

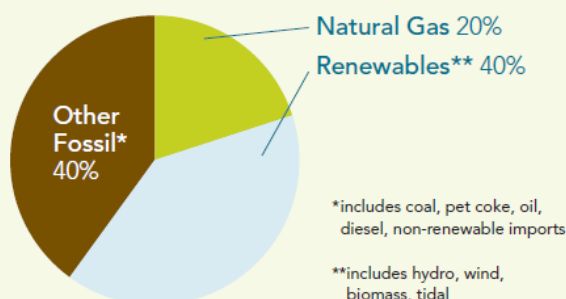
BIO-OCEANS ASSOCIATION NEWSLETTER

Issue 50

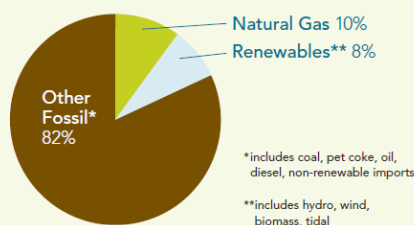
April 2011



Potential Energy Mix 2020



Energy Mix 2001



NOVA SCOTIA'S CLEANER ENERGY STRATEGY

The guest speaker for the BIO-OA "INTO SPRING CELEBRATION AND SPECIAL SEMINAR (Sunday, 20 March 2011) was Sandra Farwell, Manager of Renewable Energy with the NS Department of Energy. She spoke about the 'Province's Cleaner Energy Strategy'. Nova Scotians currently rely heavily on imported fossil fuels, but this is not sustainable. In the past decade, Nova Scotia has taken significant strides towards a cleaner, more sustainable future and she reviewed the new programs and opportunities for renewable energy that have been recently established. She also outlined the many options that are available for transforming the provincial energy sector which include energy efficiency and conservation, renewable energy for heat, electricity, and fuel, and development of cleaner, local fuels like natural gas. She outlined the 'Province's Cleaner Energy Strategy' which will set out practical, balanced steps for repatriating Nova Scotia's energy supplies and chart a realistic course for replacing imported, carbon-intensive, non-renewable fuels with sustainable, local energy sources. Nova Scotia's Renewable Electricity Plan is available on-line at <http://www.gov.ns.ca/energy/resources/EM/renewable/renewable-electricity-plan.pdf> The small, but keen, audience asked many questions and stimulated interesting discussion. In appreciation of her presentation, Ms. Farwell was presented with a BIO keychain and coffee mug.

BIO-Oceans Association
Annual General Meeting and
Beluga Award Presentation
6 May in the BIO Auditorium
0930h AGM
1100h Beluga Award Presentation

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From the President

The CCGS *Hudson* is almost 50-years old and is approaching the end of its working life. Three major studies by DFO and NRCan to define the characteristics of a suitable replacement vessel came to the conclusion that what was needed to meet present and future program requirements was a 90-metre vessel, similar to the *Hudson*. This conclusion was consistent with that reached by several other countries conducting similar scientific programs in similar environments. In 2004, the date of the most recent study, the cost for such a replacement was estimated at \$120 million. Three years later, the Fisheries and Oceans Minister announced that a 90-metre oceanographic vessel would be constructed to replace CCGS *Hudson* and that it would go into service in 2014. Unfortunately, the original 2004 cost estimate was never revised to allow for inflation. As a result, the size of the proposed replacement vessel was first reduced to a 83-metre version and then in 2010 to a 76-metre ship. This smaller vessel might be marginally adequate to conduct DFO's current east coast oceanographic program, but would present major problems for NRCan and for future multi-disciplinary research.

As OA members with e-mail addresses know, a group of BIO scientists have written a letter to the ADMs of both DFO and NRCan expressing their concerns about the shortcomings of the 76-metre vessel. After discussions with several people, the BIO-OA executive decided to send a similar letter on behalf of the Oceans Association's members to the political masters of these two departments: the ministers of Fisheries and Oceans and Natural Resources. The letters were sent via priority post on 16 March 2011. Key points raised in the letter included the following:

- ♦ a 76-metre ship will lack the ability to allow proper multi-disciplinary ecological studies crucial to understanding modern biological problems such as the decline of the commercial fisheries and other resource-related issues;
- ♦ for marine geoscience programs, it will not have the capability of doing both survey and core sampling work on a single cruise, thus severely reducing the operating efficiency of the ship and hindering the effective achievement of the scientific and management objectives;
- ♦ while the *Hudson* occasionally encounters at-sea limitations, a vessel 16% shorter will have difficulty operating effectively in high-wave conditions, thus further limiting its efficiency as a research vessel in the adverse conditions common in the North Atlantic and Labrador Sea; and
- ♦ the proposed ship will have a hull with much less in the way of ice strengthening than did the *Hudson*, resulting in

significant limitations to how far north the vessel will be able to operate in ice-invested waters.

We also pointed out that Canada's oceanographic science program is currently at a low level, but based on past experience, national priorities change as do environmental emergencies, and other uses for the vessel. This means that a ship capable of meeting only part of Canada's current oceanographic research needs will clearly be inadequate in the near future. Moreover, the reduced cabin capacity of a smaller vessel will severely restrict the ability of BIO scientists to mentor and train university postgraduate oceanography students. We ended with a request to reconsider the decision to limit the size of *Hudson*'s replacement to what can be built for \$120 million, as we consider that decision to be shortsighted and counterproductive to marine research in Canada's oceans.

We hope that you as BIO-OA members endorse the executive's action on your behalf. As of 29 March 2011, I have received an acknowledgement from the office of the Minister of Natural Resources, but nothing from DFO.

Elsewhere in this issue you will see that progress continues on the book to commemorate BIO's 50th anniversary in 2012. It has a working title—*Voyage of Discovery: fifty years of marine research at Canada's Bedford Institute of Oceanography*—and has been endorsed by the Institute's science directors. A business plan is under development, the search for an Editor-in-Chief is underway, and an Editorial Board has been appointed, consisting of the Editor-in-Chief, Don Gordon, Mike Lewis, David Nettlehip, and Mike Sinclair. In connection with this work, the BIO Archivist, Marilyn Rudi, has compiled a bibliography of histories of oceanographic institutions and organizations. I have asked our webmasters to add it to the Association's new website.

And speaking of the new website (www.bio-oa.ca), a listing of the contents of the equipment archive, complete with descriptions and photos, should be available on it by the end of April 2011. David McKeown and Phil Spencer are currently performing the final 'tweaks' to ensure that the links work correctly.

It is also my pleasure to announce that Brian Beanlands has been chosen as the 2011 recipient of the Beluga Award. He will be presented with the award on Friday, 6 May 2011, as part of our AGM. Please come to the AGM and join BIO to celebrate the contributions Brian has made to our community at BIO.

This is my final 'From the President' column. At our AGM, I will be passing the presidential gavel to Paul Keizer. It has been an interesting and enjoyable year.

Betty Sutherland

The Wave of Excitement is growing for World Oceans Day - 8 June 2011

Want to do something special for the oceans this year? Well, you may have even more opportunities than ever, no matter where you are! If you are in the Halifax area, the whole month of June will be filled with great Oceans events, such as several public lectures, the Nova Scotia Seafood Festival and lots, lots more. For example, the annual Elisabeth Mann Borgese Ocean Lecture is scheduled for the evening of 8 June 2011 at Dalhousie University. The lecture, 'Oceans and the Arts: A Celebration', will take the form of a conversation between a panel of artists moderated by Paul Kennedy (CBC Radio Ideas). A reception will follow and everyone is welcome.

You may also wish to mark your calendars on Friday, 3 June, for the annual public Halifax Waterfront World Oceans Day Celebration. It is hosted by the Maritime Museum of the Atlantic (MMA) and is currently led by the Provincial Oceans Network Secretariat as well as DFO. Doors are open from 0930h until 1530h, and admission to both the MMA and CSS *Acadia* will be free for the day. This event has taken place every year but one since the international celebration was proposed by Canada in 1992 at the United Nations Earth Summit in Rio de Janeiro (see below).



Creatures of the Deep at the Halifax Waterfront World Oceans Day Celebration in the Maritime Museum of the Atlantic in June 2010.

It may even be the most consistently held World Oceans Day Celebration in the world!

If you happen to be working or visiting BIO on 8 June be sure to drop by the Lower Cafeteria and join us for some coffee and a piece of 'World Oceans Day' cake.

Visit www.coinatlantic.ca for information on World's Oceans Day events in Atlantic Canada.

The Story of the First Oceans Day An excerpt from a speech by Judith Swan

In 1992, the government of Canada wanted to showcase the oceans during the United Nations Conference on Environment and Development in Rio de Janeiro. The federal government invited the Oceans Institute of Canada, of which I was then Executive Director, to coordinate an event which would draw attention to the many concerns of the day: coastal zone management, land-based pollution, high seas commercial fishing.

The Oceans Institute worked tirelessly for months to create a meaningful event. The participants included four federal departments, a provincial government, NGOs, the representatives of coastal communities, industry and youth, distinguished academics, the International Oceanographic Commission, some Ministers and Prime Ministers, past and present, both Canadian and 'from away', and an astronaut.

Our efforts paid off. The meeting drew an international audience and 8 June 1992 was proclaimed 'Oceans Day'. The Earth Summit had come about because the peoples of the world had been educated to "think green". The 8 June event invited them to "think blue". We didn't know it at the time, but that first 'Oceans Day' was just the start of what was to be-

come a big blue wave of support for the oceans, and an opportunity to develop programs for schools and communities to learn about the oceans.

It was the Brazilians who suggested that 'Oceans Day' should be celebrated around the world on 8 June every year. It was a challenge that could not be ignored, nor could it be done alone. Over the years, I've taken 'Oceans Day' with me wherever I've gone. A bit like Johnny Appleseed, I've planted suggestions for programs of action and education in any likely soil: individuals, community groups, schools, NGOs, governments. Unlike Johnny, I haven't been alone in planting these seeds. The celebration of 'Oceans Day' is expanding to various countries around the world; it is proving to be an excellent vehicle for learning and doing.

In my work and the work of others, I see coming together the need, the opportunity, and the will. We have already made a great investment of time and it is only just a start. We are carried forward by a conviction that care for the oceans and for the coastal environment is essential to our future. Our reward will be to recognize the divine sower in each of us to contribute to a healthier habitat and more abundant life for all who share this beautiful 'Blue Planet'.

Canada's marine energy resources

By Andy Sherin

Andrew Cornett from the Canadian Hydraulics Centre of the National Research Council published an inventory of Canada's marine renewable energy resources in April 2006 ([Cornett, A. 2006. Inventory of Canada's Marine Energy Resources, NRC Report CHC-TR-041](#)). The report quantified and mapped energy resources due to waves and tidal currents.

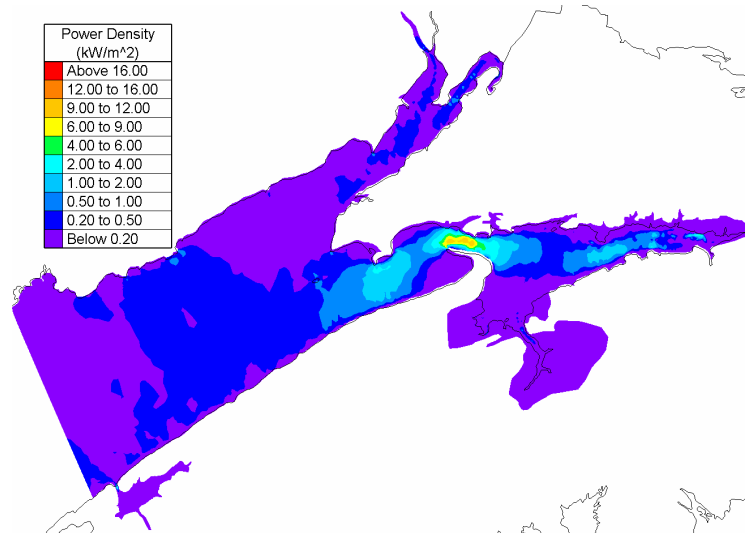
The report concluded that the annual mean wave power along the 1,000 metre-isobaths off Canada's Atlantic coast sums to roughly 146,500 MW, or more than double the current electricity demand. The wave energy available in winter is generally four to seven times greater than in summer. It is important to recognize that due to various factors including environmental considerations, losses associated with power conversion, and socio-economic factors, only a fraction of the available wave energy resource can be extracted and converted into useful electric power. Even so, the Canadian resources are considered sufficient to justify further research into their development as an important source of renewable green energy for the future.

According to Dr. Cornett's report, Canada is also endowed with sizeable tidal current energy resources. Compared to other renewable energy sources such as solar, winds and waves, tidal currents have the distinct advantage of being reliable and highly predictable. A total of 190 sites with potential mean power greater than 1 MW were identified. The total mean potential power at these 190 sites exceeds 42,000 MW. Classified by Province and Territory, Nunavut has by far the largest potential resource, while British Columbia has the most sites with mean power greater than 1 MW. It is important to note that, as in the case of wave energy, only a fraction of the available tidal current resource can be converted into useable energy without noticeable impact on tides and tidal flows. The effects of extracting energy from tidal currents and from ocean waves should be assessed carefully on a case-by-case basis.

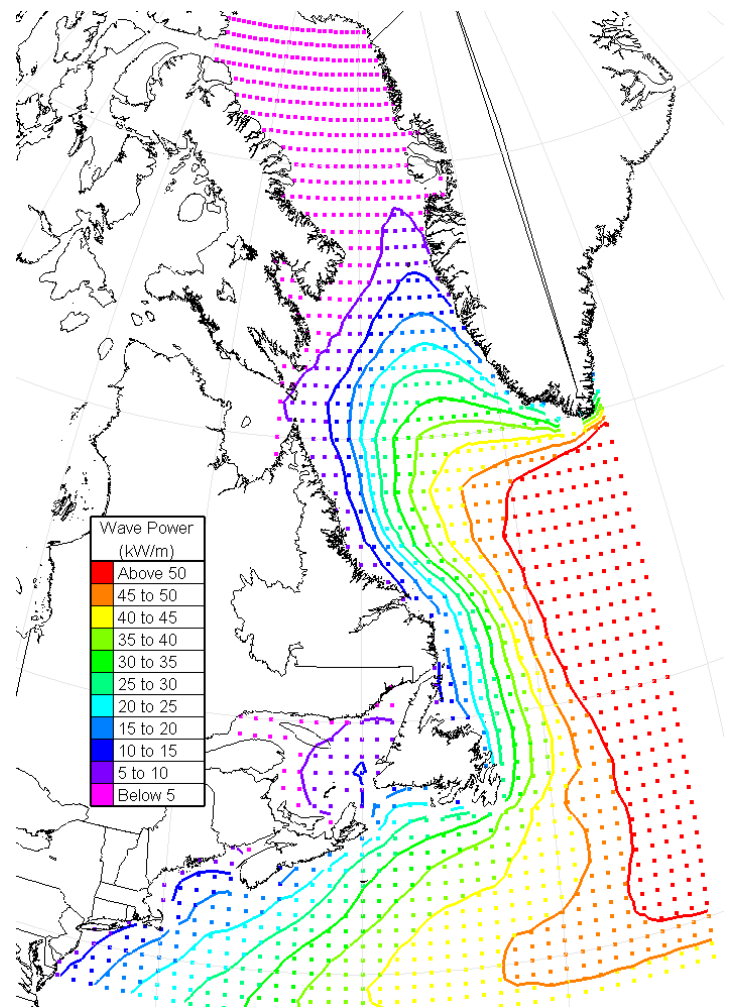
The report identified 21 sites in the Bay of Fundy with a potential tidal current energy greater the 100 MW totaling 2,725 MW of potential energy.

The report recommended further wave-energy studies for southeastern Newfoundland and the southeastern shore of Cape Breton.

The report also recommended further modeling studies in the Bay of Fundy to improve the definition of the tidal current resources available, and to investigate the impact of energy extraction on the tidal flows throughout the region.



Mean power density, Bay of Fundy from Cornett, A. 2006. Inventory of Canada's Marine Energy Resources, NRC Report CHC-TR-041.



Mean annual wave power derived from hindcast data from Cornett, A. 2006. Inventory of Canada's Marine Energy Resources, NRC Report CHC-TR-041.

Small scale tidal power: benefits from university research collaboration

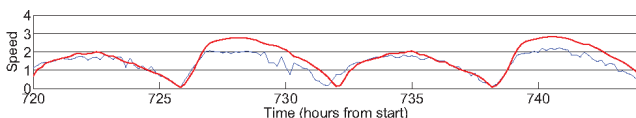
By Andy Sherin

On 22 March 2011, Dana Morin, President of Fundy Tidal Inc. (FTI) and Dr. Alex Hay of Dalhousie University, gave the opening presentation at 'Explore a Sea of Opportunity!', a session on industry-university research connections sponsored by the Atlantic Canada Opportunities Agency, the National Science and Engineering Research Council, the Halifax Marine Research Institute of Dalhousie University and Springboard Atlantic, a network to support the commercialization of research in Atlantic Canada.

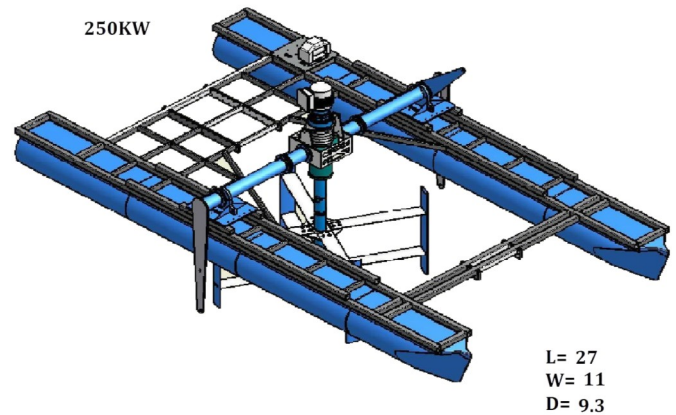
They described their collaboration to investigate the marine energy potential of Grand Passage, the passage between Brier and Long Islands. FTI was established to serve as a vehicle for community-led in-stream and tidal energy projects throughout Nova Scotia. The aim was to establish Grand & Petit Passage & Digby County as focal points of marine energy industrial development for small- to medium-sized devices in order to maximize economic opportunities for shareholders, partners and community, and to focus on small-scale generation and distribution systems. FTI's mission is to operate arrays of tidal turbines connected to the electrical grid utilizing multiple tidal power generation systems. FTI plans to test a 25-KW unit from New Energy Corporation (NEC) in summer 2011 and plans to install a 250-KW unit in 2012. They also plan site surveys in summer 2011 in Petit Passage (between Long Island and Digby Neck) and the installation of a 150-KW turbine from Ocean Renewable Power Company (ORPC) in 2012. FTI plans to have a 2-MW array of 13-ORPC machines installed by 2013 and a 2-MW array of 8-NEC machines in Grand Passage over time.

Dr. Hay is working with FTI and Dr. Richard Karsten of the Acadia University's Department of Mathematics and Statistics to study the tidal currents in Grand Passage. In October 2010, Dr. Hay conducted an Acoustic Doppler Current Profiler (ACDP) survey. The survey found that the model overestimated the current speed. Dr. Hay plans to continue the collaboration by studying turbulence and turbine flow interactions.

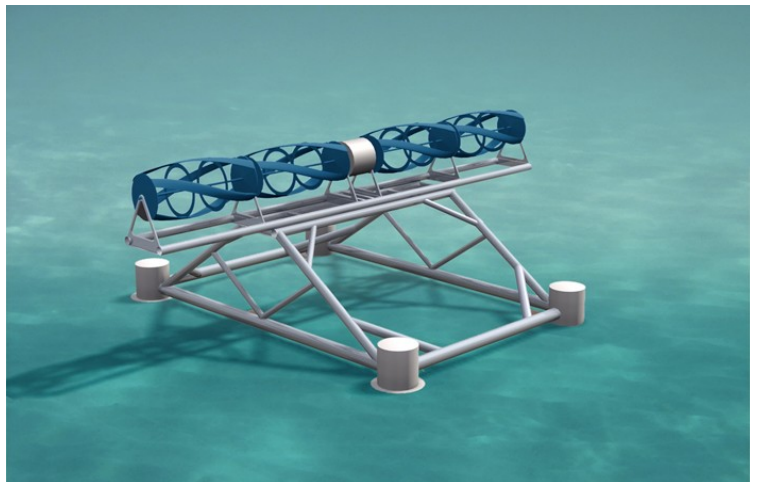
Several other presenters described initiatives to develop Nova Scotia's tidal power potential, although at a larger scale including Minas Basin Pulp and Paper and Nova Scotia Power Corporation.



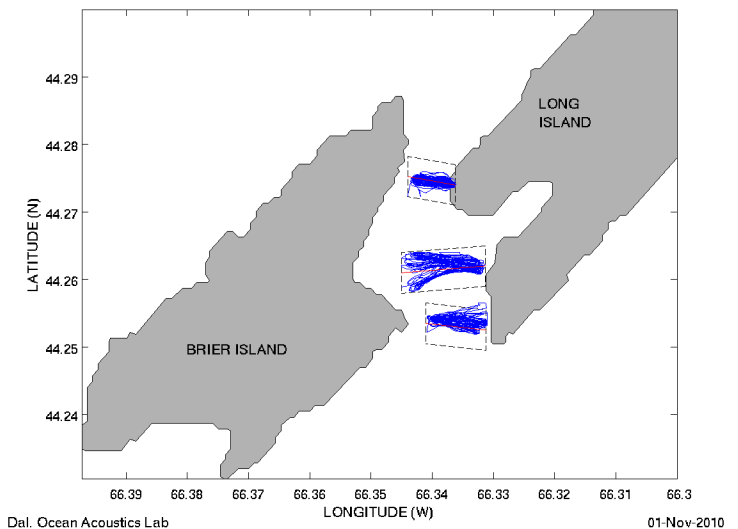
Observed (blue) and modeled (red) current speeds in Grand Passage, 15 Sept.-8 Oct 2010.



250-KW surface tidal current turbine from New Energy Corporation.



Bottom resident tidal current turbine from Ocean Renewable Power Company.



Location of the 2010 ADCP survey conducted by Dr. Alex Hay, Dalhousie University.

50th Anniversary of the Bedford Institute of Oceanography—2012

COMMEMORATIVE BOOK ANNOUNCEMENT

‘VOYAGE OF DISCOVERY’

Fifty Years of Marine Research at Canada’s
Bedford Institute of Oceanography

In commemoration of the 50th Anniversary of the Bedford Institute of Oceanography (BIO), the BIO – Oceans Association is pleased to announce its intention to assemble and publish a collection of review articles that document some highlights of the extensive scientific research conducted at BIO from 1962 to 2012. The reviews will cover contributions that BIO research has made to understanding the basic structure and dynamics of the oceans as well as how the results have been applied to improving understanding of marine issues at the local, regional, national and international levels. As well as documenting BIO scientific history for the oceanographic community, it is hoped that the proposed book will illustrate convincingly to the outside world that investments made by the Government of Canada in the BIO over the last 50 years have produced, and are continuing to produce, important and valuable long-term dividends to Canada. The book will ‘wave’ the BIO flag and hopefully bring recognition for a job

well done.

The book proposal received the endorsement and support of the BIO Science Management Committee on 16 March 2011. ‘Voyage of Discovery’ will comprise three major themes – ‘Exploring and Understanding the Ocean’, ‘Applied Ocean Science’, ‘Marine Laws and Policy’ – with several subdivisions in each including physical, chemical, biological, geological, and geophysical aspects of the sea. Forty-one contributors have already come forward offering review articles on their subject areas of expertise and there is still room available for additional authors to participate in this grand undertaking. EVERYONE is welcome, so please consider preparing a paper, alone or with colleagues, for this special publication!

For details, please contact the manuscript coordinator Dr. David Nettleship (ph: 902-826-2360; e-m: dnnlundy@navnet.net) or other members of the editorial board: Dr. Donald Gordon (ph: 902-426-3278; e-m: Donald.Gordon@dfo-mpo.gc.ca), Dr. Michael Lewis (ph: 902-426-7738; e-m: Michael.Lewis@nrcan.gc.ca), and Dr. Michael Sinclair (ph: 902-426-3492; e-m: Michael.Sinclair@dfo-mpo.gc.ca).



Sneak Preview of 2012

Mark your calendars and tell your friends from away about the BIO 50th Anniversary events in 2012!

Volunteers are needed for some events. Please consider donating some time to these events.

A BIO Lecture Series will offer public lectures of general interest about BIO research by BIO and BIO-OA researchers.
MORE VOLUNTEER SPEAKERS ARE NEEDED.

A 2-day science symposium will be held in October or No-

vember 2012 with the theme ‘Climate Change & Adaptation’.

The BIO library will contribute a bibliography of all BIO publications. There are presently 11,000 citations in the database.

A glossy, coffee-table book publication honouring ‘Hudson ’70’ will be unveiled in 2012.

The **BIO EXPO 2012** (formerly known as the BIO Open House) will be held 17–23 September 2012. For the first time, a large tent will house exhibits outdoors on the jetty.

A ‘Gala Birthday Celebration’ will be held for BIO staff and their guests on 25 October 2012, BIO’s actual birth date. Rolls-Royce Canada Limited (formerly ODIM-Brooke Ocean) is the sponsor of this event. A committee has been struck to organize the birthday celebration.

VOLUNTEERS ARE STILL NEEDED.

The Crystal Awards, recognizing team work at BIO since 1962, will be presented at this event. Entertainment will include an all-BIO choir and it is rumored the “Trompederos” may make a reunion performance.

Mark your calendars for events in 2012.

To volunteer contact info@bio2012.ca and to keep abreast of planning for the 2012 BIO 50th anniversary events visit www.bio2012.ca



The 50th Anniversary Crystal Team Awards for Outstanding BIO Projects

The Crystal Awards, sponsored by Rolls-Royce Canada Limited, will highlight up to three outstanding projects from each of BIO's five decades. They are aimed at drawing attention to, and giving recognition to, BIO research and development project teams that have shown ingenuity, imagination

and that have made extraordinary contributions to govern-

ment programs and/or international research initiatives since 1962. The work and results of these teams must demonstrate significant and meaningful outcomes that benefitted Canadians in research or assisting research in areas of marine geology, biology, oceanography, CHS mapping, or fisheries management. Each project must have exemplified strong team coordination and have made a unique contribution to the knowledge base of Canada's marine resources or to engineering advances that have facilitated new avenues of research.

For more information on eligibility for the Crystal Award and to obtain a nomination form visit www.bio2012.ca

Nominations deadline: 17 June 2011

Sable Island National Park Update

By Andy Sherin

Saint Mary's University was the venue for the annual Sable Island Update on 30 March 2011. Zoe Lucas of the Green Horse Society gave her annual report on activities on Sable Island. She reported that the horses are doing well and the number of oiled bird carcasses is down. Of concern is the increase in plastic debris. In addition to the impact of plastics on biota through entanglement and ingestion there is new evidence that micro-plastic particles generated by the degradation of plastic debris could be a vector for toxic substances.

Parks Canada staff did not participate in the presentation but copies of their December 2010 report entitled 'Sable Island: What We Heard: A Summary of Public Input' were made available to attendees (also available at <http://www.pc.gc.ca/eng/progs/np-pn/cnnp-cnnp/sable/pub-con.aspx>).

The Parks Canada report, based on c. 2800 responses, states: "In general, we heard that Canadians support the proposed national park designation; feel that it is important to maintain the ecological integrity and protect the cultural resources; are interested in visitor experience opportunities on the island that are limited in scope and scale and are well-managed; want off-island experiences and educational opportunities; are seeking careful management of natural resources, including petroleum; and are concerned about wildlife management, particularly seals and wild horses."

A few respondents wanted a higher level of protection than is presently in place. A unifying theme was that people should not have to visit Sable Island in order to learn about and connect to it. Responses from those who had visited the island often described their experience as "once in a lifetime" or "transformative". OA member Patrick Potter certainly characterized his visit in that light in his article 'Sable Island: Dream Realized', published in BIO-OA Newsletter 46 (April 2010).

Leonard Preyra, MLA for Halifax Citadel-Sable Island, updated the audience on progress of establishing national park



Foal born April 22, 2003. Photo: Green Horse Society

status for Sable Island in the absence of Parks Canada staff. He indicated that there had been some delays due to the change in Environment Minister at the federal level. He was confident that legislation would be introduced in Ottawa when Parliament resumed sitting after the election on 2 May 2011. Once the legislation is passed, responsibility for Sable Island will be transferred to Parks Canada and consultations will begin to develop the management plan.

REMINDER FROM ISSUE 48

Nova Scotian Institute of Science

Hall of Fame Nominations

Send a brief statement about a BIO marine scientist you wish to nominate to Betty Sutherland, BIO-OA President (jesuther@dal.ca). Candidates must be deceased and have made significant contributions to science in Nova Scotia.

KEEP SALMON FARMS OUT OF THE OCEAN¹

By Silver Donald Cameron²

Last month, 138,000 farmed salmon escaped from feedlots on the New Brunswick side of the Bay of Fundy, a fact that scarcely caused a ripple in the Maritime consciousness. Elsewhere — in Norway, Scotland, Chile, British Columbia — salmon farming is a highly controversial industry. Here it seems to skate along smoothly under the radar.

Salmon farming is controversial for two main reasons. First, it is a highly inefficient way to produce food. Producing feed for farmed salmon intensifies the pressure on other fisheries around the world. In effect, the process turns four kilograms of wild fish into one kilogram of industrial fish. How clever is that?

Second, salmon farms have horrible effects on the marine environment and on wild salmon. A salmon cage consists of an outer layer of netting to keep predators out, and an inner layer to keep salmon in. But parasites, bacteria, viruses and chemicals can move freely in and out of the cages — and, like all intensive industrial food production facilities, the salmon cage holds the maximum number of animals packed in together.

The clustered fish are succulent targets for epidemics of parasites such as sea lice, which can move easily through the mesh cages, and viruses such as infectious salmon anemia, which first appeared in Norway in the 1980s, and now inhabits salmon farms in Scotland, Chile and New Brunswick. To combat disease, discourage parasites and maximize growth, farmed salmon are dosed regularly with hormones, pesticides and antibiotics, which create ever-more resistant pests — and, in New Brunswick, a great many dead lobsters.

The salmon are also exuberant producers of feces. Their cages are the pigpens of the ocean. The sea floor near a salmon cage is a dead zone paved with foul food and fish doo, all bathed in a soup of bio-chemicals.

The other critter that can move through the netting of a salmon cage is a salmon, at least when the netting is torn or the cage is wrecked by storms, as happened in the Bay of Fundy last month. Once released, the farmed salmon — invariably the Atlantic variety — are free to pollute the very genetic code of indigenous wild salmon.

In B.C., interbreeding poses less of a threat than it does here in the Atlantic, where the wild fish and the farmed ones are the same species — though the farmed fish are very different from the wild ones.

Nature cannot cull the caged fish by way of predation, disease or parasites, so weak escapees survive to pass on their weaknesses in the wild. In addition, a farmed fish lacks a wild fish's genetic information — like the knowledge of its home stream,



which is also its spawning ground. Will the hybrid offspring even know how to reproduce? Norwegian research indicates that escaped salmon and their young compete fiercely for mates and habitat, but when the young go to sea, they don't return.

The dominant players in salmon farming worldwide are Norwegian companies, who developed the net-pen salmon industry. But in Norway today, reports Alexandra Morton, the B.C. warrior-scientist who has devoted her life to the protection of wild salmon, "nine out of 10 salmon rivers in the heavily farmed Hardanger Fjord have collapsed," while fish farmers "are now pumping farm salmon into well boats and bathing them in hydrogen peroxide trying to kill the lice" — a technique also used in New Brunswick.

Norway's former attorney general, who oversaw the original Norwegian aquaculture plan, now calls salmon farming "a heavy defeat for wild salmon and a huge win for sea lice." And the Norwegian Institute of Marine Science, long a supporter of fish farming, now suggests that the risks to wild salmon mean that cage-net farming conflicts with Norway's sustainability strategy.

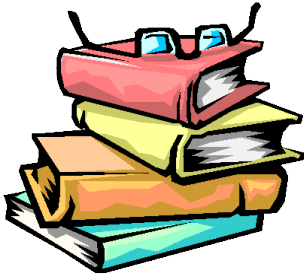
In Scotland, the Atlantic Salmon Trust, headed by the Prince of Wales, recently blasted the Scottish government for allowing fish farms to endanger Scotland's wild salmon. In B.C., Alexandra Morton and others want all salmon farms moved to above-ground tanks completely isolated from wild fish. Here in the Maritimes, where salmon stocks are officially designated as endangered, the Atlantic Salmon Federation is also demanding above-ground tanks.

Meanwhile, in Nova Scotia, a New Brunswick company proposes to rear a million net-caged salmon in St. Mary's Bay. At this stage, how long should it take to say No?

¹ Originally published in the *Nova Scotian* 30 January 2011, D2.

² Silver Donald Cameron writes a weekly column 'FirstWord' in *The Chronicle Herald* and is the host and executive producer of the environmental website www.TheGreenInterview.com.

[Editor's Note: To read commentary on this article visit: www.TheGreenInterview.com and www.atlanticfishfarmers.com .]



NOTEWORTHY READS: BOOK REVIEWS IN BRIEF

David N. Nettleship
Book Review Editor

The *Noteworthy Reads* section is an effort by BIO-OA to produce a representative list of recent noteworthy book publications related to the marine sciences and other subjects of general interest. The listing is not intended to be comprehensive or complete, but merely an attempt to highlight a number of 'good reads' that may be of interest to OA members and associates. Most books listed are available at local bookstores and public libraries. Book prices are regular retail in Canadian funds, but discounts of 20-30% are normally available on line at: e.g., amazon.ca or chapters.indigo.ca. Contributions of book reviews to 'Noteworthy Reads' are welcome – send via e-mail to David Nettleship: dnnlundy@navnet.net (phone: 902-826-2360).

SPECIAL PUBLICATION:

PRESENT STATUS AND FUTURE WELFARE OF THE OCEANS

Holland, Geoff and David Pugh (eds.). 2010. *Troubled Waters: Ocean Science and Governance*. Cambridge University Press, Cambridge, England, UK. 330 pp. Hardcover, \$53.95 (ISBN 978-0521765817). – In commemoration of the 50th anniversary of the Intergovernmental Oceanographic Commission of UNESCO, the United Nations organization brought 30 international experts together to review the state of the world's oceans. The aim was to foster intergovernmental cooperation on global marine issues and show how governments use science to establish ocean policies. The book focuses on critical issues of the day including marine pollution, resource exploitation and hazards, and the need for international cooperation to ensure a sustainable future of marine resources and the health of the oceans. It is divided into seven parts with the first setting the stage and nature of the task with the last providing a wrap-up of the future of the oceans and the roles that science and governance must play. The 'meat' falls between these two parts, covering the global context (5 papers), oceans and science (5 papers including two by BIO scientists), observations and data (2 papers), applications (4 papers), and intergovernmental agencies and science (5 papers). The editors have done a fine job in weaving the disparate topics and disciplines into a meaningful whole with an ending that is self-evident: healthy and well managed oceans are essential to the survival of the living world. This volume is a must-read for anyone interested in the world's oceans and their future.

GENERAL REVIEWS

Bowermaster, Jon. 2010. *Oceans: The Threats to Our Seas and What You can do to Turn the Tide*. PublicAffairs (Perseus Books Group), New York, NY. 322 pp. Softcover, \$20.00 (ISBN 978-1586488307). – In '*Oceans*', filmmaker and author Jon Bowermaster, gathers a number of expert marine visionaries, explorers, and ocean lovers – from academics to environmentalists and politicians – to speak to the deteriorating health of the oceans and what can be done to improve it as a companion volume to the spectacular film of the same name. Major threats to the world's oceans and marine life are first reviewed including pollution, acidification, over-fishing, climate change and more, followed by a unique anthology of 31 presentations divided into three parts. 'Loving It' provides a vivid overview of the beauty and incredible attributes of ocean waters by seven commentators including marine biologists Sylvia Earle, Carl Safina and Celine Cousteau. Part two, 'Losing It', with 14 contributions, identifies the nature and magnitude of problems facing the international community – pollution, resource exploitation, dead zones, destruction of estuaries and coral reefs, marked declines of many fish and marine mammal species, and polar sovereignty issues – if the wealth of the oceans are to be preserved. The last part, 'Saving It', is gripping, the nine contributors offering actions that can be taken to erase many of the current problems and future threats. An important work that should be read by all, from the general public to professional oceanographer.

Bryson, Bill (ed.). 2010. *Seeing Further: The Story of Science and the Royal Society*. Doubleday Canada, Toronto, ON. 405 pp. Hardcover, \$32.95 (ISBN 978-0385667463). – From the 'cream' of the Royal Society, the national academy of science in Britain and the Commonwealth, comes a superb collection of all-new science writing, a history of the present state of scientific knowledge and how it was attained. Bill Bryson, renowned writer of the widely acclaimed best seller "*A Short History of Nearly Everything*", decided to gather some of the most eminent science writers together to produce a unique volume in celebration of knowledge and the 350th anniversary of the Royal Society. The result is an outstanding "encyclopedia survey of the history, philosophy and current state of science, written in an accessible and inspiring style" that will excite, stimulate and inform anyone with an interest in science and how it has influenced the world. Contributors include some of the 'biggest brains' of our time, important scientists and writers such as Richard Dawkins (natural selection), Georgina Ferry (x-ray visions), James Gleick (at the beginning: the Society from 1660), Steve Jones (biodiversity), Martin Rees (looking ahead), Stephen H. Schneider (climate change), Neal Stephenson (atoms of cognition: metaphysics in the Royal Society, 1715-2010), Ian Stewart (mathematics), and a host of others. Overall, a provocative, admirable and highly readable work, one to possess and treasure, and learn from!

Conniff, Richard. 2011. *The Species Seekers: Heroes, Fools, and the Mad Pursuit of Life on Earth*. W.W. Norton, New York, NY. 464 pp. Hardcover, \$33.50 (ISBN 978-0393068542). – Here is a colourful history of the early naturalists/adventurers who roamed the unknown world to discover new life-forms. Award-winning science writer Richard Conniff traces some of the astonishing journeys undertaken by these early explorers and what prompted them to put their lives at risk. A broad range of early explorations are reviewed from those of Carolus Linnaeus and his network of collectors in the 1700s to those in the 19th century. Not only are details of their globe-spanning tales of adventure outlined, but also the consequences of their discoveries. The multitude of discoveries of new lands and their living inhabitants gave rise to dramatic shifts in how humans viewed the world and themselves. Without question, the rewards derived from these ventures warranted the risks involved by these unsung heroes of the day. Conniff's account of this part of human history is both delightful to read and an 'eye-opener' of the insight, courage and determination of these early 'species seekers'.

Grant, Peter R. and B. Rosemary Grant (eds.). 2010. *In Search of the Causes of Evolution: From Field Observations to Mechanisms*. Princeton University Press, Princeton, NJ. 304 pp. Hardcover, \$82.50 (ISBN 978-0691146810). – This collection of 17 essays, formulated and structured by world-renowned evolutionary biologists Peter and Rosemary Grant, is divided into four parts – 'The Origins of Biological Diversity', 'Mechanisms, Molecules, and Evo-Devo', 'Morphology and Behavior', 'Ecological Diversity' – each with a concise introduction by the Grants, with 27 contributors in addition to the editors. Altogether, this book with its most informative papers and commentaries spans the full subject of modern evolutionary biology and highlights the latest advances made and how they were accomplished. It shows vividly why a multi-disciplinary and integrated approach is essential to a better understanding of the mechanisms of evolutionary change and how today's field and laboratory experimental procedures and techniques permit progress. Without question, this brilliant work establishes a milestone in evolutionary biology and provides a modern and readable account of evolution as a process of discovery covering all levels of organization from individual genes to development, adaptation, speciation and life itself. "*In Search of the Causes of Evolution*" is a timely and riveting work that provides a clear overview of the subject today and identifies the key questions that need to be addressed in the future. Read and enjoy this wonderful book!

Heinrich, Bernd. 2010. *The Nesting Season: Cuckoos, Cuckolds, and the Invention of Monogamy*. Belknap Press (Harvard University Press), Cambridge, MA. 337 pp. Hardcover, \$32.99 (ISBN 978-0674048776). – Want some natural history reading perfect for spring and summer? Well, go no further than Bernd Heinrich's '*The Nesting Season*', an excellent and

exciting work that uncovers the wonders of bird behaviour in a delightful manner with an abundance of his own beautiful colour photos and watercolours to accompany the informative text. Heinrich, a renowned scientist and naturalist, famous for his incomparable studies on bumblebee energetics and the winter ecology and behaviour of ravens, takes the reader through the breeding season of birds revealing insights into the many facets of their courtship, reproduction and chick-rearing activities, and why they occur as they do. Bringing the results of scientific research together with his own careful observations, Heinrich reveals not only the complexity of courtship and mating rituals in birds, but shows the similarities of the reproductive strategies of birds and humans including the evolution of monogamy. 'The Nesting Season' offers a wide range of intellectual delights and aesthetic pleasures, and is sure to captivate and hold all readers interested in nature and the living world around them.

McKibben, Bill. 2010. *Eaarth: Making a Life on a Tough New Planet*. Knopf Canada, Toronto, ON. 272 pp. Hardcover, \$32.00 (ISBN 978-0307399182). – Bill McKibben, perhaps the most effective environmental activist of recent times, moves forward from his earlier dire warnings of global warming with '*The End of Nature*' (1989) to present an unnerving update on the state of the planet and the fundamental changes in climate that have taken place. In an altered world, mostly created by recent human activity and a global, fossil-fuel consuming economy, the relatively benign climate of the last 10,000 years has been replaced by one that humankind has never seen. This new planet, called 'Eaarth' by McKibben to distinguish it from the original, is melting, flooding, acidifying, drying and burning, creating conditions that threaten humanity. "Eaarth" is a climate change 'call to arms', to function as a catalyst for heightened environmental awareness and to inspire the cultural change necessary for a sustainable human civilization. The first half of the book reviews our fouling of the atmosphere, our difficulty in admitting it, and our unwillingness to accept the precarious global existence we face. The second half, assuming that the reader acknowledges the problem of global warming, presents possible solutions of how we might adjust and respond to climate change. Many of the suggestions are predictable such as: pursue renewable energy, revamp the food system, stop excessive consumerism, reform our unsustainable car addiction. McKibben recognizes that these changes alone will not solve the problem and that fundamental shifts in our lives must occur if we are to survive on this 'tough new planet'. He claims we need to become "smaller and less centralized, to focus not on growth but on maintenance, on a controlled decline from the perilous heights to which we've climbed." The development of small-scale systems of local agriculture, transportation, commerce and energy production represent our best hope. Whatever readers think of McKibben's masterful review, two valid points

emerge: we do inhabit a fundamentally changed planet, and the challenge facing humans worldwide is to accept a new kind of responsibility to ensure the future welfare of our 'Eearth'!

McNamara, Kenneth J. 2010. *The Star-Crossed Stone: The Secret Life, Myths, and History of a Fascinating Fossil*. University of Chicago Press, Chicago, IL. 256 pp. Hardcover, \$31.95 (ISBN 978-0226514697). – Kenneth McNamara, an expert on fossil echinoids, provides a fascinating and original history about sea urchin fossils from Neolithic times to the present, and their use by humans. In a clear, lucid style, the reader is exposed to a multitude of facts and ideas related to the importance of fossil sea urchins to ancient and more recent cultures of humankind. Drawing on facts from multi-disciplinary studies – archaeology, paleontology, anthropology – and careful analysis, McNamara reveals the widespread use of fossil echinoids by early humans and how they ultimately became important to many religions and cultures around the world. The story concludes with the suggestion that humanity's first appreciation of beauty and artistic expression may have their roots in early habits of fossil collecting by our ancestors! *The Star-Crossed Stone* is an outstanding and entertaining read, with gems of knowledge about sea urchin fossils and the scientists that study them.

Meek, Jim and Eleanor Beaton. 2010. *Offshore Dream: A History of Nova Scotia's Oil and Gas Industry*. Nimbus Publishing, Halifax, NS. 188 pp. Softcover, \$19.95 (ISBN 978-1551097879). – Have you ever wondered about how the petroleum industry began in Nova Scotia and what steps occurred along the way in reaching today's Sable Offshore Energy Project? If you have wanted details of the visionaries involved and the push-and-pull between oil developers and environmentalists, especially the commercial fishing industry, then this is the book for you. Writers Jim Meek and Eleanor Beaton have done a great service to Nova Scotians at large and to those interested in the processes of decision making within governments and the offshore oil-and-gas industry. Their description of events not only chronicles the history of Nova Scotia's offshore developments, but presents the people involved and brings them to life. The authors do an outstanding job in making industry's builders and politicians come alive and the reader feel they are present and involved in the actions underway. Details are abundant and often surprising, from Mobil Oil drilling eight wells on Sable Island between 1967 and 1973 to the bitter battle for Georges Bank between US oil executives and Nova Scotia's fishing communities. The dramatic story of the imposition of the first moratorium on oil and gas exploration on Georges Bank in 1988 is worth the cost of the book alone! '*Offshore Dream*' is, without question, the definitive business history of Nova Scotia oil and gas, a story that is far from complete as cash-strapped governments continue to dream about the billions in royalty revenues that

remain to be generated. Read, be entertained, and hold on for what may very well be around the corner in the cyclic world of offshore oil and gas!

Merrill, Ronald T. 2010. *Our Magnetic Earth: The Science of Geomagnetism*. University of Chicago Press, Chicago, IL. 272 pp. Hardcover, \$29.95 (ISBN 978-0226520501). – Ever wanted an exciting introduction to geomagnetism with an explanation of what it has contributed to the earth sciences? Well, this work by Robert Merrill, professor of earth and space sciences at the University of Washington, provides all the answers and more, delivered in a clear and careful fashion that both educates and entertains. We quickly learn that geomagnetism is a vibrant area of science that answers many questions about our planet's past and future prospects. Following an overview of the physics of geomagnetism and magnetic fields, Merrill touches on a broad range of topics including how the Earth's magnetic field permits a better understanding of continental drift and plate tectonics, how past changes in climate can be detected by variations in the magnetic field in rocks, and how animals sense and use the magnetic field. But his descriptions of scientific topics and the anecdotes that accompany them are skillfully weaved together in a manner that entertains while providing scientific literacy to the reader. A most rewarding read!

Wohlforth, Charles. 2010. *The Fate of Nature: Rediscovering our Ability to Rescue the Earth*. Thomas Dunne Books, St. Martin's Press, New York, NY. 434 pp. Hardcover, \$33.99 (ISBN 978-0312377373). – Charles Wohlforth, award-winning author and journalist, has produced a stunning and important examination of humankind's future and present relationship with the natural world. A lifelong resident of Alaska, Wohlforth uses this experience to great advantage in analyzing the wide-ranging treatment of the living world by humans, past and present, from sheer exploitation to great efforts to protect and preserve environments and their inhabitants. The contrast is revealing with findings that are germane to all regions of the world, especially those with ocean coastlines and people that depend on the resources they contain. Drawing on science, history, economics, spirituality and personal stories, '*The Fate of Nature*' takes us from the despair of incidents such as the *Exxon Valdez* oil spill and the environmental changes that occurred to the heart-warming responses of people to such profound tragedies. The core of this book comes with the development of the all important question of the future confronting the human population worldwide: "Can we learn how to treat our life-sustaining systems before it's too late?" Wohlforth provides the tools and guidance necessary to forge a successful relationship with nature in the future, but will we be smart enough to use them? '*The Fate of Nature*' is an eye-opening must-read for anyone who cares about our environment and the world at large.

Editor's Keyboard: Spring is here even if the temperatures are cool and we suffer the odd snow flurry. The flowers and the foals on Sable Island are not fooled. Like the tides, a focus in our lead articles in this issue, they follow a celestial calendar. I was interested to read in Fundy Tidal Inc.'s objectives a commitment to community economic opportunities supported by the research of Drs. Hay and Karsten. Silver Donald Cameron re-

minds us that the economy should not prosper at the detriment of the environment. These are important contributions for government marine research, that we will celebrate in 2012. At the same time, the capacity of BIO is compromised by budget cuts and the inadequate planned replacement for the *Hudson*. Will the visitors to BIO EXPO 2012 or the waterfront on Oceans Day understand this situation? *Andy Sherin*

ABOUT THE ASSOCIATION

The Bedford Institute of Oceanography Oceans Association was established in 1998 to foster the continued fellowship of its members; to help preserve, in cooperation with the Institute's managers and staff, BIO's history and spirit; and to support efforts to

increase public understanding of the oceans and ocean science. Membership is open to all those who share our objectives. Most current members are present or past employees of BIO or of the federal departments of Environment, Fisheries and Oceans, and

Natural Resources (or their predecessors) located in the Halifax Regional Municipality. Membership is \$10.00 per year, \$40.00 for five years, or \$150.00 for a lifetime membership.

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