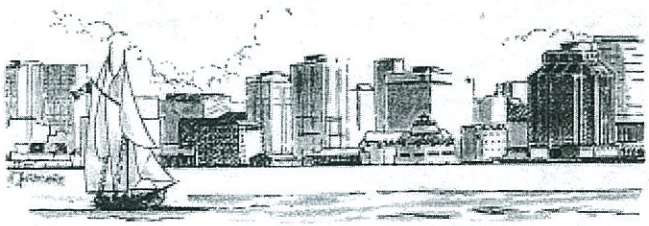
THE HALIFAX FIELD NATURALIST

#126
March to May, 2007

Return address: HFN, c/o NS Museum of Natural History, 1747 Summer Street, Halifax, NS, B3H 3A6

HFN is incorporated under the Nova Scotia Societies Act and holds Registered Charity status with Canada Revenue Agency. Tax-creditable receipts will be issued for individual and corporate gifts. **HFN** is an affiliate of Nature Canada and an organisational member of Nature NS (Federation of Nova Scotia Naturalists), the provincial umbrella association for naturalist groups in Nova Scotia. **Objectives** are to encourage a greater appreciation and understanding of Nova Scotia's natural history, both within the membership of HFN and in the public at large, and to represent the interests of naturalists by encouraging the conservation of Nova Scotia's natural resources. **Meetings** are held, except for July and August, on the first Thursday of every month at 7:30 p.m. in the auditorium of the Nova Scotia Museum of Natural History, 1747 Summer Street, Halifax; they are open to the public. **Field Trips** are held at least once a month; it is appreciated if those travelling in someone else's car share the cost of the gas. **Participants** in HFN activities are responsible for their own safety. Everyone, member or not, is welcome to take part in field trips. **Memberships** are open to anyone interested in the natural history of Nova Scotia. Forms are available at any meeting of the society, or by writing to: Membership Secretary, Halifax Field Naturalists, c/o N.S. Museum of Natural History. Members receive the quarterly **HFN Newsletter** and **HFN Programme**, and new memberships received from September 1st to December 31st of any year are valid until the end of the following membership year. The regular membership year is from January 1st to December 31st.



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Vice-President	Peter Webster	453-9244
Treasurer	Janet Dalton	443-7617
Secretary	vacant	
Past President	Bob McDonald	443-5051
Directors	Brian Bartlett, Burkhard Plache, Ingrid Plache, Lillian Risley, Stephanie Robertson	

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FEES 2006/2007

Individual	$15.00 per year
Family	$20.00 per year
Supporting	$25.00 per year
Nature NS (opt.)	$ 5.00 per year

IN THIS ISSUE

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HFN NEWS AND ANNOUNCEMENTS

EDITORIAL

It's Friday, March 16th. Will we get more snow? Could do. Will spring start from now? That could happen as well. I remember a wonderful year when summer started on May 1st; and a terrible year with no spring and no new leaves until summer weather finally blew in on the 1st of July. See Pat Leader's musings on our elusive "Spring" on p. 20.

What is happening with the 'millions' (2000) of Brown Spruce Longhorn Beetles in Nova Scotia? Despite all the resources of the Canadian Forestry Service, in seven years only a very few have been alleged. I say alleged because we don't know whether their 'finds' are actual beetles, beetle holes, or beetle sap tubes. See more details under "Beetles of Mass Destruction", p. 6.

Our previous (Winter 06/07) issue of the Halifax Field Naturalist was erroneously tagged as #124, rather than the correct #125. Also, the back cover's Nature Notes were from December, 2006, not November.

NATURE CANADA'S 2007 AGM

Pencil in your calendar this coming summer for Nature Canada's 2007 AGM and Annual Conference "Tide and Time", which will be hosted by Nature Nova Scotia in Wolfville, August 1st to the 5th. You will be surrounded by all the natural delights that the Bay of Fundy's Minas Basin and the beautiful Annapolis Valley have to offer. Meetings and accomodation will be on the campus of Acadia University, kicking off on Wednesday, August 1st, with registration at 4:00 p.m. and a wine and cheese reception at 7:00 p.m. On subsequent days there will be early morning field trips, breakfast, keynote speakers, lunch, more field trips, supper, and in the evenings you'll watch for Swifts, owls, and stars. The weekend's three keynote speakers will be Harry Thurston, Bob Bancroft, and Graham Daborn. Randy Lauff will be the speaker at Saturday's Banquet.

There will be an unbelievably rich and varied field trip programme, with different themes from which to choose.

Under **Geology and Marine Science**: **The Tidal Bore** at Kennecook River; **Fossils** at Bluebeach, carboniferous rocks (330 million years old); **Ancient Trees**, a drowned forest (5000 years old); **Triassic Geology**, Rocks, Amethyst, and Agates at Scots Bay; **Whale Watching and Pelagic Birds** in the Bay of Fundy and Brier Island; and **Intertidal Life** on the Fundy mud flats and beaches.

For **Birding**: **Owling and Roosting Chimney Swifts** at the Wolfville Robie Tufts chimney; **Atlantic Beaches**, a beach walk and birds; and **Shore birds**, bird watching and tides on mudflats.

Other Wildlife: **Dragonflies and Butterflies** in rivers and fields; and a **Pond Hop for Insects and Wild Plants**.

Outdoor Activities: **Kejimkujik National Park** for canoeing and hiking; **Inland Lakes**, canoeing and hiking in Cloud Lake wilderness; **Cape Split Hike**, tidal currents, seascape, trees and plants, birds; **Blomidon Provincial Park**, hiking, birds, tides, and wildlife; **Astronomy**, stars, planets, nebulae, galaxies; and **Wildflowers**, Kentville Ravine and the Meander River riparian zone.

Likely Pre/Post Conference Tours: **Digby Neck** for whales and pelagic birds; **Ocean Kayaking**, Atlantic shores and coves; **Cape Breton**, highlands, hiking, geology, wildlife; **Parrsboro and Cape Chignecto**, fossils, hiking, wildlife; **Southwest Nova Scotia**, birding islands; **Annapolis Royal, Digby, Bear River**, gardens, tidal power; and **Lunenburg**, fisheries museum, ship building, history.

Bring the family! — a children's programme will be offered. The speakers and trip leaders are already preparing for this wonderful event. For more information, go to **naturens.ca** or **acadiau.ca**; or contact Joan Czapalay, **joancz@ns.sympatico.ca**.

BIRDS SOAR HOW HIGH?

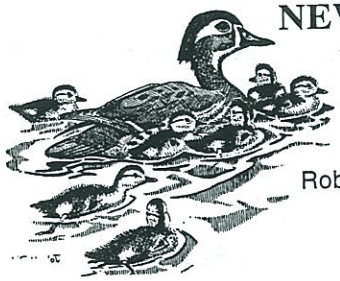
Radar, fast becoming a must-have tool for ornithologists, is capable of revealing the highs and lows of bird migration to within a few feet. The newest weather radars can even distinguish between birds, bats, insects, dust, and pollen.

The highest flyer, the Bar-headed Goose, has been sighted over the highest Himalayan peaks at 29,000 feet, foregoing the lower mountain passes. Swans have been seen flying at 27,000 feet, and raptors have been reported at 22,000 feet.

At 20,000 feet and more, birds breathe where mammals can't, thanks to a complex respiratory system that sends a continuous flow of oxygen through their lungs. Many long-range fliers rise from 5,000 up to 20,000 feet during migration, gaining height as they burn fat and lose weight. The distance champ is the Arctic Tern, with a 13,000 mile trip between polar regions twice a year.

Nocturnal migrants (most songbirds and ducks) take advantage of less turbulence and fewer predators, while gaining feeding time during daylight hours. New radar data show that when songbirds migrating over the Gulf of Mexico encounter strong headwinds, they drop to lower altitudes. In the future though, these birds will risk collisions with wind turbines.

— Jessa Forte Netting
Discover Magazine, November 2005



NEW AND RETURNING

Lise Bourque
Doug Bowes
Brian Ferguson
Hannah Minzloff & John Hillis
Roberta Matthews & Ken Easterbook
Janet Marche
L.H. Paris
Iain & Nan Taylor

SPECIAL REPORTS

FROM THE PRESIDENT

The main activities of the Halifax Field Naturalists continue to be special presentations at monthly meetings (except during July and August), and our field trips held throughout the year. The Programme Committee, Burkhard and Ingrid Plache, provided an excellent blend of interesting, illustrated talks covering a multitude of topics, and we enjoyed a number of hikes to explore natural history, both locally and further afield.

The HFN quarterly newsletter, The Halifax Field Naturalist, is published at each equinox and solstice. The content and quality of the newsletter sets the example for other such volunteer-led organisations. It contains reports on presentations, field trips, and other activities, as well as local and provincial natural history news, a seasonal almanac, special articles, and a comprehensive list of upcoming events of interest to all naturalists. The Halifax Field Naturalist's editor is Stephanie Robertson, with help from key members Ursula Grigg, Patricia Chalmers, Bernice Moores, and Doug Linzey. A special thank you is due to those members who write up the presentations and field trip reports in the first place – without them the newsletter wouldn't be possible.

The annual conference of Nature Nova Scotia was well-attended and a worthwhile experience for those of you who made it to Cornwallis last June. The resident facilities were just fine, the food was very good and plentiful, and the programme was superb. It was arranged by the Annapolis Field Naturalists, with a theme focusing on 400 years of local habitat change (and removal). We learned how the settlers used the land and its resources. Even 200 years ago, there was still an incredible natural abundance of resources – diverse forests with very large trees, clouds of birds, very fertile soil, waters with 80-pound cod, so much mackerel that they obstructed the passage of boats, and lobsters 'as big as little children'.

HFN was lucky to have such a dedicated group to serve as its Board of Directors over the last year. Our Vice President, Peter Webster, coordinated conservation-oriented activities on behalf of HFN, working with HFNers and members of other organisations to remind government of their obligations to conserve our natural areas. Janet Dalton, our Treasurer, took very good care of our financial affairs, banking and paying bills, preparing financial statements, and maintaining our charitable status with the Canada Revenue Agency. Our Secretary, Peter Payzant, was a model of timeliness, sending minutes of Board meetings on the next day, typically containing a comprehensive list of tasks to remind members of what they agreed (and may have forgotten) to do. Burkhard and Ingrid Plache, assisted by our Past President, Bob McDonald and others, spent a lot of time arranging the presentations and hikes we so enjoy, and Linda Payzant looked after membership issues, our website, and email system. Jim Wolford and Bob McDonald were very active handling conservation issues; Brian Bartlett and Bob McDonald contributed to the Young Naturalists' programme; and Regine Maass continued her much-appreciated tea and cookies after each monthly meeting.

Karen McHendry established the Young Naturalists Club in the late spring of 2006, with a full programme of presentations and hikes for pre-teens (from age eight) and teenagers. HFN members and also the staff of the Museum of Natural History helped in designing and executing the programme.

— Allan Robertson

MEMBERSHIP

During the five-year period from 1997 to 2001 total memberships averaged 143. It declined in 2002 to 128 members, and in 2003 we had a low of 119 members. Membership numbers are not available for 2004 but in 2005 the numbers began to climb slowly to 123, then 129 for 2006. For the 2006 membership year, 60% of the memberships were in the 'Individual' category, 26% were 'Family' memberships, 13% were 'Supporting' members and the remainder were 'Life' members.

Thanks to Doug Linzey for maintaining the membership database.

TOTAL MEMBERSHIPS BY YEAR

1997	'98	'99	'00	'01	'02	'03	'04	'05	'06
149	146	138	145	139	128	119	n/a	123	129

— Linda Payzant, Membership Secretary

PROGRAMME

Over the last year, the Halifax Field Naturalists offered ten well-attended presentations to its members and the larger public. The topics ranged from local interests in animals (wildlife in general, warblers, marine mammals), plants (forestry), and geology (gold) to talks about mountains near and far, the Galapagos Islands, and the Climate of the Arctic. Our 16 field trips led us over a variety of terrain in HRM and beyond. Included were old favourites like the Sewer Stroll, Butterflies, and the Cranberry Pick, as well as excursions into new areas such as Mosses in the Indian Path Commons, and two trips in Herring Cove's back country. Whereas a visit to the Ecology Action Centre was cancelled due to a snowstorm, we had a chance to see the Pockwock Water Plant and the Irving Greenhouse at Acadia University.

During the past year, the programme committee was supported by many HFN members via programme suggestions and the organisation of talks or field trips. A big thank you to all who helped.

Most importantly, this input is *essential* to continue offering a wide range of topics, and a steady input will ensure the programme reflects the interests of the society. The programme committee wants to encourage members to offer field trips to their favourite locations, so other naturalists can learn about new places.

— Burkhard & Ingrid Plache
Programme Committee

Halifax Field Naturalists
Financial Statement (Balance Sheet)
As At December 31, 2006

	2006	2006	2005	2005	2004	2004
Assets						
Cash		**$1,433**		$1,820		$2,085
Royal		**$395**		$322		$337
Accounts Receivable and Accrued Income		**$825**		$825		$825
Inventories and Prepaids		**$12,090**		$11,960		$11,881
Investments						
Fixed Assets						
		$14,743		$14,927		$15,128
Liabilities and Surplus						
Accounts Payable		**$0**		$0		$0
General		**$260**		$0		$0
FNSN						
Surplus		**$6,090**		$5,960		$5,881
Restricted		**$8,653**		$8,967		$9,247
Unrestricted	**$14,743**		$14,927		$15,128	
		$14,743		$14,927		$15,128

Halifax Field Naturalists
Statement of Income and Surplus
Year Ended December 31, 2006

	2006 Actual	2005 Actual	2004 Actual	2003 Actual
Revenues				
Membership	**$2,218**	$1,690	$1,927	$1,837
Product Sales	**$16**	$0	$8	$3
GIC	**$0**	$0	$0	$0
Interest	**$162**	$140	$121	$37
Donations	**$70**	$35	$746	$530
DF List	**($21)**	$48	$65	
	$2,444	$1,913	$2,866	$2,407
Expenses				
Field Trips	**($31)**	$0	$0	$15
Special Projects	**$0**	$0	$0	$0
Socials	**$91**		$0	$21
Grants/Donations	**$125**	$125	$125	$125
Insurance	**$225**	$225	$200	$175
Meetings	**$139**	$400	$254	$278
Memberships	**$555**	$425	$405	$485
Miscellaneous	**$0**	$0	$37	$0
Newsletters				
Postage	**$367**	$388	$318	$611
Production	**$1,100**	$619	$442	$687
Office Supplies & Expenses	**$187**	$10	$96	$23
	$2,758	$2,193	$1,877	$2,421
Net Income	**-$314**	-$280	$989	-$14
Surplus, beginning of year	**$8,967**	$9,246	$8,257	$8,271
Surplus, end of year	**$8,653**	$8,966	$9,246	$8,257

— Janet Dalton
Treasurer

NEWSLETTER

The last four issues of The Halifax Field Naturalist were produced without too many serious problems, excepting one issue which had to be completely re-printed because the type was misplaced on the pages. But this was done at the printer's expense, not our members'. Each of these publications sported back and front covers in colour; and the decision is left open for each one as to whether it can be afforded.

Last year's Spring Issue #122, our 30th Anniversary Issue, was a record 28 pages with eight of those being wonderful memoirs from 15 of HFN's founding members or those who were there in the 'beginning'. The next three issues were 20, 16, and 20 pages respectively, with the addition of a 16th reminiscence from another founding member, botanist Joe Harvey, in the Summer Issue #123.

There were a total of nine HFN Talk Reports, and 15 Field Trip reports. In addition, we had a unique submission from a St. Mary's biology student, Joseph Poissant, about candle-making with our local Bayberries, *Myrica pennsylvanica*; a Nature Nova Scotia 2006 AGM and Conference report; Bob McDonald's important 2006 HRM Bird Migration Count Report; a report on a meeting between Nature Canada representatives and a group of HFN executive and members to hear our concerns; and a fascinating write-up by Pat Leader on the history of developments (or 'non-developments'!) on the Bedford Waterfront.

There were also the important inclusions of our local HFN News and Announcements, Nature Notes observations from members at our monthly meetings, the Halifax Tide Table for each quarter, and the great Almanac of events compiled by Patricia Chalmers.

A sincere thank you to all contributors, both new and supporting.

— Stephanie Robertson
Editor, The Halifax Field Naturalist

CONSERVATION

CONSERVATION REPORT 2006/2007

As HFN Conservation Chair over the last year I have focused my efforts in a few areas.

Long Lake Park Planning

I have been pleased to work with the Long Lake Provincial Park Association, the Department of Natural Resources, and many other stakeholders on the preparation of a long range plan for Long Lake Provincial Park. This 5,000 acre park of lakes and woodland, in the Harrietsfield/Goodwood area of Halifax, was established in 1980. The Halifax Regional Municipality and the Department of Environment and Labour have also provided important input into the planning process. After more than a year of meetings and public consultations, a draft plan is now being reviewed. I am optimistic that this plan will set the direction for sound management and sustainable improvements to this beautiful and very popular park over the coming years.

More information about the Long Lake Park can be found at: **www.gov.ns.ca/natr/parks/longlake/default.htm.**

Chebucto Peninsula Public Lands

I have also been participating in discussions between representatives from Provincial Government departments, the City of Halifax, and a number of community groups, looking at ways we might work together on public land stewardship issues. These are promising discussions; I hope to have more to report on them in the near future.

Canadian Nature Network

HFN has also been working to assist Nature Canada in its nationwide consultative process to develop the Canadian Nature Network. The Halifax Field Naturalists was the first of many groups across Canada to participate in a focus group for Nature Canada. We will continue to provide them with input as they work to better coordinate the conservation activities of natural history associations across the country.

Many members of HFN have also been active in efforts to preserve our natural environment. We have provided valuable input on issues including the following: management and restoration of Point Pleasant Park; planning of the Halifax Urban Greenway; Halifax Active Transportation Corridors; and implementation of other aspects of the Halifax Regional Plan which relate to natural areas.

Nature Nova Scotia

I have also been pleased to act as the HFN representative to the Nova Scotia Federation of Naturalists/ Nature Nova Scotia over the last year. The federation is our means of coordinating our efforts on nature and conservation issues across the province, and staying in touch with the activities of the other Natural History groups.

All Members of HFN are invited to attend the Nature Nova Scotia's day of business and activities, with the Annual General Meeting in the morning and field trips in the afternoon. It will take place on Sunday, June 3rd, at the Nova Scotia Community College, Truro, N.S.

Nature Canada 2007 AGM and Conference

Nature Nova Scotia is sponsoring the 2007 Nature Canada Conference and AGM, to be held this year at Acadia University, Wolfville, N.S., August 1st to the 5th. We hope that as many N.S. naturalists as possible will attend. It will be a great opportunity to meet and talk with naturalists from across Canada (and to show off Nova Scotia's natural history!). Look for the Nature Canada Conference Information at **http://www.nature2007.ca/.**

— Peter Webster
HFN Vice President
Conservation Chair

BEETLES OF MASS DESTRUCTION

On January 11th, Friends of Point Pleasant Park entomologist Christopher Majka distributed this press release, **The Brown Spruce Longhorn Beetle: is it a Problem?**

"The Canadian Food Inspection Agency (CFIA) has proposed creating a quarantine zone in Nova Scotia the size of Prince Edward Island that would encompass all

of Halifax County and portions of Colchester and Hants Counties. This is apparently to try and contain what the CFIA considers an ever-proliferating infestation of the brown spruce longhorn beetle (BSLB) whose scientific name is *Tetropium fuscum*.

At a meeting on January 3rd, 2007 in Lawrencetown, N.S., many woodlot owners in the region expressed fears that their livelihoods would be destroyed by such an expansive zone, questioned the need for it, and vowed to fight such measures. Halifax Regional Municipality (HRM) Councillor Steve Streatch has proposed that quarantined wood could be burned or converted to biofuel to replace lost income, or that all marketable timber in potentially affected areas be harvested immediately.

An ocean of ink has been spilled on this subject, and much could be further discussed and debated. However, before rushing to implement panicked measures, it is worthwhile asking a fundamental question – is the Brown Spruce Longhorn Beetle of any concern at all to forests in Nova Scotia, or to the province's forest industry? Or, in other words, does the brown spruce longhorn beetle attack healthy trees? Why is this important? Simply put, if the beetle poses no threat to healthy trees in either natural forests or tree plantations, then there is no pressing need for an eradication campaign, no need for a quarantine zone, and no need to impact the livelihoods of many Nova Scotia woodlot owners. Also, no need to denude the HRM landscape, burn our timber, or turn our forests into biofuel.

Given that the CFIA has been 'battling' the beetle in Nova Scotia for the past seven years, Nova Scotians might well think that agency scientists had long ago answered this question — but nothing could be further from the truth. They might, indeed, think that determining the answer to this question would be the very first thing that the CFIA would do. If there is no threat, than there is no problem, and no need for the massive expenditures of funds on eradication programs.

In the spring of 2000, when it first became apparent that there were Brown Spruce Longhorn Beetles in Nova Scotia (the first known specimens collected were in 1990, but because of confusion with the very similar native beetle, *Tetropium cinnamopterum*, they had remained unrecognised), Friends of Point Pleasant Park (FPPP) researched the scientific knowledge about the BSLB in Europe where it originates. It is widely distributed across northern and central Europe, through Russia and Siberia, to Asia. It lives in similar forests to those found in Nova Scotia and has been the subject of considerable research. It is not, however, considered a threat to healthy trees in forests or plantations. Why? Like the vast majority of longhorn beetles it feeds on dead and dying wood.

In our injunction to stop the CFIA from cutting trees in Point Pleasant Park, FPPP therefore argued that there seemed little likelihood that in Nova Scotia the BSLB's habits would be any different. Hence there was no need for a panicked response. It appeared that affected trees in Point Pleasant Park were sick and dying for other reasons, and that a large suite of beetles and other insects responsible for the natural decay of wood were colonising these trees, just like they naturally do in forests throughout Nova Scotia. My research in Point Pleasant Park found 23 other native species of longhorn beetles (in addition to the BSLB), nine species of metallic wood-boring beetles, 28 species of bark beetles, and many other insects colonising the dying trees.

Moreover, two other native species of longhorn beetles, *Tetropium cinnamopterum* and *Tetropium schwarzianum*, are found in the province. These beetles are exceedingly similar to *Tetropium fuscum* (the BSLB), both in appearance and in ecology, and neither of them are of concern to healthy trees and forests. It seemed quite unlikely that the BSLB would behave differently than these native species already present in Nova Scotia's forests.

It appeared to FPPP that the BSLB was doing exactly what it does throughout Eurasia – feeding on dead and dying trees. At the time, the CFIA (on the basis of no evidence at all) argued that the beetle had changed its habits and was attacking healthy trees. In 2000 no research had been conducted in Nova Scotia to decide this question one way or the other, and therefore cutting proponents argued that on the basis of the 'precautionary principle', action (i.e. cutting) ought to be taken at once.

Friends of Point Pleasant Park expected, however, that the first item on the research agenda of the CFIA would be to determine if the BSLB attacks healthy trees in Nova Scotia. If it does not, then there is no pressing problem to contend with. While it would be better if the BSLB had not arrived in province, it would join the 93 or so other species of native longhorn beetles known to occur in the province, which all feed on dead and dying trees. Two other foreign longhorn beetles, the Violet Tanbark Beetle, *Callidium violaceum*, and the Tanbark Borer, *Phymatodes testaceus*, are already found in Nova Scotia's forests and neither has proved problematic.

So, in the last seven years what has the CFIA done to answer this question? Next to nothing. The CFIA recently published a compendium of research they have conducted on the BSLB (available on the Internet at **http://www.atl.cfs.nrcan.gc.ca/index-e/what-e/science-e/entomology-e/bslb-e/summary-e.html**. There are 13 different studies listed. They relate to detection of the BSLB; its fungal associates; potential control mechanisms (Q. Will wood-chippers kill BSLB's? A. Yes.); wasps that parasitise the BSLB; and its host preferences. One preliminary study conducted in 2000 found that Red Spruce with reduced growth rates and low vigour (i.e. 'unhealthy' trees) were more susceptible to infestation than faster growing, more vigorous trees (i.e. 'healthy' trees) but this research has not been continued.

What does this all mean? There is still no real evidence that shows that the Brown Spruce Longhorn Beetle attacks or is a threat to healthy trees. The same claims made in 2000, that the BSLB is an invasive insect that attacks healthy trees and is a threat to North American forests, have simply been recycled again and again without supporting evidence.

One could reasonably ask, after seven years of beetle battles in Nova Scotia, why has such research not been done? If the BSLB is not a problem to healthy trees, why is the CFIA spending taxpayer's dollars battling it? If there is no evidence that the BSLB is a threat, why are expansions to the quarantine zone being proposed?

Such measures would have a significant impact on many woodlot owners in the province. What is the reason for contemplating them at all?

Nova Scotia has been in the grip of an eradication juggernaut for the past seven years. The science to support the need for this campaign is almost entirely lacking. If the BSLB is a problem, let's find out. If it's not a problem, let's stop worrying about it — there are lots of other pressing environmental problems that require our attention. It is time to ask if the emperor has any clothes — and demand some answers."

— Christopher Majka
Friends of Point Pleasant Park
(902) 425-3725, email c.majka@ns.sympatico.ca

On January 23rd, the CFIA hosted a meeting about the Brown Spruce Longhorn Beetle, *Tetropium fuscum* (BSLB), at the Holiday Inn in Dartmouth. Present were representatives of the Canadian Forestry Service (CFS), the Laurencetown-Cole Harbour Citizens' Committee, the Department of Natural Resources (DNR), Friends of Point Pleasant Park (FPPP), HFN, the Ecology Action Centre (EAC), Barrett Lumber, the Maritime Lumber Bureau, and HRM.

The PowerPoint presentation by the CFIA held no surprises in style, but the meeting, which ran to 2:00 p.m. rather than 12 noon, did. The woodlot and forestry industries, the Lawrencetown/Cole Harbour Committee, and most importantly, the EAC with Joanne Cook of the Standing Tall campaign, stated their minds, and were given a chance to do so fully. In the end, it was agreed by all that there should be some additional people on the CFIA's 'science advisory committee' — representing woodlot owners, environmental and ecological interests, and unbiased scientists/entomologists.

The CFS reported that experiments are still ongoing tweaking a terpene trap formulae, and, after seven years, they are still looking for "just the right formula", "We know they're there, we just have to find them." — a perfect 'weapons of mass destruction scenario'. Their catches in seven years are nowhere near 'infestation' level; on the contrary, they are abysmally low. The CFIA is turning the scientific method on its head; instead of accepting their embarrassingly low results as indicative of the BSLB reality, they are still scrambling very hard to prove their initial claims of "millions of beetles" in 2000. Having painted themselves into a corner, how could they possibly now retract all that professional dramatic spin and overreaction (at a cost of $2 million+) without losing face with both the Canadian and American governments? Because of seven years of quarantine, the small N.S. forestry companies and private woodlot owners are paying a high price. In essence, they are less important to the CFIA than public industry interpretation and interests in the U.S.

Despite being told at a forestry industry meeting on January 16th in New Brunswick that eradication was the only answer for the CFIA, at this meeting they stated that they've decided it is impossible to eradicate, so 'containment/quarantine' will continue to be the plan of action. This will continue to effect a lot of Nova Scotia woodlot owners drastically, and also give the forestry companies (Neenah so far) a lot of cheap chips.

To quote Greg Stubbings of the Ottawa CFIA, "CFIA is not a research facility. We rely on the science of the CFS. We have a lot of weaknesses to address and a lot of problems within our organisation. We are not perfect, and we are taking steps to address some fundamental issues. We have to make decisions without perfect science or full scientific study."

To sum up the presentation from a naturalist's viewpoint, after *seven years*, they are still trying very hard to trap enough BSLB to justify their actions, but they have found comparatively only a few; just 23 trap sites in a large radius around HRM were positive (with only one to six BSLB at each site), and they promised to share that trapping data with everyone there.

The first email request for it was sent to the CFIA on January 26th, to which there was no reply. A second request was sent out on February 2nd. They answered, "The historical survey data was saved under several d-base platforms. We had to work out a retrieval query problem with the Oracle d-base format, therefore, although I cannot state to the day, it will take at least several more working days to provide this information to you." Another email, requesting only raw data, not analysed data, received no reply, and indeed, there has been none since.

A further request included this last paragraph. "It has been almost six weeks since you promised to send us the requested information. Informally, I have been told by a member of the bureaucracy (who must remain nameless for obvious reasons) that you are stonewalling our request and that the agency intends to continue stonewalling us until we give up. Well, we haven't given up, but we've certainly become disenchanted with this government agency, to say the least. We are thus taking the unusual step of copying every member of the Provincial Legislature to alert them to the behaviour of a federal agency which is supposed to be working *with* the Province, not against it. It is unconscionable that the Federal Government is treating its provincial citizens, who pay for all these programs, in such an offhand and dismissive manner."

A copy of this email was sent to all provincial MLAs, requesting them to "...contact Mr. Peter McKay, Federal Minister responsible for Nova Scotia, and Mr. Chuck Strahl, Federal Minister of Agriculture responsible for the CFIA, to strongly insist that the CFIA follow through on its commitment to provide the data it promised."

As of this writing, we are still awaiting replies. So far, only NDP MLAs Percy Paris, Leonard Preyra, and Alexa McDonough have acknowledged our request. They have also asked to meet with the Friends of Point Pleasant Park's Board of Directors.

— Stephanie Robertson

HFN TALKS

FORESTRY 7 DECEMBER

(*cont'd from Winter Issue #124 [#should have been125]*) Joanne Cook of the Standing Tall Campaign at the Ecology Action had outlined for us in detail the problems with the Nova Scotia Forestry industry and how its practices have affected negatively both our Acadian Forest and the non-pulp and paper wood industries.

She continued and said that there are two key Federal-Provincial Agreements which are consistent with the need to conserve and protect our provincial forests.

The first is the National Forest Strategy (2003 – 2008), which promotes ecosystem-based practices, diversified markets and forest products, viable woodlot businesses, and public participation.

The second, the 1995 Canadian Biodiversity Strategy, recommends that forest policies must consider ecological, economic, and social objectives, and that they must put in place forest management practices consistent with natural disturbances.

There have been years of warnings about the rate of cutting and other problems in our forests. An excellent book to read about this is Ralph Johnson's Forests of Nova Scotia.

In 1971, for example, Murray Prest, the then-President of the Nova Scotia Forest Products Association, reported in a speech to the Kiwanis Club that there was an attitude in the industry of "get all you can today because there's not going to be a tomorrow". He said also that "there has been no effective legal control of cutting operations since March 31, 1965."

The Standing Tall Campaign recognises that a diverse forest economy means a diverse healthy forest — *and vice versa*. Standing Tall calls for a focus on five approaches: 1) listening to everyone with an interest in the forests (not just the softwood sector); 2) provincial planning to diversify the forest sector; 3) creating long-term wood supplies that can support true value-added processing; 4) multi-use of woodlands (not just industrial forestry); and 5) long-term economic sustainability (not short-term fixes).

Standing Tall also promotes gradual, feasible targets: voluntary planning for new natural resources; finishing the protected provincial areas strategy as soon as possible; providing incentives for private woodlot owners; a stop to logging in game sanctuaries as soon as possible; Forest Stewardship Council (FSC) certification on Crown land cutting operations by 2010; and an end to clearcutting on Crown land by 2010.

Standing Tall is a vehicle for Nova Scotians to be heard. The Province is developing a new 10-year Natural Resources/Forest Strategy for 2007. Standing Tall has been working on it with DNR for the past year, and the emphasis will be on open, inclusive, third party consultations.

In June of 2006 Premier MacDonald promised Voluntary Planning would carry out forest-strategy consultations. DNR now says, however, that Voluntary Planning can run the public meetings, but DNR staff will write the new strategy! But Voluntary Planning is the only body that can take a long-term perspective, that is unbiased, and that can recommend policy directly to Cabinet.

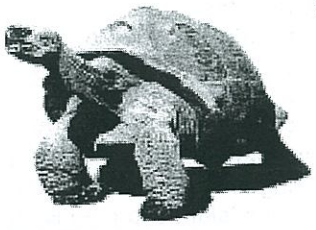
Standing Tall also has three forest sustainability recommendations: 1) make a minimum of 25% of all silviculture funding available for the management of uneven-aged forests; 2) ensure a taxpayer contribution of $3 million a year for treatments relating to uneven-aged forests; and 3) emphasise hardwoods as well as softwoods for value-added milling. Uneven-aged management will lead to more wildlife habitat and a healthier Acadian Forest.

Another key Standing Tall recommendation is to apply FSC Certification to Crown Land. The FSC is the environmental gold standard for forest practices, an international NGO founded in Toronto in 1993. It is active in 70 countries, and is applied to millions of hectares of forest that are worth over US$5,000,000,000. In Canada, Domtar, Tembec, and others follow FSC standards. In Nova Scotia a number of private interests follow the standards as well — the Nagaya Group, Pictou Landing First Nation, Eastern Forest Fibre Producers Association, and BroMoc Printing. But the Crown should lead by example, and insist that FSC certification should apply to Crown land!

What can you do to help our forests remain robust and viable? Tell the Premier that you want Voluntary Planning, not DNR, to prepare the Natural Resources Strategy (email **premier@gov.ns.ca)**. Sign on as a supporter of the Standing Tall Campaign, and join our Forest Alert. Take the message back to your friends and community. *Speak out for our forests!* For more information, visit **www.novascotiaforests.ca**.

Thank you Joanne, for this invaluable and timely talk.

Stephanie Robertson



GALAPAGOS 4 JANUARY

What a marvellous presentation! It was 'all sold out'; people who arrived a wee bit late had to be turned away, because of fire regulations and lack of space, and in anticipation, we forewent members' nature notes. (Later the following week, a special lunchtime showing was arranged at the NSMNH for those who couldn't be fitted in on Thursday evening.)

The Payzants found the Galapagos a very strange place, unlike any other spot they had ever visited, with a truly unusual natural history and with animals unafraid and/or indifferent to humans. They were completely enchanted with their experience, and had taken lots of video footage and many, many pictures of the unique natural history and animals. It was a long presentation, but never boring, and it deserves a long write-up to tell of all the many things they had researched and also seen.

Peter and Linda went to the Galapagos Islands in June of 2007. Linda told us that they were discovered in 1535 by the Bishop of Panama, and later, in the 1600s, were called 'Las Islas Encadades' (the Enchanted, or Bewitched, Islands) by a Spanish corsair, Diego Rivadeneira. Subsequently they were used by pirates, whalers, and buccaneers, and there were various early failed attempts to set up penal colonies there.

The Galapagos archipelago straddles the equator, comprising 8000 km² of landmass, and is 1000 km east of the coast of Ecuador. They are comprised of 70 to 100 islands, depending on what you call an 'island', although the majority of these are merely tiny islets without names and most are rarely visited by people. Nineteen of the islands are 'large', the largest being Isabela which is about the size of HRM.

Owned by Ecuador since 1832, in 1936 the islands were declared a National Park. Four of the islands have settlements, and in total there are only 17 - 20,000 people, a smaller population than that found in Bedford. The largest town is Puerto Ayora (on Santa Cruz) with a population of 10,000. This town has small hotels, restaurants, and tourist shops. The next largest town is the capital of Galapagos Province, Puerto Baquerizo Moreno (on San Cristobal), pop. 5,600. There's a fishing village named Puerto Villamil on Isabella and a small community on Floreana (Isla Santa Maria). Today most of the human population of the islands is involved in farming. There is also a park and conservation service, fishing, and tourism. Almost 40% of Galapagonians work in the tourist industry.

How old are these islands? Dinosaurs were all extinct by 65 million years ago (Ma); between 40 and 25 Ma we had an early horse ancestor called Mesohippus; and around 25 Ma deciduous woodlands were developing. Four Ma the earliest humanoids were evolving, and the Galapagos archipelago, which is on the tectonic Nazca plate, began to form then, with the plate's easterly movement towards South America (at 40 cm per year). However, the South American plate is moving 32 mm per year to the west, and the Nazca plate subducts under the South America plate just off the coast.

The Galapagos Islands are situated on one of the most geologically exciting areas on Earth. One explanation for how the Galapagos Islands formed is as a result of a 'mantle plume' or 'hot spot' which can be thought of as a leak in the core of the Earth. The magma rises through the rock and collects in large pools called 'magma chambers'. As the magma accumulates it pushes the lithosphere up and causes the region to rise. Then the magma breaks through the crust and creates an island.

Meanwhile, remember that the plates are moving, but the hot spot is stationary. So... the plate with a new island has moved east and more magma is accumulating above the hot spot. Again the pooled magma breaks through and another island is formed. The plate continues its eastward movement. The magma continues to rise and islands continue to form. The eastern Galapagos islands are the oldest, and the western islands are the youngest. In fact the Galapagos Islands are very young and still evolving. Many volcanoes are still active. A taxi driver in Puerto Villamil, told Peter and Linda that Sierra Negra, the volcano behind their village, erupted just last year. Fortunately, the lava flowed in the direction away from the village, so no one was hurt.

How did the islands become colonised by different life forms, when on volcanic tuff it takes approximately 1000 attempts to produce a success?

The Lava Cactus was probably the first to succeed. It can grow well in lava crevices. It could have arrived as wind-blown seeds or as bits adhering to birds. Most importantly, it doesn't need much in the way of nutrients to survive. Carpet Weed, *Mollugo flavescens*, is another of the earliest colonisers of fresh lava. One study of Galapagos plants indicates that there have been 306 colonisations in 3 million years, i.e. just one successful colonisation for every 1,000 years!

Seabirds, such as the Nazca Booby, could easily reach the islands by flying, and they don't need any resources except a place to mate and lay eggs because they fly out to sea for their food. But how did the iguanas, snakes, rice rats, insects, and other creatures get there? They can't fly, can't swim, and are too big to be blown there by the wind. Remember that it's 1,000 km across *salt* water from the nearest land.

The general flow of water is west from the coast towards the Galapagos. Large rafts of vegetation are known to flow out of rivers along the coast of South America; these can include entire trees with everything that is living on them. These rafts are carried by ocean currents to the Galapagos Islands, but it is a long and perilous journey that can take around one month.

The only native terrestial mammal is the Rice Rat, probably small enough to have survived a month at sea in the branches of some big tree. There are also two bat species, a South American one, and the common Hoary Bat which we have here in Nova Scotia, and which could have flown or been carried in strong winds, or could have also survived in the branches of a floating tree. The Sea Lions and the Fur Seals would have swum in from other areas.

There are no native amphibians (amphibians are very sensitive to salt), but there are a couple of tree frogs, thought to have been introduced by man. Reptiles, however, *can* survive long periods of dessication, and the famous Galapagos marine and land iguanas are probably descended from the South American one, having arrived on a vegetation raft.

Invertebrates can arrive in a number of ways. On floating foliage, and by wind (Peter showed us an endemic Galapagos Blue). A third transport mechanism is by birds; for instance — Flamingos with muddy feet. (Darwin proved that viable plant seeds can exist in mud that adheres to the feet of wading birds.) So the invertebrates which the Greater Flamingos eat probably arrived as eggs in the mud on their feet.

Species diversity is typically low on the islands. There are roughly 1,500 Nova Scotian plants but only 560 in the Galapagos; 260 birds as compared with 50 in the islands; and 2,150 N.S. beetles compared to 400 Galapagos beetles. The situation for the pelagic seabirds are almost the same.

There is large species endemism (species that breed nowhere else in the world). Out of all the islands' 560 plants, 250 are endemic — 45%; there are 29 land bird species with 22 being endemic — 76 %; 23 pelagic seabirds, and six are endemic — 26 %; 400 beetles, 268 being endemic — 67%. A similar list for N.S. would show almost no endemic species. With the exception of the seabirds, the Galapagos endemic species don't even exist outside the archipelago.

There is gigantism there, and a good example of this is that Galapagos icon, the Giant Tortoise. The ancestral tortoise was probably a small South American species, but breeding advantage often lies with larger individuals, so there is a tendency to rapidly evolve to a larger size. Contrary pressures to gigantism include depletion/availability of food supply, effects on mobility, and plain clumsiness; in other words, 'giant' species are more successful until they get *too* big. There is also a general fearlessness on the islands because there are no large predators for most species, because they have not evolved with man, and because they are fiercely protected by Park Staff.

The predominant effect on the climate there are the prevailing winds from southwest; they make it very dry at sea-level. There is also a significant rain-shadow effect which makes the north sides of the islands drier. Higher up, however, there is more of a rainforest habitat, where the prevailing winds cool and drop their moisture in the form of an almost continuous mist called 'garua'. In a satellite photo, we could see clouds on the south sides of the islands where there are high elevations. Thus, it's generally dry at sea level, but higher up on the south slopes of the volcanoes there is lush vegetation. Most of the land that the boat tourists see therefore is very dry.

There are no predators for Galapagos seabirds, and there is lots of space and lots of food nearby because the surrounding ocean is so very rich and productive due to the upwelling and cold Humboldt current. Peter then showed us some of these fascinating seabirds.

The Waved Albatross for instance, which has a wingspan of two and one half metres, can boast 12,000 breeding pairs on Española and ten pairs on La Plata off the Ecuadorian coast. It feeds on small fish and squid, caught well out to sea. The female lays a single giant egg which can weigh up to 10% of her weight and is incubated for two months by both parents. They breed close to cliffs because these birds have to jump off in order to get airborne. Waved albatrosses mate for life and we saw a fascinating video of their elaborate courtship ritual.

The Lava Gull is endemic and there are only 400 pairs spread over the islands. It's a scavenger, a nest robber, will eat newly-hatched iguanas and marine turtles, and is a solitary nester on beaches.

The Galapagos Swallow-tailed Gull is the only nocturnal gull in the world. It feeds at night on small fish and squid (which rise to the ocean's surface at night), far offshore. It nests in small colonies on several islands, and also on one small island off western Colombia.

The Galapagos Penguin is the most northerly penguin, and at only 35 cm tall is also one of the smallest. There are 1,300 pairs now, but in 1984 after an El Niño, the population had crashed to 463 pairs. In good years they produce three clutches of two eggs each. They are clumsy on land, but marvellous swimmers.

The iconic Frigate Birds, both the greenish-plumed Great (20,000 pairs) and the purplish-plumed Magnificent (1,000 pairs), breed on the Galapagos. Frigates cannot swim and will drown if they land in water because they have no oil to protect their feathers from saturation. They snatch food from the ocean's surface, and steal food from other birds. We saw both courtship and nesting pictures of these wonderful birds, showing the males' huge, inflated, bright red chest 'balloon', called a gular sac.

There are three endemic Boobys; the Nazca, the Red-footed, and the Blue-footed. Thousands have been bred and re-released on their proper islands. One of them is semi-nocturnal. The Red-footed has prehensile feet and feeds on land, the Blue-footed is a coastal feeder, and the Nazca feeds in between. Three Booby species are gone, and one is doomed. Eradication of introduced goats and other threats is essential for their survival.

There is a flightless Cormorant, (the only cormorant); it is the largest, at one metre and four kilograms) and it swims using its feet alone. Essentially there is no dispersal, so the population is very inbred, and they breed whenever conditions permit. The females desert the nest and look for another male 2-3 months after the eggs hatch. Males take care of the young; they are better providers because they can dive deeper and remain underwater longer. A picture of one showed its stubby wings and its blue eyes.

In recent years, with the warm El Niño currents becoming more frequent in the area, the Galapagos seabirds may not fare so well in the near future. The landbirds, however, should do well in those years.

We were then shown the famous Giant tortoises, including very young ones at a captive breeding station on Santa Fé Island; these tortoises feed on Opuntia cactus if available, but the cactus is evolving into a tree-shape to escape being eaten. At the same time, the tortoises are developing a bend in the carapace over the neck to enable them to reach up higher to get at them!

Giant tortoises can weigh up to 250 kg and can measure one and one-half metres across the shell; there is a unique subspecies on each island, and each volcano has its own subspecies as well! They have very tasty meat, and used to be killed by the thousands for it. In the mid-50s the population was dangerously low, but since then, thousands have been deliberately bred and released. Pigs, dogs, rats, goats, horses, and cattle really affected their numbers, but they are safe from dogs by age five.

Then — the iguanas! The herbiverous Galapagos Marine Iguanas are the only true marine lizards, probably descended from the Common Iguana, and they eat almost exclusively subtidal marine algae. They are good swimmers, but have to come out of the water to warm up after feeding. We were shown one feeding underwater, using its long claws to hold on to stay submerged. It spends a lot of time just basking in the sun, and is

completely indifferent to people. Its colours vary depending on the population, and it is thought to be just one species with around 11 subspecies. They can overheat while basking, and one strategy to combat this is to face into the sun. They can be up to one and a third metres long, and weigh 990 kg!

The Land Iguanas live in small colonies and are endemic. There are two subspecies, both grey to yellow in colour; *Conolophus subcristatus* is more widespread, but *Conolophus pallidus* is found only on Santa Fé. They measure up to one metre long, weigh 13 kg, and live for approximately 70 years. They too feed mainly on Opuntia Cactus, but also some insects. The young feed on insects and other arthropods, and also finch nestlings. The adults have no natural predators, but the hatchling mortality rate is >90%! When Darwin visited the islands in 1835, he had trouble finding a place to pitch his tent due to the number of their burrows.

Panoramas at the seashore showed Sea Lions, who are curious and ungainly on land but also very playful. There were very pretty Sally Lightfoot Crabs, the size of a human palm and smaller, both red and yellow, which eat algae. We were shown tracks of Green Sea Turtles leading to nests, and there were beaches with variously-coloured sands, including white, red, green, and black! We saw a Velvet-fingered Ozius (a crab) in a tidepool and cautious Ghost Crabs on the beach. The beaches there are pristine; there is no garbage, and no graffiti. Other marvellous creatures were the Cardinal Fish, the Hieroglyphic Hawkfish, Razor Surgeonfish, Blue-chinned Parrotfish (which feeds by scraping algae from rocks and corals), the Panamic Fanged Blenny, and the Yellow-tailed Angelfish. The water is cold because of the Humboldt current, and a wetsuit must be worn when swimming and snorkelling.

Only 51 species of landbirds have been recorded on the Galapagos; the resident species are fearless and very easy to photograph. We saw a Galapagos Flycatcher, *Myiarchus magnirostris*, one of the 'tyrant' flycatchers in the same group as our Great-crested Flycatcher. Only 38 of the 51 recorded landbird species occur regularly. Eight are migrants, and 13 are vagrants, leaving 30 resident species. Surprisingly, we saw a subspecies of the same Yellow Warbler that we see here. It's a resident and does not migrate.

There is just one dove, the Galapagos Dove, and only one hawk, the Galapagos Hawk. The latter is a buteo, like our Red-tailed Hawk, and is both a predator and a scavenger. It feeds on virtually anything, including young iguanas, lizards, birds, rats, centipedes, dead goats, and sea lions, etc. There are only around 800 of these birds in existence. Their breeding strategy is 'cooperative polyandry' — each female mates with up to four males, all of whom share in the task of incubating and raising the young.

There are four species of Mockingbirds, all endemic. They are great mimics and are very adaptable, especially to people; they will eat almost anything. Peter showed us a Hood Mockingbird, found only on Española and Gardiner islands. Somehow they learned that humans carry water in bottles, and will go for them to get at the contents.

Of course, the most famous landbirds on the Galapagos are the so-called Darwin's finches. There are thirteen species, all very closely related, but each occupying its own ecological niche. They are one of the finest examples of what is called 'adaptive radiation'. The niches they occupy include small, medium, and large seed-eaters, nectar-eaters, fruit and insect eaters, and even one which uses tools. We saw a Large Ground Finch, which specialises in big seeds, a Medium Ground Finch, and a Warbler Finch (it had a very tiny bill).

Charles Darwin visited the Galapagos for about one month in 1835 as part of his voyage around the world on H.M.S. Beagle. He was 24 years old. The popular understanding is that his discovery of evolution took place during or just after his visit to the Galapagos, but that is just a myth. In fact, it wasn't until he was back in England and working on his specimens that he began to think about evolution. The finches were brought to his attention by a friend, the ornithologist John Gould, in May of 1837. After examining Darwin's specimens, Gould pointed out that they were closely related but that they each occupied a distinct niche, and that most of the Galapagos birds had close relatives in South America. This led Darwin to the idea that species were not immutable, and that very different species could be descended from a common ancestor. In 1859, at the age of 48, he published On the Origin of Species.

In 1973, Princeton biologists Peter and Rosemary Grant began studying the finches on a little Galapagos island called Daphne Major. They returned for six months each year, tagging every finch on the island. As a consequence of observing them during both good years and bad (an 'El Niño year'), they were able to see evolution in action, actually measuring and documenting changes in beak sizes, depending on the types of food available.

Peter and Linda were very lucky to visit Daphne Major — only small groups are allowed on that island, and special permission is required. Getting up on it was a bit of a challenge; they had to scale a vertical cliff. But once there, there was a magnificent view and a look into the floor of its volcanic crater, where there were frigatebirds and a few boobies nesting. They also saw some finches, each one banded. The Grants' graduate students continue the work there now, although nobody was there when Peter and Linda landed. The crumbly loose rocks on the steep sides of the volcano made for tricky walking, and getting back down was just as interesting as getting onto the island. The last 12 feet or so were vertical!

The only real threats to these islands originate with people. The Galapagos animals have been evolving with neither humans nor any large predators so they have lost all fear and have no strategies for dealing with them. As was mentioned earlier in the talk,

mariners almost wiped out tortoises for food. But humans left another threat; they introduced alien species to the islands — dogs, cats, pigs, goats, horses, cattle, donkeys, and rats. And the introductions continue today with alien plant and insect species.

How do these introduced species threaten the native animals? Goats, for example, can eliminate plant species on islands, thereby removing food for tortoises. On Pinta Island three goats were released in 1959; 11 years later, in 1970, the population was between 50-100 thousand. Four plant species were eliminated and five others significantly reduced. The National Park Service responded and the goats were eliminated by 1986. The change in microclimate of tortoise nesting grounds due to vegetation loss by goats could alter the sex ratio of the tortoises (by changing the temperature of soil — the tortoises' sex development is temperature dependent).

Feral cats predate almost all small animals especially ground-nesting birds and young iguanas. Dogs consume nestlings and eggs but also attack adult marine and land iguanas, boobies, penguins, and young fur seals and sea lions.

Pigs can convert a pristine island into an ecological disaster zone; they consume large quantities of vegetation but also root up tortoise eggs, and consume the eggs and young of marine and land iguanas and green sea turtles. There's plenty to say about invasive species but they stopped, talking instead about the enormous efforts involving tens of thousands of man-hours being invested to eliminate these aliens. There have been some successes; Santiago has been cleared of goats, donkeys and pigs, and they are now working on the rats. Rock doves have been eliminated from Isabella. Cats have been eliminated from Baltra. Various native organisms are being re-introduced from captive breeding programs. It's an enormous effort.

Tourism is not a bad thing for the Galapagos islands. The Park Service is well aware of the economic value of keeping this national treasure pristine and ensuring its survival. All tourists must be accompanied by a Park guide at all times. In their case, they were very lucky have a PhD Marine Biologist.

The number of boats and visitors to the islands is strictly controlled. All boat itineraries must be approved in advance, and all landing on islands must be at designated landing sites; some islands are completely off limits. Shoes worn on one island must be washed before they can be worn on another, to prevent transference of organisms. Tourists must stay on designated paths and this rule is strictly enforced. The only exception is if a bird or animal happens to be on the path, then you may go off the path in order to stay clear of the animal. You are not allowed to approach animals to within one metre (but they can approach you!), and you are not allowed to feed the animals or give them water, although some will try very hard to get it from you, such as the Hood Mockingbird aforementioned. Nothing but garbage can be removed; you can pick up to look, but must put anything back just where it was found, including shells, rocks, and feathers.

It's possible to stay at an island hotel, but most people stay on a boat. If you stay in a hotel you do not get to many of the islands. The boats generally travel from island to island by night, as some of the crossings between islands take up to 12 hours. You can choose from boats that carry 90 passengers to boats that just have a few. Peter's and Linda's boat had 12 passengers. The advantage of a bigger boat is that it is more stable (no seasickness), but its disadvantage, with its many passengers, is that you may have to wait and take turns going on an island and there may be some islands that you can't get onto at all.

Small boats are more desirable for naturalists. Tours are usually one week or two weeks. Peter and Linda opted for a two-week tour because they then got to see more islands. For week two they went around the west side of Isabella and visited Fenandina, the youngest island. All tours include snorkeling, and some tours specialise in SCUBA.

To visit an island, you go from your ship on a 'Panga' (a Zodiac). There are two types of landings: dry, and wet. For the wet landings the panga takes you in as close as it can on a beach and then you jump into the surf. For the dry, it takes you to some very sharp, rough lava where you clamber out of the heaving boat onto the slippery rocks.

We were shown an image of a Nazca Booby that decided to use a tourist path for her 'nest', and then some pretty scenery pictures — one of Pinnacle Rock; Daphne Minor as seen from Daphne Major; Santiago Island; and Island Bartolome where some scenes featured in the movie "Master and Commander" were shot.

At the end of their wonderful presentation, there was a video of Blue-footed Boobys in a feeding/flying frenzy over water. Peter and Linda also had a few copies of a reading list for anyone who was interested.

— Stephanie Robertson

WOOD WARBLERS 1 FEBRUARY

The presentation on warblers and their songs was provided by Cindy Staicer, an Assistant Professor in Dalhousie University's Biology Deptartment, who has had a long-term interest in warbler habitat and song behaviour. She spent the first of her career in Arizona studying the Grace's Warbler; then she went on to New Hampshire to study the American Redstart. Cindy has been in Nova Scotia since 1988, studying the wood warblers of N.S., especially the Magnolia Warbler.

The name wood warbler is derived from their habitat and their songs—meaning to 'sing with trills'. The family name, Parviledae, means 'little tit'. They

are New World species found only in the Americas, and there are 110 of them. Half of these are neo-tropical migrants, temperate migrants, and Caribbean residents. The other half are tropical mainland migrants and residents. Twenty-two Warbler species breed in Nova Scotia and there are two groups of them — wood warblers, and worm eaters. They sing before-dawn songs and after-sunrise songs, and these songs differ from one another in each species.

The neo-tropical migrants arrive during a period from late April to late May. The males sing for two purposes — to establish territory, and to attract a mate. The females build the nest, lay the eggs, incubate the eggs, and brood the young, but both parents feed them. When the young mature, the territory breaks down and the young disperse. From mid-August to mid-September, they begin to migrate to their winter sites.

Individual species are very habitat-specific, with different warblers occupying different habitats. Human activity, which changes habitat (such as the building of logging roads and clear cutting), affects the relative abundance of different warblers. Research is currently going on to establish this more thoroughly.

Wood warblers have two groups of songs. The first song group has two different types. The first type is used upon arrival to establish territory and to attract a mate. The second type is a dawn chorus song which occurs after mating and peaks in early June; the males sing these dawn songs to compete with other males, but the females do not sing at all. The second wood warbler song group has only one song, and it is used throughout the season. Some members of both song groups have a flight song. Our attention was drawn to Keji Adjunct as being a good location for the early morning (sunrise) chorus.

The worm eaters, the second group of warblers, tend to follow insect outbreaks. They are widely distributed in Canada, and they winter in Central America. They have three-part songs, with trills on different pitches.

Dr. Staicer then provided us with descriptions of the habitat and special song patterns of a number of warblers found in Nova Scotia, with beautiful pictures and useful song recordings for each one. The following are brief notes on each bird shown and discussed.

The Nashville warbler prefers forest-edge habitat. The Northern Parula weaves its nest *only* in clumps of Old Man's Beard lichen. (Its Latin name, *Dendroica petechia*, means 'red-spotted tree-dweller'.) These warblers can be found in the Grafton Lake area of Keji. Each male has a different song, especially in the day, during the territorial phase. The Yellow warbler, the most widespread, is found from the mid-U.S. to Yukon-Alaska. It inhabits tall, dense shrubs. The male has many (12) dawn songs, but only a single day song.

The Chestnut-sided warbler is found in regenerating clearings, powerline cuts, etc., where small trees overtop shrubs. The Magnolia warbler can be found in spruce bogs and regenerating spruce stands; males have two songs only. The Black-throated Blue is found in open, mid-storey forest with a shrubby understorey; in mature deciduous mixes; or in mature pine forests with a lower storey.

The Yellow-rumped Warbler is known in the East as the Myrtle warbler. It lives in closed canopy forests, while the Black-throated Green lives in mature, mixed woodlands. The Blackburnian prefers tall conifers and old forests, where it stays in the treetops; in N.S. it is found in hemlock or old spruce forests.

The Palm Warbler is found in treed bogs and regenerating spruce. The Bay-breasted warbler is a declining species in Nova Scotia, because the mature spruce and hemlock forests it prefers are rapidly disappearing. The Blackpoll is a resident of the boreal forest and White Spruce coastal headlands; it winters in South America, and flies non-stop from its northern summer home.

The Black and White Warbler is seen creeping along tree trunks foraging for insects. Its habitat is deciduous trees in areas of tree bogs.

The tiny and beautiful American Redstart lives in deciduous trees, especially birch. It uses strips of Yellow Birch to make its nest, and this warbler catches insects on the wing.

The Ovenbird lives in the interior of forests with at least 75% hardwood species; it makes an oven-shaped nest on the ground. The Northern Waterthrush is a bird of riparian areas — wetlands with trees.

The Common Yellowthroat prefers low shrubs whereas the Canada warbler lives in damp, deciduous hollows in mature, closed-canopy forest. It nests on the ground in dense foliage.

Male warblers defend a relatively large, all-purpose territory and they mostly stay on that territory. Occasionally they will leave, but when they are 'off-territory', they will not sing!

Threats to these birds relate to both breeding and to wintering habitats. The Canadian species of most concern are the Bay-breasted (mature spruce habitat), Blackburnian (tall, mature hemlock), Black-throated Blue (undergrowth of deciduous and mixed woodlands) and the Canada (wet areas). Throughout the range, there is a serious decline in the mature forests that are needed as well as the drying-up of wetlands. There are many instances of areas where a particular species was once plentiful, but now the birds are rarely seen there.

— Lillian Risley

FIELD TRIPS

SEWER STROLL

DATE: Saturday, 27 January
PLACE: Various locations around Halifax Harbour
WEATHER: Clear, very cold, windy
INTERPRETER: Peter Payzant
PARTICIPANTS: 15

Bitterly cold weather with sunny skies were the situation this year. The high wind chill made it uncomfortable to stay in exposed areas for very long, so we didn't spend as much time scanning as we usually do.

Our first stop was the end of the wharf at Fisherman's Cove in Eastern Passage. We saw a couple of Black Guillemots in the cove — not very black in their winter plumage — and a single Long-tailed Duck out in the passage. Our only Common Loon of the trip was also seen at this location. The wharf was covered with ice, presumably frozen spray kicked up by the strong north winds.

One of our more productive spots is now inaccessible. The tanker wharf opposite the Tim Horton's in Easern Passage is fenced in. One participant wondered if this was a PAH-contaminated site, now fenced as an effort to demonstrate that the public is not endangered. In any case, we had to drive by and go on to a new stop for us this year — the Woodside Ferry Terminal. Although we had unobstructed views of quite a lot of harbour here, there were no birds of interest.

We moved on to the familiar North Woodside Community Centre. Things had changed drastically here since last year. Where there used to be a grassy slope leading down to the railway tracks and the shore, there is now a paved 'trail' and an access road to a new sewage treatment plant. Nevertheless, there was still some gull activity on the shore, and we had good looks at Iceland and Black-headed Gulls. The dainty Black-headed Gulls were easy to pick out by their unique fluttering flight, delicate bills and characteristic wing markings.

Our next stop has traditionally been the foot of Old Ferry Road, but once again we were thwarted. Construction related to the Harbour Solutions Project prevented us from getting to (or even seeing) the harbour. By next year things should be back to normal, although the productive sewer outfall which has been such a prominent feature of Dartmouth Cove will be no more.

By this time we were more than interested in getting inside for a few moments, and the Dartmouth Ferry Terminal was a welcome break. We stocked up on coffee and tea, and then walked over to the lee of the Peace Pavilion. The sewage outfall had hundreds of gulls — mostly Herring, Ring-billed, and Iceland — but the brilliant sun made it difficult to watch them. A trio of perhaps Lesser Scaup swam by, ignoring the gulls. Behind us, in Dartmouth Cove, we saw a few American Wigeon, a Great Cormorant, and some Red-breasted Mergansers.

There were no Cardinals or other passerines at Sullivan's Pond, but we did see four or five American Coots which had been there for some weeks. The highlight of the trip was a brief flyover of a Peregrine Falcon, brightly lit from below by light reflected off the snow.

Tufts Cove was disappointing due to heavy ice in the cove and the bright light in our faces, but we did manage to see some more wigeon and a few Common Goldeneyes at extreme range, right in the sun. Just before we left, a quartet of goldeneyes flew into the cove, banked and turned, and flew out again.

At the Sackville River outfall we had good looks at the usual Mute Swan, and here also we were able to get better looks at some Common Goldeneyes. We were hoping to be able to compare Barrow's Goldeneyes but weren't able to locate any. The Mill Cove sewage treatment plant wasn't very productive, although some of us saw a seal poking its head up for a few minutes, far beyond the ice.

Our final stop was the old Volvo plant at the Richmond Terminals. Our target species here was Black-headed Gull, but alas there were none. We did get good looks at several Iceland Gulls, and there was a brief moment of excitement when we thought that we might have a Glaucous Gull far out in the harbour. A peek through the scope revealed it to be another Iceland Gull, however.

So, not a bad day, but for next year we could wish for warmer temperatures, less ice, and perhaps a cloudy day.

— Peter Payzant

SEWER STROLL SPECIES

Common Loon	*Gavia immer*
Great Cormorant	*Phalacrocorax carbo*
Mute Swan	*Cygnus olor*
Mallard	*Anas platyrhynchos*
American Black Duck	*A. rubripes*
American Wigeon	*A. americana*
Scaup sp.	*Aythya* sp.
Long-tailed Duck	*Clangula hyemalis*
Common Goldeneye	*Bucephala clangula*
Red-breasted Merganser	*Mergus serrator*
Peregrine Falcon	*Falco peregrinus*
American Coot	*Fulica americana*
Black-headed Gull	*Larus ridibundus*
Ring-billed Gull	*L. delawarensis*
Herring Gull	*L. argentatus*
Iceland Gull	*L. glaucoides*
Great Black-backed Gull	*L. marinus*
Black Guillemot	*Cepphus grylle*
Rock Dove	*Columba livia*
American Crow	*Corvus brachyrhynchos*
Black-capped Chickadee	*Poecile atricapilla*
European Starling	*Sturnus vulgaris*

Burke-Gaffney Observatory: Public shows at the Burke-Gaffney Observatory at Saint Mary's University are held on the 1st and 3rd Saturday of each month, except from June through September when they are held every Saturday. Tours begin at 7:00 p.m. between November 1st and March 30th, and at either 9:00 p.m. or 10:00 p.m. (depending on when it gets dark) between April 1st and October 31st. For more information, phone 496-8257, or go to **http://apwww.stmarys.ca/bgo/**.

Ecology Action Centre: Several showings of Al Gore's film about climate change, "An Inconvenient Truth", are planned for Metro's public libraries in March and April. For more information, go to **http://www.ecologyaction.ca/index.shtm**, or phone your nearest branch of the Halifax Public Library.

Nova Scotia Bird Society: Indoor meetings take place on the 4th Thursday of the month, September to May, at the Nova Scotia Museum of Natural History, 7:30 p.m. For more information, phone Suzanne Borkowski, 445-2922, or go to **http://nsbs.chebucto.org/**.

22 Mar. "Studying Swifts at the Robie Tufts Nature Centre Roosting Site in Wolfville", with speaker Jim Wolford.
31 Mar. **Rain date 01 Apr.** "Baccaro/Blanche Peninsula", with leader Donna Ensor, 875-4269; **smokeytow@yahoo.com**.
14 Apr. "Martinique Beach", with leader Ian McLaren, 429-7024; **iamclar@dal.ca**.
23 Apr. "Wolfville Area", with leader Jim Wolford, 542-9204; **jimwolford@eastlink.ca**.
26 Apr. "Hawks Up Close and Personal", with speaker Christopher Hawkins from CFB Shearwater.
28 Apr. "Port l'Hebert", with leaders Dorothy Poole, 354-4844; **dpoolex@ns.sympatico.ca**, and Clyde Stoddart, 745-2105.
5 May "Cape Sable Island", with leader Murray Newell, 745-3340; **dowitcher@eastlink.ca**.
12 May "Spring Migration Counts", contact Hans Toom, 868-1862; **htoom@hfx.eastlink.ca**, to participate.
18-21 May "Bon Portage Island", with leader Claire Diggins, 825-6152; **claire_diggins@hotmail.com. Pre-registration!**
19 May "Amherst Point Bird Sanctuary", with leader Terry Paquet, 452-3622; **terrypaquet@hotmail.com**.
21 May "Historic Hants County", with leader Suzanne Borkowski, 445-2922; **sborkowski@hfx.eastlink.ca**.
26 May **No May meeting in Halifax!** "Out-of-Area Meeting and Atlas Workshop" at Liscombe Lodge.
30 May "The Fred Dobson Warbler Walk", with leader Joan Waldron, 477-4273; **waldrojo@ns.sympatico.ca**.
2 Jun. "Canso and Area", with leaders Steve Bushell, 366-2527, & Tom Kavanaugh, 366-3476; **terri.crane@ns.sympatico.ca**.
2 Jun. "Kejimkujik Adjunct", with leader Peter Davies, 354-5389; **p.davies@ns.sympatico.ca**, & Dorothy Poole, 354-4844.
3 Jun. "Beginners' Bird Field Trip/Frog Pond", with leader Suzanne Borkowski, 445-2922; **suzanneborkowski@yahoo.ca. Pre-registration!**
9 Jun. "Conquerall Mills, Lunenburg County", with leader James Hirtle, 693-2104; **jrhbirder@hotmail.com**.
10 Jun. "Lewis Lake Provincial Park", with leaders Billy and Shirley Hughes, 876-7176; **shirley.hughes@devnull.ca**.
16 Jun. "Cumberland County", with leader Clarence Stevens, Sr., 464-1664.
23 Jun. "Cape Chignecto Provincial Park", with leader Joan Czapalay, 348-2803 (prior to 15 Jun., 405-4157), 441-9262; **joancz@ns.sympatico.ca. Pre-Registration!**
24 Jun. "Dawn Chorus/Shearwater Flyer Trail", with leader Cindy Staicer, 494-3533, 478-3635; **cindy.staicer@dal.ca**.
30 Jun. "Shubenacadie", with leader Rob Woods, 261-2122; **rrtwoods@yahoo.com**.

Nova Scotia Department of Natural Resources: Many outings that will take place in Provincial Parks are listed in the "Parks are for People" Programme, available free from the Department (424-4321), at many museums, parks, and tourist bureaus, and on the web at **http://parks.gov.ns.ca/programs.asp**.

Nova Scotia Museum of Natural History: For more information, phone 424-6099, 424-7353; or go to **http://museum.gov.ns.ca/mnh/**.

- 21 May "Reptiles: Real & Robotic", with many associated events, especially for children!
31 Mar. **-1 Apr.** "Annual Orchid Society Show & Sale".
TBA Apr. "Annual Salamander Meander", with John Gilhen, museum research associate. **Register**, 424-3563, after 1 Mar.
4 Apr. "Gardens: Past and Present", with speaker Alex Wilson, retired Museum botanist.
9 May "Free as the Wind: Saving the Horses of Sable Island", a **book launch** and talk with author Jamie Bastedo, illustrator Susan Tooke, and Sable Island researcher, Zoe Lucas.
29 May **-9 Sept.** "Wings Over the Atlantic", an exhibit of marine birds by the Musée de la nature et des sciences.

Nova Scotia Wild Flora Society: Meets on the 4th Monday of the month, Sept. to May, at the Nova Scotia Museum of Natural History, 7:30 p.m. For more information, phone Heather Drope, 423-7032, or go to **http://www.chebucto.ns.ca/~nswfs/**.

26 Mar. "Experiencing Spring in Crete", with speakers Mary and Chris Helleiner.
TBA Mar. "Skunk Cabbage in Bloom in SouthWest Nova". **Register with leader Charlie Cron, 477-8272.**
23 Apr. 2007 AGM followed by "Spring Flora", with speaker Charlie Cron.

Nova Scotian Institute of Science: Meets on the 1st Monday of the month, September to April, at the Nova Scotia Museum of Natural History, 7:30 p.m. For more info, go to **http://www.chebucto.ns.ca/Science/NSIS/index.html**.

2 Apr. "Coal Age Galapagos: Joggins and the quest for World Heritage Status", with speaker John Calder of DNR.

Royal Astronomical Society of Canada (Halifax Chapter): Meets on the 3rd Friday of each month in Room L176 of the Loyola Academic Building at Saint Mary's University, 8:00 p.m. For more information, go to **http://halifax.rasc.ca/**.

— compiled by Patricia L. Chalmers

TIDE TABLE

April-avril

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0130	**1.3**	0.4	**16**	0050	**0.7**	0.2
	0713	**5.6**	1.7		0641	**5.9**	1.8
SU	1345	**1.3**	0.4	MO	1259	**0.3**	0.1
DI	1934	**5.6**	1.7	LU	1904	**6.6**	2.0
2	0203	**1.3**	0.4	**17**	0144	**0.0**	0.0
	0751	**5.6**	1.7		0732	**5.9**	1.8
MO	1414	**1.3**	0.4	TU	1350	**0.3**	0.1
LU	2006	**5.6**	1.7	MA	1950	**6.9**	2.1
3	0233	**1.3**	0.4	**18**	0236	**0.0**	0.0
	0829	**5.6**	1.7		0823	**5.9**	1.8
TU	1439	**1.6**	0.5	WE	1442	**0.7**	0.2
MA	2037	**5.6**	1.7	ME	2037	**6.9**	2.1
4	0302	**1.0**	0.3	**19**	0328	**0.0**	0.0
	0905	**5.6**	1.7		0914	**5.9**	1.8
WE	1502	**1.6**	0.5	TH	1537	**0.7**	0.2
ME	2107	**5.6**	1.7	JE	2125	**6.6**	2.0
5	0332	**1.0**	0.3	**20**	0423	**0.0**	0.0
	0941	**5.2**	1.6		1005	**5.9**	1.8
TH	1528	**2.0**	0.6	FR	1638	**1.3**	0.4
JE	2139	**5.6**	1.7	VE	2214	**6.2**	1.9
6	0406	**1.3**	0.4	**21**	0520	**0.3**	0.1
	1015	**5.2**	1.6		1055	**5.6**	1.7
FR	1600	**2.0**	0.6	SA	1744	**1.6**	0.5
VE	2213	**5.6**	1.7	SA	2303	**5.9**	1.8
7	0446	**1.3**	0.4	**22**	0620	**0.7**	0.2
	1051	**5.2**	1.6		1148	**5.2**	1.6
SA	1643	**2.3**	0.7	SU	1852	**2.0**	0.6
SA	2249	**5.6**	1.7	DI	2355	**5.6**	1.7
8	0535	**1.6**	0.5	**23**	0721	**1.0**	0.3
	1129	**4.9**	1.5		1245	**4.9**	1.5
SU	1743	**2.6**	0.8	MO	1957	**2.0**	0.6
DI	2329	**5.2**	1.6	LU			
9	0634	**1.6**	0.5	**24**	0053	**5.2**	1.6
	1214	**4.9**	1.5		0820	**1.3**	0.4
MO	1853	**2.6**	0.8	TU	1354	**4.9**	1.5
LU				MA	2059	**2.3**	0.7
10	0016	**5.2**	1.6	**25**	0204	**4.9**	1.5
	0736	**2.0**	0.6		0917	**1.6**	0.5
TU	1309	**4.9**	1.5	WE	1517	**4.9**	1.5
MA	1958	**2.6**	0.8	ME	2158	**2.0**	0.6
11	0112	**5.2**	1.6	**26**	0326	**4.9**	1.5
	0837	**1.6**	0.5		1012	**1.6**	0.5
WE	1422	**4.6**	1.4	TH	1623	**5.2**	1.6
ME	2059	**2.6**	0.8	JE	2253	**2.0**	0.6
12	0223	**5.2**	1.6	**27**	0433	**4.9**	1.5
	0934	**1.3**	0.4		1103	**1.6**	0.5
TH	1544	**4.9**	1.5	FR	1710	**5.2**	1.6
JE	2159	**2.3**	0.7	VE	2342	**1.6**	0.5
13	0342	**5.2**	1.6	**28**	0524	**4.9**	1.5
	1028	**1.3**	0.4		1151	**1.6**	0.5
FR	1645	**5.2**	1.6	SA	1749	**5.6**	1.7
VE	2257	**1.6**	0.5	SA			
14	0451	**5.6**	1.7	**29**	0025	**1.6**	0.5
	1119	**1.0**	0.3		0607	**5.2**	1.6
SA	1733	**5.9**	1.8	SU	1232	**1.6**	0.5
SA	2355	**1.0**	0.3	DI	1824	**5.6**	1.7
15	0548	**5.9**	1.8	**30**	0102	**1.3**	0.4
	1210	**0.7**	0.2		0647	**5.2**	1.6
SU	1818	**6.2**	1.9	MO	1309	**1.6**	0.5
DI				LU	1856	**5.6**	1.7

May-mai

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0134	**1.0**	0.3	**16**	0126	**0.0**	0.0
	0727	**5.2**	1.6		0715	**5.9**	1.8
TU	1340	**1.6**	0.5	WE	1332	**1.0**	0.3
MA	1928	**5.6**	1.7	ME	1924	**6.9**	2.1
2	0205	**1.0**	0.3	**17**	0219	**0.0**	0.0
	0805	**5.2**	1.6		0808	**5.9**	1.8
WE	1408	**2.0**	0.6	TH	1428	**1.0**	0.3
ME	1959	**5.6**	1.7	JE	2014	**6.6**	2.0
3	0236	**1.0**	0.3	**18**	0312	**0.0**	0.0
	0842	**5.2**	1.6		0900	**5.9**	1.8
TH	1437	**2.0**	0.6	FR	1526	**1.3**	0.4
JE	2033	**5.6**	1.7	VE	2105	**6.6**	2.0
4	0309	**1.0**	0.3	**19**	0405	**0.3**	0.1
	0919	**5.2**	1.6		0952	**5.9**	1.8
FR	1509	**2.0**	0.6	SA	1626	**1.6**	0.5
VE	2108	**5.6**	1.7	SA	2156	**6.2**	1.9
5	0346	**1.0**	0.3	**20**	0459	**0.7**	0.2
	0955	**5.2**	1.6		1043	**5.6**	1.7
SA	1547	**2.3**	0.7	SU	1730	**2.0**	0.6
SA	2146	**5.6**	1.7	DI	2246	**5.9**	1.8
6	0429	**1.3**	0.4	**21**	0556	**1.0**	0.3
	1032	**5.2**	1.6		1134	**5.6**	1.7
SU	1634	**2.3**	0.7	MO	1833	**2.0**	0.6
DI	2225	**5.6**	1.7	LU	2338	**5.6**	1.7
7	0519	**1.3**	0.4	**22**	0651	**1.3**	0.4
	1112	**5.2**	1.6		1226	**5.2**	1.6
MO	1733	**2.6**	0.8	TU	1934	**2.3**	0.7
LU	2308	**5.6**	1.7	MA			
8	0614	**1.6**	0.5	**23**	0032	**5.2**	1.6
	1157	**4.9**	1.5		0745	**1.6**	0.5
TU	1837	**2.6**	0.8	WE	1323	**5.2**	1.6
MA	2355	**5.2**	1.6	ME	2032	**2.3**	0.7
9	0711	**1.6**	0.5	**24**	0133	**4.9**	1.5
	1251	**4.9**	1.5		0837	**1.6**	0.5
WE	1939	**2.6**	0.8	TH	1426	**5.2**	1.6
ME				JE	2127	**2.0**	0.6
10	0050	**5.2**	1.6	**25**	0241	**4.6**	1.4
	0806	**1.3**	0.4		0926	**2.0**	0.6
TH	1354	**4.9**	1.5	FR	1528	**5.2**	1.6
JE	2039	**2.3**	0.7	VE	2219	**2.0**	0.6
11	0156	**5.2**	1.6	**26**	0349	**4.6**	1.4
	0859	**1.3**	0.4		1015	**2.0**	0.6
FR	1501	**5.2**	1.6	SA	1620	**5.2**	1.6
VE	2139	**2.0**	0.6	SA	2307	**1.6**	0.5
12	0312	**5.2**	1.6	**27**	0446	**4.9**	1.5
	0952	**1.3**	0.4		1103	**2.0**	0.6
SA	1602	**5.6**	1.7	SU	1704	**5.6**	1.7
SA	2238	**1.3**	0.4	DI	2350	**1.6**	0.5
13	0424	**5.2**	1.6	**28**	0536	**4.9**	1.5
	1045	**1.0**	0.3		1149	**2.0**	0.6
SU	1654	**6.2**	1.9	MO	1742	**5.6**	1.7
DI	2335	**0.7**	0.2	LU			
14	0526	**5.6**	1.7	**29**	0028	**1.3**	0.4
	1140	**1.0**	0.3		0621	**4.9**	1.5
MO	1744	**6.6**	2.0	TU	1230	**2.0**	0.6
LU				MA	1818	**5.6**	1.7
15	0031	**0.3**	0.1	**30**	0103	**1.0**	0.3
	0622	**5.6**	1.7		0703	**5.2**	1.6
TU	1236	**1.0**	0.3	WE	1308	**2.0**	0.6
MA	1833	**6.6**	2.0	ME	1853	**5.6**	1.7
				31	0137	**1.0**	0.3
					0744	**5.2**	1.6
				TH	1343	**2.0**	0.6
				JE	1930	**5.6**	1.7

June-juin

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0214	**0.7**	0.2	**16**	0256	**0.3**	0.1
	0822	**5.2**	1.6		0849	**5.9**	1.8
FR	1418	**2.0**	0.6	SA	1516	**1.6**	0.5
VE	2008	**5.6**	1.7	SA	2051	**6.2**	1.9
2	0252	**0.7**	0.2	**17**	0347	**0.3**	0.1
	0900	**5.2**	1.6		0940	**5.9**	1.8
SA	1456	**2.0**	0.6	SU	1611	**1.6**	0.5
SA	2048	**5.6**	1.7	DI	2141	**5.9**	1.8
3	0333	**1.0**	0.3	**18**	0436	**0.7**	0.2
	0938	**5.2**	1.6		1027	**5.9**	1.8
SU	1538	**2.0**	0.6	MO	1707	**2.0**	0.6
DI	2129	**5.9**	1.8	LU	2229	**5.9**	1.8
4	0417	**1.0**	0.3	**19**	0525	**1.0**	0.3
	1018	**5.2**	1.6		1113	**5.9**	1.8
MO	1625	**2.3**	0.7	TU	1803	**2.0**	0.6
LU	2211	**5.6**	1.7	MA	2317	**5.6**	1.7
5	0505	**1.0**	0.3	**20**	0612	**1.3**	0.4
	1059	**5.2**	1.6		1158	**5.6**	1.7
TU	1721	**2.3**	0.7	WE	1859	**2.0**	0.6
MA	2254	**5.6**	1.7	ME			
6	0554	**1.0**	0.3	**21**	0005	**5.2**	1.6
	1144	**5.2**	1.6		0658	**1.6**	0.5
WE	1820	**2.3**	0.7	TH	1244	**5.6**	1.7
ME	2340	**5.6**	1.7	JE	1952	**2.3**	0.7
7	0645	**1.3**	0.4	**22**	0056	**4.9**	1.5
	1232	**5.2**	1.6		0743	**2.0**	0.6
TH	1921	**2.3**	0.7	FR	1333	**5.6**	1.7
JE				VE	2044	**2.0**	0.6
8	0033	**5.2**	1.6	**23**	0151	**4.6**	1.4
	0736	**1.3**	0.4		0829	**2.0**	0.6
FR	1324	**5.6**	1.7	SA	1427	**5.2**	1.6
VE	2020	**2.0**	0.6	SA	2134	**2.0**	0.6
9	0135	**5.2**	1.6	**24**	0254	**4.6**	1.4
	0829	**1.3**	0.4		0917	**2.0**	0.6
SA	1421	**5.6**	1.7	SU	1521	**5.2**	1.6
SA	2119	**1.6**	0.5	DI	2221	**2.0**	0.6
10	0245	**5.2**	1.6	**25**	0400	**4.6**	1.4
	0923	**1.3**	0.4		1009	**2.3**	0.7
SU	1520	**5.9**	1.8	MO	1612	**5.2**	1.6
DI	2218	**1.0**	0.3	LU	2305	**1.6**	0.5
11	0358	**5.2**	1.6	**26**	0500	**4.6**	1.4
	1021	**1.3**	0.4		1102	**2.3**	0.7
MO	1619	**6.2**	1.9	TU	1659	**5.2**	1.6
LU	2317	**0.7**	0.2	MA	2348	**1.3**	0.4
12	0505	**5.2**	1.6	**27**	0553	**4.9**	1.5
	1121	**1.3**	0.4		1152	**2.3**	0.7
TU	1715	**6.2**	1.9	WE	1742	**5.2**	1.6
MA				ME			
13	0014	**0.3**	0.1	**28**	0029	**1.0**	0.3
	0605	**5.6**	1.7		0639	**4.9**	1.5
WE	1223	**1.3**	0.4	TH	1237	**2.3**	0.7
ME	1811	**6.6**	2.0	JE	1825	**5.6**	1.7
14	0110	**0.0**	0.0	**29**	0111	**1.0**	0.3
	0701	**5.6**	1.7		0721	**4.9**	1.5
TH	1322	**1.3**	0.4	FR	1318	**2.0**	0.6
JE	1905	**6.6**	2.0	VE	1907	**5.6**	1.7
15	0204	**0.0**	0.0	**30**	0153	**0.7**	0.2
	0756	**5.6**	1.7		0802	**5.2**	1.6
FR	1420	**1.3**	0.4	SA	1358	**2.0**	0.6
VE	1959	**6.2**	1.9	SA	1950	**5.9**	1.8

ALL TIMES ARE AST

TIDE TABLE

April-avril

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0130	**1.3**	0.4	**16**	0050	**0.7**	0.2
	0713	**5.6**	1.7		0641	**5.9**	1.8
SU	1345	**1.3**	0.4	MO	1259	**0.3**	0.1
DI	1934	**5.6**	1.7	LU	1904	**6.6**	2.0
2	0203	**1.3**	0.4	**17**	0144	**0.0**	0.0
	0751	**5.6**	1.7		0732	**5.9**	1.8
MO	1414	**1.3**	0.4	TU	1350	**0.3**	0.1
LU	2006	**5.6**	1.7	MA	1950	**6.9**	2.1
3	0233	**1.3**	0.4	**18**	0236	**0.0**	0.0
	0829	**5.6**	1.7		0823	**5.9**	1.8
TU	1439	**1.6**	0.5	WE	1442	**0.7**	0.2
MA	2037	**5.6**	1.7	ME	2037	**6.9**	2.1
4	0302	**1.0**	0.3	**19**	0328	**0.0**	0.0
	0905	**5.6**	1.7		0914	**5.9**	1.8
WE	1502	**1.6**	0.5	TH	1537	**0.7**	0.2
ME	2107	**5.6**	1.7	JE	2125	**6.6**	2.0
5	0332	**1.0**	0.3	**20**	0423	**0.0**	0.0
	0941	**5.2**	1.6		1005	**5.9**	1.8
TH	1528	**2.0**	0.6	FR	1638	**1.3**	0.4
JE	2139	**5.6**	1.7	VE	2214	**6.2**	1.9
6	0406	**1.3**	0.4	**21**	0520	**0.3**	0.1
	1015	**5.2**	1.6		1055	**5.6**	1.7
FR	1600	**2.0**	0.6	SA	1744	**1.6**	0.5
VE	2213	**5.6**	1.7	SA	2303	**5.9**	1.8
7	0446	**1.3**	0.4	**22**	0620	**0.7**	0.2
	1051	**5.2**	1.6		1148	**5.2**	1.6
SA	1643	**2.3**	0.7	SU	1852	**2.0**	0.6
SA	2249	**5.6**	1.7	DI	2355	**5.6**	1.7
8	0535	**1.6**	0.5	**23**	0721	**1.0**	0.3
	1129	**4.9**	1.5		1245	**4.9**	1.5
SU	1743	**2.6**	0.8	MO	1957	**2.0**	0.6
DI	2329	**5.2**	1.6	LU			
9	0634	**1.6**	0.5	**24**	0053	**5.2**	1.6
	1214	**4.9**	1.5		0820	**1.3**	0.4
MO	1853	**2.6**	0.8	TU	1354	**4.9**	1.5
LU				MA	2059	**2.3**	0.7
10	0016	**5.2**	1.6	**25**	0204	**4.9**	1.5
	0736	**2.0**	0.6		0917	**1.6**	0.5
TU	1309	**4.9**	1.5	WE	1517	**4.9**	1.5
MA	1958	**2.6**	0.8	ME	2158	**2.0**	0.6
11	0112	**5.2**	1.6	**26**	0326	**4.9**	1.5
	0837	**1.6**	0.5		1012	**1.6**	0.5
WE	1422	**4.6**	1.4	TH	1623	**5.2**	1.6
ME	2059	**2.6**	0.8	JE	2253	**2.0**	0.6
12	0223	**5.2**	1.6	**27**	0433	**4.9**	1.5
	0934	**1.3**	0.4		1103	**1.6**	0.5
TH	1544	**4.9**	1.5	FR	1710	**5.2**	1.6
JE	2159	**2.3**	0.7	VE	2342	**1.6**	0.5
13	0342	**5.2**	1.6	**28**	0524	**4.9**	1.5
	1028	**1.3**	0.4		1151	**1.6**	0.5
FR	1645	**5.2**	1.6	SA	1749	**5.6**	1.7
VE	2257	**1.6**	0.5	SA			
14	0451	**5.6**	1.7	**29**	0025	**1.6**	0.5
	1119	**1.0**	0.3		0607	**5.2**	1.6
SA	1733	**5.9**	1.8	SU	1232	**1.6**	0.5
SA	2355	**1.0**	0.3	DI	1824	**5.6**	1.7
15	0548	**5.9**	1.8	**30**	0102	**1.3**	0.4
	1210	**0.7**	0.2		0647	**5.2**	1.6
SU	1818	**6.2**	1.9	MO	1309	**1.6**	0.5
DI				LU	1856	**5.6**	1.7

May-mai

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0134	**1.0**	0.3	**16**	0126	**0.0**	0.0
	0727	**5.2**	1.6		0715	**5.9**	1.8
TU	1340	**1.6**	0.5	WE	1332	**1.0**	0.3
MA	1928	**5.6**	1.7	ME	1924	**6.9**	2.1
2	0205	**1.0**	0.3	**17**	0219	**0.0**	0.0
	0805	**5.2**	1.6		0808	**5.9**	1.8
WE	1408	**2.0**	0.6	TH	1428	**1.0**	0.3
ME	1959	**5.6**	1.7	JE	2014	**6.6**	2.0
3	0236	**1.0**	0.3	**18**	0312	**0.0**	0.0
	0842	**5.2**	1.6		0900	**5.9**	1.8
TH	1437	**2.0**	0.6	FR	1526	**1.3**	0.4
JE	2033	**5.6**	1.7	VE	2105	**6.6**	2.0
4	0309	**1.0**	0.3	**19**	0405	**0.3**	0.1
	0919	**5.2**	1.6		0952	**5.9**	1.8
FR	1509	**2.0**	0.6	SA	1626	**1.6**	0.5
VE	2108	**5.6**	1.7	SA	2156	**6.2**	1.9
5	0346	**1.0**	0.3	**20**	0459	**0.7**	0.2
	0955	**5.2**	1.6		1043	**5.6**	1.7
SA	1547	**2.3**	0.7	SU	1730	**2.0**	0.6
SA	2146	**5.6**	1.7	DI	2246	**5.9**	1.8
6	0429	**1.3**	0.4	**21**	0556	**1.0**	0.3
	1032	**5.2**	1.6		1134	**5.6**	1.7
SU	1634	**2.3**	0.7	MO	1833	**2.0**	0.6
DI	2225	**5.6**	1.7	LU	2338	**5.6**	1.7
7	0519	**1.3**	0.4	**22**	0651	**1.3**	0.4
	1112	**5.2**	1.6		1226	**5.2**	1.6
MO	1733	**2.6**	0.8	TU	1934	**2.3**	0.7
LU	2308	**5.6**	1.7	MA			
8	0614	**1.6**	0.5	**23**	0032	**5.2**	1.6
	1157	**4.9**	1.5		0745	**1.6**	0.5
TU	1837	**2.6**	0.8	WE	1323	**5.2**	1.6
MA	2355	**5.2**	1.6	ME	2032	**2.3**	0.7
9	0711	**1.6**	0.5	**24**	0133	**4.9**	1.5
	1251	**4.9**	1.5		0837	**1.6**	0.5
WE	1939	**2.6**	0.8	TH	1426	**5.2**	1.6
ME				JE	2127	**2.0**	0.6
10	0050	**5.2**	1.6	**25**	0241	**4.6**	1.4
	0806	**1.3**	0.4		0926	**2.0**	0.6
TH	1354	**4.9**	1.5	FR	1528	**5.2**	1.6
JE	2039	**2.3**	0.7	VE	2219	**2.0**	0.6
11	0156	**5.2**	1.6	**26**	0349	**4.6**	1.4
	0859	**1.3**	0.4		1015	**2.0**	0.6
FR	1501	**5.2**	1.6	SA	1620	**5.2**	1.6
VE	2139	**2.0**	0.6	SA	2307	**1.6**	0.5
12	0312	**5.2**	1.6	**27**	0446	**4.9**	1.5
	0952	**1.3**	0.4		1103	**2.0**	0.6
SA	1602	**5.6**	1.7	SU	1704	**5.6**	1.7
SA	2238	**1.3**	0.4	DI	2350	**1.6**	0.5
13	0424	**5.2**	1.6	**28**	0536	**4.9**	1.5
	1045	**1.0**	0.3		1149	**2.0**	0.6
SU	1654	**6.2**	1.9	MO	1742	**5.6**	1.7
DI	2335	**0.7**	0.2	LU			
14	0526	**5.6**	1.7	**29**	0028	**1.3**	0.4
	1140	**1.0**	0.3		0621	**4.9**	1.5
MO	1744	**6.6**	2.0	TU	1230	**2.0**	0.6
LU				MA	1818	**5.6**	1.7
15	0031	**0.3**	0.1	**30**	0103	**1.0**	0.3
	0622	**5.6**	1.7		0703	**5.2**	1.6
TU	1236	**1.0**	0.3	WE	1308	**2.0**	0.6
MA	1833	**6.6**	2.0	ME	1853	**5.6**	1.7
				31	0137	**1.0**	0.3
					0744	**5.2**	1.6
				TH	1343	**2.0**	0.6
				JE	1930	**5.6**	1.7

June-juin

Day	Time	Feet	Metres	jour	heure	pieds	metres
1	0214	**0.7**	0.2	**16**	0256	**0.3**	0.1
	0822	**5.2**	1.6		0849	**5.9**	1.8
FR	1418	**2.0**	0.6	SA	1516	**1.6**	0.5
VE	2008	**5.6**	1.7	SA	2051	**6.2**	1.9
2	0252	**0.7**	0.2	**17**	0347	**0.3**	0.1
	0900	**5.2**	1.6		0940	**5.9**	1.8
SA	1456	**2.0**	0.6	SU	1611	**1.6**	0.5
SA	2048	**5.6**	1.7	DI	2141	**5.9**	1.8
3	0333	**1.0**	0.3	**18**	0436	**0.7**	0.2
	0938	**5.2**	1.6		1027	**5.9**	1.8
SU	1538	**2.0**	0.6	MO	1707	**2.0**	0.6
DI	2129	**5.9**	1.8	LU	2229	**5.9**	1.8
4	0417	**1.0**	0.3	**19**	0525	**1.0**	0.3
	1018	**5.2**	1.6		1113	**5.9**	1.8
MO	1625	**2.3**	0.7	TU	1803	**2.0**	0.6
LU	2211	**5.6**	1.7	MA	2317	**5.6**	1.7
5	0505	**1.0**	0.3	**20**	0612	**1.3**	0.4
	1059	**5.2**	1.6		1158	**5.6**	1.7
TU	1721	**2.3**	0.7	WE	1859	**2.0**	0.6
MA	2254	**5.6**	1.7	ME			
6	0554	**1.0**	0.3	**21**	0005	**5.2**	1.6
	1144	**5.2**	1.6		0658	**1.6**	0.5
WE	1820	**2.3**	0.7	TH	1244	**5.6**	1.7
ME	2340	**5.6**	1.7	JE	1952	**2.3**	0.7
7	0645	**1.3**	0.4	**22**	0056	**4.9**	1.5
	1232	**5.2**	1.6		0743	**2.0**	0.6
TH	1921	**2.3**	0.7	FR	1333	**5.6**	1.7
JE				VE	2044	**2.0**	0.6
8	0033	**5.2**	1.6	**23**	0151	**4.6**	1.4
	0736	**1.3**	0.4		0829	**2.0**	0.6
FR	1324	**5.6**	1.7	SA	1427	**5.2**	1.6
VE	2020	**2.0**	0.6	SA	2134	**2.0**	0.6
9	0135	**5.2**	1.6	**24**	0254	**4.6**	1.4
	0829	**1.3**	0.4		0917	**2.0**	0.6
SA	1421	**5.6**	1.7	SU	1521	**5.2**	1.6
SA	2119	**1.6**	0.5	DI	2221	**2.0**	0.6
10	0245	**5.2**	1.6	**25**	0400	**4.6**	1.4
	0923	**1.3**	0.4		1009	**2.3**	0.7
SU	1520	**5.9**	1.8	MO	1612	**5.2**	1.6
DI	2218	**1.0**	0.3	LU	2305	**1.6**	0.5
11	0358	**5.2**	1.6	**26**	0500	**4.6**	1.4
	1021	**1.3**	0.4		1102	**2.3**	0.7
MO	1619	**6.2**	1.9	TU	1659	**5.2**	1.6
LU	2317	**0.7**	0.2	MA	2348	**1.3**	0.4
12	0505	**5.2**	1.6	**27**	0553	**4.9**	1.5
	1121	**1.3**	0.4		1152	**2.3**	0.7
TU	1715	**6.2**	1.9	WE	1742	**5.2**	1.6
MA				ME			
13	0014	**0.3**	0.1	**28**	0029	**1.0**	0.3
	0605	**5.6**	1.7		0639	**4.9**	1.5
WE	1223	**1.3**	0.4	TH	1237	**2.3**	0.7
ME	1811	**6.6**	2.0	JE	1825	**5.6**	1.7
14	0110	**0.0**	0.0	**29**	0111	**1.0**	0.3
	0701	**5.6**	1.7		0721	**4.9**	1.5
TH	1322	**1.3**	0.4	FR	1318	**2.0**	0.6
JE	1905	**6.6**	2.0	VE	1907	**5.6**	1.7
15	0204	**0.0**	0.0	**30**	0153	**0.7**	0.2
	0756	**5.6**	1.7		0802	**5.2**	1.6
FR	1420	**1.3**	0.4	SA	1358	**2.0**	0.6
VE	1959	**6.2**	1.9	SA	1950	**5.9**	1.8

ALL TIMES ARE AST