

**EXECUTIVE SUMMARY**

Educated in Canada, the United States and Australia, Bruce Hatcher has 37 years (31 years post-doctoral) experience as a marine ecologist and project manager in a wide variety of grant and contract-funded research initiatives and development projects in throughout the world. His primary expertise is in the application of ecological theory and empirical analyses to the better understanding of community structure, function and resource use management in marine and coastal ecosystems. His secondary expertise lies in building capacity for research and development in the academic, public and private sectors. In a professional career split between academic, governance and consulting activities, Bruce has published more than 80 peer-reviewed scientific papers, prepared in excess of 70 technical assessments and advisory reports for government and business clients, and secured over \$7.8M in research grant and contract funding. Not an armchair ecologist, he has worked in 28 countries and 6 seas, logging over 750 sea days and 1,900 hours working underwater.



Research on the ecophysiology of coastal macrophytes for Honours and Masters degrees at Dalhousie University was followed by doctoral study of the trophodynamics of coral reefs at the University of Sydney. As a Research Fellow in the CSIRO Division of Fisheries & Oceanography, Bruce joined the Division's Coastal Ecology Program in Western Australia during 1982. There his research focused on the determinants of benthic community structure and invertebrate productivity in high latitude coral reef ecosystems. Here he developed teamwork skills in multi-disciplinary, government-sponsored "big science", and learned the roles of politics in scientific research.

Moving to the research faculty of the University of Western Australia in 1986, Bruce conducted competitive, grant-funded research on the ecology and conservation biology of marine ecosystems in the eastern Indian Ocean, and managed the University's Marine Biological Laboratory. This work involved a significant investment in the measurement and analysis of physical-biological interactions, and lead to interdisciplinary approaches to the identification of marine protected areas and the development of management strategies for biodiversity preservation and natural resource conservation. Academic teaching and administration skills were developed at the UWA, and seminal papers were published with colleagues who continue to inspire his work. A consulting business was founded during this period in partnership with spouse Dr. Annamarie Hatcher (strong chemistry and modeling expertise), which continues to this day.

Bruce (and Annamarie) returned to Nova Scotia in 1990, where he joined the Ocean Production Enhancement Network (an NSERC-NCE) at Dalhousie's Oceanography Department. There, in partnership with Robert Scheibling, he conducted research on the application of ecological models to shellfish mariculture in the near-shore sub-tidal. The results provided insights to the interactions between dispersion and predation in shallow benthos, as well as practical guidelines for scallop seeding and grow-out in Maritime waters. This research resulted in 15 published papers and the training of four graduate students. Bruce was thus re-acquainted with Canadian academia.

Tiring of academic indulgences, from 1994 to 2001 Bruce moved to the private sector as a consultant on marine resource assessment and management in Africa, Canada and the Caribbean, including three years on long-term assignment in St. Vincent and the Grenadines. His work

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increasingly focused on capacity-building and institutional strengthening. Bruce's project management, negotiation and writing skills were honed on more than 60 projects and contracts. The connection with academia was also maintained through research and teaching at the graduate, undergraduate and outreach levels at four Universities and in sixteen nations.

The opportunity to become the first full-time Director of the interdisciplinary Marine Affairs Program (MAP) at Dalhousie University (in which he had taught since 1992) broadened Bruce's teaching skills and deepened his capacity for academic administration. Strong ties with the Canadian International Development Agency (CIDA) maintained a steady influx of overseas students to this unusual graduate program. Between June 2001 and autumn 2004 he supervised the education of five PhDs, five Research Associates, five Doctoral and 76 Masters' students, as well as teaching four courses and securing \$2.4M in research funding that included international graduate student support.

When the MAP was transferred from the Faculty of Graduate Studies to the Faculty of Management at Dalhousie, Bruce sought opportunity back within a mainstream science faculty, securing an institutional Research Chair at Cape Breton University in the autumn of 2004. His research is now oriented towards the development of synoptic tools for seascape ecology and ecosystem-based management of fisheries and human development on the Scotian Shelf and in the Sydney Harbour and the Bras d'Or watershed (Canada's newest UNESCO Man and the Biosphere Reserve). There he has undertaken several studies focused on establishing sustainability criteria new emerging fisheries (e.g. hagfish, sea cucumber and whelk); designing and measuring the effectiveness of mitigation and compensation for marine habitat damage and destruction (e.g. the offshore transport of coal in Morien and Mira Bays, the dredging and establishment of 250 artificial reefs in Sydney Harbour); and ecosystem-based management relevant to local issues and ecosystems (e.g. monitoring the health and modeling the ecological connectivity of the Bras d'Or estuary).

Along with this posting came the opportunity to re-establish the University's original research centre: the Bras d'Or Institute. "Applying the resources of the University to the needs of the Community" is the motto under which Bruce works as Institute Director, forging partnerships with fishermen, seafood and marine companies, government agencies, First Nations and NGOs. In the context of community development and at this stage in his career, Bruce's main focus is to seek opportunities and funding for collaborative research that builds institutional capacity.

Cape Breton University has been supportive of Bruce's efforts to establish a diving research program, install and maintain new research facilities (e.g. a coastal research vessel, a running seawater system, and a deep water video survey towfish), and partner with government, industry and community on applied research. Academic, government and industry colleagues have been generous in collaborating with Bruce on research and undergraduate teaching. The recent establishment of the Centre for Sustainability in Energy and the Environment (CSEE) on campus provides even greater opportunities for collaborative research in the fields of marine renewable energy and environmental remediation. Bruce looks forward to contributing to the acceleration of applied marine research at CBU.

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**CURRENT POSITION**                    **UNIVERSITY CHAIR in Marine Ecosystem Research**  
**DIRECTOR, Bras d'Or Institute for Ecosystem Research**  
**ASSOCIATE PROFESSOR, Biology Dept., School of Science & Technology**  
**Cape Breton University, Sydney, Nova Scotia**

**BIRTH DATE**                    June 2, 1952  
**CITIZENSHIP**                    Australian and Canadian

**EDUCATION**                    **Ph.D.** (Marine Ecology), The University of Sydney, New South Wales, Australia, 1982  
**M.Sc.** (Marine Biology), Dalhousie University, Halifax, Nova Scotia, Canada, 1976  
**B.Sc.** (Biology), Dalhousie University, Halifax, Nova Scotia, Canada, 1974

*Post-Doctoral Training:*

Mentoring Junior Faculty. Prof. S. Scully, Dalhousie University, 2004.  
Excelling as a First-time Manager. Mr. A. Lawson, Skillpath Ltd., 2003.  
Web-based Educational Methods. Prof. D.G. Patriquin, Dalhousie University, 1999.  
Modelling of Marine Systems. Prof. M. Lewis, Dalhousie Univ., 1992  
Spectral Analysis of Environmental Data. Prof. K. Thompson, Dalhousie University, 1990  
Advanced Physical Oceanography. Prof. J. Hunter, Curtin Univ., Western Australia, 1986  
Environmental Fluid Dynamics. Prof. J. Imberger, University of Western Australia, 1983

**PAST EMPLOYMENT** (inverse chronological order)

**2001 – 2004**                    Director & Professor - Marine Affairs Program  
- Faculty of Graduate Studies, Dalhousie University, Halifax, Nova Scotia.

**2001 – 2004**                    Professor – Department of Biology  
- Dalhousie University, Halifax, Nova Scotia.

**1998 – 2001**                    Principal Marine Ecologist – CFCL/CBCL  
- Canadian Fishery Consultants & CBCL Ltd., Halifax, Nova Scotia.

**1998 – 2001**                    Lecturer - Marine Affairs Programme  
- Dalhousie University, Halifax, Nova Scotia, Canada.

**1994 – 1998**                    Senior Associate & Consulting Marine Ecologist - CFCL  
- Canadian Fishery Consultants Ltd., Halifax, Nova Scotia.

**1990 – 2001**                    Adjunct Professor – Departments of Oceanography & Biology  
- Dalhousie University, Halifax, Nova Scotia.

**1990 – 1994**                    Senior Research Associate – Ocean Production Enhancement Network,  
- National Centre of Excellence, Oceanography Dept., Dalhousie Univ. Halifax, N. S.

**1985 – 1990**                    Research Associate & Officer-in-Charge – Marine Biological Laboratory,  
- Zoology Department, University of Western Australia, Perth, W.A.

**1982 – 1985**                    Post-Doctoral Fellow – CSIRO Division of Fisheries & Oceanography,  
- Marmion Marine Laboratories, Perth, Western Australia.

**1980 – 1982**                    Visiting Scientist – Australian Institute of Marine Science,  
- AIMS, Cape Ferguson, Queensland, Australia

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**EXPERIENCE**      *Research and Development (inverse order of initiation)*

- Principal Investigator on a project funded by Extrata International Pty. Ltd. designed to quantify the spatial patterns of fishing effort and secondary marine production around a proposed at-sea coal export transfer facility in **Morien & Mira Bays**, Nova Scotia. Fishery-dependent, interview-based and fishery-independent surveys & valuations of harvested secondary production and fish habitat. (Grant value \$38.5k – pending: 1 report prepared, 1 undergraduate (UG) student employed & trained).
  - Principal Investigator on an ACOA-funded project designed to design and monitor the effectiveness of 200 artificial reefs to be installed in the **Sydney Harbour** Nova Scotia as compensation for Harmful Alteration, Damage and Destruction (HADD) of fish habitat associated with the development of a Post-Panamax shipping port. (Grant value \$200k – pending: 2 reports, 2 undergraduate (UG) students trained).
  - Co-Investigator in the Atlantic Zonal Monitoring Program (AZMP) funded by Fisheries and Oceans Canada. Periodic oceanographic measurements are made at several stations in the **Bras d'Or estuary** to ground truth synoptic optical imagery from the Earth observing Medium Resolution Environmental Imaging Satellite (MERIS). (Grant value \$74k – ongoing: 1 publication, 4 UG students trained).
  - Co-Investigator in the “*Ocean Tracking Network*” NSERC Research Network. A \$68.9M international collaboration co-funded by the Canadian Fund for Innovation and the Sloan Foundation. Investigation of salmon migration within the **Bras d'Or estuary** and the **NW Atlantic Ocean** using acoustic tagging and tracking devices. (Grant value \$191k – pending: 1 Research Associate (RA) employed and 3 UG students employed & trained).
  - Principal Investigator on an ACOA-funded project designed to enumerate, capture and relocate valued ecosystem components (including commercially valuable species and species at risk) from the path of a trailing-hopper suction dredge operating in the **Sydney Harbour**. Requires extensive collaboration with fishermen, engineers, business investors and regulators. (Grant value \$60k – complete: 1 report, 1 technician employed & 7 UG students employed & trained).
  - Co-Investigator in the Pathways of Flux in the Ice Zone (PFIZ) project funded by the National Science Foundation (NSF) through the Woods Hole Oceanographic Institution (WHOI). Measures the effects of sea-ice melt on primary productivity and greenhouse gas release in the **Bras d'Or estuary**. (Grant value US\$182k – ongoing: 1 progress report, 2 presentations).
  - Principal Investigator in a large team project “*Ecosystem-based Geospatial Planning Tools for Canada's Inland Sea*” funded by Natural Resources Canada's GeoConnections program and Environment Canada's IMAGINE Pilot Project. Develop map and model-based decision support tools for planning and management in the **Bras d'Or ecosystem**. (Grant value \$331.2k – complete: 2 publications, 1 Post-Doctoral Fellow (PDF), 1 RA and 1 UG student employed & trained).
  - Co-Investigator on the Canadian Shellfish Sanitation Program (CSSP) Marine Water Quality Monitoring of the **Bras d'Or estuary** funded by Environment Canada through CBCL Ltd. Design a water sampling program to augment the CSSP that quantifies the flux of nutrients, sediments and organic matter from the watershed to the estuary as a function of catchment size, shoreline morphology and land use. (Grant value \$44.5k – ongoing: 4 reports, 6 students trained & employed).
  - Principal Investigator on a project funded by Laurentian Energy Ltd. designed to quantify the value of marine ecosystem goods and services provided by the **Sydney Harbour** to the fishing community of Cape Breton. Fishery-based and fishery-independent surveys & valuations of harvested secondary production and fish habitat. (Grant value \$62.5k – complete: 1 publication, 1 RA and 2 UG students employed & trained).
  - Co-Investigator in the “*Canadian Healthy Oceans Network*” NSERC Research Network. A \$5.1M multi-site project designed to evaluate the determinants of ecosystem health along three of the Nation's marine biodiversity corridors. Measure and model the relationship between benthic rugosity, community structure and ecological connectivity in **coastal Nova Scotia**. (Grant value \$87.5k – incomplete: program terminated pre-maturely).
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- Co-Investigator in the “*Tools for controlling the MSX oyster disease*” project funded through the AquaNet Network Centre of Excellence (Canadian Tri-Council). A multidisciplinary project using bio-physical models to predict the epidemiology of an introduced marine pathogen in the Bras d’Or Lakes estuary of **Cape Breton** (Grant value \$360k – Complete: 3 publications, 1 PDF trained).
  - Principal Investigator on a SSHRC Community-University Research Alliance (CURA) grant application: “*Capacity Building for Community-Based Evaluation of Harbourshed Management*”, designed to bring environmental stewardship groups, government and academic researchers together around the challenge of implementing integrated watershed management in the **Halifax Harbour**. (Grant value: \$20k – complete: full grant application for \$1M not successful).
  - Principal Investigator on a Canadian Fund for Innovation (CFI) grant “*Zoning the littoral: Efficient technologies for ecosystem-based management in shallow marine environments*”. New technologies of airborne marine remote sensing and radiative transfer algorithms for the rapid and cost-effective mapping of the inter-tidal and shallow sub-tidal zones are applied in proof-of-concept to map the habitats of the coast of **Nova Scotia** and **Belize**. (Infrastructure Grant value \$650k – complete: 4 publications, 64Gb imagery acquired, 130,112km driven, 152h sailed, 118 dives. 1 RA and 2 UG students employed and trained).
  - Co-Investigator on a NASA Interdisciplinary Study (IDS) Project “*Environmental Assessments of Coral Reef Ecosystems: Interdisciplinary Research Using EOS Platforms and Numerical Models*” (NASA Grant NNG04GO90G). Application of remote sensing to the modelling of coral reef ecosystems”, which supports image acquisition and analysis in **Belize** and **Mexico** (Grant value US\$1.46M – complete: 4 publications, 1 PDF and 2 graduate students trained).
  - Principal Investigator in a research project entitled: “*Towards an Integrated Management Plan for the Halifax Harbour Ecosystem*”, funded by Environment Canada’s Environmental Damages Fund and the Halifax Regional Municipality to assist the city of **Halifax** to take an ecosystem-based approach to the management of human activities in eastern Canada’s largest harbour. (Grant value \$46k - complete: 2 publications, 1 RA employed, 2 graduate students trained).
  - Co-Investigator in the “*Ecological Connections Among Reefs*” (ECONAR) project funded by an NSERC International Collaborative Research grant and the GEF-World Bank to develop and test interdisciplinary approaches to modelling the interactions among reefs and humans in the Mesoamerican Barrier Reef Ecosystem (**MBRS: Mexico, Belize, Guatemala and Honduras**). The research combines the physical, biological and social sciences to provide prediction and decision support for biodiversity conservation and marine resource management. Harmonize the physical, biological and social science activities. (Grant value: \$18M - complete: 4 publications, 2 graduate students trained).
  - Research supervisor on a CIDA & GEF-funded grant to measure the impact of coastal development on the fisheries and biodiversity of marine communities in SE Eritrea (**Red Sea**). Involved collaboration with Eritrean Government and University of Asmara scientists on environmental impact assessments and biodiversity assessments at three villages and offshore reefs. Substantial component of human resource capacity building in the work. (Grant value \$231k - complete: 2 publications, 2 graduate students and 6 interns trained)
  - Co-Investigator on a project using airborne remote sensing tools to undertake a synoptic analysis of the distribution and spread of an invasive algal species in the shallow sub-tidal along the Atlantic coast of **Nova Scotia**. Funded by the Canadian Centre for Marine Biodiversity. (Grant value \$75k - complete: 1 publication, 1 graduate student trained).
  - Co-Investigator in the Canadian Deep Sea Coral Research Project on the **Scotian Shelf** using the ROPOS deep research submersible, funded by an NSERC Facilities grant (\$1.3M) and a CFI grant (\$0.9M) entitled “Advancing new frontiers in ocean science by extending the capabilities of Canada’s national scientific submersible facility” through the Universities of Toronto and Victoria. My role was to conduct ecological studies of cold water corals on the Scotian slope off **Eastern Canada**. (Grant value \$1.3M - complete: 1 publication, 1 UG student trained).
  - Co-Investigator in the second phase of the **Australian-Canadian** Ocean Research Network (ACORN) funded by the Social Sciences & Humanities Research Council (SSHRC) to develop
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integrated approaches to ocean management. The focus of my research is on ecosystem-based approaches to marine management decision-support. (Grant value \$104k - complete: 1 publication).

- Research supervisor on a U.S. National Atmospheric and Space Administration (NASA) Long Term Data Acquisition Program (LTAP) grant (total value \$26k) to develop applications of the Landsat 7+ETM satellite multispectral sensor to the elucidation of coral reef growth under variable climate forcing. The primary research focus is the development of a statistical morphometric analysis of the growth response of the atolls of the **Maldives** archipelago to variations in Monsoon forcing and sea level rise. (Grant value \$26k - complete: 2 publications, 1 graduate student trained).
  - Consulting fisheries and aquaculture specialist to Revenue **Canada** on the assessment of projects proposed for funding under the Scientific Research and Experimental development Programme (SR&EDP). (Contract value: \$32k - complete: 2 publications).
  - Consulting aquaculture specialist to the **New Brunswick** Fisherman's Association on the implementation of juvenile scallop seeding protocols. (Contract value \$5.6k – complete: 1 publ.).
  - Team leader and Consulting Ecologist for the preparation of an Aquaculture Lease Site Application for a 10 cage fin-fish farm installation in St. Margaret's Bay, **Nova Scotia**. Site survey, oceanographic, biological and sedimentological surveys, application submission and public presentation at hearing. (Contract value \$22k – complete: 1 publication).
  - Project Leader of an Industrial Research Assistance Program (IRAP - NRC and NSERC -DFO): "Sea Urchin Resource Enhancement" (SURE) designed to develop improved harvesting strategies and grow out methods for the sea urchin roe industry in **Nova Scotia**. A comprehensive literature review, site assessments and transplantation and feeding experiments were conducted for a fishing company. (Contract value \$56k - complete: 3 publications).
  - Consulting Ecologist to the **Western Australian** Water Authority for evaluation and development of a numerical model of coastal ocean ecology in the Perth Metropolitan area. Reviewed model structure and parameterization, visited site and provided advice for inclusion of biogeochemical processes in shallow benthic environments in the model. (Contract value \$12k - complete: 1 publication).
  - Senior Research Associate in the National Science & Engineering Council (NSERC) National Centre of Excellence: "Ocean Production Enhancement Network" (OPEN). Responsible for project management and implementation of research into the movement and mortality of juvenile sea scallops in sea ranching pilot studies in **Nova Scotia**. Laboratory and field experiments combined with detailed underwater surveys and of hatchery-reared spat were used to optimize industrial strategies for sea-bed seeding of this high-value species. (Grant value \$0.8M - complete: 10 publications, 6 graduate students trained).
  - Project Co-leader of a study of Nitrogen vs Phosphorus limitation of growth in the seagrass *Posidonia oceanica* growing in the Bay of Naples, **Italy**. Worked with staff of the Marine Biological Station of Naples at Ischia to determine the relative roles of macronutrient pollutants on the dominant marine plant of the region. (Grant value \$31k - complete: 1 publication).
  - Project Ecologist on an assessment of the Coral Reef Research Unit in the Republic of the **Maldives** for the International Centre for Ocean Development (ICOD). Interviews, site visits and output verification were used to provide the project staff and funding agency with advice on how to improve the implementation of reef research and management programs. (Contract value \$49k - complete: 1 publication).
  - Principal Investigator and Co-Investigator (Marine Ecologist) on an eight (8) year program of research and exploration of the Quaternary growth history and geology of the Houtman Abrolhos carbonate platforms of **Western Australia**, funded by the Australian Research Council (ARC) and the Department of Mineral Resources. Stratigraphic, comparative and sclerochronological methods are used to determine the controls of deposition and growth of these commercially valuable offshore reefs. (Grant value: \$2.2M - complete: 5 publications, 3 graduate students trained).
  - Co-Investigator (Marine Ecologist) on a four (4) year programme of research for the development of numerical models of circulation in coral reef lagoons of **Australia** funded by the Australian Research Council (ARC). Partial and fully 3-D approaches were used and their
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applicability to the fluxes of ecologically significant materials (including nutrient pollutants) were assessed. The models have been extended to other areas of coral reef management. (Grant value \$240k - complete: 3 publications, 2 graduate students trained).

- Project Ecologist on a team using satellite imagery to interpret the growth history and palaeoceanography of the Houtman Abrolhos reefs of the eastern **Indian Ocean** funded by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Extended time series of NOAA-AVHRR thermal imagery were obtained and interpreted along ground-truthed offshore gradients to determine the dynamics of the Leeuwin Current and its effect on reef processes of primary productivity and biogeochemical cycling. (Grant value \$53k - complete: 2 publications, 1 graduate student trained).
- Lead consultant on a study of the feasibility of ecotourism development of the **Cocos-Keeling Atoll** in the Indian Ocean funded by the Australian Dept. of external Affairs and the Keeling Island Council. Site visits, marine resource mapping and socio-economic profiles were used to assist the islanders to plan sustainable developments. (Contract value \$32k - complete: 1 publication).
- Project Ecologist for the design and installation of a major marine aquarium and theme park in Yanchep, **Western Australia**. Major components included three ecosystem displays: intertidal rock pool (4.2 m<sup>3</sup>), subtidal seagrass meadow (12.5 m<sup>3</sup>) and subtidal kelp bed (58.0 m<sup>3</sup>) complete with representative plant and animal biota. The kelp bed included a 0.4 m high wave generator. Work included design, oversight of construction and stocking of the facilities. (Contract value \$1.2M - complete: 2 design-operation manuals).
- Principal investigator of a 6 year programme of research supported by the CSIRO and Australian Marine Science and Technologies Grants Council (MSTGC) to measure the role of organic detritus in sustaining high secondary production in coral reef ecosystems. Extensive field measurements and experiments were coupled with biogeochemical modelling to determine how macroalgal production supports harvestable yields from coral reefs in **Australia**. (Grant value \$1.2M - complete: 6 publications, 2 graduate students trained).
- Undergraduate and graduate student research on seagrass productivity (1 publication), kelp ecophysiology (2 publications) and coral reef ecology (5 publications), conducted at two (2) universities in **Canada & Australia**.

## **EXPERIENCE**

### ***Marine Resource Assessment, Conservation & Management (inverse order)***

- Co-Investigator in a series of projects funded by the Nova Scotia Offshore Energy Research Association (OERA) designed to determine the potential for and effects of the generation of renewable marine electrical energy from the waters of Cape Breton Island. Literature surveys of hydrodynamic and ecological conditions associated with wind, wave and tidal energy; direct measurements of tidal flows in three channels; preparation of reports on potential energy yields and environmental effects. (Grant value \$29.2k – complete: 2 reports prepared, 2 graduate students trained).
  - Co-Investigator on a three year analysis of the conditions required for the ecologically sustainable exploitation of the Waved Whelk on the **Scotian Shelf**. Funded by Louisbourg Seafoods Ltd. and the Nova Scotia Productivity and Innovation Program. Analysis of life history parameters, habitat requirements, trophodynamics and parasitism; population modelling. (Contract value \$48k – ongoing: 1 UG student employed and trained).
  - Co-Investigator – **Cape Breton** Strategic Energy Assessment, led by AECOM Ltd. and funded by the Offshore Energy and Environment Research (OEER) program of the Nova Scotia Department of Energy. Provide overview of the marine ecological conditions in areas of possible marine energy harvesting. (Contract value \$8.8k - complete: 1 report).
  - External Reviewer and CBU representative – Scientific Advisory Report, Consultation Committee and Assessment of the **St. Ann's Bank** Area of Interest for designation as a Marine Protected Area (MPA) under Canada's Oceans Act (1997). Contribute to the selection, design and monitoring of Canada's newest MPA. (*Pro-bono* – ongoing: 4 meetings to date).
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- Co-Investigator – **Bras d’Or** Lakes Offshore Tidal Power Resource Assessment. Plan, deploy and analyse tidal current measurements in the Great Bras d’Or Channel and Barra Strait in collaboration with Dalhousie University and Fundy Tidal Power Inc. Funded by the OERA. (Contract value - \$13k – complete: 1 report).
  - Executive Board Member & CBU Representative – Bras d’Or Lake Biosphere Reserve Association. Scientific support for the successful preparation of a Nomination Document to the UNESCO Man and the Biosphere Program (MaBP) for designation of the **Bras d’Or Lake** ecosystem as a Biosphere Reserve. Design and implementation of a biodiversity conservation monitoring program and an Atlas of the Bras d’Or Ecosystem. (*Pro bono* – ongoing: 2 publications, 5 presentations, 26 meetings, 1 video, 3 undergraduate students trained).
  - President (past), Executive Board Member & CBU Representative – Atlantic Coastal Action Plan (ACAP) **Cape Breton**. Scientific advice and planning for community-based watershed management in the CBRM and surrounding areas. (*Pro-bono* – complete: 6 workshops, 47 meetings).
  - Task Team Leader and CBU representative – State of the Environment Reporting and Management Decision Support of the Collaborative Environmental Planning Initiative (CEPI) for the **Bras d’Or Lakes**. Prepare a report card on the Health of the Bras d’Or ecosystem. (Contract value \$25k – complete: 2 publications, 6 presentations, 24 meetings).
  - CBU representative on the Aros na Mara project led by Cape Breton Community Ventures to design and build a Marine Research and Education Centre at **Iona** in the Barra Strait. (*Pro-bono* – ongoing: 1 publication, 5 presentations, 13 meetings).
  - Member – Fisheries Resource Conservation Council (FRCC) reporting to the Canadian Minister of Fisheries on the conditions required for the recovery of the **Atlantic** groundfish fisheries. (Contract value \$26k – complete: 1 publication, 4 presentations, 27 meetings).
  - Consulting specialist to the Sydney Harbour Fisheries Working Group on the diversity, magnitude and value of fishery resources and fish habitat in the **Sydney Harbour** ecosystem to the fishing communities of Cape Breton. (Contract value \$63k – complete: 1 publication, 4 presentations, 12 meetings, 33 fishermen trained).
  - Consulting specialist on a private sector project to assess opportunities for access and conditions for sustainable exploitation of a series of New Emerging Fisheries on the **Scotian Shelf**, including Hagfish, Whelk, Sea Cucumber and Surf clams. Funding provided by the Canadian Centre for Fisheries Innovation (CCFI), Nova Scotia Department of Fisheries and Aquaculture, Productivity and Innovation, cash and in-kind contributions from seven (7) Industry Associations and private-sector corporations (total Grant & in-kind value to date \$285k – complete: 6 publications, 1 RA and 3 UG students employed & trained).
  - Lead Sub-consultant (marine ecology) on a project that assesses the marine environmental impact of the the Hazen Creek Sewage Treatment Facility on the living and non-living resources of **Saint John Harbour**, New Brunswick, for the Municipality of St. John. Involves evaluation and modelling of the effects of 250% increases in sewage outflow on benthic and water column communities. (Contract value \$225k - complete: 2 publications).
  - Consulting specialist in experimental design and statistical analysis on an interdisciplinary project that combines social and natural sciences in integrated coastal management planning for small island developing states of the eastern **Caribbean**: “Improving coastal livelihoods in the Caribbean: institutional and technical options”. Project funded by the U.K. Department for International Development (DFID). (Contract value \$348k – complete: 1 publication).
  - Advisor to the **Canadian** Department of Fisheries and Oceans (DFO) Oceans Management National Research Network Workshop (June 2000), and the Eastern Scotia Shelf Integrated Management (ESSIM) Project Workshop (June 2000, February, 2001, April, 2002). Assisted senior DFO administrators and managers to plan research for and implement relevant sections of the 1997 Oceans Act. (*Pro-bono* - complete).
  - Lead Sub-consultant (ecology) on a project that assesses the marine environmental impact of the Canadian Defence Research & Development Canada (DRDC) Acoustic Calibration Barge in the
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**Bedford Basin.** Involves evaluation of the effects of naval sonar on marine mammals and other valued ecosystem components. (Contract value \$50k - complete: 2 publications).

- Lead consultant on a GEF-World Bank funded project to develop a protocol for assessing the effectiveness of marine protected area management in the Mesoamerican Barrier reef ecosystem. The approach combines natural, social and management science methods. (Contract value \$28k, complete: 1 publication).
  - Lead consultant on a project that used maps of marine habitat and production zones to provide estimates of potential fishery yields from the shelves and offshore banks surrounding five islands in the Northern Antilles (**Antigua, Barbuda, Montserrat, St. Christopher & Nevis**). (Contract value \$145k - complete: 2 publications & 3 interactive CD-ROM GIS products).
  - Invited advisor to the Canadian Dept. of Fisheries & Oceans (DFO) Marine Habitat Branch in a consultation designed to estimate the amount of marine habitat lost from Halifax Harbour (**Nova Scotia**), and recommend research and mitigation strategies for the preservation of that habitat remaining. (*Pro-bono* - complete: 1 publication).
  - Lead consulting ecologist on a Canadian Dept. of Fisheries & Oceans (DFO) Science Branch to classify the benthic communities of the Eastern Scotian Shelf (**Nova Scotia & New Brunswick**) using ecosystem theory and marine habitat mapping. The outputs informed the development of ecosystem-based management strategies for a 3000+km<sup>2</sup> continental shelf ocean management area. (Contract value \$20k - complete: 2 publications).
  - Principal Marine Ecologist on a Canadian International Development Agency (CIDA) - funded environmental impact assessment of the ADB-funded Eritrean Fisheries Infrastructure Project (services contract valued at \$103.k). Designed and implemented a statistically rigorous, pre-impact site assessment and trained Eritrean counterparts to conduct an ongoing field monitoring programme at three, remote coastal sites on the SW Red Sea coast of **Eritrea**. (Contract value \$103k - complete: 3 publications & 1 training manual).
  - Consultant specialist in marine habitat, environmental impact assessment and permitting to the Millbrook First Nations band (**Nova Scotia**). Advise on the feasibility of marine fisheries infrastructure, mariculture and land-based aquaculture facilities under the terms of the federal compensation and access agreements reached as a result of the Canadian Supreme Court's 'Marshall Decision'. Conducted habitat assessments, prepared & submitted permitting reports and U/W videos to DFO, design for land-based aquaculture facility submitted. (Contract value \$12k - complete: 1 publication & underwater video assessment).
  - Team Leader and Coastal Marine Ecology Specialist on the Coastal Marine Ecology and Data Management consultancy to the GEF-funded (\$4.86M) UNDP project: Conservation Management of **Eritrea's** Coastal, Marine and Island Biodiversity. Prepared a SWOT analysis of the project and provided recommendations for biodiversity data collection, analysis and project implementation. (Contract value \$183k - complete: 2 publications)
  - Coral Reef Resource and Conservation Specialist on the Plan Development Phase of a GEF proposal funded by the World Bank to develop research and monitoring protocols for the Mesoamerican Barrier Reef System in **Mexico, Belize, Guatemala, and Honduras**. (Grant value \$1.8M - complete: 1 publication, 1 workshop).
  - Advising Coral Reef Fisheries Specialist to the Government of **Eritrea** Ministry of Fisheries on the design and implementation of demersal fish resource assessments, fishery data collection systems and fishery infrastructure developments for a \$12M Fishery Infrastructure Development Project funded by the African Development Bank. (Grant value \$180k - complete: 3 publications).
  - Advising Coral Reef Fisheries Specialist for a comprehensive programme of marine fisheries management in the English-speaking **Caribbean** (project value of \$18 M). The project included resource assessments of 44 commercial species, data management, training and institutional strengthening of national fisheries institutions and universities in twelve (12) countries in the region. (Contract value \$384k - complete: 12 publications, 16 workshops, 42 meetings).
  - Project Leader of the Soufriere Experiment in Reef Fisheries Sustainability (SERFS) in **Saint Lucia**. Inter-disciplinary research that measures the effect of a system of marine protected areas on
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the coral reef fish community and the artisanal fishing community in a small tropical coastal ecosystem. Four graduate students and two fisheries division staff trained, four publications, ongoing research collaborations. (Contract value as above - complete: 4 graduate students and 2 fisheries division staff trained, 2 training workshops convened, 3 M.Sc. theses, 1 B.Sc.Honours thesis, 4 papers published and 1 report delivered).

- Project Leader of a remote sensing and marine habitat mapping/GIS project in the **Northern Antilles** (Antigua-Barbuda, St.Christopher-Nevis, Montserrat) that uses satellite imagery and novel analysis techniques to accurately map the position and area of twelve (12) benthic and water column production zones. Training workshop convened and nineteen (19) thematic maps supplied as hard copy and editable layers in a Geographic Information System (GIS) on CD-ROM. (Contract value as above - complete: 2 publications, 4 GIS base-maps, 1 workshop, 2 fisheries division staff trained).
- Project Leader of a survey to assess the spatial distribution, health and economic burdens of Ciguatera fish poisoning in **Antigua, Barbuda** and **Saint Christopher** (West Indies). Interview data from a 20% sample of the fishing population were combined with surveys of processors and consumers in a relational database suitable for import to a GIS containing marine habitat base maps. Close liaison with local fishers and fisheries scientists produced a comprehensive database. (Contract value as above - complete: 1 publication, 1 workshop, 2 fisheries division staff trained).
- Project Leader of an international marine fisheries resource assessment of the remote submerged banks of the **Jamaica-Colombia** Joint Regime Area. Spatially-replicated depletion experiments and oceanographic mapping were conducted on three (3) research cruises with national scientists. The results inform the co-management of one of the last under-exploited demersal fisheries in the Caribbean. (Contract value as above - complete: 2 publications, 1 workshop, 4 fisheries division staff trained).
- Consulting Marine Ecologist to the Department of the Environment of Brazil (IBAMA) and the Brazilian Coral Reef Society (Corallus) on the use of marine protected areas as tools for fisheries management in **Brazil**. Site visits and participation in a planning and capacity-building workshop for government and university personnel resulted in a formal declaration of policy for the conservation and management of Brazil's coral reefs. (Contract value as above - complete: 1 publication).
- Consulting Marine Ecologist to the W.A. Department of Conservation and Land Management (CALM), the International Union for the Conservation of Nature (IUCN), and the World Wildlife Fund (WWF) on the identification, selection and management of a representative series of marine conservation areas along the coast of **Western Australia**. The work involved detailed mapping of marine resources in mangrove, seagrass and coral reef areas, assessments of the resource values, and recommendations for the levels of protection and implementation of management plans in these areas, including the first management plan for the Houtman Abrolhos reefs. (Contract value \$145k - complete: 5 publications, ).
- Consulting member of the Marine Reserve Selection Working Group of the Department of Conservation and Land Management (CALM) in **Western Australia**. Charged with setting criteria for marine protected area (MPA) selection and applying them to the entire coastline over a three year period. Outputs included a strategy and plan of action for the state government in the design and implementation of MPAs, draft management strategies for two pilot MPAs, and a contribution to an IUCN marine resource directory. (*Pro-bono* - complete: 2 publications, 2 workshops, 8 meetings)
- Consulting Scientist to the Great Barrier Reef Marine Park Authority (GBRMPA) on the zoning of the Central portion of the Great Barrier Reef World Heritage Site. (*Pro-bono* – complete: 1 publication, 3 meetings).

**EXPERIENCE**      **Teaching, Training and Capacity Building** (inverse order of initiation)

- Associate Professor in the Biology Department of Cape Breton University. Teach undergraduate courses in Marine Ecology and Theoretical Ecology; supervised 22 undergraduate research students to date. (Tenured Faculty appointment – ongoing since 2004)
  - Science Advisor to the Sydney Harbour Fishers Association. Assisted in the organization and initial operation of the first fishing industry association in the **Sydney Harbour**. Worked with 42
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members from five (5) different fisheries to assess the value of marine ecosystem services and the impacts of industrial port development. More than 1000man-hours of collaborative work aboard fishing vessels and in workshops. (Ongoing: 4 workshops, 9 meetings, 2 publications).

- Chair of the Academic Standards Committee (past), Module Leader (past) and Lecturer for Marine Science and Integrated Coastal Zone Management in the International Ocean Institute (IOI) Summer B Training Programme: “The Law of the Sea and Ocean Governance”, Halifax, **Nova Scotia**. An intensive 10-week, full-credit graduate-level course that has attracted ocean managers and diplomats from all over the world without interruption for 27 years. (*Pro-bono* – ongoing since 1992).
  - Convenor of *Scenario-Based Planning for a Changing Climate in the Bras d’Or Ecosystem* during November of 2010. Eighteen (18) local participants and invited specialists undertook scenario analyses and prioritized adaptation strategies for climate change in the **Bras d’Or** ecosystem. (Complete: 1 publication).
  - Convenor of *Cape Breton Sealing Futures*, a three day workshop during September 2009 exploring the question: “Is there a future for a sealing industry in modern **Cape Breton**” involving 25 participants including Mi’kmaq, hunters, fishermen, scientists and regulators. (Complete: 2 publications).
  - Co-Convenor of *Cape Breton Oyster Futures*, a three day workshop during May 2007 exploring the question: “Is there a future for an oyster industry in modern **Cape Breton**” involving 30 participants including Mi’kmaq, fishermen, aquaculturalists, scientists and regulators. (Complete: 1 publication and appendices on CD-ROM).
  - Lead role in the design and delivery of a professional development course “Operationalizing the Oceans Act” to 60 mid-career employees of Canada’s Department of Fisheries and Oceans at the Canadian Coast Guard College, Cape Breton, **Nova Scotia**. Program delivered through the Marine Affairs Program at Dalhousie University 2003 – 2005. (Contract value \$102k – complete: 3 courses taught (2003-2005), 1 published curriculum).
  - Collaborating Professor in a Canadian International Development Agency (CIDA) Tier-1 project: “Principles in Practice: Coastal and Ocean Governance” aimed at developing the capacity of two universities in **Viet Nam** and one in the **Philippines** to conduct participatory research and teach effectively in coastal communities off campus. (Grant value \$3.1M – complete: 2 publications).
  - Advisor and faculty trainer in marine ecology and marine protected areas for the ACUC-CIDA Tier-2 programme for the development of a masters’ degree programme in integrated coastal zone management at the Universities of Havana, Ciego de Avila & Santiago in **Cuba**. (Grant value: 2.9M – complete: 5 course modules developed, 1 degree program established at 3 Universities).
  - Graduate student co-ordinator for an interdisciplinary, professional graduate degree program: the Master of Marine Management, at Dalhousie University, Halifax, **Nova Scotia**. Responsible for quality control, human resource management, oversight and coordination of curriculum development, core and elective course delivery and research theses of 20 students per annum drawn from middle and upper marine management positions in 40 countries (Complete: 58 students graduated 2001-2005).
  - Development, coordination and co-delivery of a three week course in marine ecology and biodiversity assessment for project staff in the Ministry of Fisheries, **Eritrea**, for the UNDP, as part of the implementation phase of a \$4.86M GEF project (Contract value: \$39k – complete: 19 students trained).
  - Training of extension staff from the Ministry of Fisheries, **Eritrea**, in the theory and implementation of on-site, environmental impact assessments of fishery infrastructure developments at three remote sites on the SW Red Sea. CIDA-UNDP-GEF funded curriculum development, on-the-job training and performance assessment. (Contract value \$135k - complete: 11 apprentices trained).
  - Assessment of training needs of government and university staff in **Eritrea** to conduct research and monitoring of the marine biodiversity of the coastal, marine and island ecosystems of the SW
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Red Sea for the UNDP, as part of the Implementation Phase of \$4.86M GEF project. (Contract value \$29k – complete: 1 publication).

- Assessment of needs and capacity of government, university and non-governmental organizations and scientists in **Mexico, Belize, Guatemala, & Honduras** to conduct research and monitoring of the Meso-American Barrier Reef System for the World Bank, as part of the Plan Development Phase of a \$18.5M GEF project. (Contract value \$249k – complete: 2 publications, 3 workshops).
- Professional training of senior and junior staff of national fisheries divisions from twelve (12) **Caribbean** countries in the design and implementation of fisheries data collection systems and analysis of fisheries data. Prepared five (5) curriculum modules and delivered training via short courses in country. Organized and convened two (2) workshops on tropical resource assessment methods in **Jamaica & Antigua**. (Contract value \$455k - complete).
- Supervision and advising of graduate students: Served on committees of seventy (70) graduate and undergraduate thesis students from nine (9) universities in **Australia, Canada, United States, Eritrea, United Kingdom** and the **West Indies**. Theses prepared in fields of marine ecology, coral reef ecology, tropical resource assessment, fisheries management, aquaculture, conservation biology, marine resource management, marine protected areas and marine remote sensing. (Complete: Ongoing, since 1987; currently co-supervise 1 M.B.A. and 5 B.Sc. students doing 4<sup>th</sup> year research).
- Lecturing in University undergraduate and graduate degree programs in **Australia** and **Canada** on theoretical ecology, marine ecology, coral reef ecology, oceanography, tropical resource management, biological conservation, marine affairs and marine protected areas. Five (5) new courses developed and over 560 course hours taught at three Universities. (Ongoing, since 1982).
- Community outreach education in **Australia, Canada, Eritrea & Caribbean**. Work experience placings provided to thirty-two (32) high school students; work-place internships provided to sixteen (16) undergraduate students, four (4) graduate students; three (3) short-courses in oceanography and marine ecology taught aboard sail training vessels; one (1) short course in marine biology taught on a coral atoll. (Ongoing, since 1980).

## **EXPERIENCE**

### ***Administration and Management*** (inverse order of initiation)

- Vice-Chair of the Biology Department, and Chair of the Undergraduate Research Committee of Cape Breton University. Governance and guidance of academic programs, faculty and student advancement, and facilities development. (2011-2013).
  - Reviewing Editor of the scientific journal: *Proceedings of the Nova Scotia Institute of Science* (NSIS), **Halifax**, Nova Scotia. Management of submitted manuscripts, contribute to editorial policy. (2010-present: 5 manuscripts reviewed).
  - Executive Member (currently Treasurer, past Secretary) of the Board of Directors of a community-based environmental agency: The Bras d'Or Lake Biosphere Reserve Association (BLBRA), Johnstown, **Cape Breton**. Leadership role in a successful nomination to the United Nations (UNESCO) for listing of a 3600km<sup>2</sup> estuarine-watershed ecosystem under the Man and the Biosphere Program. (2006-present: 47 meetings).
  - Executive Member (past Secretary) of the Canadian Association for Underwater Science (CAUS). Represent Cape Breton University, contribute to the maintenance of a national Standard of Practice, compile and publish national statistics on scientific diving for 18 member institutions **Canada-wide**. (2006-present: 8 meetings).
  - Member of the Steering Committee of the Collaborative Environmental Planning Initiative (CEPI) for the **Bras d'Or Lakes** (a multi-agency stakeholder association focused on ecosystem-based management using aboriginal ways of knowing). Past Chair of the Research Task Team. Represent Cape Breton University. (2005-present: 37 meetings).
  - Executive Member (Chair-elect, Chairman, Past-Chair) of the Board of Directors of a community-based environmental agency: the Atlantic Canada Action Plan (ACAP) – **Cape Breton**.
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Oversight of a not-for-profit, environmental education organization (ENGO) with 26 staff and a \$1.4M/y budget. (2005-2013: 68 meetings).

- Director, the Bras d'Or Institute for Ecosystem Research, Cape Breton University, Sydney, **Nova Scotia**. Management of program, staff, volunteers and budget as Director of an interdisciplinary research institute at a Canadian University. (2005-present: 5 staff, 4 volunteers, 19 students, \$120k/y average budget).
  - Co-Chair of the Marine Environmental Task Force (AW030T) of the Transportation Research Board, National Academies, **U.S.A.** Organize workshops and publications. (2002-2005: 3 meetings).
  - Director of the Marine Affairs Program within the Faculty of Graduate Studies at Dalhousie University, Halifax, **Nova Scotia**. Management of academic program, faculty, staff, curriculum and budget as an interdisciplinary graduate program at a major Canadian University: (2001-2004: 12 faculty & staff, ~20 students per year, \$150k/y budget).
  - Member, Co-ordinating Committee, Ocean Zoning Conference Committee. Responsible for organizing and international conference on the zoning of ocean space in Halifax, **Nova Scotia**. (2004)
  - Member of the Steering Committee, Atlantic Canada Coral Initiative. Responsible for guiding a program of research and management of the deep-water coral communities of **Nova Scotia**. (2003).
  - Co-Chair, Marine Environmental Task Force A-13B6, Transportation Research Board (TRB), **Washington, DC**, funded by the US National Academies and US Dept. of Commerce. Responsible for co-ordinating and prioritizing research into the environmental effects of maritime transportation. (2002-3005).
  - Long-term Overseas Co-operant on a \$17M Canadian International Development Agency (CIDA) Co-Leader of two (2), 14 day, CIDA-funded missions to **Eritrea**. Responsible for all logistic, on-site and follow-up activities and deliverables associated with environmental impact assessments. (2000 & 2001).
  - Team Leader of a 14 day, UNDP-funded mission to **Eritrea**. Responsible for all logistic, on-site and follow-up activities and deliverables. (2000).
  - Team leader of a 10 day, World Bank - funded mission to **Guatemala & Honduras**. Responsible for all logistic, on-site and follow-up activities. (1999).
  - Environmental Topic Editor of the Springer-Verlag scientific journal: *Coral Reefs*, **Berlin**. Management of submitted manuscripts, contribute to editorial policy write editorials. (1995-2005).
  - Member of Organizing Committee of the Sixth International Coral Reef Symposium and Co-Editor of Proceedings. Assist in the management and publication of a major international symposium: 1200 delegates, 82 manuscripts. (1988-1989)
  - Faculty member at three (3) universities in **Australia** and **Canada**. Served on admissions, curriculum, recruitment, facilities planning and diving safety committees, including the Program Management Committee of the Marine Affairs Programme at Dalhousie University. (1985-present).
  - Project Management including writing of proposals and final reports, development work plans, logical frame analysis and management of human and financial resources and logistics for more than 65 grant and contract-funded research and development projects totalling >\$6.2M in **Australia, Canada, Eritrea, Maldives** and the **Caribbean**. Responsibilities include logistic planning and maintenance of the safety of human life at sea in extensive field operations. (1983-present)
  - Officer in charge at three (3) marine research stations in **Australia** (One Tree Island, Qld., Waterman's Beach WA, and Rat Island, Abrolhos Islands, WA). Responsible for daily operations, staffing, maintenance and budget control (1980-1989).
  - Vice President and Managing Partner of an environmental and human health care consulting firm (Hatcher Research Associates Corp). Responsible for all aspects of running a small business: promotion, project design and management, research, reporting and accounting. Over \$2.8M in contracts and grants secured in seven (7) countries (1980 – present).
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**EXPERIENCE**      **Technical Skills & Training** (inverse order of initiation)

- Research SCUBA Diving. YMCA & ACUC certified Divemaster. PADI certified for mixed gas diving. Over 1900 accident-free hours logged since 1970 at 162 sites in 3 oceans and 3 seas, to 65m maximum depth. Supervision of task-oriented research dive teams of as many as 8 members.
- Seamanship & Navigation. Current certificates and Licences in Coastal Navigation, Celestial navigation, Small Commercial Vessel Operation, Marine Radio Operation. 750 days sea time logged in research vessels ranging from 5m to 105m LoA.
- Water Safety & First Aid. Red Cross Assoc. - Water Safety Instructor's Certification. St. John Ambulance Assoc. - Adv. First Aid, CPR, O<sub>2</sub> Therapy. NSCC - Marine Emergency Duties.
- Remote Sensing and Geographical Information Systems. Familiar with NOAA-AVHRR, LandSat-TM & ETM+, and CASI image acquisition, interpretation and ground truthing. Hands-on experience in six (6) projects using RS-GIS technologies.
- Experimental & Sampling Design, Data Analysis & Computing. Competent at power analysis, GLIM, ANOVA, & PCA routines. Familiar with P.C.'s, MacIntosh & SUN work stations. Experience in BASIC & FORTRAN programming, relational databases (DBASE, FOXBASE), mathematical & statistical software (MATLAB, SYSTAT, GEOSTAT, PRIMER), Image analysis & GIS software (MAPINFO, GEOMATICA, Arc-GIS, ENVI, Decipiens), and Web literacy (HTML)

**AWARDS  
& HONOURS**

(chronological order)

New York State Regent's Scholarship: 1969-70  
Dalhousie University Entrance Scholarship: 1969-70  
Dalhousie University Post-graduate Scholarship: 1974-76  
NATO post-graduate research fellowship: 1977  
University of Sydney Commonwealth Overseas Scholarship: 1978-82  
I.W. Bentwich Memorial Research Scholarship (Univ. of Sydney): 1980  
Australian Museum Post-graduate Research Award: 1981  
Australian Institute of Marine Science Visiting Fellowship: 1980-81  
CSIRO Post-doctoral Award: 1982-84  
Nominated to UNESCO Scientific Committee on Problems of the Environment (SCOPE) Working Group: "Ecosystem Function and Biodiversity on Coral Reefs": 1993  
Nominated to Society for Oceanographic Research (SCOR) Working Group #104: "The Role of Adaptation in Coral Reef Responses to Global Change": 1994  
Nominated to Ecological Society of America: 1994  
Nominated as a PEW Fellow in Marine Conservation: 1995  
Invited to deliver Plenary Address at the 8th International Coral Reef Symposium: 1996  
Appointed Environment Editor, Springer-Verlag Journal: *CORAL REEFS*: 1997  
Invited to edit a special issue of *CORAL REEFS* dealing with management: 1999  
Invited to participate in the Canadian Marine Geospatial Data Infrastructure project: 2000  
Nominated for Canadian Twenty-first Century Research Chair at Dalhousie University: 2000  
Invited to participate in 2<sup>nd</sup> phase Australian Canadian Ocean Research Network: 2000-2001  
Invited to teach at International Oceans Institute (IOI) Training Programme: 2000 & 2001  
Certification as Senior Ecologist, Ecological Society of America (ESA): 2001  
Invited speaker at 10<sup>th</sup> Annual Meeting of the PEW Fellows in Marine Conservation, 2001  
Invited Keynote Speaker at the *Research for Nation Building* symposium, Univ. of Asmara, Eritrea, 2002  
Appointed as Co-Chair of the Marine Environmental Task Force (AW030T) of the Transportation Research Board, 2002  
Founding member of the Elizabeth Mann-Borgese Centre for Ocean Governance, 2003  
Appointed as Cox Fisheries Scientist in Residence at Dalhousie University, 2004  
Appointed University Chair in Marine Ecosystem Research at Cape Breton University, 2004  
Appointed Director of the Bras d'Or Institute at Cape Breton University, 2005  
Appointed President of the Board of Directors of the Atlantic Coastal Action Program, 2007  
Appointed to Steering Committee of the IMAGINE Canada ILM Network, 2008  
Appointed to the Fisheries Resource Conservation Council of Canada, 2009  
Recognized for "*Significant contributions to marine policy & implementation*" by the Nova Scotia House of Assembly, 61<sup>st</sup> General Assembly, 2<sup>nd</sup> Session, Resolution No. 407, 2010

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Appointed to the Editorial Board of the Nova Scotia Institute of Science, 2010  
Acknowledged for “*Service to Canadian Fisheries Conservation*” by the Canadian Minister of Fisheries, 2011  
Elected President-Elect for the Atlantic Canada Coastal and Estuarine Science Society (ACCESS), 2012  
Appointed Verschuren Centre Research Fellow, Centre for Sustainability in Energy and the Environment, Cape Breton University, 2013

**PROFESSIONAL ASSOCIATIONS**  
(alphabetical order)

Alliance for Marine Remote Sensing (AMRS)  
American Society of Limnology & Oceanography (ASLO)  
Aquaculture Association of Nova Scotia (AANS)  
Atlantic Canada Coastal and Estuarine Science Society (ACCESS)  
Australian Coral Reef Society (ACRS)  
Australian Marine Sciences Association (AMSA)  
Australian Society of Fish Biologists (ASFB)  
Canadian Association for Underwater Science (CAUS)  
Canadian Water Resources Association (CWRA)  
Caribbean Aquaculture Association (CCA)  
Centre for Marine Biodiversity (CMB)  
Ecological Society of America (ESA)  
Elizabeth Mann-Borgese Centre for Oceans Governance (EM-BCOG)  
Gulf & Caribbean Fisheries Institute (GCFI) – Council member  
International Society for Reef Studies (ISR)  
Oceans Institute of Canada (OIC)  
Nova Scotia Institute of Science (NSIS)  
Pacific Science Association (PSA)  
Phuket Marine Biological Association  
Royal Society of Western Australia (RSWA)  
The Oceanography Society (TOS)  
Transportation Research Board (TRB)  
Western Society of Naturalists (WSN)

**OTHER ACTIVITIES**  
(alphabetical)

***Peer Review of Institutions and Granting Agencies:***  
Acadia University – Estuarine Research Centre  
Australian Institute of Marine Science (AIMS)  
Australian Marine Science & Technology Grant Scheme (MSTGS)  
Australian Museum Fellowship Programme  
Australian National Facility Steering Committee - Oceanographic Vessel  
Australian Research Council (ARC)  
Canadian Department of Fisheries and Oceans (DFO)  
Canadian International Development Research Council (IDRC)  
Canadian Natural Science and Engineering Research Council (NSERC)  
International Centre for Ocean Development (ICOD)  
Natural Science and Engineering Research Council (NSERC) Canada  
New Zealand Foundation for Research, Science & Technology  
Smithsonian Institution (Washington, DC)  
Social Science and Humanities Research Council (SSHRC) Canada  
Transportation Research Board (TRB), US National Academies, Washington, DC  
United States National Science Foundation (NSF)  
United States National Undersea Research Program (NURP)  
United States Sea Grant College Program  
University of Hawaii (UH)  
University of Southern California (USC)  
Western Australian Department of Conservation & Land Management (CALM)  
World Ocean Council (WOC)

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***Peer Review of Journals & Publications:***

Australian Journal of Marine & Freshwater Research (AJMFR)  
Botanica Marina  
Bulletin of Marine Science (BMS)  
Bulletin of the Phuket Marine Biological Centre (Advisory Editor: 1990-1998)  
Coral Reefs (Springer - Environmental Editor: 1995-2005)  
Environmental Science (Springer)  
Gulf & Caribbean Fisheries Institute (GCFI)  
Journal of Shellfish Research (JSR)  
Limnology & Oceanography (ASLO)  
Marine Biology (Springer)  
Marine Ecology Progress Series (MEPS)  
Marine Ecology (PSZI)  
Proceedings of the Nova Scotian Institute of Science (Co-Editor: 2010-)  
Proceedings Sixth International Coral Reef Symposium (Co-Editor: 1988-89)  
Research & Explorations (National Geographic)  
Science (AAAS)  
Trends in Ecology and Evolution (TREE - Elsevier)

**PUBLICATIONS** (*chronological order of publication*)

**Research Theses: (3)**

**Hatcher BG** 1974 Marine macrophyte productivity of an estuary on the Atlantic coast of Canada.  
*Honours Thesis, Dalhousie University, Halifax, Nova Scotia. 44pp.*

**Hatcher BG** 1976 The ecological energetics of *Laminaria longicuris*.  
*M.Sc. Thesis, Dalhousie University, Halifax, Nova Scotia. 100pp.*

**Hatcher BG** 1982 The interaction between algae and grazers on a coral reef.  
*Ph.D. Thesis, University of Sydney, NSW. 161pp.*

**Refereed Publications: Journals, Symposia Proceedings and Book Chapters: (86)**

**Hatcher BG & Mann KH** 1975 The above-ground production of Marsh cordgrass (*Spartina alterniflora*) near the northern end of its range. *Journal of the Fisheries Research Board of Canada* 32:83-87.

**Hatcher BG** 1977 An apparatus for measuring the photosynthesis and respiration of intact large marine algae and comparison of results with those from experiments with tissue segments. *Marine Biology* 43:381-385.

**Hatcher BG, Chapman ARO & Mann KH** 1977 An annual carbon budget for the kelp *Laminaria longicuris*. *Marine Biology* 44:85-96.

**Hatcher BG** 1981 The interaction between grazing organisms and the epilithic algal community of a coral reef: a quantitative assessment. In: *E Gomez et al (eds), Proc Fourth Int Coral Reef Symp, Univ Philippines, Manila, 2:515-524.*

**Hatcher AI & Hatcher BG** 1981 Seasonal and spatial variation in dissolved inorganic nitrogen in One Tree Reef Lagoon. In: *E Gomez et al (eds), Proc. Fourth Int Coral Reef Symp., Univ. Philippines, Manila, 1:419-424.*

**Hatcher BG** 1983 Grazing in coral reef ecosystems. In: *DJ Barnes (ed), Perspectives on Coral Reefs. Aust Inst Marine Sci, Townsville, pp:164-179.*

**Hatcher BG** 1983 The role of detritus in the metabolism and secondary production of coral reef ecosystems. In: *JT Baker et al (eds), Proc. Great Barrier Reef Conf., James Cook Univ., Townsville, pp:317-325.*

**Hatcher BG & Larkum AWD** 1983 An experimental analysis of factors controlling the standing crop of the epilithic algal community on a coral reef. *Journal of Experimental Marine Biology & Ecology* 69:61-84.

**Entsch B, Sim RG & Hatcher BG** 1983 Indications from photosynthetic components that iron is a limiting nutrient in primary producers on coral reefs. *Marine Biology* 73:17-30.

**Hatcher BG** 1984 A maritime accident provides evidence for alternate stable states in benthic communities on coral reefs. *Coral Reefs* 3:199-204.

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Crossland CJ, **Hatcher BG**, Atkinson MJ & Smith SV 1984 Dissolved nutrients of a high latitude coral reef, Houtman Abrolhos Islands, Western Australia. *Marine Ecology Progress Series* 14:159-163.

**Hatcher BG** 1985 Ecological Research at the Houtman Abrolhos: High latitude reefs of Western Australia. In: J Delesalle et al (eds), *Proc Fifth Int Coral Reef Cong, Antenne Museum-EPHE, Moorea*, 6:291-297.

**Hatcher BG** & Rimmer DW 1985 The role of grazing in controlling community structure on a high latitude coral reef: Measurements of grazing intensity. In: J Delesalle et al (eds), *Proc Fifth Int Coral Reef Cong, Antenne Museum-EPHE, Moorea*, 6:229-236.

Johannes RE & **Hatcher BG** 1986 Shallow tropical marine environments. In: M Soule (ed), *Conservation Biology: The science of scarcity and diversity. Sinauer Assoc Publ. Sunderland, Mass., pp.371-382.*

**Hatcher BG**, Imberger J, Smith SV 1987 Scaling analysis of coral reef systems: an approach to problems of scale. *Coral Reefs* 5:171-181.

**Hatcher BG**, Kirkman H & Wood WF 1987 The growth of the kelp *Ecklonia radiata* near the northern limit of its range in Western Australia. *Marine Biology* 95:63-73.

**Hatcher BG** 1988. The primary productivity of coral reefs: a beggar's banquet. *Trends in Ecology & Evolution* 3:106-111.

Francesconi KA, Edmonds JS & **Hatcher BG** 1988 Examination of the arsenic constituents of the herbivorous marine gastropod mollusc *Tectus pyramis*: Isolation of Tetramethylarsonium ion. *Comparative Biochemistry & Physiology* 90C:313-316.

Wright GD, Hatcher AI & **Hatcher BG** 1988 Clarifying the impact of fishing activity on the reefs of the Houtman Abrolhos: Results of a tandem approach between anthropology and marine science. *Proc. Sixth Int Coral Reef Symp, Townsville*, 2:433-437.

**Hatcher BG** 1988 Coral reefs of Western Australia (Editor, Introduction, Houtman Abrolhos section) In: Wells S (ed) *Coral Reefs of the World. I.U.C.N., Cambridge, Vol.2, pp.1-26.*

**Hatcher BG**, Johannes RE & Robertson, AI 1989 Review of research relevant to the conservation of shallow tropical marine ecosystems. *Oceanography & Marine Biology Annual Reviews* 27:337-414.

Hatcher AI, Wright GD, **Hatcher BG** 1990 Resolving the conflict between conservation values and extractive use of the Abrolhos coral reefs. *Proceedings of the Ecological Society of Australia* 16:55-70.

**Hatcher BG** 1990 Coral reef primary productivity: A hierarchy of pattern and process. *Trends in Ecology & Evolution* 5:149-155.

Crossland CJ, **Hatcher BG**, Smith SV 1991 The role of coral reefs in global carbon production. *Coral Reefs* 10:55-64.

**Hatcher BG** 1991 Coral Reefs in the Leeuwin Current: an Ecological Perspective. *Journal of the Royal Society (Western Australia)* 74:115-127.

**Hatcher BG**, Smith SV, Crossland CR 1992, The Role of Coral Reefs in Global Ocean Production. In: PG Falkowski & AD Woodhead *Primary Productivity and Biogeochemical Cycles in the Sea, Plenum Press, New York, pp.513-514.*

**Hatcher BG**, 1993. Arabian Gulfs (Book Review of 'Marine Ecology of the Arabian Region'). *Trends in Ecology & Evolution* 8:113-115

Collins LB, Zhu ZR, Wyrwoll K-H, **Hatcher BG**, Playford PE, Chen JH, Eisenhauer A, Wasserburg GJ. 1993. Late Quaternary evolution of coral reefs on a cool-water carbonate margin: the Abrolhos carbonate platforms, Southwest Australia. *Marine Geology*, 110: 203-21

**Hatcher BG** & Collins LB. 1993. The Houtman Abrolhos Reefs of Western Australia: Environmental and anthropogenic change in the structure and function of reef communities at high latitude. *Proc. Global Aspects of Coral Reefs : Health, Hazards and History, Univ. of Miami, June 1993, pp.N8-N14.*

Collins LB, Zhu ZR, Wyrwoll K-H, **Hatcher BG**, Playford PE, Eisenhauer A, Chen JH, Wasserburg GJ & Bonani G. 1993. Holocene growth history of a reef complex on a cool-water carbonate margin: Easter Group of the Houtman Abrolhos, Eastern Indian Ocean. *Marine Geology*, 115:29-46.

**Hatcher BG**. 1994. Nutrient cycling and organic production. In: LS Hammond & RN Synnot (eds), *Marine biology. Longman Cheshire, Melbourne, pp.107-130.*

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Robertson AI & **Hatcher BG**. 1994. Trophic relations, food webs and material flow. In: *L Hammond L & R Synnot (eds), Australian marine biology. Longman Cheshire, Melbourne, pp.137-151.*

Barbeau MA, Scheibling RE, **Hatcher BG**, Taylor LH & Hennigar AW. 1994. Survival analysis of tethered juvenile sea scallops *Placopecten magellanicus* in field experiments: effect of predators, scallop size and density, site and season. *Marine Ecology Progress Series, 115:243-256.*

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## **SEMINARS & INVITED PRESENTATIONS (last 6 years - 23)**

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Research on Land-Ocean interactions in the Bras d'Or ecosystem. *Bedford Institute of Oceanography*. 19<sup>th</sup> September, 2008

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Linking remotely sensed data and numerical models in studies of ecological connectivity and ecosystem-based management decision support. *MITACS - Spatial Ecology Workshop*, Dalhousie Univ., Halifax, NS, 24<sup>th</sup> February, 2009

Research on Land-Ocean interactions in the Bras d'Or ecosystem. *Thoughtful Thursdays*, Mabou, Nova Scotia. 14<sup>th</sup> May, 2009

Characterization of the Sydney Harbour marine ecosystem: Summer-Autumn, 2009. *Presentation to the Sydney Harbour Marine Group*, 30<sup>th</sup> September, 2009.

Ecosystem research for management in the Bras d'Or Ecosystem. *Collaborative Environmental Planning Initiative*

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(CEPI) Annual Science Workshop, Wagmatcook, N.S., 12<sup>th</sup> August, 2010

Improving Client Outcomes from Applied Marine Research: Comparative Analysis of Scotian Shelf, Sydney Harbour and Bras D'or Lake Examples. *Keynote Paper*, ACCESS symposium: *Marine Science Serving Coastal Communities* Antigonish, Nova Scotia, 13<sup>th</sup> May, 2011.

Operationalizing Marine Ecosystem-based Management: the Role of the Natural Sciences. Ocean University of China, Qingdao, 9<sup>th</sup> Septemnrber, 2011.

The Biodiversity of the Sydney Harbour Ecosystem. *Cape Breton Naturalists Society*. Sydney, N.S. 12<sup>th</sup> December, 2011.

Relocation of Marine Biota Prior to the Dredging of the Sydney Harbour: a Successful Team Effort. *Annual Meeting, Eastern Area Office, Fisheries and Oceans Canada*. Port Hawkesbury, Nova Scotia, 21<sup>st</sup> March, 2012.

Mitigation and Compensation for the Dredging of the Sydney Harbour: a Work in Progress. *Advisory Meeting, Lobster Fishing Area 27*. Sydney, Nova Scotia, 27<sup>th</sup> March, 2012.

Dredging the Sydney Harbour: doing what HADD to be done. *Canadian Fisheries, Oceans and Aquaculture Management invited Seminar Series*. Telfer School of Management, Univ. of Ottawa, 4<sup>th</sup> April, 2012.

Connectivity Modeling of the Bras d'Or Lakes. *Revitalizing the Oyster Fishery in Cape Breton*. Cape Breton University, Sydney, Nova Scotia. 11<sup>th</sup> April, 2012

Mitigation and Compensation for the Dredging of the Sydney Harbour: Progress Report. Atlantic Canada Coastal and Estuarine Science Society (ACCESS) symposium: Halifax, Nova Scotia, 13<sup>th</sup> May, 2012.

Creating a Robust OTN Acoustic Array in the Bras d'Or Ecosystem of Cape Breton: Adapting to Environmental Limitations on Signal Detection. Ocean Tracking Network (OTN) Annual Science Meeting, Halifax, Nova Scotia. 5 June, 2012.

Dredging the Sydney Harbour: doing what HADD to be done. *10th Annual Conference for the Canadian University/College Environmental Science Network*. Cape Breton University, Sydney, Nova Scotia. 12<sup>th</sup> June, 2012.

GIS Mapping in Marine Ecological Research. *Cape Breton GIS Day*. GeoMatics Association of Nova Scotia (GANS) . Sydney, Nova Scotia, 14 November, 2012

Sustaining Ecosystem Integrity During & After The Dredging Of The Sydney Harbour. *Presentation to the Faculty*, World Maritime University, Malmo, Sweden, 19<sup>th</sup> November, 2012.

Lessons Learned from a Career in Marine Science. *Presentation to the Graduating Class*, World Maritime University, Malmo, Sweden, 19<sup>th</sup> November, 2012.

How the Sydney Harbour has Changed During and After Dredging. *Cape Breton University Research Week*, Sydney, Nova Scotia, 18<sup>th</sup> March, 2013.

Research Diving in the Sydney Harbour, Cape Breton. *Canadian Association for Underwater Science (CAUS)*, Seneca College, King City, Ontario. 23<sup>rd</sup> May, 2013.

Opportunities for Collaboration in Research and Education at Cape Breton University. *Presentation to Chinese Marine Trade Mission to Atlantic Canada*, NSCC Nautical Inst. Port Hawkesbury, Noav Scotia. 5 June, 2013.

**COUNTRIES (29)**  
***In which I have worked***

- ANTIGUA & BARBUDA  
- AUSTRALIA  
- BAHAMAS  
- BARBADOS  
- BRAZIL  
- BELIZE  
- CANADA  
- CHINA  
- COLOMBIA  
- CUBA

- DOMINICA  
- DOMINICAN REPUBLIC  
- ENGLAND  
- ERITREA  
- FRENCH POLYNESIA  
- GRENADA  
- GUATEMALA  
- HONDURAS  
- ITALY  
- MALDIVES

- MEXICO  
- MONTSERRAT  
- PANAMA  
- PHILIPPINES  
- St. KITTS & NEVIS  
- St. LUCIA  
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