

BiOLink

The Official Newsletter of the
Atlantic Society of Fish and Wildlife Biologists



VOLUME 51, ISSUE I

April 2015

ASFWB Fall AGM in Terra Nova National Park, Newfoundland



Left: Group shot before heading out on the field trip.

Right: Student Award winners Louis Charron and Emily Kissler with president Mark Pulsifer

(Photos: Kate Goodall)



A small but mighty contingent of biologists headed to Terra Nova National Park in late October for the 51st ASFWB Annual General Meeting. The event kicked off with a special ice breaker hosted by Kirby. Attendees were treated to local cuisine including cod “britches”, crab, moose, and snowshoe hare along with some local beverages. The musical talents of many a biologist were showcased well into the wee hours of the morning.

The following day nine talks

topics including the impact of moose on forests in Newfoundland, the perceptions of nuisance wildlife among farmers in Nova Scotia and New Brunswick, and the restoration of watershed processes on Base Gagetown. Student award winners were Emilie Kissler who spoke on the impacts of moose on Newfoundland forests and Louis Charron who spoke on balsam fir forest restoration following excessive moose browse.

A fun time was had by all at the banquet and \$350 was

raised by the silent auction for the scholarship fund.

The AGM ended off with a field trip to Park Harbour, South Broad Cove, and Minchins Cove.

A special thank you goes out to everyone who participated, and those involved in planning and coordinating the event, especially Kirby Tulk.

Stay tuned for more info on the 52nd AGM which will be in Nova Scotia next fall!

Above: Chef Kirby using a table saw as a cooking surface, look out Gordon Ramsey!

(Photo: Kate Goodall)



Don't miss this!

<i>Insects of Hypopagea</i>	3
<i>Eelgrass Mapping</i>	7
<i>Profile: Bon Portage Island</i>	17
<i>Upcoming Events</i>	21

The David J. Cartwright Scholarship

The David J. Cartwright Memorial Scholarship was established by the ASFWB in 1991, following the untimely death in a vehicle accident of David J. Cartwright in October 1990. Dave was a member and strong supporter of the ASFWB for many years and contributed to wildlife management in Atlantic Canada as Furbearer Biologist with the NB Department of Natural Resources & Energy.

The 1-year scholarship is awarded annually and is open to full-time students on the Fredericton campus of the University of New Brunswick (UNB) entering the final year of Forestry (Wildlife Option) or Science (Biology Option). Potential candidates should have combined scholastic ability with a demonstrated interest in wildlife management. The scholarship is awarded by UNB on the recommendation of the Faculty of Forestry and the Faculty of Science. The ASFWB serves as donor of the scholarship, which is variable in the amount awarded. The award was established in the fall of 1994, and was first disbursed in 1996.

A note from this years recipient, Bethany Nordstrom:

Atlantic Society of Fish & Wildlife Biologists
Attn: Mr. Gerald Redmond
8 - 60 Colwell Dr
Fredericton NB E3A 6R3

Dear Mr. Gerald Redmond,

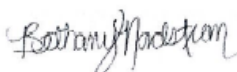
I am the recipient of the David J. Cartwright Memorial Scholarship at the University of New Brunswick this academic year. I would like to express my gratitude to you in being chosen for this award.

I am a 26 year old female in my 4th and final year of Environment and Natural Resources – Wildlife Conservation. I have always had a strong interest in the natural world, and am so happy to be perusing that interest with the Wildlife degree at UNB. After getting my bachelor's degree I plan on furthering my education doing either a master's degree or PhD. I have applied to Trent University for a master's degree in conservation genetics (focusing on grey fox in Canada), and also to Dalhousie University for a master's degree in marine conservation (focus on leatherback turtles).

I am keen to learn almost every aspect of biology – from entomology to botany to ichthyology to forestry – however my main interests lie in herpetology (the study of reptiles and amphibians). A few of my other interests are running, painting and playing the ukulele.

Receiving an award such as the David J. Cartwright Memorial Scholarship is so helpful to a full-time student today. I ended up taking a lower paying job this summer that I felt offered relevant work to my academic studies. I worked with the Department of Fisheries and Oceans as an aquatic biologist technician. I was able to do a lot of field work and witness how management of a natural resource is actually done. At the end of the summer when I calculated my tuition it was quite clear to me that I was going to short on funds and would have to work throughout the school year. This bursary relieved some of that pressure and am happy to say that I have been able to focus completely on my studies this semester. I believe my passion for environmental management and wildlife conservation is reflected in my grades since returning to University - I finished my 3rd year of university with a 4.3 GPA, and am on par to graduate with a 4.0 GPA.

Thank you very much for your support, it has made a world of difference to me.



Bethany Nordstrom

2015 ASFWB Executive

President

Stephanie Walsh
stephanie.walsh@nspower.ca

Past President

Mark Pulsifer
mark.pulsifer@novascotia.ca

Secretary/Treasurer

Lee Millett
l_millett@ducks.ca

VP Membership

Garry Gregory
ggregory@gov.pe.ca

VP Programming

Glen Parsons
glen.parsons@novascotia.ca

VP Student Affairs

Christine McLaughlan
cmclaughlan@upei.ca

Newsletter Editors

Danielle Quinn
danielle.quinn@acadiau.ca
Holly Lightfoot
hlightfoot@birdscanada.org

Web Site Manager

Greg Johnson
greg.johnson@stantec.com

The ASFWB Biolink is published twice a year. Articles and opinions do not necessarily reflect the views of the Society or its members. Thanks to all who have contributed photos and articles.

Visit our website at:

<http://www.chebucto.ns.ca/environment/ASFWB/>

The Insects of Hypopagea

Written by R. F. Lauff

“Hypo-what?” That is the understandable first question I get when people hear the word for the first time. It is understandable because the word has never before appeared, at least not in English. It’s Greek. And it’s Greek because, well, in science, we use a lot of Greek (and Latin). Hypopagea literally means *under ice*, and the insects which I was working with were the ones in frozen-over ponds.

The diversity of aquatic insects is huge. Some spend only their juvenile stages (eggs, nymphs) under water. Examples of these are the mayflies, dragonflies, damselflies and stoneflies. Aquatic beetles and true bugs spend most of their lives under water, even as adults. At some point, the adults take flight to disperse to

other ponds... there’s no sense mating with your siblings, after all. In stillwater systems, there are four families of beetles which dominate; these are the Predaceous Diving Beetles, Whirligigs, Crawling Water Beetles and Water Scavenger Beetles. Of these, only the whirligigs would be familiar to the casual observer. These are the beetles which are rapidly jetting around on the surface of ponds, often in large groups. The bugs include the Water Scorpion, Giant Water Bugs, Backswimmers and Water Boatmen.

When I talked with my friend Paul MacLean about my summer insect work, he related a story to me about having to chop a hole through the ice on his pond to get some water; he noticed, he said, that a Giant Water Bug swam up to the hole. Like everyone else, I always thought the aquatic insects went dormant in the winter, but Paul’s observation got me thinking... what else is out there? So this past winter, my colleague Barry Taylor, my student Luc Daut and I sampled eleven ponds to see what would come into our traps. It turned out that we caught more than 20



An example of the diversity of winter active insects caught under the ice in Antigonish area ponds. (Photo: R.Lauff)

kinds of beetle, at least six species of bug, and a few other species including caddisflies and mayflies. Who knew?

This work opens up a host of other questions. How do they feed when the lighting is so dim, or completely dark? Do they feed? How do the adults, which don’t have gills, breathe? Are there species which prefer being active in the winter? Perhaps over the next few years we’ll be able to answer these questions, and more.

R. F. Lauff is based out of St. Francis Xavier University in Antigonish, Nova Scotia.



Student Lucas Daut freeing up the ice around a trap to remove. (Photo: R.Lauff)

Helping Wild Salmon Thrive

Written by Krystal Binns

The Atlantic Salmon Conservation Foundation (ASCF) was created to promote enhanced community partnerships in the conservation of wild Atlantic salmon and its habitat in Atlantic Canada and Québec. ASCF was formed in 2007 with a \$30 million endowment from the federal government. Between 2008 and 2014, it has helped to fund over 200 conservation projects. So far, funding efforts by the ASCF have resulted in nearly 900,000 m² of restored habitat, 43 million m² of opened access to habitat and 28,000 individuals have benefitted from salmon education initiatives within Atlantic Canada and Québec.

Entering into their 9th granting year, the ASCF is pleased to announce that more than \$1.1 million dollars in grants will be awarded in 2015. A total of 61 high quality, salmon conservation projects will be funded in the Atlantic Provinces and Québec.

The ASCF has proven to be an effective source of funding for community volunteer organizations, First Nations and aboriginal organizations, universities and municipalities in conserving, restoring and protecting wild Atlantic salmon and its habitat with



The Atlantic Salmon Conservation foundation is an independent, volunteer led, non-profit conservation organization established through a one-time \$30 million grant from the Government of Canada.

Every year, between April 1st and mid-December we call for funding proposals for innovative, on-the-ground projects carried-out by community groups and focussed on conservation of the wild Atlantic salmon and its habitat.

Visit our web site to learn more on how to apply for funding



The Atlantic Salmon
Conservation Foundation

506 455 9900
480 Queen Street, Suite 200
Fredericton, NB E3B 1B6

www.salmonconservation.ca • www.conservationsusaumon.ca

the goal of doing so in perpetuity. Building on this success, the ASCF also shares its conservation knowledge via webinars and its website. Later this year, the ASCF will be unveiling a new addition to their website, the “Salmon Hub”. The Hub will be the new go-to web location for information on river restoration and salmon conservation.

Krystal Binns is the Conservation Program Coordinator for the Atlantic Salmon Conservation Foundation.

For more information visit: www.salmonconservation.ca

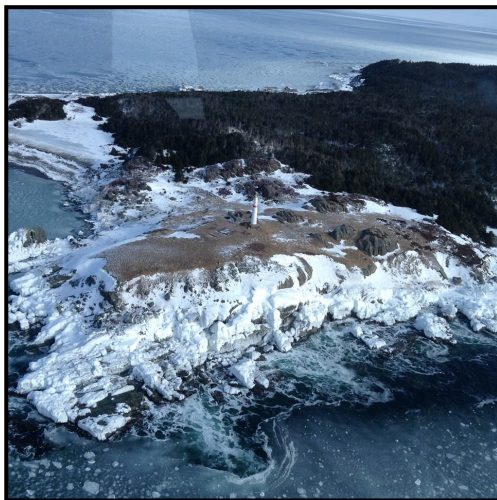
Winter Bird Surveying

This February Environment Canada Biologists Julie Paquet and Rob Ronconi conducted surveys for Purple Sandpipers and Harlequin Ducks along the shores of Nova Scotia as part of a study of high tanker traffic areas. Along with some great photos of Nova Scotian islands, the crew detected over 3000 Purple Sandpipers spread out over 143 locations and tallied more than 160 observations of Harlequin Ducks totalling over 1100 individuals.

Photos: Julie Paquet, EC-CWS.



Above: A flock of **Purple Sandpipers** photographed for easier counting back in the office.



Above: **Scaterie Island** (Cape Breton Co.). Scaterie Island has been designated as an Important Bird Area. At just over 67km², the island is thought to be home to a population of Bicknell's Thrush (Threatened COSEWIC 2009) and a colony of Leach's Storm Petrels.



Left: **Cape Sable Island** (Barrington Co.). Standing at 101 ft the Cape Sable Light is the tallest lighthouse in Nova Scotia

Right: **Outer Bald Tusket Island** (Yarmouth Co.). This island was once declared a micronation; the Principality of Outer Baldonia even had its own flag (green background with a tuna; Wikipedia). The island is now owned by the Nova Scotia Bird Society.



Fieldwork capturing swarming *Myotis* bats in Nova Scotia and New Brunswick from 2009 to 2011, describing the population genetics of bats, analyzing the social interactions of swarming bats, and writing it up were all part of the process for Lynne Burns en-route to a PhD. from Dalhousie University in July 2014. Now Lynne begins a new chapter in her life. She recently moved to Edmonton to start a term position with Environment Canada, Canadian Wildlife Service as part of the Species at Risk Unit for the Prairie and Northern region. She looks forward to the new ways that bats will be a part of her life in the prairies. (Photo: Jordi Segers)

Increasing Your Scientific Likeability Factor

Written by Christine McLaughlan

The Petitcodiac Watershed Alliance (PWA) is a lively environmental non-profit which focuses on riparian restoration, water quality monitoring, and species-at-risk conservation in the Petitcodiac River watershed. The organization was founded in 1997 and have been part of a collaborative effort to better the ecological health of the Petitcodiac River and its tributaries. We love what we do.

The PWA uses three pillars to guide its actions: Community, Education, and Science. By integrating these three components, we are able to conduct scientifically rigorous science and effectively relay important messages to residents in the watershed. We strive to distill key messages from our science and relay it to residents in the watershed by employing commonly used social platforms such as Facebook and Twitter. Additionally, in 2014 we presented our work to over 25 audiences which included schools, interest groups, NGOs, municipalities, and concerned citizens. Because we made our



Left PIT tagged Atlantic salmon. (Photo: Christine McLaughlan)

work positive and comprehensible, we received multiple earned media opportunities with radio, regional television, and local newspapers. Through these intensive outreach efforts, we learned something very valuable: people are eager to learn about your science if you're passionate and are able to communicate in a way they understand. Our projects included storm water management, water quality monitoring, wood turtle monitoring, two large scale riparian restorations, culvert assessments, fish population monitoring, and tree planting. We ensured that there was a social component to each project, crafting each message for a specific audience- it made

the science fun, but also refined our own understanding of the work and its purpose. It was no easy task, and we are still building this field of expertise for our organization, but we want to challenge you to find a way to make your science more inviting in a way that makes sense to you.

And lastly, here is a shameless plug to like us on Facebook and follow us on Twitter. We love the Atlantic Society of Fish and Wildlife Biologists, and want to see what the membership is up to! I once heard someone say that "networking is just another word for grown-ups making friends". I agree wholeheartedly.



ALLIANCE DU BASSIN VERSANT
PETITCODIAC
 WATERSHED ALLIANCE

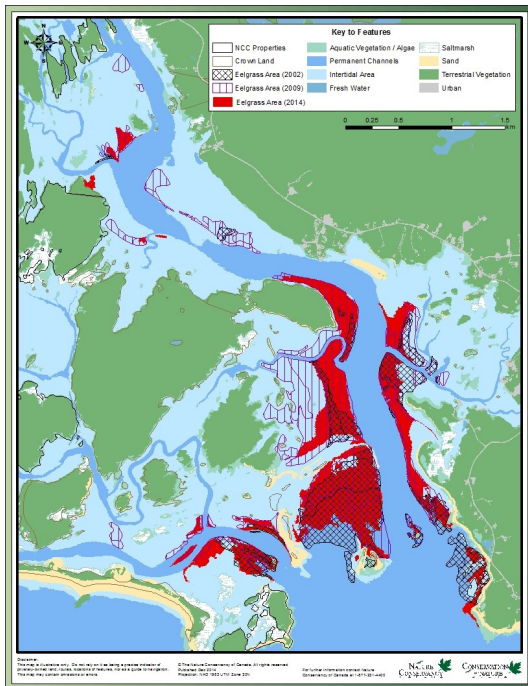
Christine McLaughlan is the Executive Director of the Petitcodiac Watershed Alliance in Moncton, New Brunswick, and the VP of Student Affairs for ASFWB.

Eelgrass Mapping – A Tale of Two Estuaries

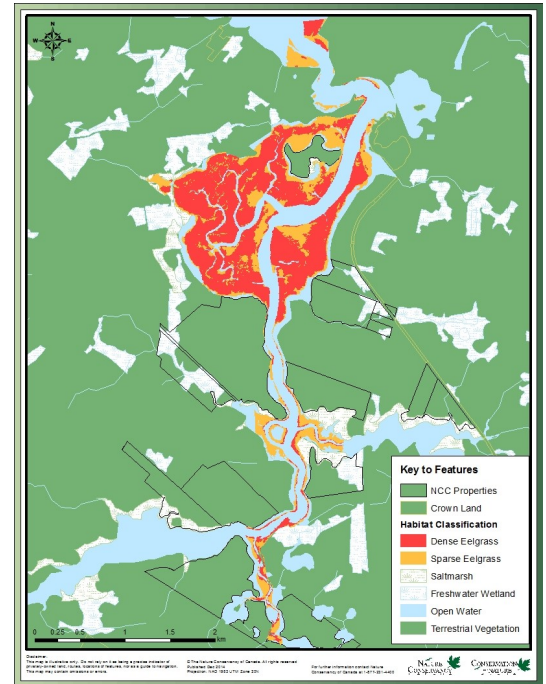
Written by Danielle Horne

Eelgrass (*Zostera marina*) is an Ecologically Significant Species that provides essential habitat for numerous aquatic species, but it is heavily threatened by coastal development and invasive species (DFO 2009). Baseline datasets are an important requirement for monitoring trends in eelgrass distribution in Atlantic Canada and assessing scope of threats to this system; unfortunately, there is a lack of baseline and monitoring data regarding eelgrass-dominated ecosystems in Atlantic Canada. Within Nova Scotia, the Nature Conservancy of Canada (NCC) identified two coastal areas (within NCC focal areas) where eelgrass mapping would be beneficial - Pugwash estuary and Musquodoboit Harbour estuary.

Previous to this work, no mapping of eelgrass meadows had been conducted in the Pugwash estuary, though a variety of eelgrass research has been occurring along the Northumberland Strait (eg. Vance 2014; Thompson 2007; Seymour et al. 2002; Hanson 2004). For the Pugwash estuary, aerial



Above Map of Musquodoboit Harbour eelgrass distribution. (NCC 2014)



Above Map of Pugwash Estuary eelgrass distribution (NCC 2014)

imagery was gathered in the summer of 2014 (during a low tide period) by Mike Dembeck Photography (using a Cessna high winged aircraft equipped with a vertical photo hole in the belly) and analyzed by NCC staff using ArcGIS 10.1. The eelgrass meadows in the Pugwash estuary comprise ~54% of the estuary with an area of 697 ac. It should be noted that percent cover is not based on available habitat, but is based on the areal extent of the estuary and lower reaches of the river system. Interestingly, eelgrass was abundant in the estuary despite the fact green crab (a known invasive species) has been present in this area for a number of years.

Conversely, the Musquodoboit Harbour eelgrass meadows have previously been mapped in 1992, 2002, and 2009 (Chapman & Smith 2004; NS DNR n.d.) – a study time-frame largely missing from published works. For this project, satellite imagery (WorldView-2 satellite with a 0.5m panchromatic, 2m multi-spectral resolution) of the Musquodoboit Harbour estuary was gathered in the summer of 2014 (during a low tide period) and analyzed using ArcGIS and eCognition by staff at the Nova Scotia Department of Natural Resources (NS DNR) – Wildlife Division. Currently,

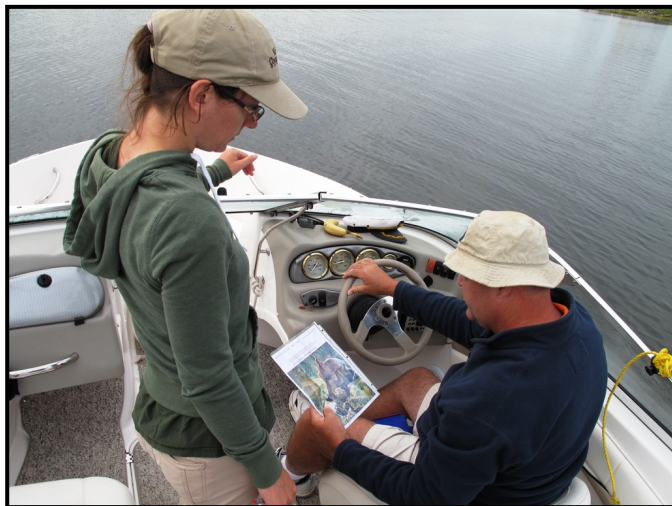
Thanks to Nova Scotia Department of Natural Resources, the Friends of the Pugwash Estuary, Jeff Barrell (Dalhousie University), and Mike Dembeck for their assistance and guidance on this project.

For a copy of the entire report, contact:
Danielle Horne (NS Stewardship Assistant)
Nature Conservancy of Canada
danielle.horne@natureconservancy.ca

Eelgrass Mapping – A Tale of Two Estuaries *(continued)*

the eelgrass meadows in Musquodoboit Harbour comprise ~8% of the estuary with an area of 353 ac, which is a net decrease of 80% since 1992 (1863 ac); however, there has been an increase of 23% since 2002 (284 ac). Again, the percent cover is based on the extent of the estuary and should not be construed as percent cover of available habitat. Following the drastic decline in the extent of the eelgrass meadows in the Musquodoboit Harbour estuary in the 1990's, these data suggest that there

is a slow trend toward recovery in this area.



Left Greg Nix (Friends of the Pugwash Estuary) and Danielle Horne (NCC) taking ground truthing points in the Pugwash Estuary

Variance in data collection combined with variances in the tidal height and acquisition dates can have an affect on the interpretation of the data collected; however, the methodologies chosen to gather and analyze the imagery for this study were accepted methodologies that have been used in a number of previous studies. In conclusion, we now have a snapshot of the Pugwash estuary and a 22

year trend in the Musquodoboit Harbour estuary. Monitoring these trends in eelgrass distribution will inform policy and decision making relevant to coastal zone management, particularly issues affecting eelgrass such as invasive European green crab and climate change impacts.

Danielle Horne is the Stewardship Assistant for the Nature Conservancy of Canada in Nova Scotia.

Hanson, A.R. (ed.) (2004). *Status and conservation of eelgrass (Zostera marina) in Eastern Canada*. Technical Report Series No. 412. Canadian Wildlife Service, Atlantic Region. viii. + 40 pp.

Department of Fisheries and Oceans. (2009). *Does eelgrass (Zostera marina) meet the criteria as an ecologically significant species?* DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2009/018.

Chapman, A. & Smith, J. (2004). Quantifying the rapid decline of eelgrass beds on the Eastern Shore of Nova Scotia: 1992 vs 2002. In: Hanson, AR. (ed). *Status and conservation of eelgrass (Zostera marina) in East-ern Canada*, pp 13–14 (Technical Report Series No. 412. Canadian Wildlife Service, Atlantic Region)

Nova Scotia Department of Natural Resources. (n.d.). *Eelgrass Classification*. NS DNR. Nova Scotia, Canada.

Seymour N., Miller A., & Garbary D. (2002). Decline of Canada geese (*Branta canadensis*) and common goldeneye (*Bucephala clangula*) associated with a collapse of eelgrass (*Zostera marina*) in a Nova Scotia estuary. *Helgoland Marine Research*, 56, 198-202.

Thompson, W.J. (2007). *Population-level effects of the European green crab (Carcinus maenas, L.) in an eelgrass community of the southern Gulf of St. Lawrence*. M.Sc. Thesis, University of New Brunswick, 95 p. In Klassen, G. and A. Locke. (2007). A biological synopsis of the European green crab, *Carcinus maenas*. Can. Manuscr. Rep. Fish. Aquat. Sci. no. 2818: vii+75pp

Vance, A. (2014). *Applying an Ecosystem-Based Risk Management Approach to the Relationship Between Eelgrass Beds and Oyster Aquaculture at Multiple Spatial Scales in Eastern New Brunswick, Atlantic Canada*. (Unpublished Masters Thesis). Dalhousie University, Nova Scotia. Retrieved from: <http://dalspace.library.dal.ca>

Just a reminder... In 2013, the Canadian Amphibian and Reptile Conservation Network (CARCNET) and the Canadian Association of Herpetologists (CAH) merged to form the Canadian Herpetological Society (CHS).

Find them at

<http://www.canadianherpetology.ca/index.html>



BECOME A MEMBER TODAY!

The Atlantic Society of Fish and Wildlife Biologists



D. Quinn



Regular Membership: \$20/year
Student Membership: \$5/year

Use PayPal and become a member online at
<http://www.chebucto.ns.ca/environment/ASFWB/>

or send us a completed membership application form (included on the last page of this newsletter) and cheque or money order!

- Network of professional contacts, including biologists, professors, managers and researchers from across Atlantic Canada
- Bi-annual newsletter keeps you up to date on local research and upcoming events

Don't forget to check us out on Facebook!

facebook

Name:
Atlantic Society of
Fish and Wildlife
Biologists (ASFWB)

Recent Literature

Have some time to spare while waiting for the snow to melt? Keep up to date with fish and wildlife research publications from Atlantic Canada and beyond.

- Anderson, J.C., C. Dubetz, V.P. Palace, 2015. Neonicotinoids in the Canadian aquatic environment: A literature review on current use products with a focus on fate, exposure, and biological effects. *Science of The Total Environment* 505: 409–422 doi:10.1016/j.scitotenv.2014.09.090
- Baillie, Shauna M., Dianne H. Brunton, and Andrew W. Boyne. 2014. Should I Stay or Should I Go: Influences on Roseate Terns' (*Sterna dougallii*) Decisions to Move the Chicks. *Northeastern Naturalist* 21(3): 380-396 doi: <http://dx.doi.org/10.1656/045.021.0306>
- Belland, René J. 2015. The Arctic-Alpine and Montane Mosses of the Gulf of St. Lawrence Region Part I: Montane Element. *Evansia* 32(1):10-24. <http://dx.doi.org/10.1639/079.032.0104>
- Betts, Matthew G., Kevin J. Gutzwiller, Matthew J. Smith, W. Douglas Robinson, and Adam S. Hadley. 2015. Improving inferences about functional connectivity from animal translocation experiments. *Landscape Ecology* 30 (4):585-593 doi:10.1007/s10980-015-0156-x
- Boland, Todd. 2014. *Wildflowers of Nova Scotia Field Guide*. Boulder Publications 422 pp \$34.95
- Bond, Alexander L. and Keith A. Hobson. 2015. Relaying propensity and characteristics of replacement clutches of Leach's Storm-Petrels (*Oceanodroma leucorhoa*). *Canadian Journal of Zoology* 93:181-185, doi:10.1139/cjz-2014-0110
- Bond, Alexander L., Keith A. Hobson, Brian A. Branfireun. 2015. Rapidly increasing methyl mercury in endangered ivory gull (*Pagophila eburnea*) feathers over a 130 year record. *Proc. R. Soc. B*: 2015 282 20150032; DOI: 10.1098/rspb.2015.0032.
- Bond, A. L., Provencher, J. F., Daoust, P.-Y., & Lucas, Z. N. 2014. Plastic ingestion by fulmars and shearwaters at Sable Island, Nova Scotia, Canada. *Marine Pollution Bulletin* 87(1-2):68-75 doi:10.1016/j.marpolbul.2014.08.010
- Bourret, V., Dionne, M. and Bernatchez, L. 2014, Detecting genotypic changes associated with selective mortality at sea in Atlantic salmon: polygenic multilocus analysis surpasses genome scan. *Molecular Ecology*, 23: 4444–4457. doi: 10.1111/mec.12798
- Boyd, Nathan S., Scott White, and Kailang Rao (2014) Fertilizer and Fluazifop-P Inputs for Winter Bentgrass- (*Agrostis hyemalis*) Infested Lowbush Blueberry Fields. *Weed Technology*: 28 (3): 527-534. doi: <http://dx.doi.org/10.1614/WT-D-13-00124>.
- Bradbury, Ian R. Lorraine C. Hamilton, Sara Rafferty, David Meerburg, Rebecca Poole, J. Brian Dempson, Martha J. Robertson, David G. Reddin, Vincent Bourret, Mélanie Dionne, Gerald Chaput, Timothy F. Sheehan, Timothy L. King, John R. Candy, Louis Bernatchez. 2015. Genetic evidence of local exploitation of Atlantic salmon in a coastal subsistence fishery in the Northwest Atlantic. *Canadian Journal of Fisheries and Aquatic Sciences* 72:83-95, doi:10.1139
- Brown, Tanya M., Sara J. Iverson, Aaron T. Fisk, Robie W. Macdonald, Caren C. Helbing, Ken J. Reimer. 2015. Local contamination, and not feeding preferences, explains elevated PCB concentrations in Labrador ringed seals (*Pusa hispida*). *Science of The Total Environment* 515-516:188-197 doi:10.1016/j.scitotenv.2015.02.019
- Burdett, S., M. Hulley, and A. Smith. 2014. Applying the Soil Water Assessment Tool to 5th Canadian Division Support Base Gagetown. *Water Quality Research Journal of Canada* 49 (4): 372–385 doi:10.2166/wqrjc.2014.012
- Burns, Lynne E., Jordi L. Segers, and Hugh G. Broders. 2015. Bat Activity and Community Composition in the Northern Boreal Forest of South-central Labrador, Canada. *Northeastern Naturalist* 22(1): 32-40. doi: <http://dx.doi.org/10.1656/045.022.0109>
- Burns, Lynne E., Frasier, Timothy R., Broders, Hugh G. 2014. Genetic connectivity among swarming sites in the wide ranging and recently declining little brown bat (*Myotis lucifugus*). *Ecology and Evolution* 4(21): 4130-4149 DOI: 10.1002/ece3.1266
- Byers, Stacey.E. and Gail.L Chmura. Observations on shallow subsurface hydrology at Bay of Fundy macrotidal salt marshes. *Journal of Coastal Research* 2014 297: 1006-1016 doi: <http://dx.doi.org/10.2112/JCOASTRES-D-12-00167.1> [Volume 30(5):]

Recent Literature

- Champoux, Louise, Jean-François Rail, Raphael A. Lavoie, Keith A. Hobson. 2015 Temporal trends of mercury, organochlorines and PCBs in northern gannet (*Morus bassanus*) eggs from Bonaventure Island, Gulf of St. Lawrence, 1969–2009. *Environmental Pollution* 197: 13–20 doi:10.1016/j.envpol.2014.10.030
- Craik, Shawn R., Alan R. Hanson, Rodger D. Titman, Matthew L. Mahoney, and Éric Tremblay 2015. Potential Impacts of Storm Surges and Sea-level Rise on Nesting Habitat of Red-breasted Mergansers (*Mergus serrator*) on Barrier Islands in New Brunswick, Canada. *Waterbirds* 38 (1): 77-85. doi: <http://dx.doi.org/10.1675/063.038.0110>
- DeLuca, William V., Bradley K. Woodworth, Christopher C. Rimmer, Peter P. Marra, Philip D. Taylor, Kent P. McFarland, Stuart A. Mackenzie, D. Ryan Norris. 2015. Transoceanic migration by a 12 g songbird. *Biol. Lett.*: 2015 11 20141045; DOI: 10.1098/rsbl.2014.1045.
- Dixon, Heather J., J. Brian Dempson, Michael Power. 2015. Assessing the use of different marine growth zones of adult Atlantic salmon scales for studying marine trophic ecology with stable isotope analysis. *Fisheries Research* 164: 112–119 doi:10.1016/j.fishres.2014.10.009
- Drolet, D., Locke, A., Lewis, M. A., Davidson, J. (2014), User-friendly and evidence-based tool to evaluate probability of eradication of aquatic non-indigenous species. *Journal of Applied Ecology*, 51: 1050–1056. doi: 10.1111/1365-2664.12263
- Fairn, Evan R., Mark A.W. Hornsby, Terry D. Galloway, and Colleen A. Barber. 2014. Ectoparasites of nestling European starlings (*Sturnus vulgaris*) from a nest box colony in Nova Scotia, Canada. *J. Acad. Entomol. Soc.* 10: 19-22 <http://www.acadianes.org/journal.html>
- Favaro B, Claar DC, Fox CH, Freshwater C, Holden JJ, Roberts, A and UVic Research Derby. 2014. Trends in Extinction Risk for Imperiled Species in Canada. *PLoS ONE* 9(11): 113118. doi:10.1371/journal.pone.0113118
- Filgueira, R., T. Guyondet, L. A. Comeau, and J. Grant (2013), Storm-induced changes in coastal geomorphology control estuarine secondary productivity, *Earth's Future* 2 (1): 1-6 doi:10.1002/2013EF000145
- Fortin, Guillaume, Mélanie LeBlanc, Sophie Schiavone, Omer Chouinard, Anouk Utzschneider 2015, Local Perceptions, Ruslefac Mapping, and Field Results: The Sediment Budget of Cocagne River, New Brunswick, Canada. *Environmental Management* 55 (1):113-127 DOI 10.1007/s00267-014-0399-3
- Franci, Cynthia D., Magella Guillemette, Émilien Pelletier, Olivier Chastel, Salomé Bonnefoi, Jonathan Verreault. 2014. Endocrine status of a migratory bird potentially exposed to the Deepwater Horizon oil spill: A case study of northern gannets breeding on Bonaventure Island, Eastern Canada. *Science of The Total Environment* 473-474 (1):110-116. Doi:10.1016/j.scitotenv.2013.12.006
- Fraser, Dylan J., Paul V. Debes, Louis Bernatchez, Jeffrey A. Hutchings. 2014. Population size, habitat fragmentation, and the nature of adaptive variation in a stream fish. *Proceedings of the Royal Society of London B: Biological Sciences* 2014281 20140370; DOI: 10.1098/rspb.2014.0370
- Frasz, Samantha L., Allison K. Walker, Tienabe K. Nsiama, Gregory W. Adams, J. David Miller. 2014. Distribution of the foliar fungal endophyte *Phialocephala scopiformis* and its toxin in the crown of a mature white spruce tree as revealed by chemical and qPCR analyses. *Canadian Journal of Forest Research* 44:1138-1143, 10.1139/cjfr-2014-0171
- Gero, Shane, Jonathan Gordon, Hal Whitehead. 2015. Individualized social preferences and long-term social fidelity between social units of sperm whales *Animal Behaviour* 102:15–23. doi:10.1016/j.anbehav.2015.01.008
- Ghoshdastidar, Avik J., Shannon Fox, Anthony Z. Tong. 2015. The presence of the top prescribed pharmaceuticals in treated sewage effluents and receiving waters in Southwest Nova Scotia, Canada. *Environmental Science and Pollution Research* 22 (1): 689-700 DOI 10.1007/s11356-014-3400-z
- Goldhar, C. Bell, T. Wolf, J. 2014. Vulnerability to freshwater changes in the Inuit settlement region of Nunatsiavut, Labrador : a case study from Rigolet. *Arctic* 67 (1): 71-83
- Gonçalves, A. L., Chauvet, E., Bärlocher, F., Graça, M. A. S. and Canhoto, C. (2014), Top-down and bottom-up control of litter decomposers in streams. *Freshwater Biology*, 59: 2172–2182. doi: 10.1111/fwb.12420

Recent Literature

- Grégoire, Dorthea M., Dan T. Quiring, Lucie Royer, Stephen B. Heard, Éric Bauge. 2015. Indirect host-mediated effects of an exotic phloem-sap feeder on a native defoliator of balsam fir. *Forest Ecology and Management* 341: 1–7. doi:10.1016/j.foreco.2015.01.001
- Haughian, Sean R. and Katherine A. Frego. 2014. *Calypogeia suecica* (Arnell & J. Perss.) Müll. Frib., a New Liverwort Record for New Brunswick, Canada. *Evansia* 31 (3), 109-111 <http://dx.doi.org/10.1639/079.031.0306>
- Hedd, A., Regular, P. M., Wilhelm, S. I., Rail, J., Drolet, B., Fowler, M., Pekarik, C. and Robertson, G. J. (2015), Characterization of seabird bycatch in eastern Canadian waters, 1998–2011, assessed from onboard fisheries observer data. *Aquatic Conserv: Mar. Freshw. Ecosyst.*, doi: 10.1002/aqc.2551.
- Hedd A, Montevecchi WA, Phillips RA, Fifield DA. 2014 Seasonal Sexual Segregation by Monomorphic Sooty Shearwaters *Puffinus griseus* Reflects Different Reproductive Roles during the Pre-Laying Period. *PLoS ONE* 9(1): e85572. doi:10.1371/journal.pone.0085572
- Hicks, Barry J., Brettney L. Pilgrim and H. Dawn Marshall (2014). Origins and genetic composition of the European fire ant (Hymenoptera: Formicidae) in Newfoundland, Canada. *The Canadian Entomologist*, 146, pp 457-464. doi:10.4039/tce.2013.81.
- Jacobs, J.D., S. Chan, E. Sutton. 2014. Climatology of the forest-tundra ecotone at a maritime Subarctic-alpine site, Mealy Mountains, Labrador. *Arctic* 67 (1): 28-42
- Jameson, Ryan G., Andrew J. Trant, Luise Hermanutz. 2015. Insects can limit seed productivity at the treeline. *Canadian Journal of Forest Research*, 2015, 45:286-296, 10.1139/cjfr-2014-0385
- Johnson, M. G., Granath, G., Tahvanainen, T., Pouliot, R., Stenøien, H. K., Rochefort, L., Rydin, H. and Shaw, A. J. (2015), Evolution of niche preference in Sphagnum peat mosses. *Evolution*, 69: 90–103. doi: 10.1111/evo.12547
- Khankhet J, Vanderwolf KJ, McAlpine DF, McBurney S, Overy DP, Durda Slavic, Jianping Xu. 2014. Clonal Expansion of the *Pseudogymnoascus destructans* Genotype in North America is Accompanied by Significant Variation in Phenotypic Expression. *PLoS ONE* 9(8): e104684. 10.1371/journal.pone.0104684
- King TL, Henderson AP, Kynard BE, Kieffer MC, Peterson DL, et al. (2014) A Nuclear DNA Perspective on Delineating Evolutionarily Significant Lineages in Polyploids: The Case of the Endangered Shortnose Sturgeon (*Acipenser brevirostrum*). *PLoS ONE* 9(8): e102784. doi:10.1371/journal.pone.0102784
- Kot, B. W., Sears, R., Zbinden, D., Borda, E. and Gordon, M. S. (2014), Rorqual whale (*Balaenopteridae*) surface lunge-feeding behaviors: Standardized classification, repertoire diversity, and evolutionary analyses. *Marine Mammal Science*, 30: 1335–1357. doi: 10.1111/mms.12115
- Lalonde Benoit A., William Ernst, Christine Garron. 2015. Formaldehyde Concentration in Discharge from Land Based Aquaculture Facilities in Atlantic Canada. *Bulletin of Environmental Contamination and Toxicology* 94(4):444-447 DOI 10.1007/s00128-015-1493-9
- Lalonde, Benoit A., William Ernst, Christine Garron. 2014. Chemical and physical characterisation of effluents from land-based fish farms in Atlantic Canada. *Aquaculture International* 23 (2): 535-546 DOI 10.1007/s10499-014-9834-y

A Friendly Reminder: We are still raising funds for the Gilbert R. Clements Scholarship

If you would like to donate to the scholarship you can do so:

Online: www.hollandcollege.com/alumni-and-friends/give-to-holland-college

By mail: 40 Weymouth Street
Charlottetown, PEI
C1A 4Z1

By phone: 902-566-9590

Cheques are payable to the Holland College Foundation. Please include a note and/or indicate the award name in the cheque memo.

Recent Literature

- Langille, Barbara L., Kimberly E. O'Leary, Hugh G. Whitney, and H. Dawn Marshall (2014) Mitochondrial DNA diversity and phylogeography of insular Newfoundland red foxes (*Vulpes vulpes deletrix*). *Journal of Mammalogy*: August 2014, Vol. 95, No. 4, pp. 772-780. doi: <http://dx.doi.org/10.1644/13-MAMM-A-221>
- Langlois, Mélanie N., Jonathan S. Price, Line Rochefort. 2015. Landscape analysis of nutrient-enriched margins (lagg) in ombrotrophic peatlands. *Science of The Total Environment* 505 (1): 573-586. doi:10.1016/j.scitotenv.2014.10.007
- Lapointe, Martine, Michel Leboeuf, et Arold Lavoie. 2014. *Plantes de milieux humides et de bord de mer du Québec et des Maritimes Guides nature Quintin, 4770, rue Foster, Waterloo, QC, Canada, J0E 2N0. 455 pages, \$34.95*
- Letto, K. R., Y. F. Wiersma, J. Brazil, and B. Rodrigues. 2015. Bald eagle (*Haliaeetus leucocephalus*) population increases in Placentia Bay, Newfoundland: evidence for habitat saturation? *Avian Conservation and Ecology* 10(1): 4. <http://dx.doi.org/10.5751/ACE-00729-100104>
- MacDonald Elizabeth C, Frost EH, MacNeil SM, Hamilton DJ, Barbeau MA. 2014. Behavioral Response of *Corophium volutator* to Shorebird Predation in the Upper Bay of Fundy, Canada. *PLoS ONE* 9(10): e110633. doi:10.1371/journal.pone.0110633
- Mallory, Mark L., Birgit M. Braune, Gregory J. Robertson, H. Grant Gilchrist, Conor D. Mallory, Mark R. Forbes, Regina Wells. 2014. Increasing cadmium and zinc levels in wild common eiders breeding along Canada's remote northern coastline. *Science of The Total Environment* 476–477(1): 73–78 doi:10.1016/j.scitotenv.2013.12.102
- McBride, Meghan C., Theodore V. Willis, Rod G. Bradford, Paul Bentzen. 2014. Genetic diversity and structure of two hybridizing anadromous fishes (*Alosa pseudoharengus*, *Alosa aestivalis*) across the northern portion of their ranges. *Conservation Genetics* 15:1281-1298 DOI: 10.1007/s10592-014-0617-9
- McFarlane Tranquilla, L.A., et al. 2014. Individual winter movement strategies in two species of murre (*Uria* spp.) in the northwest Atlantic. *PloS ONE* 9(4): e90583.
- McMullin, Troy & Frances Anderson. 2015. *Common Lichens of Northeastern North America: A Field Guide*. New York Botanical Garden Press. 192 pp
- Mitchell, Jeremy S., and Craig F. Purchase 2014. Rapid Colonization of a Species at Risk: a New Eastern Range Limit for *Fundulus diaphanus* (Banded Killifish), in Newfoundland. *Northeastern Naturalist* 21 (3): N41-N44 doi: <http://dx.doi.org/10.1656/045.021.0312>
- J. Mocq , A. St-Hilaire , R. A. Cunjak. 2015 Influences of Experts' Personal Experiences in Fuzzy Logic Modeling of Atlantic Salmon Habitat. *North American Journal of Fisheries Management* 35(2): 271-280
- Moore, J.-S., Bourret, V., Dionne, M., Bradbury, I., O'Reilly, P., Kent, M., Chaput, G. and Bernatchez, L. (2014), Conservation genomics of anadromous Atlantic salmon across its North American range: outlier loci identify the same patterns of population structure as neutral loci. *Molecular Ecology* 23: 5680–5697. doi: 10.1111/mec.12972
- Murdoch, A., Dempson, J. B., Martin, F. and Power, M. (2015), Temperature–growth patterns of individually tagged anadromous Arctic charr *Salvelinus alpinus* in Ungava and Labrador, Canada. *Ecology of Freshwater Fish*, 24: 193–203. doi: 10.1111/eff.12133
- Nicault, A., E. Boucher, D. Tapsoba, D. Arseneault, F. Berninger, C. Bégin, J.L. DesGranges, J. Guiot, J. Marion, S. Wicha, Y. Bégin. 2015. Spatial analysis of black spruce (*Picea mariana* (Mill.) B.S.P.) radial growth response to climate in northern Québec – Labrador Peninsula, Canada. *Canadian Journal of Forest Research*, 2015, 45:343-352, 10.1139/cjfr-2014-0080
- Ordóñez, C. and P.N. Duinker 2014. Assessing the vulnerability of urban forests to climate change. *Environmental Reviews* 22: 311-321 10.1139/er-2013-0078
- Pannua, Ravinder, Steven D. Siciliano, and Nelson J. O'Driscoll. 2014. Quantifying the effects of soil temperature, moisture and sterilization on elemental mercury formation in boreal soils. *Environmental Pollution* 193:138-146 doi:10.1016/j.envpol.2014.06.023

Quick Tip: To find an article, paste the DOI in your browser.

Recent Literature

- Perry, R. C., J. R. Pickavance, and S. Pardy. 2014. Spiders of the southern Taiga biome of Labrador, Canada. *Canadian Field-Naturalist* 128(4): 363–376.
- Pitocchelli, Jay. 2014. Song discrimination by male Mourning Warblers (*Geothlypis philadelphia*) and implications for population divergence across the breeding range. *Canadian Field-Naturalist* 128(4): 408–415.
- Pollet, I. L., Hedd, A., Taylor, P. D., Montevecchi, W. A. and Shutler, D. (2014), Migratory movements and wintering areas of Leach's Storm-Petrels tracked using geolocators. *Journal of Field Ornithology*, 85: 321–328. doi: 10.1111/jfo.12071
- Proulx, Gilbert, Dwight Rodtka, Morley W. Barrett, Marc Cattet, Dick Dekker, Erin Moffatt, and Roger A. Powell. 2015. Humaneness and Selectivity of Killing Neck Snares Used to Capture Canids in Canada: A Review. *Canadian Wildlife Biology & Management* 4(1):55-65
- Rae, L. F., Whitaker, D. M. and Warkentin, I. G. (2015), Variable effect of playback of chickadee mobbing calls on detection probability of boreal forest birds. *Journal of Field Ornithology*, 86: 51–64. doi: 10.1111/jfo.12088
- Ramp C, Delarue J, Palsbøll PJ, Sears R, Hammond PS (2015) Adapting to a Warmer Ocean—Seasonal Shift of Baleen Whale Movements over Three Decades. *PLoS ONE* 10(3): e0121374. doi:10.1371/journal.pone.0121374
- Randall, Jennifer and Hugh G. Broders .2014. Identification and Characterization of Swarming Sites used by Bats in Nova Scotia, Canada. *Acta Chiropterologica* 16(1):109-116. doi:http://dx.doi.org/10.3161/150811014X683327
- Rayl, Nathaniel D., Todd K. Fuller, John F. Organ, John E. McDonald, Jr., Robert D. Otto and Shane P. Mahoney. 2014. Den abandonment and transitional day bed use by black bears *Ursus americanus* in Newfoundland. *Wildlife Biology*, 20: 222-228. Doi:http://dx.doi.org/10.2981/wlb.00020
- Richard, Emmanuelle, Steven E. Simpson, Sarah A. Medill and Philip D. McLoughlin. 2014. Interacting effects of age, density, and weather on survival and current reproduction for a large mammal. *Ecology and Evolution* 2014; 4 (19): 3851-3860 DOI: 10.1002/ece3.1250 [horse]
- Robertson, Gregory J., Scott G. Gilliland, Pierre C. Ryan, Johanne Dussureault, Kyran Power, and Bruce C. Turner. 2014. Mortality of Common Eider, *Somateria mollissima* (Linnaeus, 1758), and other water birds during two inshore oiling events in southeastern Newfoundland, 2005 and 2006. *Canadian Field-Naturalist* 128(3): 235–242.
- Ronconi RA, Steenweg RJ, Taylor PD, Mallory ML (2014) Gull diets reveal dietary partitioning, influences of isotopic signatures on body condition, and ecosystem changes at a remote colony. *Marine Ecology Progress Series* 514:247-261 doi:10.3354/meps10980
- Roper, Clyde F. E., Heather Judkins, Nancy A. Voss, Elizabeth Shea, Earl Dawe, Debi Ingrao, Paula L. Rothman and Ingrid H. Roper. 2015. A Compilation of Recent Records of the Giant Squid, *Architeuthis dux* (Steenstrup, 1857) (Cephalopoda) from the Western North Atlantic Ocean, Newfoundland to the Gulf of Mexico. *American Malacological Bulletin* 33(1):78-88. doi: http://dx.doi.org/10.4003/006.033.0116
- Sainte-Marie, Guillaume B., Daniel D. Kneeshaw, David A. MacLean, Chris R. Hennigar. 2015. Estimating forest vulnerability to the next spruce budworm outbreak: will past silvicultural efforts pay dividends? *Canadian Journal of Forest Research* 45:314-324, 10.1139/cjfr-2014-0344
- Segers, J.L., and H.G. Broders. 2014. Interspecific effects of forest fragmentation on bats. *Canadian Journal of Zoology* 92 (8) :665–673 10.1139/cjz-2014-0040
- Selva, Steven B., 2014. The calicioid lichens and fungi of the Acadian Forest ecoregion of northeastern North America, II. The rest of the story. *The Bryologist* 117 (4), 336-367 doi:http://dx.doi.org/10.1639/0007-2745-117.4.336
- Shutler, Dave, Andrée D. Gendron, Myriam Rondeau, David J. Marcogliese. 2015. Nematode parasites and leukocyte profiles of Northern Leopard Frogs, *Rana pipiens*: location, location, location. *Canadian Journal of Zoology* 93:41-49, 10.1139/cjz-2014-0156
- Silk, P. J., K. Ryall, P. Mayo, D. I. MaGee, G. Leclair, J. Fidgen, R. Lavalley, J. Price, J. McConaghy. 2015. A Biologically Active Analog of the Sex Pheromone of the Emerald Ash Borer, *Agrilus planipennis*. *Journal of Chemical Ecology* 10.1007/s10886-015-0562-1

Recent Literature

- Simpson, Jamie. 2015 Restoring the Acadian Forest. 2nd edition A Guide to Forest Stewardship for Woodlot Owners in the Maritimes. Nimbus Press, Halifax.
- Sivarajah, Branaavan, Joshua Kurek, Kathleen M Rühland, John P. Smol. 2015. Effects of *Didymosphenia geminata* blooms on benthic diatom assemblages in the Restigouche River Watershed, eastern Canada. *Botany*, e-First 10.1139/cjb-2014-0216
- Spaes, A. D., Dadswell, M. J., MacMillan, J., Madden, R., O'Dor, R. K. and Stokesbury, M. J. W. (2014), To fast or feed: an alternative life history for anadromous brook trout *Salvelinus fontinalis* overwintering within a harbour. *Journal of Fish Biology*, 85: 621–644. doi: 10.1111/jfb.12447
- Spencer NC, Gilchrist HG, Mallory, ML (2014) Annual Movement Patterns of Endangered Ivory Gulls: The Importance of Sea Ice. *PLoS ONE* 9(12): e115231. doi:10.1371/journal.pone.0115231
- Spooner, Ian, Susann Stolze, Bryan Martin, André Robichaud, Tom Herman, Stephen Mockford, Brennan Caverhill, David Mazzucchi, Hilary White. 2014. A 10,000-Year Record of Environmental Change from Blanding's Turtle (*Emydoidea blandingii*) Habitat at Pleasant River Fen, Nova Scotia, Canada. *Wetlands* Sept. 2014 Online First DOI: 10.1007/s13157-014-0573-7
- Stenson, G. B., and Hammill, M. O. 2014 Can ice breeding seals adapt to habitat loss in a time of climate change? *ICES Journal of Marine Science*, 71: 1977–1986. doi:10.1093/icesjms/fsu074
- Stokesbury, Kevin D. E., Michael J. W. Stokesbury, Matthew T. Balazik, Michael J. Dadswell. 2014. Use of the SAFE Index to Evaluate the Status of a Summer Aggregation of Atlantic Sturgeon in Minas Basin, Canada, and the Implication of the Index for the USA Endangered Species Designation of Atlantic and Shortnose Sturgeons. *Reviews in Fisheries Science & Aquaculture* 22, (3): 193-206 DOI:10.1080/23308249.2014.913005
- Strong JS, Leroux SJ. 2014. Impact of Non-Native Terrestrial Mammals on the Structure of the Terrestrial Mammal Food Web of Newfoundland, Canada. *PLoS ONE* 9(8): e106264. doi:10.1371/journal.pone.0106264
- Swain DP, Benoît HP (2015) Extreme increases in natural mortality prevent recovery of collapsed fish populations in a Northwest Atlantic ecosystem. *Mar Ecol Prog Ser* 519:165-182 doi:10.3354/meps11012
- Tao, Jing, Paul S. Hill, Ryan P. Mulligan, Peter C. Smith. 2014. Seasonal variability of total suspended matter in Minas Basin, Bay of Fundy. *Estuarine, Coastal and Shelf Science* 151(5):169–180. doi:10.1016/j.ecss.2014.10.005
- Toms, J. D., and M.-A. Villard. 2015. Threshold detection: matching statistical methodology to ecological questions and conservation planning objectives. *Avian Conservation and Ecology* 10(1): 2. <http://dx.doi.org/10.5751/ACE-00715-100102>
- van der Velden, S., J.B. Dempson, M. Power. 2015. Comparing mercury concentrations across a thirty year time span in anadromous and non-anadromous Arctic charr from Labrador, Canada. *Science of The Total Environment* 509–510: 15 165–174 doi:10.1016/j.scitotenv.2013.11.147 **Part of a Special Issue: Mercury in Canada's North (habitats, wildlife and people).**
- Vernouillet A, Villard M-A, Hache', S. 2014. ENSO, Nest Predation Risk, Food Abundance, and Male Status Fail to Explain Annual Variations in the Apparent Survival Rate of a Migratory Songbird. *PLoS ONE* 9(11): e113844. doi:10.1371/journal.pone.0113844
- Vitt, Dale H. 2015. A Key and Review of Bryophytes Common in North American Peatlands. *Evansia* 31(4):121-158. 2014 doi:<http://dx.doi.org/10.1639/079.031.0402>
- Vue, Sherr Kurt M. Samways, Richard A. Cunjak. 2015 Bioelectrical Impedance Analysis to Estimate Lipid Content in Atlantic Salmon Parr as Influenced by Temperature, PIT Tags, and Instrument Precision and Application in Field Studies. *Transactions of the American Fisheries Society* 144(2):235-245 DOI:10.1080/00028487.2014.972576
- Waldman, John, Daniel Hasselman, Paul Bentzen, Michael Dadswell, Lorraine Maceda, Isaac Wirgin. 2014. Genetic Mixed-Stock Analysis of American Shad in Two Atlantic Coast Fisheries: Delaware Bay, USA, and Inner Bay of Fundy, Canada. *North American Journal of Fisheries Management* Vol. 34 (6):1190-1198 DOI:10.1080/02755947.2014.954067

Recent Literature

- Weng, Yuhui H., Pengxin Lu, Greg Adams, Michele Fullarton, Kathy Tosh. 2015 Genetic parameters of growth and stem quality traits for jack pine second generation progeny tested in New Brunswick. *Canadian Journal of Forest Research* 45 (1) 36-43 10.1139/cjfr-2014-0106
- White, Scott N., Nathan S. Boyd, and Rene C. Van Acker. 2015. Temperature Thresholds and Growing-Degree-Day Models for Red Sorrel (*Rumex acetosella*) Ramet Sprouting, Emergence, and Flowering in Wild Blueberry Weed *Science* 2015 63 (1), 254-263 doi: <http://dx.doi.org/10.1614/WS-D-14-00048.1>
- White, Scott N., Nathan S. Boyd, Rene C. Van Acker, Clarence J. Swanton. 2015. Studies on the flowering biology of red sorrel (*Rumex acetosella*) ramets from lowbush blueberry (*Vaccinium angustifolium*) fields in Nova Scotia, Canada. *Botany* 93(1): 41-46 DOI 10.1139/cjb-2014-0123
- White SN, Boyd NS & Van Acker RC (2014). Demography of *Rumex acetosella* in lowbush blueberry (*Vaccinium angustifolium*). *Weed Research* 54, 377–387.
- Wikgren B, Kite-Powell H, Kraus S (2014) Modeling the distribution of the North Atlantic right whale *Eubalaena glacialis* off coastal Maine by areal co-kriging. *Endangered Species Res* 24:21-31 doi:10.3354/esr00579
- Wilke, N. F., O'Reilly, P. T., MacDonald, D. and Fleming, I. A. (2015) Can conservation-oriented, captive breeding limit behavioural and growth divergence between offspring of wild and captive origin Atlantic salmon (*Salmo salar*)? *Ecology of Freshwater Fish*, 24: 293–304. doi: 10.1111/eff.12148
- Wires, Linda R. 2014. *The Double-crested Cormorant: Plight of a Feathered Pariah*, Yale University Press 349 pp., \$30, ISBN: 9780300187113

Winter Duck Banding



As part of his Master's Thesis at Acadia University in the Mallory Lab Matthew English will focus on the diet and food supplies of the American black duck, while assessing the relative influence of urban vs. natural food supplies on condition and possibly survival.

Photos: Matthew English Acadia University

Above: Matthew English and Liam Peck (Acadia University) measuring total head length of a male Mallard trapped at Oulton's Pond in Windsor NS, Hants Co. on March 5th, 2015.

Right: Glen Parsons (NS DNR Wildlife Division) and Dave Rockwood (NS DNR Technician—Head of Jeddore) extracting American Black Ducks out of an air canon net in Cole Harbour NS, Halifax Co. on February 12th, 2015.



ASFWB Research Profile

The Evelyn and Morrill Richardson Research Station Bon Portage Island, Nova Scotia

Written by Dave Shutler

Bon Portage Island (BP) is (mostly) an Acadia-owned property easily reached from Shag Harbour in the southerly reaches of Nova Scotia; the island is approximately 3 x 1 km. Terrestrial ecosystems include boreal forest similar to areas much further north, and a fen; these habitats have had little human disturbance for perhaps 50 or more years.

The first ecological research on BP began in the early 1970s (earlier if one considers the natural history observations of lighthouse-keeper Evelyn Richardson from 1929-1964) when the first plant inventory was conducted. Through the 1980s and early 1990s, several Honours and MSc students conducted research on resident birds and shrews supervised by Peter C. Smith and Tom Herman (both Acadia). Many federal and provincial biologists in the Atlantic region and beyond either had some training or formed some connection to BP, and the spiritual connection of BP to many other alumni extends around the globe. For example, in 2012, Ian Jamieson from University of Otago in New Zealand (BSc Hons 1979) made a visit to BP after an absence of more than 30 years.



Above The south end of Bon Portage Island.
(Photo: Ingrid Pollet)

Seven years later in 2005, BSc Honours student Annika Samuelson sold me on a research project on Leach's storm-petrels; storm-petrels now figure prominently in my research program, and I have had about a dozen students involved in this research. One thrust of our research centres on movements of adults during and outside the breeding season; until recently, this has been a black box in storm-petrel ecology. Although almost 70,000 storm-petrels were banded between 1921 and 1995 in Canada, only 7 (SEVEN! or 0.01%!) had ever been recaptured outside of North America. As an interesting bonus, in 2009, BSc Honours students Holly Lightfoot and Emma Vaasjo retrieved a bird from a burrow that bore an unfamiliar band: it had come from Spain.

After some digging and persistence, we discovered that the bird had been banded on Tenerife Island, off the northwest coast of Africa. It was the only storm-petrel banded that year, and it created a minor sensation locally, leading to several photos and an article in the local newspaper. But the biggest piece of news was that this had occurred 14 years earlier! Moreover, only a tiny handful of birds banded on their wintering grounds are ever captured on their breeding areas; the opposite

The Evelyn and Morrill Richardson Research Station Bon Portage Island, Nova Scotia *(continued)*



Above A young Leach's storm-petrel.
(Photo: Ingrid Pollet)

boxes of movements of several albatross relatives that weigh much more than our 45-g storm-petrels. Allometric projections from these data suggested that our petrels would forage about 200 km from BP to provision their nestlings, which is about the error associated with latitude and longitude estimates from geolocators, so summer deployments would likely be risky. Partly to test attachment methods, and partly from optimism, in 2012, Ingrid attached geolocators to adult birds tending nestlings. Amazingly, we found that some of these birds were foraging more than 1000 km from their breeding colony (i.e., 5× the allometric projection), and travelling up to 3000 km in a round trip. In contrast, robins probably travel no more than 2 or 3 km per trip! The reasons for this are too complicated to properly discuss here.

Moving on, the biggest test of our patience came when we deployed geolocators on storm-petrels in October, hoping the birds would return to us the next year with information on winter tracks. After the agonizing wait between October 2012 and May 2013, Ingrid phoned me from BP and asked if I was sitting down; sure enough, a bird had returned healthy and bearing its geocator from 2012! In one (swell) fell swoop, we had accomplished so much more than 75 years of banding had.

Too much about us. In 2006, Gabrielle Nevitt from University of California, Davis initiated a long-term research program on BP's storm-petrels. Gaby's research program is diverse but mostly includes questions about olfaction. Birds are generally considered to have poor senses of smell, and although that perception may be shifting, the consensus remains that birds aren't as good as, for example, mammals. However, there are some exceptions, and nocturnal birds number among them. The first tests Gaby and colleagues conducted were on whether nestling storm-petrels could distinguish the smell of their own from a stranger's burrow. The subsequent year, they swapped eggs between burrows and tested whether

pattern is far, far, far more common. Despite these apparent successes, the enormous sweat, time, and expense invested in banding had provided little information save a few start and end points for storm-petrel movements, with no data on intervening locations: a persistent, big black box. Enter PhD candidate Ingrid Pollet; with the help of several colleagues, we have begun to illuminate the black box of petrel movements using geolocators, small devices that monitor sunrise and sunset on a moving object. If one calibrates local time, then time of sunrise and sunset give good estimates of the longitude a geocator has occupied. By computing the difference between sunrise and sunset, one obtains good estimates of latitude. Recently, geolocators have begun to illuminate the black



Above An adult Leach's storm-petrel.
(Photo: Emma Vaasjo)

The Evelyn and Morrill Richardson Research Station Bon Portage Island, Nova Scotia *(continued)*

emerging nestlings cued in on their foster or their natal burrow. In both cases, the nestlings demonstrated their capacity to use olfaction to navigate towards the burrow in which they had hatched.

A deeper theoretical bandwagon has been about whether organisms can use odours to judge the suitability of prospective mates; briefly, parts of the genome code for camouflage of your (self) cells, camouflage that pathogens must imitate if they want to hide from the immune system. You and your mate both provide camouflage to your offspring, and a diverse repertoire of camouflage theoretically makes pathogen invasion more difficult, so you may want to choose a mate that differs at the relevant parts of the genome. Initial evidence supports these ideas about mate choice based on olfaction, but what's puzzling is that some evidence from birds is consistent with the hypothesis. But, how so if



Above ABO banding station. (Photo: Holly Lightfoot)

birds have poor senses of smell? What better birds to use to test this than storm-petrels? In collaboration with Scott Edwards (Harvard), Gaby and her students are rigorously testing this hypothesis.



Above A banded, singing, male blackpoll warbler. (Photo: Phil Taylor)

Another biological attraction to BP has been the Atlantic Bird Observatory (ABO), whose funding was cut in 2014 after 19 years of continuous operation. Despite this setback, Phil Taylor (Acadia) continues to study migration ecology of a diversity of bird species, in some cases capitalizing on archived data of ABO. Phil's lab has been among the few in the world that are pioneering research on refining radar technology to obtain detailed data on migration directions at different locations (in his cases, around the Bay of Fundy) and at different times of year. His lab has also explored how fat, morphological traits, natal origins (based on stable isotopes), and other variable influence decisions about when to attempt to traverse the Gulf of Maine, a somewhat daunting crossing.

Finally, the lab has been and continues to be busy using a network of antennas both on BP

The Evelyn and Morrill Richardson Research Station Bon Portage Island, Nova Scotia *(continued)*

and around the Bay of Fundy to detect movements of a variety of passerines, most recently blackpoll warblers, for which they have recaptured the first individuals that had carried geolocator over the winter.

Bon Portage is an island of tranquility where one can forget the office, and lose oneself in a good book. But it also manages to seethe with clever and important work led by diligent, dedicated, and hardworking researchers.

Dr. Dave Shutler is a professor at Acadia University and the Director of Bon Portage Island.

Special thanks to Phil Taylor and Gabrielle Nevitt for their input to this article.

For more information about Bon Portage Island and ongoing research, go to:

<http://www.acadiau.ca/~dshutler/BPIsland>



Above Bon Portage Island, Nova Scotia.
(Photo: Dave Shutler)



Do you have a research project, wildlife topic, event, story, photo, or other related information that you would like to see included in the next issue of BioLink?

If so, email Danielle Quinn
(danielle.quinn@acadiau.ca) or
Holly Lightfoot
(hlightfoot@birdscanada.org)!

We're always looking for content ideas and photos from our membership!

Upcoming Events

26 April 2015: Citizen Science Expo Wolfville’s Farmers Market, Wolfville NS. For more information go to: <http://www.blomidonnaturalists.ca/node/565>

13-17 July 2015: International Conference on Fish Telemetry. Halifax, NS. For more information, go to: <http://2015icft.org/>

16-19 July 2015: The Association of Field Ornithologists, the Society of Canadian Ornithologists/Societe des Ornithologistes du Canada, and the Wilson Ornithological Society joint annual meeting Acadia University, Wolfville NS. For more information go to: <http://personalpress.acadiau.ca/ornithmeet2015/>

Spring and Summer 2015: Striped Bass Tagging Ambassador Workshops, multiple dates and locations around Nova Scotia and New Brunswick. For more information, go to: www.strippedbass.ca

Every year, Ducks Unlimited Canada holds hundreds of fundraising events that are open to the public, and encourage everyone to attend. For more information, go to www.ducks.ca/events

ASFWB Fish and Wildlife Research Grant

The **ASFWB Fish and Wildlife Research Grant** was established in the fall of 1994 to assist members who are conducting or supervising wildlife or fisheries research in Atlantic Canada. The grant provides funding up to \$500 annually for research projects. Any aspect of fish and wildlife research will be considered, but projects with applied management goals will receive preference. Applicants must be members of ASFWB. Projects that are largely government sponsored or funded are not eligible for this award. For more information, go to: <http://www.chebucto.ns.ca/environment/ASFWB/researchgrant.html>

ASFWB MEMBERSHIP APPLICATION / RENEWAL FORM

Date.....

Name.....

Title.....

Affiliation.....

Telephone (H) (O)

Mailing Address.....

.....

Email.....

Regular Member (\$20) _____ Student (\$5) _____

I would like to receive newsletters, notices, announcements, etc. by email regular mail

Please remit your cheque or money order to Nic McLellan, Ducks Unlimited Canada, P.O. Box 430, Amherst, N.S. B4H 3Z5, n_mclellan@ducks.ca, 902-667-8726. You may also pay with PayPal by visiting us on our website at <http://www.chebucto.ns.ca/environment/ASFWB/>