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Natural History Society of Newfoundland and Labrador

THE NATURAL HISTORY SOCIETY OF NEWFOUNDLAND AND LABRADOR

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The Natural History Society of Newfoundland and Labrador is the provincial affiliate of Nature Canada, a non-profit conservation organization whose mission is to protect and conserve wildlife and habitats in Canada by engaging people and advocating on behalf of nature.

Cover photo: by Alex Bond. Least Auklet (*Aethia pusilla),* Kiska Island, Alaska.

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The Osprey is published quarterly by the Natural History Society of Newfoundland and Labrador. Opinions expressed in The Osprey are those of the author and do not reflect necessarily those of the editor or of the society. Letters, articles, photographs, illustrations and reviews of books about any aspect of natural history are welcome. Please submit documents in Microsoft Word through e-mail attachment using American Psychological Association (APA) style. Submit images and tables as separate files, not embedded in the text. Provide documents in a format compatible with photocopying in black and white. Writers replicating the work of others, including photographs and illustrations, should acquire permission in writing to reprint that work in *The Osprey*. The editor reserves the right to make changes to submissions.

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OUTDOORS
THE EDITOR'S NOTE

What a glorious time of year fall is, with its great splashes of colour and cool hiking weather. The end of summer, though, always leaves me with a tinge of sadness. Perhaps it's a throwback to the end of school vacation, and having to get up out of the beaches, leave the crabs and winkles, leave sculling lazily around the harbour in a dory and getting excited about a maiden ray to go sit at a desk for reading, writing and arithmetic, and be confined to looking out the window when the teacher's back was turned.

But what a terrific summer it's been. I started my holidays with a delightful week traipsing around with John Maunder and friends on the Wildflower Society's Avalonia field trip – my first. The variety of plants adapting to their habitats on marshes, barrens, forests and seashores was impressive (see memories of day one in this month's edition of Sarracenia, the Wildflower Society's newsletter). Then a week in Petite Forte and a three-day cruise exploring the abandoned communities of Placentia Bay on my brother's crab boat fulfilled a dream I had had for years, to walk the paths where our ancestors walked and see the harbours where they picked berries, grew cabbage and potatoes, tanned traps and sailed out of to go fishing. These harbours, now with their summer homes and speed boats at floating docks, are symbolic of the vitality and bounty of coastal Newfoundland in the era of waking up to the sound of make-and-break engines, each with its distinctive sound, putt-putting around the point and out through the arm in the morning: Woody Island, Presque, Habour Buffet, Merasheen, Bruley, Bar Haven and Rose au Rue, its rusty-looking whale-factory vats still visible on the shore.

To top off the summer, my son and I attended the Mushroom Foray at Max Simms Camp in central Newfoundland, where we learned about edible and poisonous mushrooms and the fungi that cause white and brown rot in wood (I never knew!) and spent more wonderful days in the woods. With the introduction of The Mushroom Basket as a regular feature starting with the next edition, I welcome mushroom enthusiasts to submit articles on fungi. I'm delighted, as well, to introduce in this edition the first in a series of winning essays by students applying for the Tuck Avian Ecology Scholarship. In this edition, Alex Bond, PhD candidate, writes about the vulnerability of birds to rat invasions on island colonies.

Thank you to everyone who shared comments, offered suggestions and sent me articles and photos. I plan to have the next edition out before Christmas.

Ed Hayden, Editor
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Deadline for next edition: November 30, 2009

Society Matters

COMPILED BY ED HAYDEN

The society presents a free indoor program on the third Thursday of each month, except July and August, at the MUN Botanical Garden at 8 p.m. and field events at various locations throughout the year. The board of directors is active in promoting natural history and protecting the environment.

Labrador – Island Transmission Link
On September 3, 2009, the proponent, Nalcor Energy, advised that the Gros Morne National Park proposed transmission route for the Labrador – Island Transmission Link was no longer under consideration. The Long Range Mountain route, as outlined in the January 29, 2009, Environmental Assessment registration submitted by Nalcor Energy, is now the proposed route. In March 2009, Allan Stein, on behalf of the Natural History Society of Newfoundland and Labrador, had requested a full Environmental Assessment of Impact Statement (EIS) of the Lower Churchill and the transmission lines projects. In addition to arguing against the Gros Morne route, Allan pointed out that the alternative Long Range Mountain route was also highly undesirable to the society, as that route went through the headwaters of the Upper Humber and Main rivers. He wondered also why Nalcor Energy had not considered a more direct crossing of the Long Range Mountains to the Cat Arm hydro-development and then follow the eastern coast of the Northern Peninsula. The provincial Minister of Environment and Conservation has determined that an EIS is required. The society will make a detailed submission to the Environmental Assessment Panel when it convenes.

Lower Churchill Hydroelectric Generation Project
Don Steele, John Gibson, Marjorie Evans and Alan Stein attended a public meeting on September 25, 2009 (originally scheduled for April), to discuss the environmental review process. John Gibson and Don Steele had submitted comments as participants, but there had been no reply. The EIS and supporting documents were not sent out by the panel but by the proponent. The EIS is available on a CD, and individuals can contribute comments. Hearings will begin in 2010 but where and when is unknown. The Telegram (September 25, 2009) quoted Don Steele as saying that the panel 'sent out 100 pounds of documents' and that the process is cumbersome and should be more succinct.

Exxon-Mobil Hebron Project
Len Zedel attended an information session on the Hebron offshore development in early September. Some of the highlights of that project are: it will be a gravity-based structure similar to the Hibernia platform, a 30-year life is anticipated, and decommissioning will allow for removal (but it was not clear that removal would, in fact, take place). One of the most significant issues concerning offshore oil developments is how the project disposes of waste material produced through the drilling process (so-called drill cuttings). This is important because drill cuttings discharged into the ocean will smother an area of ocean bottom. As well, because the cuttings are covered in lubricant and contain many heavy metals, they introduce a lot of dangerous chemicals into the environment. For the Hebron project, the proponents intend to dispose of drill cuttings by injecting it back into the earth into sedimentary layers where it can do no harm to ocean life: this is the best possible approach from an environmental perspective. A second major consideration for environmental impact in offshore oil developments is the disposal of water that is brought to the earth's surface along with the oil that is produced (this is called produced water). Regulations restrict produced water to contain, on average, no more than 30 mg of oil per litre of water, but this could, through the life of the project, introduce several thousand cubic metres of oil into the environment. The proponents will be looking into the feasibility of re-injecting the produced water back into underground reservoirs again, keeping these pollutants out of the marine

environment.

Kyotoplus Action
At the direction of the board of directors, John Jacobs has signed on the society to Kyotoplus, a group of community partner organizations pushing for government action on climate change. Through this initiative, the society is committed to building public expectations for success at Copenhagen through lobbying politicians, collecting signatures on a petition to be presented by Kyotoplus and linking the society website to Kyotoplus. Readers are encouraged to join the campaign by visiting http://www.kyotoplus.ca/. Watch for news about local activities scheduled for the Global Day of Action on Climate Change October 24th.

Osprey in the News
On August 1, 2009, Derek Brace, in his My Backyard column in the Saturday Telegram, noted Michael Burzynski's article on brazen Black Bears in The Osprey, mentioned the many articles published in The Osprey about the outdoors and provided the society's website address for more information.

Society Finances
As the former treasurer has declared bankruptcy, and since secured creditors, such as Revenue Canada, banks, credit card companies and mortgage companies, have first access to restitution, the Natural History Society, as an unsecured creditor, may not receive repayment of lost funds.

Nature Notes

Oil Sands
'The US imports more oil from Canada than from any other nation, about 10 percent of its total foreign supply, and around half of that now comes from the oil sands. Anything that reduces ... dependence on Middle Eastern oil, many Americans would say, is a good thng. But clawing and cooking a barrel of crude from the oil sands emits as much as three times more carbon dioxide than letting one gush from the ground in Saudi Arabia.'
Peter Kunzig. 'The Canadian Oil Boom' in National Geographic, 215:3 (March 2009), p. 44.

Standing Still?
'No matter how long you think you've been standing still, remember that the earth is travelling around the sun at an average speed of 66,641 miles per hour.'
Diane Shoemperlen. 1998. Forms of Devotion. Toronto: Harper Collins, p. 130.

Salty Towns
'*Wich* is an Anglo-Saxon word meaning 'a place that has salt,' and all the English towns whose names end in *wich* were at one time salt producers. But they could never produce enough for the Newfoundland cod fishery.'
Mark Kurlansky. 1997. Cod: A Biography of the Fish that Changed the World. Toronto: Knopf, p. 56.

PRE-ERADICATION SEABIRD MONITORING: IDENTIFYING KEY TRAITS MEANS A QUICKER RESPONSE TO INVASIVE SPECIES

By Alexander L. Bond, PhD candidate, Memorial University

Effects of rat invasion on Least Auklet. Photo by Alex Bond.

Rats have reached over 80% of oceanic islands and have wreaked havoc on native seabirds on a global scale – decreasing their survival and successful rearing of offspring, and even causing declines or extirpations in some populations. Invasive species are, along with fisheries by-catch, the leading cause of avian declines worldwide. Seabirds are particularly vulnerable to rat invasions because they have low reproductive rates and delayed maturity, and young often have lengthy periods between hatching and fledging. Surface and burrow/crevice nesting species are the most vulnerable, and they may lack the behavioural adaptations required to recognize and react to ground-based predators.

Kiska Island lies in the western Aleutian Islands of Alaska, and is one of the world's largest colonies of Least Auklets (*Aethia pusilla*), the smallest seabird in the auk family (see cover photo). Arctic foxes (*Alopex lagopus*) were introduced here in 1835, and over 650 were removed during the final eradication in 1987. In 1942, Japanese

forces landed and occupied the island until July 1943, building numerous structures, a runway and harbour facilities. U.S. and Canadian military forces bombed the island repeatedly and when they landed in August 1943, found the island deserted. Among the debris left behind from wartime activities were Norway rats (*Rattus norvegicus*).

Norway rats are the most destructive of the three invasive rat species because of their large body size and ability to exist in nearly any environment. In short, they are an excellent invader, with a highly adaptable reproductive capacity. Their large size as compared to Least Auklets, their underground and nocturnal lifestyle and their ability to consume nearly anything means that when faced with a rat, Least Auklets don't stand a chance (see photo on previous page).

In 2001 and 2002, auklet reproductive success was the lowest ever recorded in the Aleutians, with less than 1 in 10 eggs resulting in a chick surviving long enough to make it on its own. Caches of dead adults and predated eggs are still found every year, even though rat abundance and distribution had varied greatly. Based on anecdotal observations, auklet reproductive success is highest in years with low rat abundance. In recent years, reproductive success has been similar to that at rat-free colonies nearby at about 60%, but adult survival has been steadily decreasing, and is now at a level that is not sustainable in the long-term (<80%), and is likely linked to changes in climate.

My investigations in the western and central Aleutian Islands are unique in that I will be measuring variables across three islands and over several years. My hope is that this approach will allow me to disentangle the natural variation in the system to attempt to quantify the effect of rats at Kiska Island.

Still fewer studies have simultaneous monitoring of similar variables and responses across islands with and without rats. Buldir, Kiska and Kasatochi Islands span almost 600 km in the Aleutian chain, and all are home to substantial auklet colonies. This represents a unique opportunity for conservation biology to be able to obtain pre-eradication data on auklets at Kiska over a lengthy period (10 years, 2001-2010), and compare this to similar data collected at other rat-free islands.

My goal is to examine a suite of variables and indicators with which managers can compare post-eradication data to allow a true assessment of the impact of rats on the auklets at Kiska. This is crucial to the conservation of birds on a global scale, including Newfoundland, since it will show what aspect of the birds' biology is likely to be affected by rat invasions, and will allow rapid monitoring and assessment, leading to a quicker eradication of any possible invader. Newfoundland is home to some of the most impressive seabird colonies in Canada, if not North America, including Cape St. Mary's, Baccalieu Island, Witless Bay and the Gannet Islands of Labrador. Conditions exist where rats (which are not native to Newfoundland) could possibly arrive at some of these colonies across pack ice, as Arctic foxes do currently, and have a devastating effect on the native avifauna. A rapid response and ability to monitor the birds' responses is crucial to minimizing any long-term impact.

In Alaska, I will measure, specifically, the survival of adult birds and explore its relationship

with a changing climate. Survival of other seabird species (Whiskered and Least Auklets at Buldir Island, Alaska and Razorbills in Labrador) is related to climate indices. For planktivores like Least Auklets, oceanography and currents, and therefore climate, directly affect the distribution and abundance of prey. I can use stable-isotope analysis, a cutting-edge laboratory technique, and biochemical analyses to examine the winter diet of Least Auklets by sampling feathers grown in the winter. Other variables, such as diet composition, breeding success and chick growth, could also be affected by rat presence, but disentangling the variability caused by multiple factors, including rats, requires the measurement of many other covariates. In times when a swift response to an invasion is required, there is not often time to perform a full pre-eradication assessment. By establishing a suite of variables affected by rat presence in the Aleutian Islands, my study will promote fast action and immediate monitoring of the effects of any rat invasion of seabird colonies in Newfoundland and around the world.

About the Author

Alex Bond is a PhD student at Memorial University of Newfoundland, where he has spent the last three years studying the influence of climate, oceanography and invasive species on the population dynamics of auklets in the Aleutian Islands, Alaska. Prior to his time at MUN, he completed a M.Sc. at the University of New Brunswick, which examined the biomagnification of mercury in a seabird community, and he also holds a B.Sc. (Honours) from Mount Allison University in New Brunswick. His favourite seabird remains the Razorbill.

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About the Award

The Leslie M. Tuck Avian Scholarship is named in honour of the late Dr. Leslie Mills Tuck, the first Dominion Wildlife Officer and the first Canadian Wildlife Service Scientist in Newfoundland & Labrador. Author of two definitive and award-winning books, The Murres (1961) and The Snipes (1972) on Newfoundland birds, Les Tuck held a J.L. Paton Research Chair in the Department of Psychology following his retirement from the Canadian Wildlife Service. The scholarship was created to promote research and conservation of birds and their habitat in Newfoundland & Labrador. Eligible applicants include full-time graduate students at Memorial University conducting research relevant to avian conservation and habitat protection. Awards of up to $5000 are made by the Dean of Graduate Studies based on essays submitted by applicants, describing their research.

Biodiversity in Boreal Newfoundland and Labrador, Temperate Canada & Tropical Forests

By Robin Tim Day

Big fleas have little fleas upon their backs to bite them, and little fleas have lesser fleas, and so ad infinitum (Jonathan Swift 1733)

By doing without autos, running water and electricity I was able to retire from a string of international teaching contracts at age 50 and conserve 58 acres of Ontario forest and wetland. I've also visited a few more tropical and subtropical forests for comparison (my life data) in Trinidad and Tobago, Cuba, Cayman Islands, Yucatan (Mexico), Ecuador, Peru, Brazil, Philippines, Cheju Island (South Korea), Bali (Indonesia) and Thailand. I am struck that tropical forests are structurally very similar to Canada's Boreal and Temperate forests. Trees do the same basic things everywhere. The differences in these forests are in the details, the big plant groups, families and genera and the size and elaboration of individual specimens. A humid day in Canada's temperate forest is very similar to a humid day in the tropics surrounded by the unfolding greenery and the sounds of frogs, insects and birds, remembering that many of these birds in temperate forests are short-term tropical visitors[1.a].

There is no single explanation to high species diversity, or species richness, in tropical ecosystems, no Holy Grail. We know the influences are additive and interactive. Many explanations have been put forward, and many of the influences on diversity I am going to describe could or should have been tested long ago in experimental microbial cultures, microbial ecological experiments with algae or bacteria to start with. Perhaps these microbial ecological experiments have been performed already but I am not aware of them. The classic population studies of G.R. Gausse, Russian ecologist, used *Paramecium* and *Euglena to* study population dynamics. I suggested using algae on Petri dishes to Dr. Paul Keddy back in the early 1980s while doing graduate work at the U. of Ottawa, but the idea was brushed off. He dumped his responsibilities and left the country. That ended my PhD studies. Universities in Canada allow this kind of behaviour and potential graduate students need to hear how common this is.

In the following sections you will see that some controls of diversity are large scale and geographical, as when two continents drift and join, and others are small scale and very local, like the competition of several plants growing in the same meadow.

Species on Gradients and Niche Partitioning and Total Radiant Energy

Trees worldwide are usually responding to the same needed but dispersed resources above and below ground, and so they branch like animal lung and vascular tissue above and below ground to increase surface area and absorb in fierce and deadly competition the limiting resources found there: scarce minerals, chiefly nitrogen below, and light above. Even the tall coastal mangrove forests of Ecuador are much like the Silver Maple freshwater swamps around Ottawa. Both have low oxygen soils but the mangroves have to deal with salt and tides as well. Tillman (1988) examines forest development in detail[1b]. We know that seedlings die annually in huge numbers in failed competition. In our maturing Boreal forests, we see spindly dead and leaning and fallen trees that have been crowded (killed) by their neighbors. This struggle kills many seedling and young trees but also separates those that survive along gradients in the forest, and this influences the diversity, or species richness, we observe and measure. Tree seedlings that survive are often spread, or partitioned, across a soil nutrient or moisture gradient, a disturbance-by-grazers gradient or a light gradient across the landscape. Can, or should, this partitioning be considered cooperation? Probably not.

There is a great deal of work written about niche partitioning[2], especially by animal ecologists. The basic idea is that species have evolved slightly different specializations and, thus, compete best within these narrow limits of niche space[3]. Animal

ecologists studying niche partitioning are working with consumers, not producers, and have different approaches and methods. In their studies, they often correlate the prey size and the predator mouth size for a series of potential competitors. I have not explored this area in animal ecology with much depth and will say no more, though I agree with the general idea. Instead, I will comment mostly about the big trees and other plants, the big photosynthetic producers which give most structure to a forest.

Being small is important. Tiny organisms are able to divide resources much more finely than larger ones, and thus contribute much more to overall species diversity.

All plants and animals evolve within a food chain and, more broadly, a niche [3.a], and tropical food chains and webs tend to be longer and more complex, with most species being tiny invertebrates and parasites. Think of all the beetles on a huge, old tropical tree. Being small is important. Tiny organisms are able to divide resources much more finely than larger ones, and thus contribute much more to overall species diversity. Rarity is a common condition in forests. The majority of species in any given area are rare or uncommon, and this has long been demonstrated by graphing species versus area curves. A small group of plants are common, others occasional and the majority rarely encountered as more area is searched.

Humid tropical forests capture much more total radiant energy, having 12 active growth months compared to maybe 3 warmish months in Newfoundland (more slices of the energy pizza). The Boreal and Temperate forests have the obvious disadvantage of a major annual setback or disturbance in development during winter, and many also experience forest fire periodically [3.b]. The humid tropics have ongoing growth, and the setback of wild forest fire is rare. Think of tropical trees like a huge Manhattan office tower compared to a simple boreal forest hut, with much more space and energy to partition or subdivide. Even the tropical rivers can teem with fish, large shrimp and crab for 12 months, providing foods, for example, for the seven species of Egret-Heron, Curlew and various Sandpipers outside my door on the Rio Jama, Ecuador. Shallow tropical coral reef systems can be equally rich in solar energy and species.

In the following notes, I comment on two of the biggest differences in forest structure regarding vines and epiphytes and then mention some more general controls that foster or hinder plant and animal richness. Many will be familiar to readers already.

Vines

Tropical forests, wet or seasonally dry, have many vines and some become full- size trees. These are plants that take a short route to the sunny tree canopy by climbing up and over bigger plants[4,5]. Newfoundland's flora has very few vines, and none of them are native to forests: Black Bindweed (*Polygonum convolvulus*), Deadly Nightshade (*Solanum dulcamara*) ~ mapped, Day 1978 ~ Purple Vetch (*Vicia cracca*) and Bindweed (*Convovulus sepium* and *C. arvensis).* All are confined to urban and disturbed habitats and were probably all introduced to the island with human activity. Near Ottawa *Convolvulus sepium* behaves like a tropical vine, where it evades the intense crowding or competition from tall and dense herbaceous Cattail communities. It climbs the shoots and trails across the top in a single growing season, only 3.5 warm months versus 12 in the humid tropics. In this way it can catch the sun in a moist, fertile marsh habitat. The climbing Wild Cucumber (*Echinocystis lobata)* in the Saint John Valley of New Brunswick does

the same. Newfoundland does have one other herbaceous climber, a parasite, that feeds and climbs other herbs, the Dodder *(Cucuta)*. Wild Grape (*Vitis riparia*) and Bitter Sweet Vine (*Celastrus scandens*) grow in the warmer parts of Canada but not in Newfoundland. However, Farley Mowat, in his 1965 Westviking book, suggested that the Wild Grape may have grown here in isolated locations but was killed out in the early colonial period by very cold winters. Maybe and maybe not. There is no other evidence. I did not mention *Lathyrus palustris,* Marsh Pea. It is a small native Newfoundland herbaceous climber. Did you catch my omission? Thinking of others?

Woody plants grow overtop other woody plants in our Boreal forest, shrub lands and arctic vegetation as part of the normal competition for light, but none are vines, though some, like Twinflower (*Linnea borealis*), are trailing. We could think of them as horizontal vines on a miniature scale, as are the trailing runners of Strawberry plants. Similarly, plants with creeping underground rhizome stems can be thought of as subterranean vines pushing radially and horizontally through soil, moss and litter, emerging in light gaps. Most of our perennials do this, like Cinnamon Fern (*Osmunda cinamomea*) and two Aspens, mentioned later.

Epiphytes

The tropical forests often have large numbers of epiphytes. These too take a short cut to the canopy or sub-canopy of woody trees, sometimes climbing, but mostly by seeds or plant fragments carried by animals or wind. Epiphytes even colonize electrical lines and have to be removed periodically.

The main epiphytes in tropical forests are the Orchids, Bromeliads, Cacti and Ferns, but they also have the ones common to our Boreal forests as well: liverworts, mosses, lichens and algae. A lush growth of lower plants can be seen on big old Yellow Birch trees in southern Newfoundland [6], and the lichen Old Man's Beard (*Usnea sp.*) is common on conifers in more humid locales, like St. Mary's Bay and Salmonier Line. (I would very much like to know more about this mini ecosystem on tree bark from knowledgeable teachers.)

Look for an epiphytic fern in Newfoundland and Labrador, and you may find one. Can you think of it? The Rock Polypody Fern (*Polypodium vulgare*) can sometimes be found in the crotches of old hardwood trees, but is more common on large glacial boulders in forests where it has less competition and more light. There is only one other native flowering epiphyte in Newfoundland, a semi-parasite actually, the Dwarf Mistletoe (*Arceuthobium pusillium*), and it derives its moisture and some food internally from Black Spruce bark.

If you look for a flowering epiphyte, an Orchid, Cactus or Bromeliad in Newfoundland, you waste your time. You will not find one. All Newfoundland orchids are terrestrial and cannot tolerate the desiccation of an epiphytic winter. The closest Bromeliad can be seen growing in North Carolina State, where evergreen live Oaks are famously draped in Spanish Moss (*Tilandsia usneaoides*), a flowering Bromeliad (Pineapple family). This genus is widespread in the Neotropic cloud forests. I see it daily in the misty hills near Jama, Ecuador. Look for an epiphytic fern in Newfoundland-Labrador and you may find one. Can you think of it? The Rock Polypody Fern (*Polypodium vulgare*) can sometimes be found in the crotches of old hardwood trees, but is more common on large glacial boulders in forests where it has less competition and more light. There is only one other native flowering epiphyte in Newfoundland, a semi-parasite actually, the Dwarf Mistletoe (*Arceuthobium pusillium*), and it derives its moisture and some food internally from

Black Spruce bark. I have seen it sprouting a few millimeters out of branches near Corner Brook[7]. It is hard to find and a guide is essential.

Other Influences on Diversity: The island area versus continental effect, human imports and hunting of species

The tropics are famous for amazingly diverse floras and faunas, but this is not always so. Many tropical islands have few tree species, often only the coconut, and have never been colonized by four-legged herbivores. The native mammals of North Island, New Zealand, are a bat and some seals. This was caused by ocean isolation and the small land size, the island area versus continent effect. Much of the tropical diversity we observe comes from the relative ease of dispersal of organisms through connected continental tropical forests. Southeast Asia, one of the richest areas, has organisms also found in India and Africa. Think of the wide-ranging Leopard and Pangolin and our own dispersal, first *Homo erectus* and later *H. sapiens,* out of Africa and across south Asia.

Newfoundland has a very low diversity of native trees, only thirteen species: Balsam Fir, Black and White Spruce, Larch, Red and White Pine, Black Ash (very rare), White and Yellow Birch[6,8], Trembling and Balsam Popular and Pin and Choke Cherry. In the Humber Valley, Speckled Alder can reach the stem diameter of six inches, a tree, but rarely so. Jack Pine managed to disperse to Labrador but not Newfoundland (Day 1995-98). *Amelanchier*, Service Berry, and *Sorbus*, Mountain Ash, also reach small tree size occasionally. Exotic trees and weeds have been brought in with European settlement, boosting diversity, and most of these are found in St. John's and Corner Brook. The negative side of human influence is ecosystem disruption, leading to loss or gain of diversity, and many extinctions, local (extirpations) or total (global). Weeds are still invading the Goose Bay area of Labrador, thousands of years since deglaciation. This area is a sandy hot pocket in spring and summer where many southern plants thrive (Day 1995 & 98). The Moose is also a new colonizer here.

The saltwater barrier around our island has cut us off from the continents of North America, Europe and Asia. This barrier has also kept out many animals, limiting diversity. Porcupine, Groundhog squirrel or Marmot, Hare, Moose and Red and nocturnal Flying Squirrel colonized Labrador naturally but not Newfoundland, and the Wolverine may have once been on the island, like the Wolf, Polar Bear, Walrus and Giant Auk. All have been killed out with European settlement. We have a lot of damage to restore.

We have no palms in Newfoundland. This group is tropical and subtropical, and they have not evolved much tolerance to cold, which limits diversity. As you can guess, there is a very rough correlation between latitude (or altitude) and diversity. One short palm species gets as far north as the Carolinas, the Palmeto Palm (*Sabal serrulata*)[9]. This cold limitation is the case for a very large number of plant and animal groups. No Tapir comes north, only one Hummingbird visits eastern Canada, there are no Begonias, which are largely South American, and only one Cactus (*Opuntia fragilis*), exclusively of the Americas, made it to the Boreal region of south Manitoba. No Tree Sloth migrated to North America, but Giant Ground Sloths (Yukon to Patagonia) and Capybara migrated north across Panama, probably 3 million years ago (late Tertiary). Several large mammals are thought to have been hunted to extinction by natives, using fire, traps and spear throwers (atlatl), as were the entire elephant family. The Pleistocene ice sheets and cold dry climate compressed many ecosystems into the American southwest, Florida and the Texas-Louisiana coast, making large animals more vulnerable to hunting. Armadillo now exist as far north as Florida, and Opossum just gets into south Ontario, where they often experience frostbite on ears and tail. This is Canada's only marsupial – Porcupine from South America dispersed north to the arctic tree line. The Coyote

recently got into Newfoundland, perhaps in the back of a transport truck left open at a truck stop in Nova Scotia. Raccoon will likely be next to arrive. Coyote have spread to all areas, and we don't know what effect this is having on our rare Pine Martin. The Coyote is not in South America yet, where small foxes and feral dogs are common, but will probably get there soon and perhaps drive some prey species to extinction. Sadly, most of South America's large mammals, like the Giant Llama and Giant herbivorous) Armadillo (*Glyptodont*), have been killed out. The Manatee, River Dolphin, Capybara (all aquatic), Tapir, Rhea, Spectacled Bear, White-tail Deer and smaller Llamas remain. When cats, such as Jaguar (extirpated in the US in early 1900s), Puma, Jaguarundi and Ocelotte, finally migrated south with the formation of the Isthmus of Panama, they, too, likely played an important role in extinctions. No large marsupials remain.

Under very high disturbance, plant diversity is suppressed and low, and under low disturbance, intense plant competition leads to monopolies and drives diversity down. Thus, diversity is highest in intermediate conditions

Animal Effects on tree and soil cavities (niche space) and Geological Heterogeneity, or Gradients
Animals, wind and tree fall all wound or excavate cavities in trees, thus promoting diversity. Porcupine do this as well as woodpeckers and squirrels. Even marmoset monkeys bite tree bark to stimulate resin flow, a major food but also an entry point for tree decay and cavities. In Newfoundland's Terra Nova Park, I have seen ants excavating the dead heartwood of trees already weakened by fungi, and then black bear excavate and eat them. These cavities are vital for many birds and others that cannot tunnel in wood, like snakes, amphibians and bats. Animals that burrow (ground squirrels, badgers, termites) make vital refuges shared by those that cannot, like the Burrowing Owl seen on the Canadian Prairies and also at Arraial d'Ajuda, coastal grasslands of Brazil. These tunneling activities in trees and soil promote species richness, as does geological diversity or heterogeneity, tied in with gradients: sink holes, boulders, spires and caves of limestone karst landscape, for example. We see the same heterogeneity with the diversity of forms in coral reefs and coral sand – bio-generated geology.

Summing Up
Years back when looking at plant diversity in plant communities of Ottawa River marshes (Day et al. 1988), Paul Keddy and I were interested in fertility and disturbance gradients as major controls of species richness or diversity. We refined the Intermediate Disturbance Hypothesis, a family of hump-back curves. Moderate disturbance can boost local plant diversity (proposed in Grime´s 1979 influential book). Under very high disturbance, plant diversity is suppressed and low, and under low disturbance, intense plant competition leads to monopolies and drives diversity down. Thus, diversity is highest in intermediate conditions. We also reconfirmed that water depth had the greatest influence structuring river marsh vegetation. Water is a very strong physical gradient for plants and animals, a steep gradient for many things, including oxygen, CO_2, light and pressure.

As noted in the introduction, the more elaborate tropical forests have a whole series of factors that add up or detract but also interact. Some are historical or geographical, like the isolation of continents, but others act on communities nearly every day, like grazing disturbance in a pasture[10]. We can all apply what we learn to boost or conserve diversity[11] on our own property.

All the trees and animals have things that eat or live upon or disperse or parasitize or bite them *ad infinitum*, as noted in Johanathan Swift's (1733) poem. My notes touch on much of the

observed diversity. Eventually someone will write a huge, cumbersome equation, a computer model, to explain diversity. It won't be me, but examples can be found in journals like *American Naturalist*. Fortunately for botanists, foresters, farmers and gardeners, Tillman (1988) has identified limiting soil nitrogen and light at the soil surface as *the* major factors structuring well-watered plant communities. This is encouraging.

Finally, what are you doing to conserve Earth biodiversity?

Footnotes

1a. Cattail (*Typha latifolia)*, Spikerush (*Eleocharis)*, Water Rush (*Scirpus)*, Water Smartweed (*Polygonum)*, and Willow (*Salix)* can be seen growing in Newfoundland and also in tropical wetlands. Are you surprised? Common weeds like Shepherds Purse (*Capsella bursa-pastoris)* and Plantain (*Plantago major*) are also here in Brazil and Ecuador. Even our insectivorous Sundew (*Drosera rotundifolia*) has relatives in Venezuela. The genus seems to have dispersed by island hopping through the Caribbean to the US Coastal Plain and then north to Newfoundland and Labrador. I have seen our Bladderwort genus (*Penguicula*) growing in pools outside Puket, Thailand. The national bird of Brazil may surprise you. It is a thrush with a rusty red breast, hardly different from our common American Robin. What an adaptable bird. I´m wondering which group is ancestral, North or South American?

1.b. Tilman 1988 p. 222, citing Vitousek (1982), points out that most forests are limited in growth by available nitrogen. This is certainly true in Newfoundland and Labrador, where the half million citizens rarely make a practice of using dilute urine or wood ash on valued trees or use compost toilets to improve soils but, instead, flush all the nutrients into the sea or in deep underground septic beds below the reach of most plant roots. Flush toilets are wasteful, polluting technology (Hupping Stoner 1978). The same can be seen when we note that our province has more dogs and cats (fed imported food) than sheep, goats or cattle. We have thousands more imported lawnmowers than hay bailers or silage cutters, and the lawns they cut produce not a drop of milk or a gram of meat or cheese. Where is the leadership in the necessary cultural changes? It´s right here. Memorial University can easily offer a degree specialization in technical horticulture and soils with existing courses. Making sustainable farms in the Boreal forest takes generations of input for extensive fenced grazing land (except islands), or thousands of dollars for intensive greenhouses, a double option. Farms are a success when they are married to market outlets, cafes or bed and breakfast homes.

2. Niche partitioning is an unpopular term for many biologists (self included), as the word 'partitioning' is an active verb and does not fit what is happening. The animals or plants as individuals adjust to their fluid niche and those around them, all part of natural selection and evolution.

3.a. The biology concept of niche (French for gap or crack) is a difficult thing to wrap the mind around. It is a metaphor. It is the sum total of random events, space, place, time and resources used by a species in an environment (foods, nesting holes, food chain, etc.). It is not exactly the same for all individuals (organisms all eat differently and have a different history) but approximately so and always changing. Excuse me for using the tired expression, it is multidimensional and, therefore, difficult or exhausting to measure.

3.b. Conifers that retain their needle-leaves (not Larch) lose much less biomass as a result of the winter disruption. True, they must form buds, and some root hairs die in the cold of winter, but deciduous trees, herbaceous communities and especially annual herbs suffer a massive autumn dieback of biomass from which they must recover in spring. This is one major advantage to being evergreen.

4. Some places in Southeast Asia and South America even have strange elongate climbing palms, the Ratan Vines (several genera), used to bind imported bamboo furniture. Ratan Palms have spines that aid climbing but tear flesh.

5. In South Korea some vines, like the legume Kudzu Vine (*Pueraria lobata*), are so agressive they climb light poles and support cables, and the leading shoots have to be kept back by attaching conical excluders like the rat excluders often seen on ropes attaching ships in port.

6. The Yellow or Golden Birch forests common in the river valleys of the south coast of Newfoundland are mostly restricted to the warmer south- and west-facing slopes, while the northern and eastern slopes are colder and all conifers. On these warmer slopes, Yellow Birch can reach a magnificent size, with branches draped in lichen. An example close to St. John´s is at the mouth of the Salmonier River. My father, from Galtoise, Long Island, and people of his region, called this tree Witch Hazel for the wintergreen smell released from broken twigs. This Yellow Birch forest has deep brown soils over an active moss and humus layer, fine for agriculture, and is related to the more diverse Acadian Forest of NS NB and PEI. Our Yellow Birch forests were mapped by Damman (1976) and shown to have a higher than usual growing season heat or growing degree days. Tiny Yellow Birch seedlings can become established on bared mineral soil when trees fall over and rip up the moss and litter layer, or they may be perched on moist rotted stumps or fallen logs. Here they obtain a stable water supply which is critical for many Boreal tree seedlings (Day 1981).

7. Some believe that the Grey or Boreal or Canada Jay is responsible for dispersing the single sticky seed which can explode from the fruit. I know no more about this.

8. My own 58-acre forest organic farm and hostel, Little Eden Nature Reserve, south of Ottawa and Merrickville, has Yellow Birch and a whole range of trees never seen in Newfoundland. Some are found in the Acadian forest, but more are part of the large number of species in the southern Appalachian Mountain system, a center of temperate biodiversity very closely related and once in contact with the forests of China, Korea and Japan (Arctotertiary Forest). I have fragrant Eastern White Cedar, Black Cherry (beautiful furniture), Basswood (attracts bees), Red Oak, Silver and Sugar Maple (can be tapped for sap), Beech, Ironwood, Elm, Ash, Musclewood and Hemlock as well as the common Newfoundland trees. This type of forest is a treat to a Newfoundlander raised in the Boreal forest, a treat and a challenge to understand.

9. Palms are macrophyls or big-leaf plants, the largest leaves in the plant kingdom. They are close to the extinct Seed Ferns, essentially like the surviving Cycads. Many, like the spiny-stemmed Chonta Palm (*Aiphanes aculeate*), make a mad dash to the canopy, devoting most energy to a very active single apical meristem, a very special competitive strategy. They are so specialized in their upward growth that they rarely branch unless damaged. Flower stalks of palms do branch, as do the leaves, or, rather, they split while enlarging, thus dispersing the energy of winds. Banana leaves do the same. The leaf stalk of many palms clasp the stem for mechanical support just like corn/maize and most other grasses.

10. In 2008 I visited a private botanical orchid forest restored over 25 years ago. It is just outside the town of Puyo on the eastern Andes of Ecuador. The owner and English guide, Omar Tello Benalcazar (jblorquideas@andinanet.net), has rebuilt a forest by collecting salvaged seedlings, cuttings and epiphytes and by daily bringing in bags of organic matter to improve the clay soil of a degraded cattle pasture. He told me he is convinced that the carnivorous bugs which control the herbivorous species also control the health and diversity of the trees. The mechanisms were not explained exactly but these ideas need testing with hard science. Omar is also domesticating many delicious Amazonian plants. He has found a very rare new cycad but only one sex, so he cannot breed it sexually.
In coastal Brazil at Arriail d'Ajuda, the grass airfield, now an informal municipal park, has developed artificially in what was originally a tropical coastal forest. In 2007 I saw it was kept open by tree removal, patchy fires and grazing by mules and horses. Over many years it has been invaded by a huge variety of grasses, other herbs and shrubs. There has been no inventory of this remarkable field/prairie.

11. The Natural History Society can offer workshops to landowners for enhancing wildlife. There are many useful techniques, most as simple as gardening or favouring hardwoods which promote soil fertility. For example, I place logs on the east side of my tractor-made pond so Painted and Blanding's Turtles and Northern Brown Water Snakes can warm in the morning sun. This modest pond provides water to the whole forest in dry summers.

Acknowledgements I thank Fred Rayment (Agriculture Canada) and Fred Pollett (Forestry Canada) for giving me summer student employment many years back when I first studied pasture plants, then Lambkill (*Kalmia*

angustifolia) and then Boreal forest regeneration after fire. I remember the friendship of potato specialist Ken Proudfoot who recently passed away. I thank my parents for giving me the luxury of study. I also thank the people of the Jama River, Ecuador, where I had a small museum built in 3 days, opened in 2 months and now exhibits animal skulls and pre-Columbian artifacts. This was my writing home for a second winter. I tubed down the Jama & Mariano rivers for 8.5 hours, saw clouds of butterflies but not a single turtle, which are taken by children as pets, as in Canada. One-to-one education is sorely needed. In Ecuador one can see 83 % of Brazil's biodiversity in a much smaller, fertile, volcanic country. Incidentally, I saw the Scarlet Flycatcher here and in north coastal Peru. The male is red like a puff of fire. I suggest it mimics a red flower and attracts insects that it can then eat. The male is also likely noticed more and eaten by predators. These hypotheses can be tested experimentally.

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Quarterly Bug

NASAL BOT OF CARIBOU *(Cephenemyia trompe (Modeer))*

by Dave Larsen

Autumn is that time of year that many Newfoundlanders take to the woods and barrens to help fill the larder for the winter...in other words, the hunting season. Most prized is Newfoundland's only native deer, the caribou, with herds in a number of areas of the province. Hunters and naturalists voice concern over the health of these herds, and condition of the animals. One observation they make is the presence of a parasite in the nasal passages of these animals.

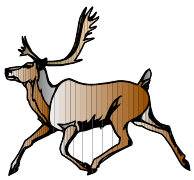
The parasite in question is a fly known as a nasal bot, and the species affecting caribou is *Cephenemyia trompe (*Modeer*)*. This species is found throughout the arctic region, although not throughout the range of its hosts, the deer (*Cervidae*) which occur also in South America and the Orient. This discrepancy, and others in global oestrid distribution, have been an aspect in theories of continental drift and migration during periods of glaciation.

These flies are members of the family *Oestridae*, of which all members are, as larvae, obligate parasites of mammals. Adults of this family are robust, hairy and somewhat bee-like. Unlike other calyptrates, in Oestridae the mouthparts are vestigial or absent. *Cephenemyia trompe*, and other members of the subfamily *Oestrinae*, differ from other oestrids in that they inhabit the respiratory passages of the host, rather that the gut or skin. They also differ in that the females larviposit rather than oviposit, and in fall swarm about the host to forcibly expel first-instar larvae into droplets of fluid around the nostrils. For *Cephenemyia*, larvae crawl towards the upper lip and enter the host through the mouth. They then migrate to the sinuses and other nasopharyngeal recesses. There the larvae feed on blood and secretions. Presence of the larvae, or 'bots,' can cause inflammation and edema, occasionally leading to pneumonia. There may even be death due to suffocation when the infestation is particularly heavy. There are usually 30-60 third-instar larvae in these cavities, about 15 mm long when mature. The larvae overwinter in the host, and in spring, mature larvae detach and leave the host via the nostrils to pupate in the soil. This exodus is accompanied by much snorting and sneezing on the part of the caribou, and after emergence the host may still suffer from localized infections caused by the infestation.

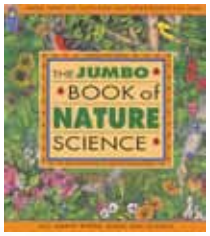
The fly itself causes annoyance and fear-driving in the caribou, which can lead to loss of condition due to inadequate feeding. Caribou under attack generally cluster, or may become nervous or panic-stricken, even stampeding, and have been said to assume a 'terror-stricken look' as females hover around them.

There has long been knowledge of this parasite. Aristotle (384-332 B.C.) wrote 'All deer ...have living maggots inside their heads: they infest the hollow region under the tongue and near the vertebra to which the head is attached: these maggots are as big as the biggest grubs; they grow in a bunch huddled up together, about twenty of them.'

So bear in mind as you foray onto the barrens this fall, the numerous other creatures, both great and small, which depend and dine on caribou.



Collecting Leaves



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Collecting leaves

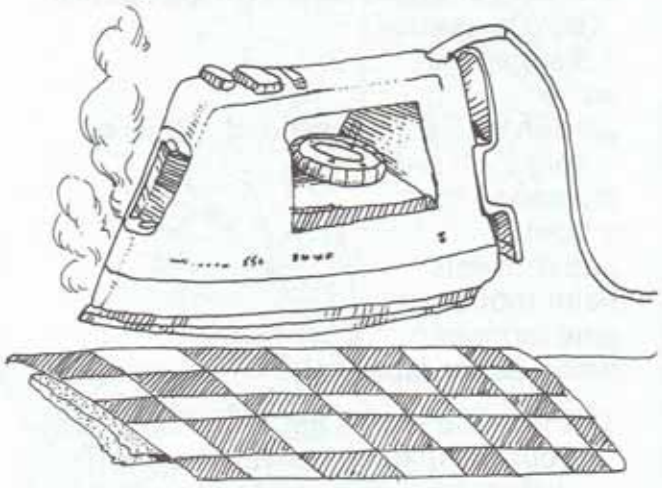
Take a look at the leaves in your garden, in your local park or on your houseplants. What kinds of shapes do you see? There's an almost endless variety of plant leaves, and that makes looking at them and collecting them lots of fun. Here's an easy way to preserve the leaves in your collection.

You'll need:
a variety of leaf shapes
waxed paper
a dish towel
an iron (Ask an adult to help you.)
glue
several sheets of three-ring binder paper
a binder

1. Collect a sampling of undamaged leaves from a variety of plants. Try to find as many different shapes as possible. You can collect green leaves in summer and coloured leaves in fall.

2. Fold a piece of waxed paper in half so that the waxy surface is on the inside. Make sure the folded paper is large enough to cover your biggest leaf.

3. Place a leaf between the folded waxed paper. Cover the paper with a dish towel and carefully iron on top with a hot iron. The heat from the iron will melt the wax onto the leaf. This waxing process should prevent the leaf from drying out.



4. Glue each leaf to a sheet of paper. Beside the leaf, write where you found it, when, and what kind it is.

5. Store your collection in a binder.

Goodyera oblongifolia Rafinesque:

Relocation of a historic species in a new site in the Humber Valley

By Andrus Voitk, Maria Voitk, Humber Village, NL

In 1991 Bouchard reported Rouleau's 1955 collection of *Goodyera oblongifolia* from under conifers on a steep slope on the northeast corner of Serpentine Lake, housed in l'Herbier Marie-Victorin in Montréal. Paul Martin Brown has sent us digital photographs from 1995 of the plant in the same area. It has not been relocated since and is presently classified as historically present in Newfoundland. In 2003 Anne Marceau, Michael Burzynski and we were unable to relocate it during an August week-end in the same area. Bruce Roberts suggested its disappearance may be related to past severe spruce bud worm infestations of the area, possibly compounded by subsequent heavy insecticide sprayings (pers. comm.).

A colony of about 40 plants was found 148 meters above sea level on a south-facing slope in the Humber Valley above Humber Village on Aug 13, 2005. Two plants had a flower spike in bloom and one dead spike was seen from the previous year. The other plants formed healthy rosettes of relatively small leaves. The plants grew close together within one square meter under a canopy of *Abies balsamea* with some *Betula papyrifera* and *Acer spicatum*. Typical ground cover of the area was *Maianthemum canadense*, *Cornus canadensis* and *Clintonia borealis*. No other G. *oblongifolia* were seen in the area; specifically, none were seen up or downhill from the site. We have traversed through this forest quite frequently and have never encountered any *Goodyera* species there; the only orchid we have seen there has been *Corallorhiza maculata* var. *maculata*.

The site was marked, GPS location noted, plants photographed and two specimens collected, one in bloom and one healthy rosette of leaves. Identification was confirmed by Henry Mann, Associate Professor of Biology, Sir Wilfred Grenfell College, Memorial University of Newfoundland, who placed the specimens in the herbarium of the college.

Acknowledgment

We thank Henry Mann for reviewing the manuscript.

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Editor's Note:
This article was submitted in 2005 but inadvertently slipped through the cracks. Mea culpa. (Ed.)

L to R: *Goodyera oblongifolia* in bloom, close-up of the flowers and typical leaf rosettes. The spike is 36 cm tall, the flowers on one side. Petals and sepals are longer than those of *G. tesselata* or *G. repens* and the mouth proportionately narrower. The wavy leaves have a characteristic light central stripe.

Ask a Natural History Question

Question:
I've read that milkweed is the only plant that monarch butterflies eat. Do we have this plant in Newfoundland and, if not, what do monarchs eat here? Ed Hayden

Response from John Maunder:
Monarch butterflies occur irregularly in southern Newfoundland, in varying numbers, usually as strays blown eastward during their epic fall migrations. However, no breeding has been reported for here. Nor has any breeding been reported for Prince Edward Island. The species does appear to breed somewhat sparingly, if only occasionally, in New Brunswick (primarily along the St. John River) and Nova Scotia (primarily in the Annapolis Valley).

Monarch butterfly larvae require milkweed as their host feeding plant; so the species breeds only where milkweed occurs. There are about 22 species of milkweed in North America. Only two of these occur as far east as the Atlantic Provinces of Canada. The much less common, narrower-leaved, Swamp Milkweed (*Asclepias incarnata)* is relatively rare in wet areas eastward throughout New Brunswick, P. E. I. and Nova Scotia. The much more common, broader-leaved, Common Milkweed (*Asclepias syriaca)* is scattered in dryer areas, supposedly only about as far eastward as the Strait of Canso in Nova Scotia. Neither species is generally thought to occur in Newfoundland.

However, it turns out that *Asclepias syriaca* does occur in our province, at least sparingly. This summer, there were two separate, documented reports: one from Stephenville, and one from Gros Morne National Park [See the milkweed page in the "Digital Flora of Newfoundland and Labrador Vascular Plants" http://digitalnaturalhistory.com/flora_asclepiadaceae_index.htm]. Whether either or both of these occurrences were "human-assisted" is impossible to say. Milkweed seeds are endowed with tufts of long, fine, silky hair that allow for long-distance dispersal by wind, so that both the Gros Morne and the Stephenville plants could, theoretically, have arrived on their own. It is interesting to speculate upon how many other isolated milkweed occurrences remain to be discovered in our province.

Does the scattered occurrence of milkweed in Newfoundland mean that, eventually, Monarchs will be found to breed here? Probably not, considering that the closest known breeding records for Monarchs are from southern New Brunswick and western Nova Scotia.

Nonetheless, given the complication that, lately, the Insectarium in Deer Lake has been distributing "school kits" of Monarch caterpillars, along with live milkweed plants(!) [see, for instance: http://swa-grade3.blogspot.com/2007/05/monarch-butterfly-project.html], Monarch breeding sometime down the road may not be completely beyond the realm of possibility (although, since the aforementioned "school kits" are not distributed until early fall, the possible introduction of milkweed would seem to be the most significant initial result of this experiment).

Unlike Monarch larvae, Monarch adults feed on a wide variety of plants. Thus, any adult Monarch appearing in Newfoundland (whether blown here by fall storms, or deriving from "school kits") could, theoretically, avail itself of most of the nectiferous flowering species occurring here. However, goldenrods, asters and purple loosestrife are generally the most preferred nectar sources.

Do Monarchs detouring through Newfoundland (especially eastern Newfoundland) actually survive their arduous southward trip to central Mexico? It is hard to say. During the late summer of 1973, I witnessed the amazing sight of easterly-displaced Monarchs streaming southward out over the cliffs of Cape St. Mary's in astounding numbers, heading merrily out to sea. A few days later, while aboard a longliner, about 25 km west of Cape St. Mary's, on the open sea at the mouth of Placentia Bay, I noted that many butterflies were still streaming south. But, I still can't help thinking that they all perished at sea.

Online Resources:

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Rainfall statistics and new water questions

LETTER TO THE EDITOR
The Telegram

We live in a cool maritime climate, where adequate rain and snowfall can be relied upon in most years. So why do we have a water supply shortage in St. John's? According to the writer of a recent letter ("The end of the waterline," Sept. 12), we are simply drawing down our reservoirs at an unsustainable rate. Others, including some of our municipal officials, have blamed the shortfall on "abnormal" weather - that is, on the input side of the water equation. Which is it?

Environment Canada data for St. John's Airport allow us to estimate the input. This past winter (2008-09), precipitation was 471 mm, which is 11 per cent above the long-term average. This spring, with 307 mm, we were 13 per cent below average, and this summer, we were five per cent below average with 284 mm. However, taking the three seasons together, we were only one per cent below normal. So, on the input side, the water potentially available to fill our reservoirs can't be said to be much below "normal."

Why do we have water shortage in our reservoirs when precipitation has been near normal? Slightly above normal summer temperatures and evaporation might explain part of it, but even then we are not far from average.

Over the past 50 years, the annual precipitation at St. John's has been as high as 2,067 mm and as low as 1,055 mm. Our long-term average is 1,514 mm, or about a metre and a half. Statistical analysis of the record shows that in any given year there is very good chance (one in four) that we will have 10 per cent less than average precipitation and one in 10 chances that it will be 20 per cent below average.

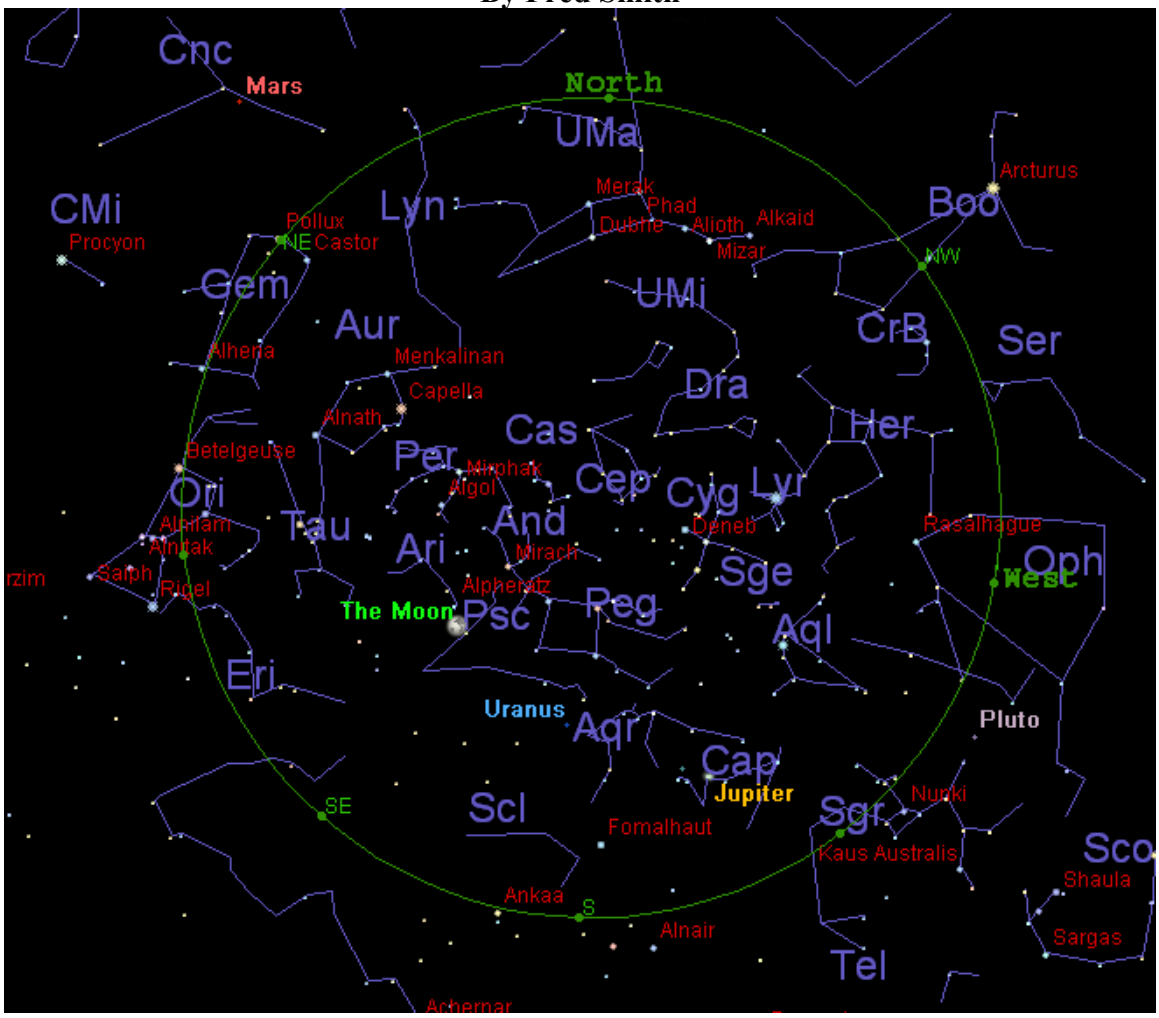
Our water supply system should be capable of delivering adequate supplies to residents in all but the driest years. That it is not doing so is not the fault of our climate. Rather, we are indeed drawing too much from a finite supply.

It is time to get serious about water conservation in the greater St. John's area. Before developing expensive new sources, let's repair our leaking infrastructure, immediately make water meters mandatory in new residential development, and implement a program of prompt retrofitting of meters in existing residences.

John D. Jacobs
St. John's

22/09/09

THE NIGHT SKY
OCTOBER – NOVEMBER 2009
By Fred Smith



The star chart above shows the sky in eastern Newfoundland at 9:00 pm on 1 November 2009. The chart will be useful for October and November. You will notice that the chart shows East on the left and West on the right. The chart is intended to be held over the head looking up at the sky. Hold the chart up to the sky and rotate the chart until North on the chart points towards North from your location. Note the Moon subtends an angle of 0.5 degrees and since the moon is easy to identify it is used as a reference in the chart commentary. WARNING: Never point binoculars or telescopes at the sun. Serious eye damage will result.

For more information contact frsmith@mun.ca

Star Chart Commentary

October – November 2009
By Fred Smith

THE PLANETS IN OCTOBER

Mercury rises well before the sun, and this is probably the best month to see it. Early in the month you should be able to see Mercury an hour and a half before the sun comes over the horizon. Look in the area where the sun will rise and below Venus, but once the sun makes an appearance be sure no one has a telescope or binoculars pointed in that direction.

Venus rises a couple of hours before the sun and will be brilliant. However, by the end of the month, the time between Venus rising and sunrise will decrease to an hour and a half.

Mars rises in the Northeast around 1:00 am and will be below Gemini at the beginning of the month and heading in to Cancer by mid-month. On the last day of the month, use binoculars and you will see Mars next to a cluster of stars known as the Beehive Cluster. Jupiter is the only planet you can see before midnight this month. It will be low in the Southeast at sunset and approximately South at midnight. Saturn rises just before the sun and will be low in the East all month.

OCTOBER OBSERVATIONS

4 Sun	Full Moon
7 Wed	Moon 0.1 degrees North of the Pleiades
8 Thu	Mercury 0.3 degrees South of Saturn
11 Sun	Moon Last Quarter
12 Mon	Mars 1.2 degrees North of the Moon
13 Tues	Venus 0.6 degrees South of Saturn
18 Sun	New Moon
21 Wed	Peak in Orionid Meteor Shower
26 Mon	Moon First Quarter

THE PLANETS IN NOVEMBER

Mercury is not visible for most of this month but it may be possible to get a glimpse of the planet just as the sun sets. It is now an evening planet. Venus still rises before the sun but it will continue to get closer to the sun as the month passes. It is easy to recognize by its brightness.

Mars rises before midnight in the constellation Cancer and by sunrise is almost due South. It will be in the constellation Leo by the end of the month.

Jupiter is approximately South at sunset and sets around midnight. On November 23, Jupiter will be just below the moon, and if it is a clear day you may be able to use the moon to locate Jupiter during daylight. Saturn rises earlier each day and by mid-month will rise 4 hours before the sun.

NOVEMBER OBSERVATIONS

1 Sun	Daylight Savings Time ends Mars 0.05 degrees South of Beehive Cluster
2 Mon	Full Moon
4 Wed	Moon 0.02 degrees South of Pleiades
9 Mon	Moon Last Quarter
16 Mon	New Moon
17 Tues	Leonid Meteor Shower peak
24 Tues	Moon First Quarter

Starfish: Symbols of the Sea

BY JOHN HORWOOD

This is the third in a series of nature articles by the late John Horwood that first appeared in The Telegram under the banner of the Natural History Society. It is reprinted here with permission of his brother Charlie Horwood.

The typical five-armed starfish is so familiar that it has become symbolic of the ocean. If an artist is drawing a shoreline and wants to indicate that it is a seashore, what better way than to include a starfish?

Perhaps we should say first of all that they are not fish and are not related to fish. The term 'sea star' is used by some who consider it less confusing. However, both names have been used for centuries, and both are acceptable.

Starfish belong to a very large and diverse group of animals known as Echinoderms (ch is pronounced like k), which means animals with spiny skins. 'Echinos' is Greek for hedgehog. Others of this group are sea urchins, sea cucumbers, brittle stars and sea lilies. The ancestors of these animals branched off quite early on the evolutionary tree and, like sponges, show few connecting links with other animals.

This large group is included in the vast category of creatures popularly known as invertebrates because they have no backbone or spinal cord. It is interesting and a little humbling to take a quick look at the amazing diversity and weight of numbers possessed by the invertebrates, animals which we may casually think of as lower life forms. Contained within this vast category, we find the tiny simplicity of the single-celled amoeba, which is not really very simple when we look at the complexity within the living cell. At the other extreme, we have the huge complexity of the giant squid, which can hold its own with the larger back-boned animals. There are jellyfish, shellfish, insects, sponges, spiders and their kin, lobsters and crabs, to name a few.

It has been suggested that the word 'innumerable' is useful when thinking of the great mass of invertebrates. They certainly have not all been numbered or classified as yet, and may never be. But the number of species outnumbers those of vertebrates (fish, amphibians, reptiles, birds and mammals) by about 30 to 1.

Purple Starfish

The species of starfish that we see most often in Newfoundland is known commonly as the Purple Starfish. This name is a little confusing because, although the majority are purple or purplish brown, some are really brown, blue, cream, pink, rose, orange or red. Anyone who did not know these creatures could easily be misled into thinking that there are several species on a particular mussel bed where there is only one.

The Purple Starfish has the typical starfish shape, with five pointed arms radiating from a central body disc. Each arm has a red eye-spot at the tip and is covered with short spines, while a heavier row of spines is seen in the middle of each arm, creating a sort of stripe. They are six to twelve inches in diameter. This species ranges from southern Labrador to North Carolina. It is found around shores in shallow waters throughout Atlantic Canada except the St. Lawrence estuary. However, it can also be found in deeper water, even to depths of over 1,000 feet. Like many other starfish, this one feeds mainly, but not exclusively, on bivalve mollusks, such as mussels and oysters, pulling on the shells until they weaken and open enough for the starfish to insert its stomach, and so digest the creature right in its own shell.

There is an ironic tale of oyster fishermen who, outraged at the damage done to their oyster beds by the predation of starfish, would chop up and throw overboard every starfish that came their way. They were not informed about the amazing regenerative powers of the starfish. A great many of these pieces that they threw overboard in malicious anger grew into whole new starfish and so compounded their problem.

Polar Starfish

The other large starfish in our waters is the Polar Starfish, also known as the six-rayed starfish because it has six arms. The upper surface is covered with a network of blunt spines that may be in clusters. It is usually green or greenish brown. Its range is from Greenland to Cape Cod and from the tidal low-water mark to 1,200 feet.

The Blood Sea-star grows to only two to three inches. But it would get my vote as the most beautiful of our Echinoderms. This little starfish has five cylindrical arms, with spines so fine that they are almost unnoticeable. It is usually a very powerful shade of bright red, although it can be orange, purple, rose or cream. It ranges from Greenland to Cape Hatteras. It likes rocky shores and may be found in tide pools down to depths of 3,000 feet. The ones I have seen have all been in 15 feet of water or more. They are said to feed exclusively on sponges.

Starfish occur throughout the oceans of the world. There are about 2,000 species distributed from inter-tidal water to depths of 20,000 feet. They are particularly common in the northern hemisphere, and the most prolific area of all is the northwest Pacific.

The reproductive process in starfish, as in other Echinoderms, may be termed haphazard, both eggs and sperm being broadcast into the water with the expectation that they will find each other. Although this method may be criticized by more sophisticated creatures, nobody can argue against its effectiveness, since the seashores of the world fairly bristle with starfish and their allies. The eggs hatch into small larvae that are bilaterally symmetrical and free-swimming. They eventually settle down and become radially symmetrical creeping adults. An exception is the Blood Star, in which the larvae are not free swimming and the female broods the eggs.

In these creatures, when adult, locomotion is accomplished by rows of tube feet. These projections are small and flexible; they extend and retract and have suction discs at the end. Tube feet are also used in capturing prey and in feeding, as when pulling apart the shells of a mussel or holding a small fish or worm until the starfish stomach has enveloped. These tube feet can easily be observed by turning a starfish upside down; then its tube feet will be extended to the maximum as the animal tries to find purchase to turn itself upright.

It is well to remember that to remove these creatures from the cool sea for more than a minute or two of careful observation is to expose them to cruelly unsuitable conditions and death. A non-swimmer may best observe starfish in the still and shallow water of a tidal pool.

Crown of Thorns

One starfish worthy of special mention is the Crown of Thorns, which makes its home in the South Pacific from Hawaii to the Indian Ocean. As the name suggests, it is covered in large sharp spines, which are also venomous. It grows up to 14 inches in diameter and may have up to 16 arms. The cause of its fame, or infamy, is that it feeds on living coral and in this century there have been population explosions of the Crown of Thorns that have turned thriving coral reefs into underwater deserts. The cause of these unfortunate events has been the predation by people on the predator of this starfish, a huge marine snail called a Triton Shell or Triton Trumpet, which grows to 15 inches. This snail has been greatly reduced in numbers by hunters who furnish items for the souvenir trade. And so the natural scheme of things has been unbalanced.

When those blessed days come again, when we shall visit our beaches for recreation, we will pause again, as always, to examine more closely our familiar, yet fascinating, starfish.

Index Electrofishing of City Rivers, St. John's
September 22, 2008

By R. John Gibson, Diana Baird, Dan Ficken, Eric Salter, Don Steele

As in the last few years, the Natural History Society (NHS) and the Northeast Avalon Atlantic Coastal Action Programme (NAACAP) in 2008 made electrofishing surveys at sites in the City rivers. We attempt to make annual surveys to document whether the systems remain stable or if there have been changes. In previous years (e.g., Gibson 2003), we documented growth of young Atlantic salmon (*Salmo salar*), which had been stocked for experimental purposes. We showed that the salmon had good survival and could successfully compete with brown trout (*Salmo trutta*), and in fact, unusually, they had better growth than the trout. Also they showed better growth than salmon elsewhere in the province. They were stocked in too few numbers to start a run and, although there were a few returns of adults, the species is apparently no longer present.

We did our electrofishing on September 22nd. We choose the fall for our sampling time since major growth is over, water and weather conditions are usually suitable, and this is before spawning time (the beginning of October to mid-November in the city rivers). However, there may have been migration of some adults from other parts of the systems. It was a pleasant day, with sunny intervals and a NE breeze. Water levels were relatively low at all stations, the water clear, and ideal for electrofishing.

We used a Smith Root back pack electrofisher, borrowed by Don Steele from Memorial University Biology Department. This was set at 400 volts and a frequency of 60 Hz. Due to time and personnel constraints we did not use enclosure nets, but made semi-quantitative surveys, of 500 seconds of electrofishing time (254 seconds in the Virginia R.), over about 25 m. The electrofisher emits pulsating direct current, and one of the crew makes "sweeps" going upstream with the anode. This anode has a switch which is only activated during the sweep, since keeping the current on tends to drive the fish. Fish within a metre or two are attracted to the anode, where they are temporarily narcotized. The fish are caught either on the net of the anode, or by one of the two crew members with a dip net (not all are caught!). The fish is immediately transferred to a bucket of water and then to a holding net. At the end of the electrofishing period, fish are transferred, a few at a time, to a bucket half filled with water and into which a couple of Alka Seltzer tablets have been dissolved. The fish are anaesthetized by the CO_2 and are individually transferred to a measuring board, of which we had two. After measuring and recording, the fish is then placed into another holding net to recover. Trout were measured to fork length (tip of the nose to the fork in the tail), and two eels (*Anguilla rostrata*) that were caught measured to total length. The fish on recovery are then released. We had no mortalities. We also recorded physical and chemical variables (Table 1).

We choose the fall for our sampling time since major growth is over, water and weather conditions are usually suitable, and this is before spawning time (the beginning of October to mid-November in the city rivers).

We surveyed the same stations as in previous years (Gibson et al. 2008), in the Virginia River, Leary's Brook, Waterford River and South Brook.

Virginia River

This station is a short distance (about 250 m) upstream from Quidi Vidi Lake. We started here at 9:45 a.m. The station was riffle habitat, with a substrate of approximately 50% boulder, 40% rubble, 10% cobble. Our electrofishing time for this station was 254 seconds, but over the same section as in previous years (about 25 m). This resulted in a total catch of 50 brown trout.

Leary's Brook

This station is alongside the Prince Philip Parkway, at the corner of Wicklow St. We started at 11:15 a.m. Habitat was pool-flat, with about 10% riffle.

Our happy crew attempting to stay upright in the Waterford River

Substrate consisted of 90% cobble, 10% rubble. Total catch was 34 brown trout .

Waterford River

The station here was immediately upstream from Syme's Bridge. Habitat was riffle, with substrate of 50% rubble and 50% cobble. Undercut banks provided good habitat for trout. We started the station at 2:30 p.m. We caught 28 brown trout and one eel (*Anguilla rostrata*), the latter of about 40 cm total length. The three largest trout were probably sea trout.

South Brook

This station is in Bowring Park, about half a kilometre upstream from its confluence with the Waterford River. We started here at 3:30 p.m. The station was ¾ riffle and ¼ flat type habitat, with substrate of 50% rubble and 50% cobble. Total catch was 54 brown trout and one eel of about 25 cm total length. Our two eels of the day were taken to the Fluvarium by Don Steele.

Trout remain incredibly abundant. In Figure 1 estimates of age are shown. We did not take scale samples for aging, so that the estimates are made from previous years' work (Gibson and Haedrich 1988; Steele 1991), and probable ages from the size classes. The overlap in sizes within and between age groups is interesting, and possibly a tactic to use all size groups of prey in the system. The young of the year (0+) were most abundant in the Virginia River and South Brook stations, indicating that South Brook is an important recruitment and rearing area for the lower Waterford, and Virginia River for Quidi Vidi Lake. Young of the year (0+) were fewer at the Leary's Brook and Waterford river stations than the previous year (Gibson et al. 2008), possibly indicating adverse sediment or hydrological effects at critical times. Three large trout that we caught in the Waterford River were probably sea trout, which migrate into the river at this time of year. Two were quite silvery (Fig.2). One had the usual resident colouring, suggesting that it had been in fresh water for a while.

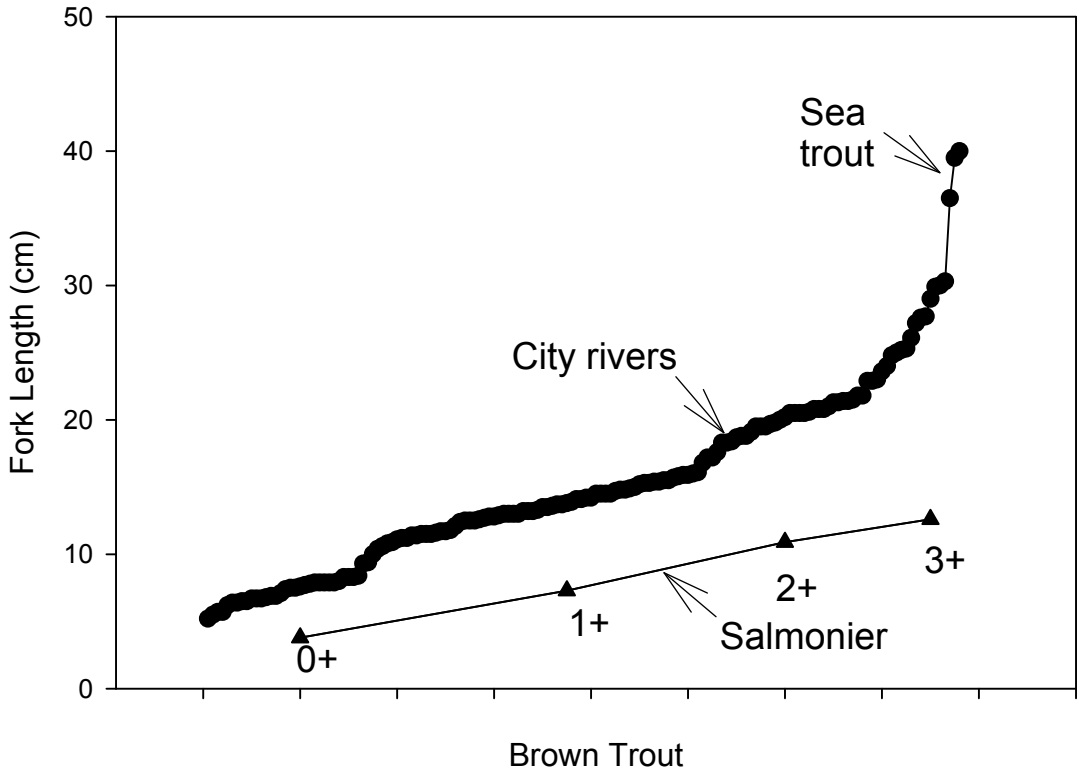
Noteworthy is the exceptional growth. As a

comparison for growth in other parts of the island, the size at age of brown trout in the Salmonier River (Gibson and Cunjak 1986) is plotted with total city river samples from the present study in Figure 1. Similarly, lengths of age classes of brook trout (*Salvelinus fontinalis*) of the Avalon Peninsula are smaller than those of brown trout of the city rivers (Wiseman 1972).

The extraordinary production of trout in our city rivers is probably related to water enrichment, providing abundant prey items (Gibson and Colbo 2000; Gibson and Haedrich 1988). All stations were very slippery, especially the Waterford and South Brook stations, indicating algae and other biofilm covering the rocks, suitable as food for grazing invertebrates. Vegetation is thick along the banks, providing food for the "collectors" that feed on the microorganisms colonizing decaying vegetation, and terrestrial invertebrates also are an important food source (Steele 1991). In addition the stream gradient and geology provides suitable habitats for all the life history stages, including gravel and pebble areas at the end of pools suitable for spawning. Also competition and predation is low from other fish species.

As we have mentioned in previous reports (e.g., Gibson et al. 2008), we should not be complacent about the present situation. Unfortunately city authorities ignore important conservation issues, such as treatment of storm drainage and sources of sewage, so that episodes of siltation and pollution are common. Although

Figure 1 City Rivers, 2008.



Samples of brown trout from the city rivers compared with brown trout sampled from the Salmonier River. The 1+ from the Salmonier are about the size of 0+ trout in the city rivers, the 2+ and 3+ from the Salmonier are about the size or smaller than the 1+ and 2+ respectively from the city rivers.

the best trout fishing in the country is in our city waters, surprisingly nothing is made of this fact by city or provincial authorities. Better appreciation of the importance of our city rivers possibly would improve conservation attitudes. As development proceeds, unless federal and provincial regulations are enforced, water quality could deteriorate to the extent that the ecosystems could collapse. With developments in the headwaters, the city rivers have become more "flashy", and therefore less productive than more stable systems. In addition to engineering solutions for flood control, efforts should be made to control runoff by retaining wetlands in the system, similar to the US's "no net loss" wetlands rule, which "requires that the loss to development of any wetlands be mitigated by the creation or restoration of at least as much comparable wetland elsewhere." This becomes more important in light of climate change where we can expect more high flows and extreme events. Higher flows aggravate erosion. For example in Rennie's River below the Herder Falls until recently we could watch hundreds of trout spawning in October, but now there are few, most probably because much of the gravel substrate suitable for spawning has been displaced by high flows in recent years (pers. com. Dick Haedrich). A problem is that the city rivers are under control of the Department of Engineering, whose interests and training ignore biological conservation. A coordinated, interagency, interdisciplinary team approach with adequate staff, training and funding is required to address all instream flow issues that exist under each agency's responsibilities. In order to conserve this unique resource, we recommend to begin with that the city employ ecological consultants to advise on suitable restoration and conservation measures (and that their recommendations be seriously considered by a coordinated agency, and incorporating public input).

Figure 2. A sea trout sampled at the Waterford River station

Table 1. Physical and chemical variables at the sampling sites in the city rivers

Station	Temperature (°C)	TDS (g/l)	Conductivity (µS/cm)	Salinity (psu)	DO (mg/l)	DO (%)	pH
Virginia River	12.7	0.3	0.437	0.21	10.72	101.7	8.15
Leary's Brook	13.01	0.3	0.423	0.20	9.75	92.6	6.98
Waterford River	13.09	0.3	0.457	0.22	10.92	104.2	8.15
South Brook	13.67	0.2	0.259	0.12	10.87	104.5	8.75

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Note:
The 2009 electrofishing report will appear in the next edition of The Osprey. (Ed.)

Spring migration (2009) in Saint-Pierre et Miquelon islands

by Roger Etcheberry

The spring was about average even if we got our worst winter storm on the 21th of March. April and May were relatively sunny although rather windy ! We have a few interesting reports ! It is time, I think, to praise the contribution of several dedicated, and now experienced observers providing a very good coverage of St. Pierre island. Coverage of larger Miquelon-Langlade on another hand is largely unsatisfactory.

Red-throated Loon: One pair in flight on western Langlade on May 14 (BL) is the only spring report.

Common Loon: Present around the islands throughout the season and fairly well reported. No concentration noticed. Maximum in Miquelon were: 13 and 15, off Mirande lake on March 23 and April 14 respectively (RE). In St-Pierre there was a maximum of 6 birds on March 25 (BL) and April 11 (PA).

Red-necked Grebe: No real concentration as in the past around the islands: only 11 off Cape Miquelon on March 18 (RE) and 36 off the west coast of St. Pierre on April 10 (LJ). Last seen on that latter date.

Northern Fulmar: 3 were south of St. Pierre on May 13 (JD).

Northern Gannet: One bird was off the south-west coast of Miquelon on April 7 (LJ), 2 weeks earlier than average. Few other reports except 42 in flight apparently heading for their breeding grounds of Cape St. Mary's on May 14 (RE).

Double-crested Cormorant: The first one was off the harbour of Miquelon on April 21 (RE) about 10 days earlier than average. Seen regularly then from April 25 on (RE). A few birds were reported in St. Pierre on May 14 (RE/DL) and on May 21 (PA).

Great Cormorant: Not much data for this resident species. A few were in their usual wintering site on the cliffs of Cape Miquelon in April and May (RE).

Snowy Egret: One, first reported by Jean de Lizarraga on the north-east coast of Miquelon on May 17 was confirmed (RE/DL). Possibly the same bird was seen in St. Pierre on May 22 and 23 (PB/PA).

Green Heron: One was seen and photographed in St. Pierre on May 18 and 19 (PHA/PB).

Snow Goose: The bird that arrived in early July last year is still there and probably cannot be considered a wild bird anymore. It is always in company with domestic white geese, although not really part of the group. (m. ob).

Canada Goose: The first three birds were spotted near Grand Barachois on March 14 (LJ). Numbers started to build up slowly then on. JD had a total of 62 birds between Miquelon and Langlade on March 29 while the same day PHA had 70 birds in flight in St-Pierre. Numerous non-breeders were around throughout the rest of the season. The first brood appeared on the Isthmus on May 17 (RE). more details on the nesting season report.

American Wigeon: The two birds that over-wintered in St. Pierre were last seen by PA on April 10. On bird was alone there between April 14 and 26 (PA), then two pairs on April 29 and one pair on May 1 and 3 (JD/PB).

American Black duck: When the marshes thaw in spring the species tend to spread out, so the last reliable count for Grand Barachois is about 500 birds on March 10 (BL). Up to 30 birds were on the salt pond near the village of Miquelon in March (RE). Several broods were seen in St. Pierre between May 23 and 29 (PA/BL).

Mallard: One male was in St. Pierre on March 13 (PA), 18 (PB) and April 24 (LJ). One female was seen up to March 22 (PA). There was a pair on the Isthmus on April 30 (RE), and a male near the village on May 26 (LJ).

Blue-winged Teal: One male was in St. Pierre on April 5 (PHA/FPA).

Northern Shoveler: One pair was in St. Pierre between April 29 and May 13 (m. ob.). One female was in the same area on May 29 (FPA/BL).

Northern Pintail: 2 males in St. Pierre on March 3 were rather early (LJ). Regularly seen from April 1, mostly on the Isthmus and in St. Pierre throughout the season (m. ob.). The first brood of 9 ducklings seen in St. Pierre by PHA on May 17 had only 7 ducklings left on May 23 and 24 (PA).

Green-winged Teal: The first migrant was seen in St. Pierre on March 22 (BL). One pair was on the Isthmus on April 8 (BL). I had a pair on the Isthmus on April 18 and 25.

Ring-necked Duck: Most observations for St. Pierre: 1 pair on April 27 was 6 days later than average (LJ); 2 males on April 29 (LJ/PB) and 1 male from May 5 to 7 (JD/PB). Surprisingly I saw my first bird (a male) in a rather unusual place, on a pond of Cape Miquelon May 16.

Greater Scaup: The now annual winter residents of the salt pond near the village of Miquelon reached, for this spring, a maximum of 130 individuals on March 18 and 23 (RE). They were about 60 during the 2nd fortnight of April, they dwindled thereafter while spreading in freshwater ponds (RE).

King Eider: Two adult males were with Common Eiders

off de S-W coast of Miquelon on April 6 (LJ).
Common Eider: Over 6000 were estimated around Miquelon on March 10 (BL) and about 2400 on April 1 (LJ). BL had several thousands off the Isthmus and about 1700 south of St. Pierre on April 2. A total of 7500 were estimated off the Isthmus, Miquelon E. and Miquelon W on April 9 (BL). Last significant reports are: about 200, mostly immature, off Southern St. Pierre and about 400 on the North-West coast of Miquelon on April 16 and 18 respectively (BL/RE).
Harlequin Duck: 7 reports for St. Pierre only, for a maximum of 61 birds on March 17 and 51 on April 16 (BL). Last report: 15 birds off St. Pierre on April 24 (LJ).
White-winged Scoter: "A few thousands" off the east coast of the Isthmus on April 2 (BL). Several hundreds birds (or more) seen from the land on many occasions off the Isthmus to May 3 (RE/BL/LJ).
Long-tailed Duck: Two females were in St. Pierre harbour between March 6 and 15. Rather few reports, the species seems again on the "lowish" side ! A maximum of 300 were off the East coast of Miquelon on May 8 (LJ). Last seen about 50 off Miquelon harbour on May 15 (LJ).
Bufflehead: One adult male was at Grand Barachois on March 16 and April 1 (LJ).
Common Goldeneye: A maximum of about 100 was reported at Grand Barachois on April 1 (LJ). A pair or two were on ponds of the Isthmus on April 18 (RE).
Barrow's Goldeneye: One male and one immature were seen at Grand Barachois on April 1 and one male only on April 6 (LJ).
Common Merganser: One male was seen and photographed near the town of St. Pierre on April 13 and 14 (PHA/PB/FPA). We have very few records for this species which is resident in nearby Newfoundland.
Red-breasted Merganser: Common as usual on ponds and at sea throughout the season. There are apparently more reports than usual for St. Pierre where the species is much less common than in Miquelon (m. ob.).
Osprey: One on the Isthmus (RE) and one in St. Pierre (JD) on May 23 were ten days later than average.
Bald Eagle: There was a maximum of at least 12 birds on the Isthmus on March 29 (JD). Otherwise, about as usual in the three islands, more details in the nesting season report.
Northern Harrier: One in St. Pierre on April 18 (PHA) was 11 days earlier than average and was also seen two days later (PB/PHA). I briefly saw one on Cape Miquelon on April 26. One, was flying high above the hills in a usual nesting site in southern Miquelon on May 17 (RE/DL).
Sharp-shinned Hawk: The over-wintering bird was seen in St. Pierre for the last time on April 12 (JD). One was seen in Cape Miquelon on April 26 and May 1 (RE).
Northern Goshawk: 3 birds were on western Langlade on March 8 (BL). One was in St. Pierre on March 10 (PHA/JD). A few other reports for Miquelon and Langlade to May 14 (LJ/RE/BL).
American Kestrel: One in St. Pierre on April 25 (JD); one in Miquelon on April 30 (RE) and one in St. Pierre on May 2 (LJ).
Merlin: One in St. Pierre on March 5 was probably and over-winterer. The first migrants were seen in St. Pierre from April 29 on (m. ob.) and in Miquelon on May 10 near Mirande lake (RE). A few other sightings both in St. Pierre and in Miquelon.
Peregrine Falcon: 11 reports, one bird at a time between March 7 and May 26 (m. ob.).
Common Moorhen: This rather uncommon bird was seen and photographed in St. Pierre between May 6 and 17 (LJ/PB/RE/DL/PHA).
Semipalmated Plover: Two birds near Grand Barachois on May 15 (LJ) were 6 days later than average. There was a pair near the village of Miquelon on May 21 (RE).
Piping Plover: The first bird was seen by LJ on the southern part of the Isthmus on May 10. The same observer had 4 birds, same area, on May 21 where two nests were found on May 26 (LJ). 3 birds were seen around the gully of Grand Barachois on May 21 (LJ/PB).
Killdeer: The first bird appeared in St. Pierre on May 1 (LJ). One bird was also seen in St. Pierre between May 24 and 29 (LJ/JD/PA/JD/BL). Three were seen on the southern part of the village of Miquelon on May 15 (LJ/BL).
Greater Yellowlegs: One bird in St. Pierre on April 9 (PHA) stayed up to April 18, It was 16 days earlier than average and a new record early (previous one was May 13, 1994). Regularly seen from April 20 on and up to May 26 in the three islands in rather low numbers (m. ob.).
Solitary Sandpiper: One in St. Pierre on May 20 (PHA/PB).
Willet: One near the village of Miquelon On May 7 (RE) and May 8 (LJ).
Spotted Sandpiper: One in St. Pierre on May 20 (PB/PHA) were 3 days later than average. A few birds here and there on the Isthmus and St. Pierre from that date on (m. ob.). I saw the first ones for Miquelon only on

May 31.
Sanderling: Two birds were near the village of Miquelon on March 16 (LJ). 5 to 8 birds (all over-winterers) were seen on the Isthmus between April 5 and 25 (LJ/RE).
Least Sandpiper: Apparently scarcer every year ! Two on the Isthmus on May 15 (LJ) is the only report.
Purple Sandpiper: 9 reports between March 12 and May 21 for a maximum of 88 near Cape Miquelon on March 16 (LJ) and 70 on the shores of Grand Barachois on April 15 (RE). Last seen, several at Grand Barachois on May 21 (PB).
Wilson's Snipe: The first one was heard in St. Pierre on April 14 (PA) 6 days earlier than average. Regularly then from April 19 on (m. ob.). Seemed fairly common and winnowing here and there throughout the rest of the season (m. ob.).
Red Phalarope: 6 were seen and photographed off southern St. Pierre on May 24 (JD).
Black-headed Gull: About 10 near St. Pierre harbour, all but one were immature between March 1 and 20; last seen on April 3 and 4 (PA). One adult in breeding plumage was in St. Pierre harbour on March 26 (PB).
Ring-billed Gull: 2 birds over-wintered in St. Pierre, so 3 birds seen on March 20 may include one migrant (PA). The first ones for Miquelon were seen near the village on March 29. Quite common from April 9 on (RE/PA).
Iceland Gull: We do not usually count the birds in late winter, anyway this is what PA did on March 8 and found 325 birds in St. Pierre harbour ! Mostly immature were in St. Pierre harbour on April 5. 10 were near St. Pierre harbour on May 9, all but one were immature. Last seen: several immature in St. Pierre on May 24 (RE/DL).
Lesse black-backed Gull: One adult was in St. Pierre harbour between March 18 and May 11 (PA/PB/FPA). Apparently 3 birds were present on April 7 (LJ).
Glaucous Gull: Two in St. Pierre harbour and one nearby on March 5 (PA/PB).
Black-legged Kittiwake: A few were at sea off the cliffs of Cape Miquelon on March 18. Hundreds were, same area, on April 7 (RE). No reports for St. Pierre.
Caspian Tern: Two were seen in flight near the village of Miquelon on May 9 (RE). Two were in St. Pierre on May 16 (PA) and one on May 21 (LJ).
Common Tern: Two were in St. Pierre on May 18 (PA) and 6 on May 26 (PHA).
Tern sp. (Arctic/Common: One was near Grand Barachois on May 15 (LJ) and 4 on the North-east coast of Miquelon on May 17 (RE/DL). Fairly common thereafter in good numbers (m. ob.).
Dovekie: On off St-Pierre's east coast on March 2 is the last report for the season (LJ).
Razorbill: A few dozens were around Colombier island on April 3 (RE) and 100+ on April 7 (LJ). About 400 were, same area, on April 18 (JD/FPA). Numbers continue to increase on that island year after year.
Black Guillemot: Several in St. Pierre harbour were almost in full breeding plumage by March 15 (PB). Fairly common at sea and around cliffs as usual.
Atlantic Puffin: First reported on April 20: several hundreds around Colombier island (JD). Numbers on Colombier island are rather high for the last few years.
Mourning Dove: 2 to 5 birds were at JD's feeder throughout the month of March in St. Pierre while PHA is reporting 5 birds for the same period, to April 2. One was in the village of Miquelon on May 3 (RE). JD reports from 1 to 3 birds at his feeder during the month of May.
Snowy Owl: Seen regularly in St. Pierre from the beginning of the season up to May 14 for a maximum of 9 individuals on March 5 (JD). One bird was seen carrying a Black Guillemot in breeding plumage in St. Pierre on March 31 (LJ). None reported for Langlade and only 3 reports for Miquelon, one bird at a time on March 16 (RE), April 5 (LJ) and 10 (RE).
Boreal Owl: All data for St. Pierre: one adult was photographed in the town of St. Pierre on March 5 by Guy Jugan. One bird was seen in the field on March 28 (LJ) and one found dead on April 5 (fide PA). One nesting box in St. Pierre occupied by April 11, had 4 chicks on May 17 aged a few days and only three on May 24 (JD).
Chimney Swift: One in St. Pierre between May 5 and 8 (JD/PHA). One was in Miquelon on May 22 (JMO).
Belted Kingfisher: The first one was seen by LJ on April 27 and 29. Two were near PHA's house (located near a very rich little pond, the Mecca of all observers in St. Pierre) throughout the month of May. One only was seen in Miquelon, near the village, on May 4 (RE).
Yellow-bellied Sapsucker: One in St. Pierre on April 7 (JD). The species is very uncommon but it is reported almost every year.
Northern Flicker: One in Langlade on April 3 (LJ) seemed a bit early for a migrant. Only 10 reports, between April 30 and May 13 for 3 birds at a time in St. Pierre and in Miquelon on May 1 (LJ/RE), probably indicating a migration. One male was heard singing in Miquelon only on May 4 and 5 (RE).

Olive-sided Flycatcher: One was in St. Pierre seen and photographed between May 26 and 29 (PHA/PB).
Eastern Wood-Pewee: One in St. Pierre on May 22 and 23 (PHA/PB). The species was seen here in spring 24 years out of 36.
Yellow-bellied Flycatcher: 4 in St. Pierre from May 24 to the end of the period, arrived a good week earlier than average. PA had one on May 26 in the same general area.
Least Flycatcher: One was in St. Pierre on May 24 (PHA) and one was singing at Langlade on May 26 (LJ).
Eastern Phoebe: One was in St. Pierre on May 1 (LJ). It is less regular than the E. W. Pewee.
Eastern Kingbird: One in St. Pierre on April 23 was almost a month earlier than average although the record is April 19, 1998. The next ones were seen from May 12 up to May 29 for a maximum of 5 birds at a time in St. Pierre. One was briefly seen in flight in the village of Miquelon on May 17 (RE) and one was at Langlade on May 26 (LJ).
Northern Shrike: One was in St. Pierre on March 6 (FPA/PB).
Blue-headed Vireo: One was in St. Pierre on May 23 (JD) and 28 (PB). PHA had one near his feeder between May 15 and 31. One, heard only, near Mirande lake on May 31 is possibly this species (RE).
Philadelphia Vireo: One in St. Pierre on May 21 (PB).
Red-eyed Vireo: One near PHA's feeder between May 16 and 31.
Blue Jay: Regular at several feeders in St. Pierre throughout the season, maximum 7 birds seen by LJ on April 10. One was heard near Mirande lake on May 17 (RE).
Common Raven: 53 individuals were counted on the carcass of a finback whale stranded on the North-west coast of Langlade on March 14. One usual nest in Cape Miquelon was seen occupied on March 18 (RE).. One nest on a gravel pit in St. Pierre seemed also occupied on May 13 (RE/DL).
Horned Lark: A few birds usually over-winter in Miquelon. The first migrants are usually noticed in St-Pierre. This year none were reported ! It also happened in 1995.
Purple Martin: One female was seen and photographed in St. Pierre between May 13 and 19 (RE/DL/PB).
Tree Swallow: The first one was seen by LJ above Mirande lake on May 12 and the first ones were reported in St. Pierre the next day (RE/DL). PHA reports 3 nesting boxes occupied by May 20. There was a maximum of 20 to 25 birds in this area in May. One only was on the Isthmus on May 21 (PB).
Bank Swallow : One was on the Isthmus on May 21 (PB); two were in St. Pierre the same day (PA). About five birds were also in St. Pierre on May 26 (PA) and two only on May 28 (PHA).
Cliff Swallow: One was in St. Pierre from May 1 to 4 (PHA).
Barn Swallow: Three were near Mirande lake on April 21, and one in Cape Miquelon on April 26 (RE). A few were in St. Pierre between May 1 and 26 (LJ/PB/JD/PHA) for a maximum of about 25 on May 26 (PA).
Black-capped Chickadee: Apparently there is only one bird in our islands and it is in St. Pierre, seen on April 7, and 19, (JD); May 14, 16 and 20 (PB). As it is reported singing, this is then a male.
Boreal Chickadee: Few reports, almost none on the woods of North-eastern Miquelon (Mirande area). Seems to be on the low side.
Red-breasted Nuthatch: Very few in the field and none reported for Miquelon. Only JD had 2 to 4 birds at his feeder in April and 1 to 3 in May.
Winter Wren: A very low year for the second year in a row. None seen or heard in Miquelon and Langlade. One was in St. Pierre On May 3, 16 and 23 (PB/PHA).
Golden-crowned Kinglet: 4 reports only and for St. Pierre, few birds at a time between March 5 and May 3 (FPA/JD/PB).
Ruby-crowned Kinglet: The first ones were seen in different areas of St. Pierre on April 26, right on average (PHA/JD). Fairly common thereafter throughout the rest of the season. I saw the first ones near Mirande lake and in Cape Miquelon on May 1.
Northern Wheatear: One bird seen in St. Pierre by FPA on March 6 was early indeed ! This is only our second spring report. The other one was seen on the Isthmus May 8, 2008.
Eastern Bluebird: One rather wary bird was seen and photographed in St. Pierre on May 28 (PB). This is only a second report. The first one occurred on December 8, 1994.
Gray-cheeked Thrush: One in St. Pierre On May 23 (LJ) and May 28 (PHA).
Swainson's Thrush: One near Mirande lake on May 1 (RE); One in St. Pierre on May 4 (JD) and May 19 (PHA).
Hermit Thrush: The first ones were seen both in St. Pierre (PB) and in Miquelon (RE) on April 29. A few here and there throughout the rest of the season (m. ob.).

Wood Thrush: One was seen and photographed in St. Pierre by JD on May 26 and 27. This is our fifth record.
American Robin: One in St. Pierre and one on southern Miquelon on Mach 14 (PHA/LJ) were possibly not migrants, but the 30 birds reported in St. Pierre on March 29 (PHA/LJ) certainly were. About 12 near Mirande lake seen by LJ are the first migrants for Miquelon on April 2. Common thereafter (m. ob.).
Gray Catbird: Two were in St. Pierre on May 28 (PHA/ PB).
Northern Mockingbird: A single report: one bird in St. Pierre on May 23 (PA).
American Pipit: One near Grand Barachois on April 5 was exactly where one was seen on February 21 (LJ). One was in St. Pierre on May 7 and 8 (PB/JD).
Cedar Waxwing: One to three birds were seen in St. Pierre between May 22 and 23 (PB/LJ/PHA).
Tennessee Warbler: One was in Miquelon on May 27 (JMO) and one in St. Pierre on May 29 and 31 (PHA/ PB/FPA).
Nashville Warbler: One was in St. Pierre on May 23 (PHA).
Northern Parula: One was in St. Pierre from May 14 to 31 (PHA/PA/PB).
Yellow Warbler: The first one was in St. Pierre on May 14 (PHA), few other reports to the end of the month. I saw my first ones near Mirande lake on May 31.
Magnolia Warbler: A few birds were in St. Pierre between May 21 to 31 (PB/JD/FPA).
Cape May Warbler: One bird was in St. Pierre between May 21 and 31 (PB/JD/LJ/PHA). One was in the village of Miquelon on May 27 (JMO).
Yellowrumped Warbler: The first ones were in St. Pierre on April 29 (PHA/LJ). Regular thereafter and termed "common" by most of our observers whose interest in birds is at most 15 years old. They have not known the abundance of the species I witnessed in my first years of bird watching in 1974. For me, the bird is uncommon, chiefly in Miquelon where I saw very few birds this spring.
Black-throated Green Warbler: A few birds were in St. Pierre from May 14 to the end of the period (JD/PB/ PA/PHA). I saw the first one in Miquelon on May 31 near Mirande lake.
Blackburnian Warbler: One was in St. Pierre on May 29 (PHA/FPA).
Yellow-throated Warbler: One bird was seen and photographed in St. Pierre on April 16 by FPA. This is our 7th record, and 3rd in spring.
Palm Warbler: The first ones appeared in St. Pierre on April 29, 4 days earlier than average (PHA). A few here and there in St. Pierre up to May 15 (PHA/FPA/PB/ JD). A little migration was noticed near Mirande lake on May 5 (RE).
Bay-breasted Warbler: A single record, one in the woods near Mirande lake on May 31 (RE).
Blackpoll Warbler: Several birds were noticed in St. Pierre on May 14 (PB) while the first one was in the village of Miquelon on May 23 (JMO). The species is either on the low side or underreported !
Black and White Warbler: A fairly early one was in Miquelon on May 10 (LJ). A few seen regularly then in the three island to the end of the period (BL/PB/JD/ PHA).
American Redstart: Three were in St. Pierre on May 23 (JD). One female seen up to May 31 was also in St. Pierre (PB) One young male was singing in St. Pierre on May 29 (LJ).
Northern Waterthrush: A migration was noticed on May 14 (RE/DL/PHA/PB) in St. Pierre. A few were singing in Miquelon on May 17 (RE). Fairly common thereafter but very far from the numbers present in the past ! ....
Common Yellowthroat: Rather scarce: One male was singing in St. Pierre on May 20 (PB). 3 birds were also in St. Pierre on May 23 (JD). I saw the first non-singing male near Mirande lake on May 31.
Wilson's Warbler: The first one was seen in St. Pierre on May 16 (PA) while the next one was heard in Miquelon only on May 22 in Miquelon (RE)/DL). Few other reports, never abundant, the species is probably fairly uncommon to rare now.
Scarlet Tanager: One male was in St. Pierre, seen and photographed between April 23 and May 26 (PHA/ PB/ LJ).
Eastern Towhee: One male was seen and photographed in the village of Miquelon between May 15 and 26 (JMO/RE). This is only our 7th record, two of them in spring.
Chipping Sparrow: One in St. Pierre on May 22 (JD); one from May 23 to 28 (PHA); One on May 30 (FPA). One bird was also in the village of Miquelon between May 27 and 30 (JMO/RE).
Savannah Sparrow: The first one was briefly seen on the Isthmus on April 25 (RE), 3 days earlier than average. Seen in St. Pierre the next day (PHA) and regularly then, about as usual. 2 individuals of the Ipswich subspecies

were observed this spring in St. Pierre, one on April 27 (LJ) and one May 17 (PHA/PB).

Fox Sparrow: The first migrant seems to have appeared in St. Pierre on April 2 at FPA's feeder whom reports 5 to 10 birds the next day and for the rest of the month. The first ones in Miquelon were 3 or 4 birds singing in the Cape on April 4 (LJ). Common then everywhere, about as usual.

Song Sparrow: A few birds usually over-winter in St. Pierre. In Miquelon, one was singing on southern Miquelon on May 3 and one in the Cape on May 16 (RE).

Lincoln's Sparrow: A single report: 2 birds seen and photographed on S-E St. Pierre on May 13 (RE).

Swamp Sparrow: First seen in St. Pierre on May 3 (PHA) and near Mirande lake on May 12 (RE). Seems rather uncommon this year and probably on the low side !

White-throated Sparrow: The first migrants appeared in St. Pierre on April 26 (PHA), 12 days earlier than average. In Miquelon, the first ones were seen near Mirande lake on May 1 (RE). Fairly common thereafter although rather on the low side.

White-crowned Sparrow: One in St. Pierre on April 22 (LJ) was very early, although the record is April 15, 2008. One was in the village of Miquelon on May 15(JMO). One was at FPA's feeder from May 20 to 29 while JD had from 1 to 3 birds at his feeder between May 21 to 27.

Dark-eyed Junco: Common in St. Pierre as usual due to several feeders, less common in Miquelon. PHA reports a nest on his property on May 31.

Lapland Longspur: 2 or 3 birds were with Horned Larks near the village of Miquelon on March 20 (RE).

Rose-breasted Grosbeak: One pair at PHA's feeder from May 3 to 25 in St. Pierre. A few other reports in St. Pierre. To be noted, 3 females at FPA's feeder from Mai 26 to 31. In Miquelon, one male was in the village on May 15 (JMO).

Indigo Bunting: One male was photographed by Joseph Beaupertuis in St. Pierre on April 24. This is a record early by one day although the average is May 17. One was at PHA's feeder from May 17 to 19. PA reports an immature male at his feeder from May 20 to 22.

Bobolink: One male was in St. Pierre on May 23, 25 and 27 (PA/JD/PB); one was on PHA's property on May 24.

Red-winged Blackbird: One in St. Pierre April 10 to 12 (LJ). One, possibly the same, was at PHA's feeder on May 14.

Rusty Blackbird: Two in St. Pierre on April 30 (LJ) while one was in Miquelon on May 1 (RE). 10 birds were on PHA's property between May 1 to 20. 4 were seen in North-eastern sp on May 3 (PB); one was in the same general area on May 23 (JD). Is it a comeback for a species that became quite rare in recent years ?

Common Grackle: Two in the village of Miquelon on April 10 may have been over-winterers, although there was one in St. Pierre the same day (LJ). 6 birds were in the village of Miquelon on May 29 and 30. 12 were at PHA's feeder throughout the month of May.

Brown-headed Cowbird: One was in town of St. Pierre on April 27 (PB) and one also in St. Pierre on April 29 (PB/PHA). One was near Mirande lake on April 30 (RE).

Pine Grosbeak: 7 or 8 birds were on North-western Langlade on March 16 (RE). One or two birds were seen a few times in St. Pierre between April 13 and May 3 (PB/JD). One or two were singing in the woods near Mirande lake on April 14, 18 and May 12 (RE). Seems also on the low side.

Purple Finch: A few in St. Pierre, seen occasionally, between March 13 and May 31 (JD/PHA/FPA). Three immature or females were in Miquelon on May 15 (JMO).

White-winged Crossbill: None reported for St. Pierre. 3 or 4 birds were near Mirande lake on April 24, and one pair, same area, on May 12 (RE).

Common Redpoll: 8 birds in St. Pierre on March 3 and 3 in North-eastern Miquelon on March 16 (LJ).

Pine Siskin: Very few birds at various feeders in St. Pierre between March 20 and May 31 (PHA/PA/JD).

American Goldfinch: Quite common in St. Pierre. The town being small it is difficult to have a good idea of actual numbers as birds can shift from one feeder to the other. Anyway here are a few numbers: JD: between 10 and 60 birds in March. PHA: 40 every day and a maximum of 70 on March 20 which is also date of the record high of JD ! About 80 were at the feeder of Didier Desbois on March 13 (fide PA). Less common in Miquelon: two males and two females were in the village on May 23 (JMO).

Evening Grosbeak: One female seen and photographed near Mirande lake on May 6 (RE) is the only report.

Contributors: Frédéric & Patricia Allen-Mahé (FPA); Pascal Asselin (PA); Patrick Boez (PB); Joël Detcheverry, Patrick Hacala (PHA); Laurent Jackman (LJ); Danielle Lebollocq (DL); Bruno Letournel (BL) Jean-Marie Orsiny (JMO). . Miquelon, June 30.

Gift Ideas from the Natural History Society

Society Memberships - Any time is a great time to give a membership to the Natural History Society, which includes four issues of *The Osprey* and notices of all society functions. $25.00.

Society Lapel Pins - four-colour enamel pins reproduce the society's *The Osprey,* designed by John Maunder, in blue, brown and white on a gold back: Oval. $3.00.

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Getting to Know the Weeds - the collected writings of Charlie Horwood, a long-serving member of the society and a thoughtful and insightful naturalist with a gift for capturing his views of the natural world in writing. 160-page book with over fifty of Charlie's best short pieces. Soft cover. $14.95.

Tuck/Walters Award
Nominations are invited

This award is named in memory of Dr. Leslie M. Tuck and Captain Harry Walters.

Dr. Les Tuck was Newfoundland's first Dominion Wildlife Officer, and Harry Walters was the Director of the Newfoundland Rangers Force. Following Confederation with Canada, Dr. Tuck headed the Canadian Wildlife Service in the province—a position he held for more than twenty-five years. In the latter part of his long and distinguished career, Dr. Tuck held the L. J. Paton Research Professorship in the Psychology Department of Memorial University. He was instrumental in the reactivation of the Natural History Society in the 1950's. Captain Harry Walters served for many years as the Head of the Newfoundland Wildlife Division, which he was instrumental in establishing.

Both Walters, working provincially, and Tuck, working federally, were instrumental in establishing our province's first seabird reserves (Funk Island, Cape St. Mary's, Witless Bay, and Hare Bay) and the former Avalon Wilderness Area. Their combined efforts put natural history awareness, protection and appreciation on a solid footing in Newfoundland and Labrador. Although they were employed in resource conservation and management careers, their enthusiasm and dedication transcended their duties, and it is for these qualities that the society has chosen to honor their memory with this award.

The Tuck/Walters Award is discretionary - it does not have to be given out every year. On the other hand, it may be given to more than one recipient if the Nominating Committee feels this is appropriate. Successful candidates are individuals who have made outstanding and enduring contributions to the advancement of natural history appreciation and protection in Newfoundland and Labrador, outside the parameters of their employment responsibilities.

Tuck/Walters Award Winners
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Dr. Roger Tory Peterson
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Tony Power
Stephen Herder
Dr. Don Steele
Charlie Horwood
Clyde Tuck
Bernard Jackson
Laura Jackson
Henry Mann
Lois Bateman
Dr. Jon Lien

For more information or to make a nomination for the Tuck/Walters Award, contact:
Dr. Bill Montevecchi
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Bring this form to the next regular society meeting at the Memorial University Botanical Garden on the THIRD THURSDAY of each month from September to June.
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