



THE BLUE HERON

The Bras d'Or Stewardship Society

P.O. Box 158, Baddeck, Nova Scotia B0E 1B0

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Editorial

The last year has been an interesting one in Nova Scotia. We had a change of government. In a provincial election the Liberals replaced New Democrats; gone after only one term. The New Economy (Ivany) Commission Report on Nova Scotians came out and painted a dismal picture of the future of Nova Scotia unless major changes take place at all levels. The price of a barrel of oil and with it Canada's petro-dollar continues to plummet. In Cape Breton, controversy over the planned monstrous Never-to-be Forgotten Memorial in the Highlands National Park tended to overshadow these issues. And the Province, in particular Cape Breton, had one of the harshest winters in years.

In this issue of the Blue Heron besides the usual items, we have

three new articles of interest each with a quite different focus. The first, by Dr. Bruce Hatcher and his Cape Breton University (CBU) team, on the complex electronic salmon research they are doing in the Bras d'Or Lakes. The second derives from the report biologist Minga O'Brien produced at the request of the Stewardship Society about a meeting at CBU on the development of possible new forest products: what do these scientists and engineers understand about Nova Scotia's forests and forest-dependent wildlife? Do they have any sense of how degraded they are, and the potential impacts of even greater pressures on them?

The third is quite different. This is a charming story of high romance, daring elopement, mad dashes of lovers across the frozen Bras d'Or Lakes on sleighs, of angry rejected suitors with all the trimmings, told about and partially by John V. Newlands about his Crammond Islands ancestors: a made to measure libretto for a romantic nineteenth century Italian style opera: Rosini, Verdi, where were you when we needed you?

To finish on a less happy theme. This is the last issue of the Blue Heron I will edit. Time is catching up with all that infers in terms of my various faculties. To quote Shakespeare (from As You Like It) on the subject of advancing years

.....
*The last scene of all--
 "That ends this strange eventful
 history is second childishness
 Sans teeth, sans eyes, sans taste,
 sans everything".*

From the general to the personal, in this context. I have to get (costly) lost hearing aids replaced, my few remaining teeth looked after, a cataract removed and glasses replaced but I can't remember the name of the dentist or the optometrist I saw last time...

James O'Brien

NOTICE

**THE ANNUAL GENERAL
 MEETING OF THE SOCIETY
 WILL BE HELD ON
 SATURDAY, APRIL 25, 2015
 AT 10:00 A.M.
 AT THE MASONIC HALL
 IN BADDECK
 ALL MEMBERS ARE INVITED
 TO ATTEND AS WELL AS
 INTERESTED CITIZENS WHO
 ARE CONCERNED WITH THE
 FUTURE STEWARDSHIP OF
 THE BRAS D'OR LAKES.**

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NEWS ITEMS:

Scientific Work on Middle and Baddeck Rivers

By Chuck Thompson

Science work continues on Middle River as well as Baddeck River. A joint effort between Federal Department of Fisheries and Oceans (DFO) and Nova Scotia Department of Fisheries (NSDoF) resulted in brood (spawning) stock being collected from both rivers. These fish will be raised at the Margaree Hatchery to be released back into parent stream when they reach parr size. As well, the annual dive counts by DFO and UINR are underway in a yearly attempt to estimate stock numbers. Middle River has held up well given the poor state of salmon stocks elsewhere.

Kidston Island Shoreline Protection:

In December 2014, work was undertaken to stop the erosion at the west end of Kidston Island in Baddeck. This required the placement of large stones near the base of the light house on the shore to hopefully stop any further erosion of the shore front. Increasingly, there seems to be situations driven by wind, rain and wave power that are an impact on shorelines in the Bras d'Or Lakes. Recently, a CBC radio interview featured local geologist, Fred Baechler, discussing the merits of protecting land by the placement of armor stone on eroding shorefronts. Baechler stated that proper engineering is a critical component of such remediation.

Striped Bass Population:

It has been reported that the striped bass population in the Bras d'Or Lakes has been increasing. The reason maybe the warming of the water temperatures as a consequence of global warming allowing this fish to be considered an invasive species. This species will impact on other resident fish populations as it feeds on local aquatic dwellers. Catching striped bass is popular with recreational fishermen.

St. Peter's Canal Hours:

Changes in the hours that the St. Peter's Canal operates received some criticism from recreational boat owners who found they could not get through the St. Peter's lock due to new hours of operation. The greatest impact was early in the season and in the fall.

Upgrades at St. Peter's Marina:

St. Peter's Marina operated by the St. Peter's Lion's Club is undergoing upgrades to its facilities. A new foundation is in place under the club house and the docking and finger piers are to be upgraded. Funds to effect these improvements were accessed through Enterprise Cape Breton Corporation (ECBC) prior to its being consumed by the Atlantic Canada Opportunities Agency (ACOA).

Upgrades at the Bras d'Or Yacht Club:

Baddeck's Bras d'Or Yacht Club had its waterfront upgraded with a very well constructed new wharf that should withstand the powers of Mother Nature. The wharf was completely rebuilt starting in late July 2014 and finished up in August 2014. This was a timely upgrade as the old structure had been

undermined by wave action and needed replacing. Funds provided for this work came from Enterprise Cape Breton Corporation (ECBC) and donations through a fund raiser held in the summer of 2014.

Railway Closure:

The former CN rail track from Port Hawkesbury to Sydney will no longer operate because there is no 'business case' to support rail traffic. There has been much protest about the closure of this line which cannot support itself given current rail numbers. A commission was formed to save this historic infrastructure.

An unaddressed concern is the fate of the Grand Narrows rail bridge that no doubt has seen its better days. The looming question is who will be responsible for its moth balling and oversight. No doubt without any train traffic this ancient structure is redundant and poses a potentially serious environmental safety (liability) problem.

Semi-Annual BSS Meeting:

In August 2014, the Society held its semi-annual meeting. A presentation was made by Dr. Susanna Fuller, PhD. regarding the New Economy Commission's Report on the social and economic issues facing Nova Scotia. Fuller was a commission member traveling throughout the province as the Commission listened to public concerns about Nova Scotia's economy and future. The New Economy Commission's report can be accessed at www.onens.ca.

ROSS FERRY STEWARDSHIP SOCIETY REPORT FALL 2014

by Terri Shubrook

The Ross Ferry Marine Park is located on the scenic Bras d'Or Lake in Cape Breton, Nova Scotia. The park is on the site of the ferry which operated for many years between Ross Ferry and Big Harbour, across the Great Bras d'Or Channel.

The Ross Ferry Stewardship Society is a volunteer based community organization, formed in 2004. It was formed with the intention of improving the site and to provide continued access to the Bras d'Or. The Society negotiated an agreement with the Province of Nova Scotia to manage the site and work began to create the Marine Park.

Today we have a vibrant community park which includes picnic areas, walking trails, refurbished wharf facilities, a sewage pump out for boaters, a boat launch, and a children's playground, all in an idyllic setting on the shores of the Bras d'Or.

The park has continued to receive funding from the federal government and municipal governments for summer students but apart from these contributions the operation and maintenance of the park is dependent on local fund raising and donations.

We started a new activity this year ... "Summer Evenings at the Park". We had a Fossil Info night as well as an introduction to the Bras d'Or Lake Biosphere. Our Astronomy nights were thwarted by poor weather and the night we did proceed, the sky opened up 10 minutes after the event was over.

We tried something different with the spring park clean-up this year. We held a Park and Road Clean-up

followed by a Family Supper. We partnered with Clean Nova Scotia and the Baddeck Tim Horton's and combined the Park Clean-up with a road clean-up. Clean Nova Scotia provided us with garbage and recycling bags. Tim Horton's provided Tim Bits and Hot Chocolate. The weather did not cooperate but those few that showed up got the job done. Trish Aker and Joella Foulds entertained us while we ate chili and visited.

Our big project this year was to do repairs to the Wharf. We received funding from ECBC – now ACOA – with the understanding that we were to contribute 25% of the costs. We hired a Contractor and proceeded to raise our portion of the funds. In addition to our Canada Day and Labour Day events we held a Pub Night. We were grateful for the \$5,000 contribution from the County of Victoria.

In 2015 we are planning on installing a community bulletin board, updating our signage, expanding our "Summer Evenings" and installing our Green Gym.

Our AGM was held November 13, 2014. Our 2015 Executive is: Terri Shobbrook (Chair) – 902-674-0148, Marilyn McKenna, Brenda Rymes, John Hugh Edwards, Murdock Morrison and Alex Gilchrist.

REPORT FROM THE BRAS D'OR LAKE BIOSPHERE RESERVE FOR THE FALL OF 2014.

By Jim Foulds

The Bras d'Or Lake Biosphere reserve was designated by UNESCO in June 2011 and is governed by an 18 member Board of Directors from around the

watershed. All Board members are volunteers who give their time to oversee the activities of the association and to work on projects. We meet 9 times a year at community halls throughout the watershed! All of our meetings are open to the public.

Here are some highlights of our work over the past year.

www.blbra.ca

Education Resource Project: The Education Resource Committee is developing a resource document for Grade 4 Science teachers (and other leaders/parents) to help children learn about, and connect with, the natural environment around them. The resource is focused on the Geology and Habitats within the Bras d'Or Lake Biosphere Reserve. The document is divided into three sections: background information for **teachers**; engaging materials for Grade 4 **students** to read themselves; and detailed outlines of hands-on, interactive **activities**. Throughout the document, the unique nature of the Bras d'Or Lake and its watershed is emphasized. We are also taking an approach that recognizes and celebrates the different cultures present around the Bras d'Or. The "Two-Eyed Seeing" approach respects both Western science and Indigenous knowledge, and both 'ways of knowing' complement each other. The second section for students will be available in English, French, Mi'kmaq and Gaelic.

The final product will be the resource document itself (which will be printed and digitized), as well as related materials (such as videos of local stories/people of interest) hosted online. Once the resource is published, we will hold a Professional Development day for teachers to introduce them

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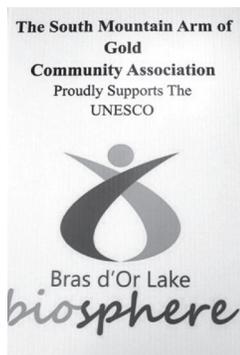
to this resource, and work with schools in the Biosphere Reserve to pilot the project.

Currently, the resource is in the drafting stage. We have a full document (approximately 120 pages, without diagrams). Most sections are complete or near-complete as far as content collection goes (with the exception of the student section, for which a significant amount of material still needs to be collected e.g., stories, legends, fun facts). We underwent a first round of revisions to incorporate the Mi'kmaq worldview, and we are currently undergoing a second round of revisions.

To complete this project, we will need assistance from an illustrator, a professional editor, a website designer, translators and a part-time project coordinator. The budget will be mainly comprised of labour from the contractors listed above, as well as printing and associated distribution costs.

Signage for the Biosphere:

We are actively promoting the installation of Biosphere signage. Local organizations are taking out memberships in the association – this gives them the right to use our logo. The South Mountain Arm of Gold Community Association from the St. Georges Channel area



(West Bay) has done so – proudly displaying the sign (see picture) both inside and outside their very busy hall. It is also available for businesses to use in their promotional materials. Greg Silver of CAPEBRETONSAILING.COM

is the first to do so. Thanks Greg! On a grander scale, it looks like Richmond County will be the first municipality to start incorporating the logo and information about the Bras d'Or Biosphere in signage at the St. Peters Canal as part of their new tourism strategy.

Walking Around the Bras d'Or Lake Project:

This project has an ultimate goal of a walking trail that extends around the entire watershed. The idea of a trail that went around the lake has always been a positive, well supported goal to work toward. The example of the Bruce Trail in the Niagara Escarpment Biosphere Reserve has inspired this in great measure although, as we have discovered, there are many existing trails and many avid participants using them! The latest from the Trail committee:

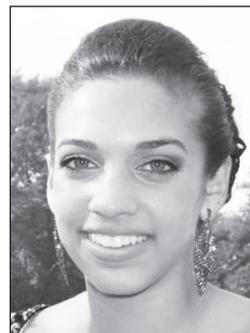
- Trail maps have been created (thanks to CBRM staff). They show existing trails but will also have a glyph, website address, Facebook symbol and updates for NS Nature Trust and Bras d'Or Preservation Nature Trust properties
- The maps will be distributed to community centres/fire halls throughout the watershed as soon as possible for the purpose of raising awareness and gaining further information about existing trails and trail developments
- Two public information documents will be prepared. One will be a digest of the original background document and the Final Report; the second document will be a brochure-type publication containing a map and current information about Trail opportunities.
- To organize and support four community-level activities to enable each area to undertake trail projects and identify

challenges in developing sections of the Bras d'Or Lake Walking Trail.

Museum Display: The display at the AGB National Historic site has been installed! It will help to explain the Biosphere Reserve concept to over 70,000 visitors /year! It also promotes Alexander Graham Bell's interest in the environment of the Bras d'Or showing his interest in sustainability. The highlight of the display is the light-table of an aerial view of the watershed – on loan from a long-time Bras d'Or Biosphere supporter – the Bras d'Or Preservation Nature Trust.

Summer Student 2014:

Elise Marsman worked as an Assistant for the Education Resource project of the Bras d'Or Lake Biosphere Reserve



Association during the summer of 2014. Elise is currently a second-year student in the Engineering Transfer Diploma Program at Cape Breton University, majoring in Environmental Engineering. She brought to the job extensive extra-curricular experience working with children, through refereeing soccer and organizing children's day camps. She has always enjoyed outdoor activities, but especially swimming and boating on the Bras d'Or Lake.

As the Education Resource Assistant, Elise was tasked with content gathering and editing responsibilities. She spent time gaining an understanding of the Two-Eyed Seeing approach (in which Western Science and Indigenous Knowledge

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complement each other). She gathered materials relevant to the Geology and Habitat content of the resource document, and spent time editing several sections. She also gathered biographies of people doing inspiring work within the Bras d'Or Biosphere!

Biosphere Atlas: There is a wealth of information on-line in what we call the "Biosphere Atlas". Our website has a link to the atlas on every page. The atlas is a Google Earth based database with an ever increasing amount of information on a variety of general activities throughout the watershed. By clicking on or off different layers, you can see or hide the information. Major subject layers are: Natural Resources and Stewardship, Education, Development and Economy, Culture, Social & Recreation and Science and Research. Under each major heading, there are many groups of data to peruse. This project started with an inventory of community organizations within the watershed – to make sure we had an idea of what they did and how we could contact them. We encourage everyone to have a look around the atlas and if you want something added, let us know!

CRAMMOND ISLAND HISTORY

This (lightly edited) letter was sent to Mr. David Gunn of Dundee by John Vernon Newlands of Maine USA

I am writing to you in regards to the article entitled 'The Crammond Islands' which you authored and was published in the July 2012 issue of The Blue Heron Like Johanna MacKenzie, I too have a connection to the (Crammond)

Islands. My grandmother, Victoria Eliza, (nee Smith) Newlands, was the youngest of Archie Smith's eight girls. I thought that I would share with you a little more the history of the Islands.

Alexander Smith, my 3rd great grandfather, and his wife, Catherine (nee MacLeod) and 3 of their children, John, Donald, and Catherine immigrated to West Bay in 1815 from Balallan, Isle of Lewis, Scotland.

The two Crammond (Smith) Islands were originally owned by Alexander Smith as a result of a land grant petition that he was awarded on 22 July 1818. (I have in my possession the original document). In 1820, he successfully petitioned for the third island, known as Floda.

After Alexander Smith's death on 8 Apr 1850, all three islands passed to his youngest son, Donald Smith (my 2nd great grandfather). Donald and his first wife, Ann (nee MacDonald) had seven children before her death at the rather young age of 34. Donald remarried Sarah Kennedy in 1845 and together they had 3 additional sons; Archibald (Archie), my great grandfather, John and Isaac. In addition to farming, Donald Smith was also a carpenter and some locals referred to the Islands as Carpenter's Island.

As you noted in your article, "social life was quite active". And the following tale gives a fine example of some of that activity. This was written by Vera L. Davison. It appeared in the Atlantic Advocate Magazine in June 1958 and was called The Double Elopement.

'In 1845 there lived on Carpenters Island (now known as Crammond Islands), in the beautiful Bras d'Or Lake, a certain Donald Smith and his family. Smith was a prosperous farmer as the island, one and a half miles in length and about half

a mile wide, was ideally suited to both pasture and cultivation.

At the time, Mary, one of Donald Smith's daughters, had reached marriageable age, and indeed had a sweetheart, Angus Ross, who lived on the mainland. Angus had recently acquired a farm but being a thrifty Scot was biding his time till he was in a better financial position before proposing to Mary. However, in those days it was still customary for parents to arrange marriages for their daughters, so when a Mr. Johnson from Lake Ainslie asked for Mary's hand in marriage her parents, knowing him to be well-to-do, gave their consent.

A fine ball was held at the Smith home in honour of the engagement. It was early in the year and the lake was still frozen over so Angus Ross skated across and attended the festivities. While dancing with Mary, he emulated his famous countryman Young Lochinvar by whispering in her ear a plea to elope. This she was very willing to do and going into a bedroom adjoining the parlour she climbed through the window. Her two brothers gleefully entered into the plot and helped Angus harness a horse to a sleigh. The lovers then set off across the four miles of ice to Black River and thence to Arichat to be married. They did not fear pursuit as their horse, known as the Barra Mare, was famed for speed on the ice.

Soon the elopement was discovered and the jilted Mr. Johnson was naturally somewhat downcast. He soon found compensation, however, in the charms of lovely Henrietta MacKenzie, and shortly proposed marriage. Although already engaged to one Peter McFarlane, Henrietta accepted and they too set out for Arichat. On

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the way they encountered Mr. And Mrs. Angus Ross returning. There were no hard feelings and they drank to each other's health before continuing on their way.

Henrietta's erstwhile fiancé) meanwhile was vowing vengeance in no uncertain terms 'til Henrietta's young sister Anne calmed him down. Being just thirteen at the time she promised she would marry him if he would wait two or three years. This he did, and did not regret his wait.

Donald Smith's last will and testament bequeathed the western island, ("Smith Island") and half of Floda Island to his son, Isaac Smith. Isaac and his wife, Catherine Bell MacKenzie, lived on Smith Island and had three children, Daniel, Mabel and James.

Daniel (Dan) Smith, Isaac's eldest son, married Alice Muriel Cotterel in 1918 and they lived on the western Crammond Island, commonly called Smith's Island until 1930 when he felt that his family must relocate so that his daughters might get their education. Previous to this, he and his family lived with his parents Isaac and Catherine Bell on the island. For many of those years, Isaac was crippled so Dan shouldered all the responsibility of the farm on the island. Upon Isaac's death, he willed the island to Dan. It was one of the conditions of Isaac's will that Dan care for his mother, Catherine Bell.

Dan's family seriously considered moving to the United States. Flora MacLeod, at whose house in Mt. Mabel Dan was born, encouraged this move and promised to help them settle. When she died suddenly, Dan and his family moved to Seal's Cove near Orangedale. His mother, Catherine Bell, refused to leave the old homestead on

Smith Island so Dan deeded the property to her.

Catherine Bell believed that her youngest son, Jim (James Smith / 'Jim Crow') would bring her groceries and so forth. Jim, who had been irresponsible, moved in with his mother on the island. But, he did not treat her well, so she left the island and came to live with her son, Dan, in Whycocomagh Portage some fifty miles away. There she remained for the rest of her life. I do not know what transpired with the ownership of 'Smith Island' after Jim Smith left the island to go live with his brother Dan's widow, Alice, in Whycocomagh. Dan passed away in 1955, Jim in 1969 and Dan's wife, Alice in 1985.

As for "MacLean Island", the middle island, Donald Smith willed it and the other half of Floda Island jointly to his wife, Sarah and his son, Archie (Archibald K. Smith) with the stipulation that Archie would become the sole owner upon Sarah's passing which occurred on 14 Oct 1885.

Archie, my great grandfather, who passed away on 10 Oct 1905, did indeed have eight daughters. The first six of these girls, Sarah Mae ('Sadie'), Mary Henrietta ('Etta'), Katherine Isabella, ('Katie'), Dolena Margaret, ('Lena'), Annie Jane, ('Jenny') and Minnie Barbara, ('Minnie') were by his first wife, Annie MacLachlan.

Annie (nee MacLachlan) Smith died 10 Feb 1885 leaving Archie on the island with his 6 daughters, ages 11 to 2 years old and his widow mother, Sarah, who was then 79 years old. In March of 1885, Archie married Katherine Maclachlan who was the older sister of his first wife, Annie. Katherine and Archie had two more daughters, Edith Ellane and my grandmother, Victoria Eliza who was born on 24 Jan 1888.

With the exception of Archie's

eldest daughter, "Sadie", who married Colin MacRae, and died at the young age of 23, the Smith girls all moved to Massachusetts. Archie's second wife, Katherine, from whom "MacLean Island" was purchased, passed away in Woburn, Massachusetts on 26 Dec 1912.

I do not know who currently owns the Crammond Islands. But, somehow 'Smith' and 'MacLean' islands must have come together again under one owner. I inquired about this in the early 1990's and I was informed that they were possibly owned by a German investment company. However, I do know that they both were offered for sale in the late 1980's for \$850,000 (US). So, perhaps John Hector MacLean got a pretty fair deal for \$1,000.

My wife and I are planning a trip to Cape Breton this summer. We hope we will be able to find a rental boat and make a pilgrimage to the Crammond Islands. So maybe if all goes well, one of Archie Smith's great grandchildren will once again set foot on the Crammond Islands.

ADVANCING WOODY BIOMASS OPTIONS IN NOVA SCOTIA:

Are researchers oblivious to or purposely ignoring a long history of poor forestry practices in Nova Scotia?

*By Minga O'Brien MSc BSC
Forest Technician*

On behalf of the Bras d'Or Stewardship Society, I attended a workshop this fall at Cape Breton University entitled

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"Advancing Woody Biomass Options and Opportunities in NS". Essentially, the workshop was about presenting new and atypical ways to make use of wood products.

The workshop at CBU's Verschuren Centre was interesting and enlightening. The mood was upbeat, with many of the presenters enthusiastic about their research. I learned about projects investigating opportunities for all manner of wood products, such as BioOil, BioChar, betulinic acid, activated carbon, and cellulosic ethanol (wood based ethanol that can fuel cars), as well as experimental trials at CBU and Point Edward growing short rotation willow and poplar crops. Betulinic acid, for example, is derived from the bark of birch trees, and is purported to have anti-inflammatory, anti-viral, anti-cancer, anti-malaria, and antibiotic properties. It is worth \$1,000 per gram! Activated carbon is made out of birchwood, and has an enormous surface area per volume. It can be used to capture contaminants such as heavy metals from smoke stacks and tailings ponds. It is even used in hospitals as a treatment for poisoning.

In a province with a poorly diversified forest industry - pulp, paper, and construction lumber - it is good to see new forest products emerging that add greater value per unit of wood harvested.

What was missing from this workshop, however, was context. Imagine researchers getting excited about new jellyfish products as jellyfish populations bloom and biodiversity declines in response to human-induced, cumulative impacts on the ocean.

Like the oceans, economically

and ecologically, Nova Scotia's forests are in very poor shape. The legacy of land clearing, human-lit fires, and more than 40 years of widespread clearcutting has transformed our naturally diverse, uneven-aged, long-lived Acadian forests to low value, low vigour, short-lived hardwoods like white and grey birch, red maple and poplar, and insect-prone balsam fir and white and black spruce. We have cut most of the older forests. It is now common to see logging trucks with trees less than 3 inches in diameter. Today, tall straight white pine – once the most coveted trees in the province – are difficult to find outside protected areas and inaccessible terrain.

Forests play a critical role in reducing water temperatures and temperature fluctuations, nutrient losses, storm runoff and sedimentation. They are also habitat for a large number of forest-dependent species, such as barred owls, bats, woodpeckers, moose, marten, salamanders, wood turtles, snakes, and unusual orchids.

How much wood is needed to produce woody biomass products like electricity and ethanol, and will these wood-based energy sources have a lower carbon footprint than fossil fuels? Consider Nova Scotia Power Inc.'s co-generation facility of Point Tupper. At the biomass workshop, the NSPI engineer overseeing the bioenergy operations at Point Tupper confirmed that 670,000 tonnes of woody biomass were burned in the NSPI boiler at Point Tupper in its first year of operation. That's 50-60 truckloads carrying 1,780 tonnes of green biomass per day. The vast majority of forest harvesting in the province is by clearcutting, so supplying these amounts to the NSPI co-generation facility is roughly equivalent to clearcutting 5,160 – 6,255 hectares (or 12,750

– 14,450 acres) per year. For comparison, in 2012, the total area clearcut in the province was 27,000 hectares (or 66,690 acres). The demand for woody biomass in Point Tupper is thus accounting for 19-23% of the provincial harvest.

We have (mis)managed our forests and now we are scraping the bottom of the barrel. Currently, the only 'viable' products are softwood chips for pulp and paper mills, small-sized softwood logs destined to become 2 x 4's, and woody biomass. Even the viability of generating power from woody biomass is questionable: at the 2010 hearings of the NS Utility and Review Board, NSPI showed reluctance and aversion to biomass projects. However, with the province guaranteeing a rate of return from the production of electricity from woody biomass, the corporation's risks were minimized and the Point Tupper biomass plant was built. Finewood Flooring, a value-added hardwood flooring business in Middle River, Victoria County, closed its doors in 2014 due to a lack of supply of good quality sugar maple logs.

At the workshop at CBU, one member of the audience (an employee of the Department of Natural Resources) asked about the sustainability of repeated harvesting for fibre on soil nutrients and organic matter. Unfortunately, the response was vague and ill-informed: that research is being done on the topic. In fact, there has been more than 30 years of research on this topic, and a quick search of the literature since the early 1980s would reveal a large number of peer-reviewed, scientific publications. Dr. Andrea Service, an ecologist based out of the Annapolis Valley, prepared an extensive, 164 page literature

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review entitled "Silvicultural and Ecological Impacts of Conventional Forestry and Forest Biomass Harvesting at the Stand and Landscape Levels: A Literature Review". This paper was prepared for the Nova Scotia Department of Natural Resources, and St FX and Dalhousie Universities in 2009. [I have a digital copy of it, and can share it with interested individuals.]

¹ These calculations are based on conversions from tonnes to cubic meters made available by the NS Dept of Natural Resources, and cubic meters of wood per ha of clearcut from the Canadian Council of Forest Ministers National Forestry Database

There is an underlying assumption behind policies and regulations that favour greater use of woody biomass: that woody biomass is a renewable source of energy, and carbon neutral. A comment from one of the workshop presenters emphasized the carbon sequestration rates of younger forests, but made no reference to the loss of soil carbon caused by clearcutting, or to the vast pool of carbon stored in the belowground biomass of older forests. Even the International Panel on Climate Change has made this assumption, and promoted the use of biomass-derived energy to reduce greenhouse gas emissions. Similarly, under the Kyoto Protocol, carbon released when burning biomass fuels (that is, vegetation or vegetation-derived fuels), are exempt from being counted towards a nation's greenhouse gas emissions.

The scientific literature shows that harvesting forests – especially by clearcutting – can result in very significant losses of forest carbon. A paper published in Science by M. Harmon and others, in 1990

(25 years ago), showed that on-site carbon storage is reduced considerably with timber harvesting, and does not approach old-growth storage capacity for at least 200 years (provided the site is not cut again during that period). A study by J. Aber and others (presented in the Canadian Journal of Forest Research in 1978, 37 years ago) predicted that soil organic matter decreases for 15 to 30 years after clearcutting in the Acadian Forest and takes 60 to 80 years to recover to pre-harvest levels.

Concerns raised by scientists and others about the carbon neutrality of using woody biomass to generate heat and power prompted the State of Massachusetts to commission a life-cycle analysis of carbon emissions from forest harvesting for biomass energy. Released in 2010, the study by T. Walker and others confirmed that forest biomass, in the Massachusetts context, is not inherently carbon-neutral at the time of burning. This 182-page report reviewed many possible scenarios under which a carbon debt incurred by burning biomass can be "repaid" over time, as the harvested forest regrows. Under best case scenarios (i.e., partial harvesting, highly efficient use of biomass, and replacement of inefficient use of fossil fuels such as older coal-fired power stations), the carbon debt can be repaid within an estimated 10 to 20 years. Under worst case scenarios (clearcut harvesting, inefficient use of biomass, replacement of highly efficient fossil fuel use such as a modern natural gas power station), the carbon debt will not be repaid for over a century. Informed by the results of this study, the State of Massachusetts changed its regulations on renewable energy and biomass. It is notable that Point Tupper would not qualify as "renewable energy" under

Massachusetts' new regulations.

I would posit that here in Nova Scotia, we are much closer to the worst case scenario, and that our soils are already highly depleted of nutrients and organic matter due to repeated cutting, land clearing and burning. In this context, the province needs to review the scientific literature and revisit the inclusion of large scale industrial uses of woody biomass in its renewable energy policy. The researchers and presenters attending this workshop need to think about the demands their products will be placing on forest habitat and a highly degraded resource.

Thanks to Jamie Simpson for sharing his report 'Forest Biomass Fuel and Carbon Emissions: Is Renewable Energy Policy Keeping Pace with Science?'

The Bras d'Or Stewardship Society is interested in contributions from our members. If you have something to contribute to the Newsletter or would like to work with the society's board, please let us know. The society is an all volunteer organization that welcomes input from individuals interested in promoting the conservation, protection and restoration of the Bras d'Or Lakes and its watershed.

MORE SALMON SECRETS FROM THE MIDDLE RIVER

Bruce G. Hatcher,
Bras d'Or Institute for Ecosystem Research, Cape Breton University

In the last issue of *The Blue Heron* (Vol. 18 (2), July 2014), I described the Bras d'Or Acoustic Array in the Atlantic Arena of the Global Ocean Tracking Network, and reported on the outcomes of our first experiments tracking the movements of Atlantic Salmon smolts captured and tagged in the Middle River during 2012. Those results posed more interesting questions than they answered. Here I summarize the results of the 2013 and 2014 tagging experiments to date, and describe the work we started for 2015.

A summary of our Middle River Salmon smolt tracking results to date is given in Table 1 below.

Year	# of tags	Tag-mort	Exit River	Exit Bay	Exit GBC	Exit LBC	CBS / SBX	Stay	Die / Stay / Exit (%)
'12	16 V-9	4 < 1d 25%	12 < 3d 75%	8 2 – 13d 50%	0	7 10 – 34d 44%	3 26 – 35d 19%	5 8 – 60d 31%	17 / 25 / 58%
'13	50 V-8	7 < 1d 14%	40 < 2d 80%	36 < 8d 72%	6 17 – 52d 12%	18 17 – 41d 36%	16 28 – 32d 32%	11 15 – 64d 22%	19 / 26 / 56%
'14 (I.P.)	30 [21 V-8 9 V-9]	1 < 1d 3.2%	27 <3d 90%	23 2-9d 77%	12 7 – 23d 40%	9 12 – 33d 30%	???	5 >45d 17%	10 / 17 / 70%

Glenn Crossin from the Dalhousie Biology department again joined the CBU and UINR teams in the Spring of 2013 to tag smolts captured by the UINR smolt wheel in Middle River. The smolt run was consistent, and we were able to tag 50 fish over a period of 5 days in May. The results from this larger sample of a strong smolt run reinforce the patterns observed in 2012. Only 7 (14%) of the 50 tagged smolts were never detected again and are assumed to have died as a direct or indirect effect of the tagging process. This is a lower value than the 25% tag-induced mortality incurred in 2012, reflecting improvements in tagging technique and the use of the smaller VEMCO V-8 acoustic tags. The remaining 43 fish were detected at as many as 11 (mean of 3.3) listening gates in the river and the estuary, for as long as 64 (mean of 22) days after tagging. A further 7 fish disappeared between the river and the mouth of Nyanza Bay, and are assumed to be natural mortalities (probably the result of predation in the large river delta) demonstrating the perils faced by smolts in this critical transition from fresh to salt water. Of the 36 fish that left Nyanza Bay, 24 (66%) reached the outer ends of the Great Bras d'Or and Little Bras d'Or channels (6 & 18 fish resp.), and another two must have sneaked out past our listening gates because they were amongst the 16 fish (37% of the tag survivors) detected crossing the gates at the Cabot Strait gate and, or the Strait of Belle Isle (650km to the NNE!). One of the fish was even heard by a robot glider that constantly plies the surface waters of the Gulf or St. Lawrence! It is a tremendous advantage that the Bras d'Or acoustic array is nested within these other, large OTN arrays that detect salmon migrations into the NW Atlantic Ocean.

It follows that 11 smolts (26% of the tag survivors) remained in the Bras d'Or for as long as 64 days (when tag batteries are running down). Of those that remained, 8 may have died prior to tag battery depletion. But they could also have stayed in areas where no receiver could detect them (i.e. most of the volume of this huge estuary!) So we still cannot demonstrate conclusively that there are Salmon smolts that do not leave the estuary and survive into adulthood within the estuary.

The Spring of 2014 followed a particularly severe winter on the Bras d'Or, and the Middle River smolt run was late, weak and sporadic. Michael Orr from CBU worked closely with Shelley Denny, Tyson Paul and the UINR team to deploy and operate the smolt wheel so as to maximize the number of fish available for tagging while minimizing tag-induced mortality. We used two types of tags in this experiment (generously provided by the NS Dept. of Fisheries and the Federal Department of Fisheries and Oceans): powerful V-9 tags in large smolts, and specially-programmed V-8 tags in smaller smolts that transmitted for 45days, then turned off to save battery power, then turned on again after a further 60 days. The idea is to detect smolts that remained in the estuary into the autumn; long after their cohort had left. (We anxiously await the download of the Bras d'Or array in 2015 to see evidence of long-term residence of smolts in the estuary).

We tagged a total of 30 Smolts into early June 2014, and the CBU team (including senior students Alicia Penney, Caelin Murray and Jesse McDougal) tracked fish in the river with both fixed receivers and from a small boat.

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Michael's surgical technique was good and we documented only one (3%) tag-induced mortality, but another two fish did not leave the river. Of the 27 (90%) that did, 23 (77%) exited Nyanza Bay, and 21 (70% of tag survivors) are known to have reached the outer ends of the two exit channels. (Note that no tagged smolt has ever been detected leaving the Bras d'Or estuary through the St. Peter's Canal). As always, we must await the returns from data downloads of the other arrays before finalizing our results from the 2014 smolt experiment. But it is apparent we have greatly reduced the mortality associated with tagging, and that 2014 was a very different year. A much higher proportion of smolts appear to have left the estuary than in previous years, and a majority of them migrated through the Great Bras d'Or Channel.

These 96 small, vulnerable fish exhibited a large range of migration behaviours over the course of our studies. Some made a dash for the ocean, leaving the estuary by the shortest route in as little as 17 days. Others seemed to explore widely before leaving, or deciding to stay, visiting Whycogomagh Bay, returning to Nyanza Bay, then into the Great Bras d'Or Channel, then back down to the Barra Strait before finally being detected in the St. Andrews Channel prior to exiting the estuary through the Little Bras d'Or Channel. Or not... What factors motivate these different behaviours? Weather, predators, water quality, inherited memories of watery havens? The smoltification process is stressful, so the condition of the fish when they exit the river may be an important factor. More questions...

CBU graduate student Alicia Penney analyzed the behaviours of fish that exited the estuary in some detail. She found that the average swimming speed of smolts between listening gates in the Bras d'Or array was 1.77 Body Lengths per second (approx. 0.9 kph), but reached maxima of 4.24 BL/s and 5.34 BL/S in the Great Bras d'Or and Little Bras d'Or Channels (resp.). The fish typically wait until the favourable (ebbing) tide at night to pass through the channels. They assemble at the mouths of these channels and may wait for many days until the conditions are right. Why so many of the smolts show a preference for the more distant, narrow, shallow Little Bras d'Or Channel over the much larger Great Bras d'Or Channel remains an open question. Perhaps the smaller channel feels more like a river to these fish, and poses less of an osmotic challenge than the sharp salinity fronts that characterize the tidal progression through the larger channel (from where fish often turn around and swim back into the estuary).

In the first non-salmon acoustic tagging experiment in the Bras d'Or Array during the Autumn of 2013, Allison MacIsaac and the Eskasoni Fish & Wildlife (EFWC) team captured 7 Striped Bass (ranging in size from 209 to 508cm fork length) in Benacadie Pond, inserted V-9 acoustic tags and released them between the listening gates in the Barra Strait. Two of these fish disappeared into the big Lake after two days, while five (71%) headed directly to St. Patrick's Channel and into Whycogomagh or Nyanza bays in as little as 6 days (max 17d), where fishermen report large aggregations of striped Bass near the Steelhead aquaculture pens and at the mouth of the Baddeck River (resp.). Are these large fish a significant source of mortality for juvenile salmon leaving the rivers of the Bras d'Or watershed?

Speaking of predation: Alicia tracked one emigrating smolt that travelled from the Little Bras d'Or Channel to the Cabot Strait line in only one day! This translates to approx. 8.5 BL/s, which is about five times faster than the known, sustained swimming speed of an Atlantic Salmon smolt. It approximates the swimming speed of a Grey Seal (3.5 kph) however, and we suspect that the smolt (and it's tag) reached St. Paul's Island in the belly of a seal!

When we were tracking smolts in the lower reaches of the Middle River in the Spring of 2014 we counted more than 40 Salmon kelts (post-spawn adults) milling about in a broad reach. Do they eat their young? Or were they waiting to escort the emerging smolts out to sea? The habits of adult salmon are poorly known in the Bras d'Or, and so this Autumn we established a sub-array of receivers in the Middle and Baddeck rivers in anticipation of an adult tagging experiment. In a close partnership with the NS Dept. of Fisheries team, the Guardians from Wagmatcook, the UINR team, and members of the Middle River Watershed Association; Michael worked with Glenn and graduate student Xavier Bordeleau from Dalhousie to tag 15 adult salmon kelts at the Margaree Fish Hatchery that were used to augment salmon reproduction in these two rivers, and then to capture and tag a further 3 fish in the rivers by angling. These are very large and powerful V-16 tags that will last at least a year. Based on preliminary data to date (13 Dec. 2014), twelve of these kelts have been heard in the rivers where they were released, but only three are known to have traveled to the mouth of the rivers where they join Nyanza Bay. Again: we anxiously await the interrogation of the expanded Bras d'Or array later this year.

Finally, I am very pleased to report that after four years of pains-taking work (and a considerable learning curve), the vision of the Ocean Tracking Network's Bras d'Or Acoustic Tracking Array is mature. This high tech science tool is helping a multi-institutional, multi-disciplinary and multi-cultural group of researchers to answer here-to-fore intractable questions about the secret lives of Atlantic Salmon (and other fish species) in the Bras d'Or Biosphere. It has served to create a broad partnership of people with a shared purpose and curiosity. The trick now is to build on this infrastructure, and gain as much knowledge and mutual understanding as we can from the experience. I thank all of the many partners, named and unnamed here, for their intellectual, logistic and financial support; as well as their generous friendship.

TRANS CANADA TRAIL

Bras d'Or Lake Blueway Water Route

Initiated in 1992 to celebrate Canada's 150th anniversary on July 1, 2017, the Trans Canada Trail (TCT) is one of the world's longest networks of multi-use recreation trails, connecting our country from coast-to-coast-to-coast.

With 75 per cent already complete, millions of Canadians and visitors from abroad hike, cycle, canoe, kayak, horseback ride, ski and snowmobile the trail to explore our country's beautiful natural environments, rich culture and history.

A portion of Cape Breton is already connected via the Celtic Shores Coastal Trail, which spans 92 km from Port Hastings to Inverness. A proposed trail will connect Inverness to Whycocomagh where the Bras d'Or Lake blueway alternate water route will begin at the Whycocomagh Waterfront Centre and then encompass a 322 km route around our beautiful Bras d'Or Lake to

North Sydney where the TCT can connect to Newfoundland.

The Bras d'Or Lake blueway water route is expected to include up to two-dozen launch areas or public access points for canoe and kayak enthusiasts. A number of communities around the Bras d'Or Lake have already expressed interest in developing an access point in their area. Participation in the blueway water route is an opportunity for us to take advantage of community development opportunities, raise awareness of the Bras d'Or Lake and its ecosystems, encourage tourism, and preserve our culture and heritage for the benefit of both

current and future generations.

Jessica Farrell has been hired by Nova Scotia Trails - Trans Canada Trail's recognized agent for the province - to advance the connection of waterway routes and land trails on Cape Breton by providing information and support to communities interested becoming part of this exciting, Trans Canada Trails national legacy project.

If you, or your community group, would like to learn more about the Trans Canada Trail Bras d'Or Lake Blueway water route project, please contact Jessica at (902) 227-8017 or jessica@novascotiatrials.com.

The Bras d'Or Stewardship Society

Addresses and telephone numbers of the Board of Directors

Henry W. Fuller,
*Interim' Chairman
 & Treasurer*
 RR#2 #1065 Big Harbour
 Baddeck, N.S.
 B0E 1B0
 (902) 295-2664

Rosemary Burns,
Vice Chair
 3042 West Bay Highway
 St. George's Channel
 RR #2 West Bay, N.S.
 B0E 3K0
 (902) 345-2896

Mabel MacEachern
 93 Rigby Street
 Sydney, NS B1P 4T5
 (902) 562-6138

Jim O'Brien
 RR#2 #1180 Big Harbour
 Baddeck, N.S.
 B0E 1B0
 (902) 295-2344

Timothy Lambert, Ph.D.
 Lower Ship Harbour
 RR#1,
 Lake Charlotte #752
 Nova Scotia
 B0J 1Y0
 (902) 845-2189

David L. Gunn
 2792 RR#2
 West Bay, N.S.
 B0E 3K0
 (902) 345-2263

Walter MacNeil
 41 Grove St.
 Sydney, N.S.
 B1P 3M7
 (902) 562-5434

Stephen Sober
 1675 Southside
 River Denys, N.S.
 B0E 2Y0
 (902) 756-2390

James M. Crawford
 P.O. Box 277
 74 Abershore Road
 Whycocomagh, N.S.
 B0E 3M0
 (902) 756-3556

James Foulds, Ph.D.
 6025 Kempt Head Rd.
 Boularderie, NS
 B0C 1B0
 (902) 674-2578

Jim Carson
 RR#1
 West Bay, NS
 B0E 3K0
 (902) 345-2268

Charlie Dennis
 P.O. Box 8096
 4102 Shore Road
 Eskasoni, NS
 B1W 1C2
 (902) 379-2163

Bras d'Or Watch
 to report any observed acts, incidents and violations
 that threaten the integrity of Bras d'Or Lakes please call
 any of the directors listed above.

Our Email: www.brasdorstewardshipsociety.org

2015

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Bras d'Or Stewardship Society
P.O. Box 158
Baddeck, Nova Scotia, B0E 1B0

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