Tantallon Public Library. His message was that trail work can be fun and creates new members. In fact, some volunteers in the province have enjoyed working with him so much that they will travel for hours, even out of the province, to join his crew for free. He is an inspiring volunteer leader and heads two volunteer trail groups of his own besides running Cobequid Trail Consulting.

WRWEO is planning a one day workshop on trail repair for this May that will be led by Garnet. He is regarded far and wide as "the go-to person" for stone tread work and has transformed wilderness trail work in the Province. If you are fit and think you might enjoy learning these skills from Garnet, please let us know (email me at: richmond.campbell@dal.ca).

Pot Lake loop flooded around the 150 metre boardwalk near the beginning of the trail. At one point the entire length of the boardwalk was floating a few inches off its moorings. When the water receeded almost all of the length settled back into place except for a short 10 foot section which had lost its footing. The small boardwalk just after the first junction also was in bad shape because of the flooding. Inspired by Garnet's talk, several volunteers (Daniel Allaire, Paul Berry, Rich Campbell, and Jim Carwardine) brought tools and boards to the problem areas, made the repairs, and removed a broken tree hanging over the trail.

More than 75 hikers passed us during our work, giving us the opportunity to explain that the trail is maintained through volunteers. We also got a sense of how very enthusiastic users of the trail are about the quality of the trail.

Minor repair work and tree fall removal is continually needed. For example, WRWEO volunteer Daniel Allaire removed dead fall created by a December storm just past the first junction. If you are interested in helping in this way please let me know.

Jeff Schnurr, who heads Community Forests Canada and works on our trail, is also strongly committed to working to improve environments internationally. He has been so successful that he was recently nominated as one of CBC's Champions of Change. Please go to www.cbc.ca/change and learn about the contest and his work in Tanzinia.

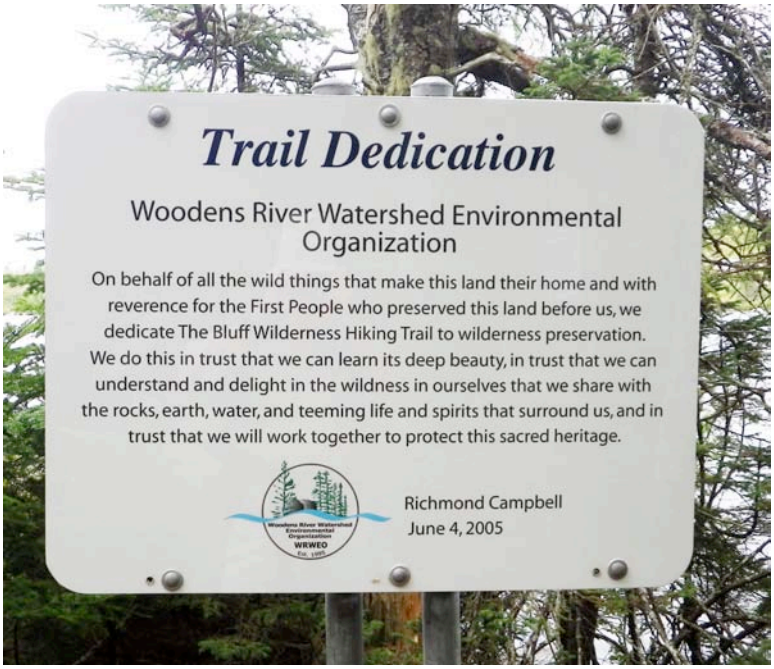
Halifax Regional Search and Rescue is a dedicated large group of well-trained volunteers who can be called out at any time of day or night to rescue someone from danger. As some of our readers will know, on June 20 and October 5 there were incidents on the trail requiring HRSAR to be called in to help. According to reports in the local newspaper, the persons who were in trouble on the trail were far enough out that in each case that a helicopter was needed to make the rescue.

WRWEO made contact with HRSAR during the summer and eventually three members of WRWEO (Rich Campbell, Jim Carwardine, and Catherine Klefenz) were invited to meet with HRSAR on November 1 to discuss how it is possible to access remote loops on the trail quickly by taking water routes. This was a successful meeting. Each group learned from the other.

Shortly before the meeting members of HRSAR hiked more than two loops of the trail and then conducted a mock rescue operation on the trail during the night (reported in the November 10 issue of The Masthead News). HRSAR has asked us to give the GPS coordinates of possible landing sites for helicopters. We have now done so, with the help of volunteer Daniel Allaire and Mark Reed.

We remind all our readers who use the trail to make sure that they carry with them the items listed on the sign at the trailhead: Map, compass, first aid kit, water and water purifiers, extra layers of warm clothing, rain pants and jacket, matches, flashlight, and knife. On our planned updated sign we will now add: GPS, cell phone, whistle, and in winter cleats for your boots.

A Provincial Trails Conference was held in Cornwallis on October 1-3 and attended by four members of WRWEO. Paul Berry took a training session to become a trail warden and is now officially qualified. Approximately 60 of the 200 some delegates were from government so that there could be a thorough exchange of ideas between volunteers and those in government dedicated to supporting trails. The last such conference was held 23 years ago. Paul reported that the focus tended to be on trails as tourist attractions more than on community-oriented fitness and well-being opportunities. Nanci Lee, one of the delegates from WRWEO, provided a detailed report of the conference to the Board. The important outcome from our perspective is that there is more discussion and reflection on the significance of trails for both our economy and the health and general well-being of Nova Scotians.



The Bluff Trail and Wilderness Protection are closely linked, as reflected in the words on the trail dedication sign at the first junction of the trail. The words were offered on June 4, 2005 when the trail opened after some seven years of planning and preparation. We expect that wilderness protection of Five Bridge Lakes Wilderness Area will be soon achieved. We are planning a future issue of WRWEO Watch to deal in detail with the relation between the trail and wilderness protection.

Annual General Meeting

The theme of the 2011 Annual General Meeting is: **The Future of The Bluff Wilderness Hiking Trail – How To Keep It Wild, Inspiring, and Safe**. The AGM is Wednesday evening, March 2, from 7 pm to 9 pm at the Tantallon Public Library. Registration and renewal of membership ($10 per person) begins at 6:30 pm. (However, the meeting is open to members and non-members alike.) Please mark this date on your calendars.

We expect the business to take about 45 minutes. It will include summaries of our activities over the past year related to: (i) The Bluff Wilderness Hiking Trail, (ii) protection of the Five Bridge Lakes Wilderness Area, and (iii) aquatic habitat & water quality in the Woodens River Watershed and there will be an election of a new board of directors.

Then, the keynote speaker, **Garnet McLaughlin, will talk about how volunteers can work to preserve the wildness and beauty of our trail**. An inspiring speaker, Garnet is regarded by many as the premier wilderness trail specialist in the Province. He has revolutionized wilderness trail management in Nova Scotia by re-introducing the ancient technique of stone tread construction, used on 42 sites on our trail. Besides running his company, Cobequid Trail Consulting, he leads two volunteer community trail groups.

Thank you for your attention. Please share your thoughts and comments. We are always glad to hear from our members.
- *Richmond Campbell* & *David Patriquin* (Co-chairs, WRWEO)

To Contact WRWEO: Our e-mail address is wrweo@yahoo.ca. You can also write or call directly to Richmond Campbell (Co-chair: 876-7847 at home or 489-0457 for his cell), or any of the other board members listed on the website; write to WRWEO, Unit 14, Box 300, 3650 Hammonds Plains Road, Upper Tantallon, Nova Scotia B3Z 4R3.

Hikers go through oak woodland on the Pot Lake Loop

Photographs in this issue of WRWEO WATCH were taken by David Patriquin