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DRAFT

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BIO CHRONOLOGY

Being compiled by Don Gordon

This chronology is intended to be a compilation of major events in the history of the Bedford Institute of Oceanography. It is being prepared for the 50th anniversary of BIO in 2012. It builds upon earlier chronologies developed by Carol Broome (Library summer student) for the BIO archives and by Dale Buckley for the BIO Oceans Association (web site and the stamp proposal). Much more information was gleaned from the BIO Annual Reports. Of particular note are those of 1986 and 2002 which are special 25th and 40th anniversary issues. Other sources of information include the MEL reunion in 2006, a chronology of marine sciences in Canada prepared by Eric Mills and information from the web. I also have notes on the development of instrumentation at BIO from Dave McKeown but have not yet consulted them.

This is very much a work in progress. There remain many gaps to fill plus substantial editing is needed. Discussion is needed on far to proceed with this venture and the format in which it should be made generally available.

Important Background Events

1842

Creation of the Geological Survey of Canada under William Logan.

1862

Creation of the Nova Scotian Institute of Science.

1873

HMS *Challenger* visits Halifax.

1883

Creation of the Georgian Bay Survey to systematically survey and chart Georgina Bay and Lake Hurson. This was the precursor of the Canadian Hydrographic Service.

1893

E.E. Prince was appointed Dominion Commissioner of Fisheries.
Establishment of the Canadian Tidal Survey.

1898

A Board of Management, composed of university and government representatives, was established to construct and manage a floating research station on the Atlantic coast of Canada.

1899

The floating research station was completed and first used in St. Andrews, NB. It operated at various east coast sites until 1907.

1904

The responsibilities of the Georgian Bay Survey were broadened and its name changed to the Hydrographic Survey of Canada.

1908

Establishment of the Atlantic Biological Station in St. Andrews, NB.

1912

The Board of Management became the Biological Board of Canada and membership expanded to include the fishing industry.

1913

The CHS *Acadia*, designed in Canada but built in Newcastle-on-Tyne, began her 57 year career as a hydrographic survey vessel.

1915

The Canadian Fisheries Expedition was conducted.

1925

Opening of the Atlantic Experimental Station on Water Street in Halifax, NS.

1928

The Hydrographic Survey of Canada was renamed the Canadian Hydrographic Service (CHS).

1931

Creation of the Newfoundland Fishery Research Laboratory in Bay Bulls which was housed in the upper story of a fish plant. This burned down in 1937 and staff moved to St. John's. After Confederation in 1949, this lab became the St. John's Biological Station with Wilfred Templeman as Director.

1937

The Biological Board of Canada became the Fisheries Research Board of Canada (FRB). Under the control of the Minister of Fisheries, the Board developed a network of fishery research stations across the country and conducted investigations of practical and economic problems connected with marine and freshwater fisheries, flora and fauna. FRB developed an excellent international scientific reputation but was disbanded as a line agency in 1973. Its history is documented in The Aquatic Explorers written by Kenneth Johnstone (University of Toronto Press, 1977).

1944

Creation of the Naval Research Establishment (NRE) in Halifax.

1946

The Joint Committee on Oceanography (JCO) was created to coordinate the development of oceanography in Canada on both coasts. It was composed of representatives from both federal agencies and universities.

The Fisheries Research Board (FRB) created the Atlantic Oceanographic Group (AOG). This was initially based in St. Andrews, NB. For many years it was headed by Dr. Harry Hachey. The early program was primarily physical oceanography but later expanded to include geology, chemistry and biology. Ship support was provided by the Royal Canadian Navy. In the same year, the Pacific Oceanographic Group (POG) was created on the west coast and headed for many years by Dr. Jack Tully.

Creation of the Nova Scotia Research Foundation in Dartmouth, NS.

1947

Creation of the Defence Research Board (DRB) which included the Naval Research Establishment (NRE).

1949

The CNAV *Kapuskasing* was transferred by the Royal Canadian Navy to the Department of Mines and Technical Surveys (DMTS) and converted at the Halifax Shipyard to conduct hydrographic surveys. She was built in 1944 and carried out convoy escort duties during World War II.

1950

Creation of the International Commission for the North Atlantic Fisheries (ICNAF).

1951

The CNAV *Sackville*, a Flower Class World War II corvette, was made available to the Atlantic Oceanographic Group (AOG) by the Royal Canadian Navy (RCN) for oceanographic studies.

1952

The Naval Research Establishment moved to a new laboratory in Dartmouth, NS.

1957

The CHS *Baffin*, built by Canadian Vickers, was delivered to the Department of Mines and Technical Surveys (DMTS) and began her work as a hydrographic survey vessel out of Halifax. Soon after she went aground off Lunenburg, Nova Scotia while on a shakedown cruise.

1958

At the 30th meeting of the Joint Committee on Oceanography (JCO), Dr. William van Steenburgh of the Department of Mines and Technical Surveys (DMTS) stated that the Department expects to set up an east coast establishment at Purdy's Wharf in Halifax in the near future, and that this establishment should allow for the advancement of east coast oceanography.

Canadian Hydrographic Service (CHS) staff, originally based in Ottawa, opened an office in the Ralston Building in Halifax. The CHS survey ships all berthed at Purdy's Wharf on the Halifax waterfront except for the CSS *Acadia* which returned to Pictou each fall.

Establishment of the Polar Continental Shelf Project in which BIO staff later participated.

1959

The Joint Committee on Oceanography was replaced by the Canadian Committee on Oceanography (CCO) which continued to operate under the same coordination mandate.

The CCO decided that oceanography needed to be expanded in Canada. Although the Fisheries Research Board (FRB) had both AOG and POG under its wing, Dr.Jack Kask, Chairman of FRB from 1953 to 1963, was not interested in developing oceanography further since the principal responsibility of FRB was fisheries. All agreed that a broad and expanded oceanographic program fitted better under the Department of Mines and Technical Surveys (DMTS) which had two ambitious builders in Dr. William van Steenburgh and Dr. William M. Cameron. This decision ultimately led to the creation of the Bedford Institute of Oceanography in 1962.

At the 32nd meeting of the Canadian Committee on Oceanography (CCO), it was reported that DMTS plans on the east coast were progressing favourably. Services were being supplied to the Bedford Basin site in Dartmouth, and wharves and jetties would probably be under construction in 1960.

The Institute of Oceanography (IODAL) was created at Dalhousie University to offer graduate degrees in oceanography. The first director was Dr. Ronald Hayes. A similar institute was created on the west coast at the University of British Columbia.

1960

The Atlantic Oceanographic Group (AOG), still part of FRB under the Department of Fisheries, moved from St. Andrews to Halifax, but still reported to St. Andrews. Dr. Neil Campbell was Oceanographer-in-Charge. They occupied a group of single story wooden buildings (now gone) on Terminal Road between Hollis and Water Streets across from the Nova Scotian Hotel (now the Westin).

The AOG mandate was to study the ocean environment and its dynamics taking into account the processes which maintain or modify ocean conditions in both inshore and offshore waters. The initial focus was on physical oceanography but with strong links to fisheries since it was part of the Fisheries Research Board (FRB). The geographic area of interest was the entire Atlantic Canada continental shelf. Numerous cruises were run, especially on the CNAV *Sackville*. The program was coordinated by the Canadian Committee on Oceanography (CCO) and there was considerable collaboration with the Institute of Oceanography at Dalhousie University.

The Oceanographic Research Division of the Department of Mines and Technical Surveys (DMTS) was established in Ottawa. Dr. William M. Cameron was appointed the first Director.

At the 34th meeting of the Canadian Committee on Oceanography (CCO), Dr. William van Steenburgh reported that the contract for CSS *Hudson* would be awarded shortly, and that the construction of the new Dartmouth lab on Bedford Basin was proceeding satisfactorily.

The East Coast Working Party on Oceanographic Services for Defence was established. Its purpose was to study, develop and recommend methods of meeting maritime warfare

requirements in oceanography.

The CNAV *Sackville* participated in seismic refraction/reflection experiments with the RV *Vema* from the Lamont Doherty Geological Observatory of Columbia University to identify the structure and nature of the Nova Scotian continental shelf. Results of this research provided the foundation for later geological and geophysical studies that showed that the Scotian Shelf was a potential area for oil and gas exploration.

The CSS *Baffin*, together with the CCGS *Labrador*, carried out a hydrographic and marine geology survey in Lancaster Sound between Baffin Island and Devon Island. They became the first vessels to circumnavigate Baffin Island in one season.

1961

The Marine Sciences Branch (MSB) was created under the Department of Mines and Technical Surveys (DMTS). It combined the operations of the Canadian Hydrographic Service and marine research in the physical and geosciences. Dr. William M. Cameron was appointed the first Director.

The CHS *Maxwell* was delivered to DMTS and provided an additional vessel for hydrographic surveying.

BIO Years

1962

The Bedford Institute of Oceanography (BIO) officially opened on 25 October, 1962. The Honourable Paul Martineau, Minister of the Department of Mines and Technical Surveys (DMTS) and Dr. Jack L. Kask, Chair of the Fisheries Research Board (FRB), give speeches. Over three hundred guests were invited, including The Honourable Robert L. Stanfield, then Premier of Nova Scotia.

Organization and People

BIO was designed to become Canada's centre for hydrography, oceanography, geophysics, chemistry and geology for Atlantic Canada and most of the Canadian Arctic. The lead agency was the Marine Sciences Branch (MSB) of the Department of Mines and Technical Surveys (DMTS). Dr. William N. English was the first director. The Atlantic Oceanographic Group (AOG) of FRB, headed by Dr. N.J. Campbell, and CHS hydrographers moved over from Halifax to become part of the new Institute. Most of the hydrographic work at that time was led by staff in Ottawa but responsibility was expected to shift BIO as new staff were recruited and established. By the end of the year, there were 140 staff employed at the Institute, 16 in FRB and 124 in DMTS. Senior staff were:

- W.H. English, Director
- G.W. LaCroix, Regional Hydrographer
- C.R. Mann, Regional Research Oceanographer
- N.J. Campbell, Scientist-in-Charge of AOG
- R.L.G. Gilbert, Engineer-in-Charge
- J.S. Horam, Regional Ships' Officer
- S.H. Scott, Administrative Officer

Program

The initial focus of the BIO program was on hydrography and oceanographic research.

Facilities

The facilities at the time of opening were the main building (now Polaris and van Steenburgh before additions), the depot and the jetty. There also was a guard house for security at the entrance on the top of the hill.

Ships

When BIO opened its doors, the research fleet consisted of the following vessels:

- CHS *Acadia*,

- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

Additional vessels were chartered as needed.

Technology

Meetings, Workshops and Conferences

In October, the Canadian Committee on Oceanography (CCO) met at BIO. This was the first CCO meeting ever to be held outside of Ottawa.

The first BIO Open House was held on 26 October, the day after BIO was officially opened.

Honours and Awards

On 24 October, Dr. William van Steenburgh, Director-General of Scientific Services for the Department of Mines and Technical Surveys (DMTS), was awarded a Doctorate at Dalhousie University for his contributions to oceanography in Canada. In his acceptance speech Dr. van Steenburgh chronicled the events which led to the founding of BIO.

Visitors

- The Honourable Paul Martineau, Minister of the Department of Mines and Technical Surveys (DMTS)
- Dr. J. L. Kask, Chair of the Fisheries Research Board (FRB)
- The Honourable R. L. Stanfield, Premier of Nova Scotia

The French research vessel *Thalassia* was the first foreign research vessel to visit BIO.

Key External Events

The Atlantic Provinces Inter-University Committee on the Sciences (APICS) was created and BIO became an associate member. In 1978 this organization was renamed the Atlantic Provinces Council on the Sciences.

The Diefenbaker government created the Canadian Coast Guard in order to consolidate Canada's fleet of icebreakers, navigation aid vessels and northern supply craft under one agency.

1963

Organization and People

BIO continued to grow rapidly. Marine Science Branch (MSB) staff from current surveys and hydrography transferred from Ottawa. The Marine Geology Unit of the Geological Survey of Canada (GSC) under Dr. Bernie R. Pelletier transferred from Ottawa and became part of MSB. New groups in theoretical oceanography and marine geophysics were established in the MSB. L.P. Murdock became the new Regional Hydrographer.

The research program was organized as follows:

Marine Science Branch Support Program:

- Ships
- Engineering Services
- Oceanographic Services

Marine Science Branch Research and Technical Surveys Program:

- Physical Oceanography
- Theoretical Studies
- Marine Geology and Geophysics
- Hydrographic Surveys

Atlantic Oceanographic Group Program:

- Physical Oceanography
- Geology and Geochemistry
- Benthic Fauna Studies
- Chemical Oceanography

Senior staff were now:

- W.H. English, Director
- L.P. Murdock, Regional Hydrographer
- C.R. Mann, Regional Research Oceanographer
- N.J. Campbell, Scientist-in-Charge of AOG
- R.L.G. Gilbert, Engineer-in-Charge
- J.S. Horam, Regional Ships' Officer
- S.H. Scott, Administrative Officer

The Secretariat of the International Commission for the Northwest Atlantic Fisheries (ICNAF) moved into BIO. The Executive Secretary of ICNAF was L. R. Day, formerly of the St. Andrews Biological Station.

At the end of the year, BIO staff totalled 154 (134 MSB, 15 AOG, 5 ICNAF) plus the personnel of the survey/research fleet.

Program

The program continued to evolve to meet national requirements in support of fisheries, navigation, maritime defence, natural resources and weather forecasting.

Scientists from BIO carried out marine geological research as part of the Polar Continental Shelf Project.

The CCGS *Labrador* and CSS *Baffin* undertook the first marine geophysical survey in Baffin Bay and the Nares Strait.

The first joint marine biological and geological study was carried out at Ellerslie, PEI to determine the cause of oyster deterioration in that area.

Facilities

Ships

The BIO research fleet consisted of the following vessels:

- CHS *Acadia*,
- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

Additional vessels were chartered as needed.

On 23 December, the CSS *Hudson*, built at Saint John Shipbuilding and Drydock, was delivered to BIO. A wonderful Christmas present.

Technology

Meetings, Workshops and Conferences

The 1963 Annual Meeting of the Scientific Committee on Oceanic Research (SCOR) was held at BIO.

Honours and Awards

Visitors

The RV *Atlantis II* of the Woods Hole Oceanographic Institute (WHOI) visited BIO.

Key External Events

1964

Organization and People

In August, Dr. William N. English resigned as the first Director of BIO and moved back to the west coast. He guided the growth and development of the Institute during its formative first two years. Dr. L.A. Earl Doe was appointed Acting Director in his place. Dr. Reginald L.G. Gilbert assumed the responsibilities of Director when Dr. Doe was in Pakistan for two months. The group of marine geologists of the Geological Survey of Canada, under the leadership of Dr. Bernie Pelletier, were now fully integrated into the Institute. R.L. Melanson became Regional Hydrographer.

The Atlantic Oceanographic Group (AOG) still reported to St. Andrews but was now headed by Dr. Ronald W. Trites. AOG announced the intent to gradually develop a broader program in biological oceanography, geology and geochemistry, physical oceanography and chemical oceanography. The basic philosophy adopted was that if direct and fundamental links between the fisheries and the environmental parameters were to be established an integrated study was required.

The Frozen Sea Research Group moved from BIO to Victoria, British Columbia in order to work contiguously with a group at the Pacific Naval Lab having nearly identical logistics problems.

The research program was now organizied as follows:

Marine Science Branch Program:

- Administration
- Engineering Services
- Oceanographic Services
- Ships

Marine Science Branch Research and Technical Surveys Program:

- Oceanographic Research
- Hydrographic Group
- Marine Geology
- Instrument Design Group

Atlantic Oceanographic Group Program:

- Physical Oceanography
- Geology and Geochemistry
- Biological Oceanography
- Chemical Oceanography

Senior staff were now

- L.A.E. Doe, Director
- R.C. Melanson, Regional Hydrographer

- C.R. Mann, Senior Oceanographer
- R.L.G. Gilbert, Engineer-in-Charge
- B.R. Pelletier, Head of Marine Geology
- R.W. Trites, Oceanographer-in-Charge of AOG
- A.M. Holler, Marine Superindent
- S.H. Scott, Administrative Officer

Staff

Program

The journal *Maritime Sediments* was established by Dr. B.R. Pelletier.

The first sedimentological map of Hudson Bay was published and based in part on research carried out by BIO staff.

The first multidisciplinary offshore hydrographic/geophysics survey was completed using the CSS *Baffin*.

The CSS *Hudson* conducted a geophysical survey of the continental shelf which resulted in the discovery of the Orpheus Anomaly. This anomaly was caused by a Triassic graben structure, thus indicating thick sequences of sediments underlying the continental shelf.

Facilities

There were no major changes in buildings during the year. However, with the increase of staff, space was becoming an issue.

Ships

On 14 February, the CSS *Hudson* was commissioned at BIO by The Honourable W. M. Benidickson, Minister of the Department of Mines and Technical Surveys (DMTS).

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Acadia,*
- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

For most of the year, the CSS *Hudson* was involved in conducting trials and tuning equipment. However, in June she sailed to Charlottetown, PEI, to represent BIO at the 100th Anniversary of the Charlottetown Conference.

Technology

Meetings, Workshops and Conferences

Honours and Awards

Visitors

Key External Events

Dr. Ronald Hayes left the Institute of Oceanography at Dalhousie University (IODAL) to replace Dr. Jack Kask as the Chairman of FRB in Ottawa. He was temporarily by Dr. Ewart Blanchard.

1965

Organization and People

On 1 April, Dr. William L. Ford assumed the position of Director of BIO for the Marine Sciences Branch (MSB). The following quote from the Annual Review emphasized the uniqueness of BIO at the time.

"The Bedford Institute of Oceanography (BIO), now in its fourth year, may be viewed as a promising experiment in the organization of resources for marine research. The activities of BIO form part of a broad national program coordinated by the Canadian Committee on Oceanography, on which eight agencies of the Federal Government and four universities are represented. The Institute houses on one campus and, in varying degrees, integrates several organizations which previously had operated more or less in isolation from one another."

The largest unit was the Marine Sciences Branch (MSB), under the Department of Mines and Technical Surveys (DMTS), which was built from components of the Canadian Hydrographic Service and the Geological Survey of Canada as well as the recruitment of new staff. Institute buildings and ships were owned and operated by MSB. The second largest unit was the Atlantic Oceanographic Group (AOG).

The Atlantic Oceanographic Group (AOG) expanded further and became an independent Fisheries Research Board (FRB) laboratory reporting directly to the Chair of FRB. Dr. Lloyd M. Dickie was appointed Director. This new lab was not officially named the Marine Ecology Laboratory (MEL) until 1968 but 1965 is generally accepted as its birthdate. This marked the beginning of a new and expanded FRB program to study physical and biological processes underlying marine production with special reference to fisheries. This laboratory had its own director, program, administration and support services.

The Standards Lab was established to provide a maintenance and calibration service for all electronic and electrical test equipment in use at BIO and aboard ships.

The research program was now organized as follows:

Marine Science Branch Program:

- Oceanographic Research
- Marine Geology
- Micropalaeontology
- Hydrography
- Engineering Services
- Ships
- Administration

Atlantic Oceanographic Group Program:

- Biological Oceanography
- Environmental Oceanography

Senior staff were now:

- W.L. Ford, Director
- L.A.E. Doe, Senior Oceanographer
- R.L.G. Gilbert, Engineer-in-Charge
- S.W. Howell, Regional Marine Superintendent
- R.C. Melanson, Regional Hydrographer
- B.R. Pelletier, Head of Marine Geology
- L.M. Dickie, Director of AOG
- S.H. Scott, Administrative Officer

At the end of the year, BIO staff totalled 210.

Program

A marine geological and hydrographic survey of Hudson Bay was carried out using CSS *Hudson*.

The CCGS *Labrador* conducted the first systematic geological survey of the Labrador Sea. Results of that research show that sedimentary rocks underlie the central and outer shelf.

The CSS *Hudson* undertook a geophysical survey of the Mid-Atlantic Ridge.

Facilities

In recognition of the basic importance of a good library in a research organization, the BIO Library was supported jointly by MSB and FRB. The collection continued to develop under the guidance of the librarian Miss Allen and was widely used by both BIO and Dalhousie staff.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Acadia*,
- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

Charlotte Keen and Francis Wagoner of BIO and Joleen Aldous of Dalhousie were among the first group of women scientists to participate in an oceanographic expedition

on the CCS *Hudson*.

Technology

Installation of the CDC 3100 mainframe computer increased capacity for data processing and analysis. A PDP-5 computer was rented for use at sea.

Meetings, Workshops and Conferences

Honours and Awards

Visitors

Key External Events

Across the harbour, Dr. Gordon A. Riley arrived from Yale University as the new Director of the Institute of Oceanography at Dalhousie University (IODAL).

1966

Organization and People

In Ottawa, Dr. William van Steenburgh moved from the post of Deputy Minister of the Department of Mines and Technical Surveys (DMTS) to undertake a special assignment connected with the work of the Sciences Secretariat of the Privy Council Office.

The Marine Science Branch (MSB) had a change in reporting structure when the Department of Mines and Technical Surveys (DMTS) became the Department of Energy Mines and Resources (DEMR). The Atlantic Oceanographic Group (AOG) was renamed the Dartmouth Laboratory of the Fisheries Research Board. A new Section of Applied Oceanography was created with staff from both MSB and AOG to pool the resources of a number of small groups working on practical problems. It was headed by Dr. Ronald W. Trites. The Ocean Circulation Group under Dr. Cedric R. Mann was also formed at this time. The Engineering Services Section was divided to form Metrology, which was responsible for the research, design, and development in the field of specialized oceanographic instrumentation, and Engineering Services, which was responsible for general engineering support functions.

The research program was now organized as follows:

Marine Science Branch Program (W.L. Ford, Director)

- Oceanographic Research (C. Maunsell)
- Applied Oceanography (R.W. Trites)
- Marine Geology (B. Pelletier)
- Hydrography (R. Melansen)
- Metrology (R.L.G. Gilbert)
- Engineering Services (A. Atkinson)
- Ships (S. Howell)

Atlantic Oceanographic Group Program (L.M. Dickie, Director)

- Environmental Oceanography (R.W. Trites)
- Biological Oceanography (R. Conover)
- Fisheries Oceanography (J. Paloheimo)

Staff

Program

The CSS *Hudson* initiated studies of the physical and chemical oceanography of the Irminger Sea off Greenland.

Facilities

A Marine Sciences Branch (MSB)/Fisheries Research Board (FRB) study identified

the need for major additions to BIO. A four-year building plan, estimated to cost $2.31 million, was approved. The plan envisaged a 50% extension of both the laboratory and office wings of the main building, a second depot building, and the provision of small boat berthing facilities. It also proposed a building specifically designed to house a regional library for the marine sciences.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Acadia*,
- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

On 7 October, the engine room of the CSS *Hudson* caught on fire.

While working out of Antigua in the early months of the year, the CSS *Baffin* provided anchorage, weather and other information to the Royal Yacht *Britannia* on her visit to the island with Her Majesty the Queen and His Royal Highness the Duke of Edinburgh. Senior officers had the honour of being presented to the Royal Couple at a reception ashore.

The MV *E.E. Prince*, a steel stern trawler for fisheries research, was built and delivered for the Fisheries Research Board (FRB). The *Sigma-t* was purchased and converted for inshore research work by FRB. These FRB vessels, including the MV *A.T. Cameron*, were programmed jointly by the FRB labs in Dartmouth, St. Andrews and St. John's.

Technology

Two PDP-8 computers were acquired for BIO.

Meetings, Workshops and Conferences

Honours and Awards

Visitors

Key External Events

The first hydrocarbon exploration well was drilled on the Grand Banks.

The Science Council of Canada was established.

1967

Organization and People

There were no major changes in BIO organization. However, the Naval Research Establishment was renamed Defence Research Establishment Atlantic.

Staff

Program

The CSS *Hudson* spent January to April working in the Denmark Straits studying the formation of deep Atlantic water in cooperation with the National Institute of Oceanography, UK and the Woods Hole Oceanographic Institution. The ship's endurance was rigorously tested with heavy sea ice, icing of the ship's superstructure, extreme wind and wave conditions and low air temperature but the program was completed.

Dr. L.H. King demonstrated how acoustic reflection data can be used to determine sedimentary facies on the continental shelf.

A stable platform for air-sea interaction studies was placed two miles offshore near the approaches to Halifax Harbour.

Facilities

An extension to the main building was constructed.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Acadia*,
- CHS *Maxwell*
- CHS *Baffin*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

In April, the CSS *Baffin* sailed to Monaco for an international hydrographic conference. In May, the CCS *Hudson* sailed to Montreal to be on display at Expo 67. She received over 20,000 visitors in just one week. Late in the year the CSS *Dawson* was scheduled for commissioning.

Technology

Meetings, Workshops and Conferences

Honours and Awards

Visitors

- The Honourable Jean-Luc Pepin, Minister of the Department of Energy, Mines and Resources
- The Honourable R.L. Stanfield, Premier of Nova Scotia
- Dr. O. M. Solandt, Chairman of the Science Council of Canada, and twenty-seven members of Council

Key External Events

The first hydrocarbon exploration well was drilled on the Scotian Shelf.

1968

Organization and People

BIO was renamed the Bedford Institute. The two major elements of the Institute were also renamed. The Marine Science Branch laboratory, under the Department of Energy, Mines and Resources, became the Atlantic Oceanographic Laboratory (AOL) and Dr. William L. Ford continued as Director. The Atlantic Oceanographic Group laboratory of the Fisheries Research Board, under the Department of Fisheries and Forestry, became the Marine Ecology Laboratory (MEL) and Dr. Lloyd M. Dickie continued as Director. The responsibility of the Ellerslie field station on PEI was transferred from St. Andrews to MEL.

Department of Energy, Mines and Resources

Atlantic Oceanographic Laboratory (W.L. Ford, Director)

- Oceanographic Research (C. Maunsell)
- Applied Oceanography (R.W. Trites)
- Marine Geology (B. elletier)
- Hydrography (R. Melansen)
- Metrology (R.L.G. Gilbert)
- Engineering Services (A. Atkinson)
- Ships (S. Howell)
- Administration and Personnel Services (S. Scott and P. Sutherland)

Department of Fisheries and Forestry
Fisheries Research Board of Canada

Marine Ecology Laboratory (L.M. Dickie, Director)

- Environmental Oceanography (R.W. Trites)
- Biological Oceanography (K.H. Mann)
- Fisheries Oceanography (S. Paulowich)
- Population Dynamics (B.S. Muir)
- Oyster and General Estuarine Ecology (R. Drinnan)

In October 1968, total scientific and administrative staff was 352 while total ship staff was 334 for a BIO grand total of 686 staff.

Program

Progress was made in the integration of hydrographic and geophysical surveys of offshore areas to obtain the economies of operation resulting from one ship performing the two functions simultaneously. The CSS B*affin*, the major offshore hydrographic survey vessel, was outfitted with a gravity meter, towed magnetometer and data processing systems and carried out a joint hydrographic/geophysical cruise on the Grand

Banks. Interest in oil exploration has been creating a high demand for geological data on the continental shelf.

A *CSS Hudson* expedition to the Caribbean Sea carried out hydrographic, biological, and geological surveys on behalf of the Federation of Caribbean States.

The submersible *Pisces 1* was deployed from the CCGS *Labrador* to carry out geological research in the Arctic Archipelago.

Preliminary plans were developed for the Hudson 70 Expedition.

Facilities

A 5,000 sq ft fish laboratory with continuous flows of salt and freshwater was completed for MEL. Just to the north of it, the MEL laboratory trailer complex was started to help relieve overcrowding in the main building.

The MEL field station was established at St. Margaret's Bay, including a jetty for berthing small vessels.

The BIO jetty was extended to provide sheltered berthing for launches and small research vessels. The main laboratory wing extension was nearing completion, increasing laboratory space by a much needed 50%. Planning was well underway for the expansion of the office wing. The library was completely refurbished.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CSS *Acadia*,
- CSS *Maxwell*
- CSS *Baffin*
- CSS *Dawson*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

In February, the CSS *Dawson* was delivered to BIO from the G. T. Davie Shipyard in Lauzon, Quebec, and commissioned as a new member of the BIO fleet. She was designed for general oceanographic research with special emphasis on arrangements for the safe and efficient handling of bulky equipment over the side such as moored current meter arrays.

The MV *Navicula*, a 65 foot wooden-hulled research vessel, built for inshore MEL programs, was also commissioned and began operations in St. Margaret's Bay. It was programmed and operated by the Fisheries Research Board.

BIO ships started to use satellite navigation.

Technology

The main computer at BIO was a CDC 3100 with 16 K words of memory, two disk drives, three tape drives, one paper tape station, one line printer, one card reader and one typewriter. The Institute also possessed four PDP-8 computers, two of which were on the ships.

A remotely controlled hydrostatic pressure rock-core drilling unit, capable of operating at depths of 1200 feet, was designed and built at BIO. This drill successfully drilled into the top of the Rehoboth Seamount in the North Atlantic and proved that these New England seamounts are capped with marine carbonates.

Meetings, Workshops and Conferences

Honours and Awards

Visitors

- The Right Honourable Roland Michener, Governor-General of Canada

Key External Events

1969

Organization and People

Dr. John Weir took over from Dr. Ronald Hayes as the Chairman of the Fisheries Research Board (FRB) which continued under the Department of Fisheries and Forestry.

Dr. Lloyd M. Dickie was loaned to the Science Council of Canada to undertake a study of marine science and technology in Canada in collaboration with Dr. Robert W. Stewart of the University of British Columbia.

Dr. Bosko D. Loncarevic, formerly head of the Geophysics Group, was appointed Assistant Director (Research) of the Atlantic Oceanographic Laboratory (AOL).

Staff

Program

On 16 January, The Honourable J. J. Greene, Minister of the Department of Energy, Mines, and Resources (DEMR) announced in the House of Commons the forthcoming Hudson 70 Expedition, a cruise of CSS *Hudson* around North and South America.

A multidisciplinary research program in Bedford Basin-Halifax Harbour was initiated.

Facilities

Further extensions were added to the main building, depot and fish lab. Two new floors were added to the administrative wing, including a new 100-seat seminar hall on the top floor (6^{th} Floor Seminar Room).

A fire, caused by a gas explosion, damaged one of the MEL trailers behind the Fish Lab.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CSS *Acadia*,
- CSS *Maxwell*
- CSS *Baffin*
- CSS *Dawson*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

On 19 November, the CSS *Hudson* departed on the first leg of Hudson 70.

The CSS *Acadia* completed its final cruise in November. It was subsequently moored alongside the Institute and opened to visitors.

CSS *Baffin* circumnavigated North America, including the Northwest Passage.

Captain W.N. Kettle, Master of the CSS *Hudson* since 1966, died suddenly from heart failure.

Technology

The electric powered diamond rock core drill developed at BIO successfully drilled into Precambrian rock on the Flemish Cap, demonstrating that the Flemish Cap is a continental fragment.

Meetings, Workshops and Conferences

Honours and Awards

Visitors

Key External Events

The tanker *Manhattan* made her historic voyage through the Northwest Passage.

A spill of elemental phosphorous occurred in Long Harbour, Placentia Bay, NL which stimulated studies to determine the effects of this element on marine organisms.

1970

Organization and People

Recognizing the need for more research into the quality of the marine environment, two pollution units were established within the Fisheries Research Board. The Atlantic unit was incorporated into the Marine Ecology Laboratory (MEL) and became the Environmental Quality Division headed by Dr. Donald C. Gordon. It was housed in the newly expanded trailer complex north of the Fish Lab. The Pacific unit was set up in an old cannery in West Vancouver, BC and became the Pacific Environment Institute headed by Dr. Michael Waldichuk.

The Chemical Oceanography Division was established in the Atlantic Oceanographic Laboratory (AOL) and headed by Dr. Alan Walton.

The Scientific Services and Special Projects Division, headed by Dr. Charles Maunsell, was formed in AOL and incorporated Computing Services, Scientific Information Services, and Library Services.

A navigation group was established in the Hydrography Division of AOL. Its objective was to provide BIO surveyors and scientists with the best possible positioning systems for investigations at sea.

A small component of scientists from the Resource Development Branch (RDB) of the Department of Fisheries and Forestry was established in the MEL trailer complex to work on applied pollution issues.

The Frozen Sea Research Group left AOL to become a part of the Pacific Region of the Marine Sciences Branch (MSB).

Department of Energy, Mines and Resources

Atlantic Oceanographic Laboratory (W.L. Ford, Director)

- Chemical Oceanography (A. Walton)
- Coastal Oceanography (R.W. Trites)
- Marine Geology (B. Pelletier)
- Marine Geophysics (D. Ross)
- Metrology (R.L.G. Gilbert)
- Ocean Circulation (C.R. Mann)
- Hydrography (R. Melansen)
- Scientific Services and Special Projects (C. Maunsell)
- Engineering Services (A. Atkinson and S.B. MacPhee)
- Ships (S. Howell)
- Administrative Services (S. Scott)
- Personnel (P. Sutherland)

Department of Fisheries and Forestry
Fisheries Research Board of Canada

Marine Ecology Laboratory (L.M.Dickie, Director)

- Biological Oceanography (K.H. Mann)
- Environmental Oceanography (R.W. Trites)
- Population Studies (B.S. Muir)
- Fisheries Oceanography (S. Paulowich)
- Environmental Quality (D.C. Gordon)

The Marine Ecology Laboratory (MEL) celebrated its 5th anniversary. During its five years in existence, MEL grew from an initial staff of 15 and an operating budget of $200,000 to an establishment of 59 personnel and an operating budget of $1,000,000.

RDB?

Staff

Program

BIO staff responded immediately to the *Arrow* oil spill in Chedabucto Bay and assisted the Department of Transport and Imperial Oil Ltd. in cleanup efforts. A task force, named "Operation Oil", was created and headed by Dr. Patrick McTaggart-Cowan. Dr. William L. Ford was seconded as Scientific Coordinator. The task force, disbanded in July, produced a detailed report on its findings. The *Arrow* spill was the first major oil spill to be studied in Canada and stimulated several long-term research projects at BIO.

The search for oil on the continental shelf intensified with several drilling rigs in operation. To provide a regional depository for the mandatory core samples required from all holes drilled, the first stage of a core storage and archival laboratory was completed and operated by the Resource Administration Division of the Department of Energy, Mines and Resouces (EMR). In a related move, the Geological Survey of Canada established a new team to conduct stratigraphic mapping of the continental shelf.

The first of a number of surficial geological maps for the Canadian offshore was published by Dr. L.H. King. These maps, based on formation identification, were the first in the world of their type.

Gas escape features described as pock marks were discovered on the Scotian Shelf by L.H. King. This was the first identification of these features in the world, though they were later identified in many places by other researchers.

Ice scouring of the sea floor by sea ice in the Beaufort Sea was discovered using side scan sonar.

The new Environmental Quality Division began a research program investigating the fate and effects of contaminants in the marine ecosystem with a focus on petroleum and chlorinated hydrocarbons.

In response to the discovery of an uncharted shoal during the 1969 cruise of the SS *Manhattan* (an experimental ice-strengthened tanker), CSS *Baffin* surveyed a portion of the Beaufort Sea and discovered large pingo-like features on the sea floor which posed a distinct hazard to navigation and intrigued geologists.

Facilities

The Fish Laboratory and trailer complex were expanded to provide facilities for the new MEL pollution unit research staff and RDB staff. In addition, extensions were made to the Depot. An extended sewage treatment plant was installed to reduce both solids and BOD in effluent discharged into Bedford Basin.

The Argo Building was completed for the Resource Administration Division of the Department of Energy, Mines, and Resources (DEMR) for the processing and storing of offshore drilling core samples.

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CSS *Maxwell*
- CSS *Baffin*
- CSS *Dawson*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

The CHS *Acadia* was retired after ?? years of service.

The CSS *Hudson* continued on the Hudson 70 Expedition. Ports of call included Rio de Janerio, Buenos Aires, Punta Arenas, Valparaiso, Tahiti, Vancouver, Victoria and Tuktoyaktuk. She traversed the Northwest Passage on 22-30 September and arrived back at BIO on 16 October. The Honourable J. J. Greene was on hand to greet the ship and to bring a message from the Governor-General. She became the first ship ever to circumnavigate the Americas. During Hudson 70, she sailed 55,000 miles, carried 122 scientific staff during the course of her voyage and generated an impressive body of uniqu oceanographic data. Medals commemorating the historic event were presented to all participants.

The CSS *Baffin* circumnavigated North America. After passing through the Panama Canal and steaming up the Pacific and through the Bering Straits, she joined CSS *Hudson* to conduct surveys in the Beaufort Sea. She and the CSS *Hudson* returned together through the Northwest Passage.

Technology

The development of Batfish, an undulating towed underwater vehicle, reached the stage where a local firm was granted the licence to manufacture it.

Meetings, Workshops and Conferences

Honours and Awards

Dr. George T. Needler was named a Rossby Fellow at the Woods Hole Oceanographic Institution.

Visitors

Key External Events

The A. Murray MacKay Bridge was opened.

On 4 February, the Liberian tanker *Arrow* ran around on Cerberus Rock in Chedabucto Bay, NS and spilled approximately 2.5 million gallons of Bunker C oil.

The oil barge *Irving Whale* sank north of PEI.

Establishment of the Huntsman Marine Laboratory in St. Andrews, NB

1971

Organization and People

The name of the Institute was officially changed back to the Bedford Institute of Oceanography.

In June, the federal government created the Department of the Environment. This new department included the Marine Ecology Laboratory (MEL), still part of the Fisheries Research Board (FRB) and most of the Atlantic Oceanographic Laboratory (AOL), still part of the Marine Sciences Branch (MSB). However, the Marine Geology and Marine Geophysics sections of AOL remained with the Department of Energy, Mines and Resources (DEMR) under the Geological Survey of Canada (GSC).

The GSC Basin Analysis Group transferred to BIO from Calgary.

Dr. William M. Cameron stepped down as head of the Marine Science Branch in Ottawa and was replaced by Dr. Arthur E. Collin.

RDB?

Staff

Program

A scientific team headed by Dr. William L. Ford visited Bermuda in January to advise its government on how to deal with the tar washing up on its beaches which originated from oil tankers cleaning their tanks at sea.

MEL initiated the Halifax-Bermuda Section Program. For two years, quarterly cruises were run to collect data on a wide variety of biological and chemical variables in the water column. Numerous collaborators participated, especially from the Department of Oceanography at Dalhousie University.

Facilities

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CSS *Maxwell*
- CSS *Baffin*
- CSS *Dawson*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

Technology

A radio-controlled launch prototype developed at BIO was tested in Antigua and during a cruise to the Mid-Atlantic Ridge.

Meetings, Workshops and Conferences

Honours and Awards

Visitors

Key External Events

First hydrocarbon exploratory well was drilled on the Labrador Shelf.

1972

This year marked the tenth anniversary of BIO. There was substantial growth over the first ten years and scientific and technical support staff now totalled about 700 and the annual operating budget approached $15 million.

Organization and People

In January, the Atlantic Geoscience Centre (AGC) was created under the Geological Survey of Canada (GSC) in the Department of Energy Mines and Resources (DEMR). Dr. Bosko D. Loncarevic was appointed as the first Director. Technical Support Services was established in the Atlantic Oceanographic Laboratory (AOL) under Dr. R. L. G. Gilbert. The Tidal Section was established within the Canadian Hydrographic Service(CHS) to direct tide, tidal current, and water levels work.

After major changes in government organization over the past two years, BIO was now organized as follows.

Department of Environment
Marine Sciences Directorate

Atlantic Oceanographic Laboratory (W.L. Ford, Director)

- Chemical Oceanography (A. Walton)
- Coastal Oceanography (R. W. Trites)
- Metrology (C.S. Mason)
- Ocean Circulation (C.R. Mann)
- Hydrography (R.C. Melanson)
- Administration (S.H. Scott)
- Personnel (P.H. Sutherland)
- Public Relations (C.E. Murray)
- Technical Services (R.L.G. Gilbert)
    - Ships (E.S. Smith)
    - Engineering Services (S.B. MacPhee)
    - Computing Services (M.T. Darwood)
    - Scientific Information Services and Library (H.B. Nicholls)
    - Drafting and Illustrations (J.R. Lord)
    - Photography (N.E. Fenerty)

Fisheries Research Board

Marine Ecology Laboratory (L.M. Dickie, Director)

- Biological Oceanography (T. Platt)
- Environmental Oceanography (R.W. Trites)
- Fisheries Oceanography (B.S. Muir)
- Environmental Quality (D.C. Gordon)
- Administration (M. Blaxland)

RDB?
EPS?

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (B.D. Loncarevic, Director)

- Eastern Petroleum Geology (B. Sanford)
- Marine Geophysics (D.I. Ross)
- Marine Geology (R.B. Pelletier)

Staff

Program

Planning for a major Gulf of St. Lawrence ecosystem research project was undertaken under the leadership of Dr. Max Dunbar on loan from McGill University.

Between April and July, an international, three-ship experiment including the CSS *Hudson*, the *Chain* of WHOI and the *Cirolana* of Lowestoft, UK, was undertaken to study the Gulf Stream off the Tail of the Grand Bank of Newfoundland.

Facilities

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CSS *Maxwell*
- CSS *Baffin*
- CSS *Dawson*
- CNAV *Kapuskasing* (operated by the Navy)
- CNAV *Sackville* (operated by the Navy)

The CNAV *Kapuskasing* was retired from the BIO fleet and returned to the Department of National Defence.

The *Minna* became the first private ship to be used by BIO in offshore surveys.

A PDP-11 computer was installed on CSS *Hudson* and used mainly for navigation.

Satellite navigation became standard on BIO ships.

Technology

Meetings, Workshops and Conferences

Honours and Awards

The Nova Scotia Technical College awarded Dr. C.R. Mann the degree of Doctor of Engineering *honoris causa* for his work on the Hudson 70 cruise.

Visitors

- The Honourable Jack Davis, Minister of the Environment and of Fisheries
- The Honourable Alastair W. Gillespie, Minister of State for Science and Technology
- The Honourable Donald McDonald, Minister of Energy, Mines and Resources
- The Honourable Robert Stanbury, Minister of Communications,
- Sir Peter Hayman, the British High Commissioner
- Mr. Adolph W. Schmidt, USA Ambassador.

Visiting ships included the *Vilikitsky*, *Liman* and *Kolequev* of the USSR, the RV *Trident* from the University of Rhode Island, the *Wymen* from the US Navy and the RV *Cirolana* from the UK.

Key External Events

United Nations Conference on the Human Environment was held in Stockholm which recognized the need to consider the environmental consequences of human activities.

The Institute of Oceanography at Dalhousie University became the Department of Oceanography.

The Governments of Canada, Nova Scotia and New Brunswick created the Bay of Fundy Tidal Power Review Board to purse studies of the feasibility of tidal power development.

1973

Organization and People

This year marked the 75th anniversary of the Fisheries Research Board (FRB)(which began as the Board of Management in 1898). It also saw the conclusion of this unique organization's role as the active research arm of the Canadian Fisheries Service. It was relieved of direct control over research programs and facilities and became a wholly advisory body. This major change in policy and organization integrated fisheries research and development under senior line managers in the Department of Environment. While all the ex-FRB labs retained their independence, their directors now reported to a new Assistant Deputy Minister of Fisheries and Marine Science, Ken Lucas, rather than the Chairman of the Fisheries Research Board.

The Atlantic Oceanographic Laboratory (AOL) joined the Marine Ecology Laboratory (MEL) as part of the new Fisheries and Marine Service.

RDB?
EPS?

Staff

Program

BIO assisted the Department of National Defence in the recovery of a Sea King helicopter which crashed and sank approximately 50 km offshore from Halifax.

The St. George's Bay larval fish studies program began.

Institute staff participated in the Joint North Sea Wave Project held in the German Bight to study how waves dissipate and the extent of the wind energy in wave fields.

Geological studies began in the Bay of Fundy to assess the potential effects of tidal power development.

BIO staff examined the wreck of the *Irving Whale* which sank in 1970 between Prince Edward Island and the Magdalen Islands in 60 metres of water while carrying 4500 tons of Bunker C oil.

A study of human impacts on the marine environment was begun the Canso Strait and Chedabucto Bay.

The CSS *Hudson* participated in Overflow '73 in the Denmark Straits, an international program involving 12 ships from 6 countries.

Facilities

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*
- CNAV *Sackville* (operated by the Navy)

Technology

Meetings, Workshops and Conferences

Honours and Awards

Lloyd Dickie was elected to the Royal Society of Canada.

Visitors

Key External Events

1974

Organization and People

Program Analysis and Project Coordination was created and headed by Dr. C.D. Maunsell. Finance and Administration was now headed by R.P. Smith.

Dr. Lloyd M Dickie departed the Marine Ecology Laboratory (MEL) to become the Chairs of the Department of Oceanography and the Institute of Environmental Studies at Dalhousie University. Dr. Barry S. Muir became the Acting Director of MEL and Dr. Dan Ware took over as head of Fisheries Oceanography. A Social Science Research group was established in MEL and led by Dr. R.D.S. MacDonald.

The Secretariat of the International Commission for the Northwest Atlantic Fisheries ICNAF) moved from BIO to 800 Windmill Road in Dartmouth.

BIO was now organized as follows.

Department of Environment
Fisheries and Marine Service

Atlantic Oceanographic Laboratory (W.L. Ford, Director)

- Chemical Oceanography (A. Walton)
- Coastal Oceanography (R.W. Trites)
- Metrology (C.S. Mason)
- Ocean Circulation (C.R. Mann)
- Program Analysis and Project Coordination (C. Maunsell)
- Hydrography (R.C. Melanson)
- Finance and Administration (R.P. Smith)
- Public Relations (C.E. Murray)
- Technical Services (R.L.G. Gilbert)
    - Computing (M.T. Darwood)
    - Drafting and Illustrations (J.R. Lord)
    - Engineering Services (S.B. MacPhee)
    - Photography (N.E. Fenerty)
    - Scientific Information Services and Library (H.B. Nicholls)
    - Ships (E.S. Smith)

Marine Ecology Laboratory (B.S. Muir, Acting Director)

- Biological Oceanography (T. Platt)
- Environmental Oceanography (R.W. Trites)
- Fisheries Oceanography (D.M.Ware)
- Environmental Quality (D.C. Gordon)
- Social Science Research (R.D.S. Macdonald)
- Administration and Support Staff (M. Blaxland)

RDB?
EPS?

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (B.D. Loncarevic, Director)

- Eastern Petroleum Geology (L.P. Purcell)
- Environmental Marine Geology (D.E. Buckley)
- Regional Reconnaissance (D.I. Ross)
- Program Support (K.S. Manchester)
- Administration (R.A. Eden)

Staff

Program

BIO staff provided advice during the clean-up operation of an oil spill at Saglek, Labrador.

BIO participated in the GARP Atlantic Tropical Experiment (GATE).

An in-depth Make-or-Buy analysis was carried out for the entire Institute. A number of projects with a potential for contracting out were identified. It was anticipated that a substantial portion of the BIO program would be achieved in close cooperation with Canadian industry.

Facilities

A portrait of Dr. W.E. van Steenburgh, painted by noted Nova Scotian portrait artist Leon Zwerling, was unveiled at the Institute by his wife Lydia and their family just a few days before he died.

Plans were well underway for new facilities which would provide needed permanent space and modernize the existing laboratory. Construction was expected to start in 1975.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*
- CNAV *Sackville* (operated by the Navy)

Women were employed for the first time on ship's crews.

The CSS *Baffin* undertook a production/training survey cruise off of Guyana in South America.

The MV *Minna* ran aground on the east side of Resolution Island, NWT. Attempts to salvage it failed and the vessel sank.

Technology

Meetings, Workshops and Conferences

Ocean '74, the fifth Institute of Electrical and Electronics Engineers (IEEE) International Conference on Engineering in the Ocean Environment, was held in Halifax. BIO staff played a major role in organizing this large conference that attracted over 500 international delegates.

Honours and Awards

Visitors

- Dr. J.R. Weir, Chair of the Fisheries Research Board
- Sir George Deacon, Director Emeritus, Institute of Ocean Sciences, UK
- The Honourable Jeanne Sauve, Minister of State for Science and Technology
- Dr. David F. Downing, British High Commission to Canada.

Key External Events

Discovery of gas in sediments on the Labrador Shelf.

1975

Organization and People

Dr. Barry S. Muir moved across the harbour to Halifax to become the Director of the Fisheries Resource Branch and Dr. Donald C. Gordon became Acting Director of the Marine Ecology Laboratory.

Dr. B. R. Pelletier, Assistant Director of the Atlantic Geoscience Centre, departed BIO to join the Terrain Sciences Division of the Geological Survey of Canada in Ottawa.

Program

Offshore Geology of Eastern Canada was published as a two-volume compendium of geoscience research that summarized the knowledge of geology and geophysics off eastern Canada.

A three-year multidisciplinary geoscience study of the Miramichi Estuary was begun.

BIO staff participated in the international Deep Sea Drilling Project.

BIO staff aided the Woods Hole Oceanographic Institution in a joint USA-USSR Polymode experiment by laying additional deep-sea moorings in the Gulf Stream.

Facilities

The Honourable Romeo LeBlanc, Minister of State for Fisheries, announced the expenditure of $18 million for an update of the Institute's buildings. The work would be carried out over a period of four years and double the existing space. New facilities would include laboratories, offices, a library and computing centre, a new access road and extensions to the fish lab and geological core storage facilities.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*
- CNAV *Sackville* (operated by the Navy)

The CNAV *Sackville* made her final cruise for BIO but she continued to be used by Defense Research Establishment Atlantic (DREA) until decommissioning in 1982.
The bridge of the CSS *Hudson* was rebuilt. The renovations included a navigation centre, which provided the officer of the watch with a good view of over-the-side operations for

the first time, and significantly reduced the operating fatigue of all those who work on the bridge.

Technology

The joint development of a deep tow seismic reflection system in collaboration with Huntec ‘70 Ltd. was completed. The system was used on four CSS *Hudson* cruises.

Meetings, Workshops and Conferences

In November, the Institute hosted a 3-day Open House which attracted 15,000 people.

BIO staff helped organize Benthonics ’75, the first international symposium on benthic foraminifera of continental margins which was held in Halifax.

Honours and Awards

Dr. Charlotte Keen won the APICS/Fraser Young Scientist Medal.

Visitors

Key External Events

1976

Organization and People

The Department of Environment was renamed the Department of Fisheries and Environment. The Honourable Romeo LeBlanc was appointed Minister.

There were major changes in the national organization of the Fisheries and Marine Service (FMS). The principal parts of the former Fisheries Research organization, the ex-FRB labs and the Resource Development Branch (RDB), were placed within Fisheries Management while the remaining elements, including the Marine Ecology Lab (MEL), were assigned to Ocean and Aquatic Sciences (OAS), formerly the Marine Science Branch. A degree of decentralization from Ottawa was achieved by the appointment of regional Directors-General (DG) responsible to the Assistant Deputy Minister (ADM) for Ocean and Aquatic Sciences in Ottawa. Dr. William L. Ford was appointed as the regional DG and Dr. Arthur E. Collin became the ADM in Ottawa. Dr. Cedric Mann replaced Dr. William L. Ford as Director of the Atlantic Oceanographic Laboratory. Dr. T.C. Platt became Acting Director of MEL in August.

As a result of these organizational changes, some MEL functions were transferred to Fisheries Management. These included the management and financial control of a major project for stock assessment on the continental shelf using the acoustic fish counter developed by MEL, the shellfish aquaculture program and the operation of the substation at Ellerslie, PEI.

Institute-wide technical support functions, previously managed under the Atlantic Oceanographic Lab (AOL), became Institute Facilities (IF) managed by Dr. Reginald L.G. Gilbert.

The Directors of AOL and MEL, as well as the Manager of IF, now reported to the RDG.

The Environmental Oceanography Division, which overlapped AOL and MEL, was closed and staff transferred to either the Fisheries Oceanography Division in MEL or the Coastal Oceanography Division in AOL. AOL's Air-Sea Interaction Group was transferred from the Metrology Division to the Ocean Circulation Division. The Canadian Hydrographic Service (CHS) began the transfer of its cartographic function from Ottawa to BIO.

Publication Services was established to facilitate and enhance BIO's publication effort. It was composed of the scientific information resources that were previously affiliated with the library and the central drafting and photographic services.

The Marine Fish Division, headed by Dr. R. Halliday, was created under the Resource Branch in Halifax and began setting up new staff at BIO.

The Seabird Research Unit of the Canadian Wildlife Service (CWS) was located at BIO and headed by Dr. David Nettleship.

The Institute continued to function as a community, sharing many common facilities and services and managed by a committee of directors. The chair of this committee rotated amongst the three directors. The regional DG and the Manager of IF attended as members. This committee was later named the Tuesday Club.

BIO was now organized as follows:

Department of Fisheries and Environment

Ocean and Aquatic Sciences (W.L. Ford, Regional Director-General)

Atlantic Oceanographic Laboratory (C.R. Mann, Director)
- Chemical Oceanography (A. Walton)
- Coastal Oceanography (J.A. Elliott)
- Metrology (D.L. McKeown)
- Ocean Circulation (G.T. Needler)
- Hydrography (R.C. Melanson)
- Finance and Adminstration (G. Bowdridge)
- Scientific Consultation (C.D. Maunsell)
- Public Relations (C.E. Murray)

Marine Ecology Laboratory (D.C.Gordon/T.C.Platt, Acting Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (D.C. Gordon)
- Equipment Development (S.A. Paulowich)
- Fisheries Oceanography (R.W. Sheldon)
- Administration (M.F. Blaxland)

Institute Facilities (R. Gilbert, Manager)
- Ships (E.S. Smith)
- Engineering Services (D.F. Dinn)
- Computing Services (A. McEwan)
- Library Services (A. Nevill)
- Drafting and Illustrations (J.R. Lord)
- Photography (N.E. Fenerty)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (B. Loncarevic, Director)
- Eastern Petroleum Geology (L.P. Purcell)
- Environmental Marine Geology (D. E. Buckley)

- Regional Reconnaissance (D.I. Ross)
- Program Support (K.S. Manchester)
- Administration (R. Eden)

BIO also housed a number of smaller groups, several newly created, of government scientists, engineers and managers whose activities had a marine theme. These included:

- Marine Fish Division, Resource Branch (R. Halliday)
- Laboratory Services Division, Environmental Services Branch, Environmental Protection Service (EPS) (H. Samant)
- Seabird Research Program, Canadian Wildife Service (CWS) (D. Nettleship)
- Resource Management and Conservation Branch of DEMR

Industries located on campus included:

- Huntec Seabed Project Office
- Canadian Ocean Data System (CODS) Shore Base
- Hermes Electronic Ltd.

The BIO Library was designated as the major Canadian oceanographic library.

The combined BIO budget for 1976 amounted to approximately 20 million dollars with a total employment of 675.

Program

The first hydrocarbon potential assessment was completed for the Scotian Shelf, Grand Banks and Labrador Shelf.

The Sable Island Program produced the first measure of gas flux between the sea and air.

The Shelf Break Dynamics Program was begun on the Scotian Shelf.

A bedrock map of the eastern Canadian offshore was published by Drs. L. King and B. MacLean. This was the first such map of this type published anywhere in the world.

Facilities

The Strickland Building was well under construction with occupation expected in early 1977.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*

On 13 May, the MV *Christmas Seal* caught fire and sank three hours from Halifax. Fortunately all hands were rescued.

Technology

Meetings, Workshops and Conferences

BIO staff assisted the organization of a joint meeting of the American Association of Stratigraphic Palynologists and the Commission Internationale de Micropaléontologie Paléozoique held in Halifax.

Honours and Awards

Visitors

- A Chinese fisheries delegation led by Hsiao Feng, Director, Aquatic Products Bureau, Ministry of Agriculture and Forestry
- Dr. J.B. Hersey, Deputy Assistant Oceanographer for Ocean Science, ONR, USA
- Mr. H.H. Haunschild, the West Germany Deputy Minister of Research and Technology
- Professor A.P. Kapitsa, Chairman of the Far Eastern Scientific Centre, Vladivostok, USSR.

Key External Events

1977

Organization and People

Dr. Richard F. Addison was appointed as Acting Director of the Marine Ecology Laboratory (MEL). Later in the year, Dr. A. R. Longhurst, former Deputy Director of the Institute for Marine Environmental Research, Plymouth, United Kingdom, arrived to become the permanent Director of MEL.

Dr. Bosko D. Loncarevic resigned as Director of the Atlantic Geoscience Centre to return to research. Dale Buckley took over as interim Director until Dr. Michael J. Keen arrived from Dalhousie University as the new Director.

The first Canadian Hydrographic Service cartographers arrived from Ottawa as the decentralization of this function began.

The Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) was established by the Department of Fisheries and Environment as a forum for scientific debate on methodology and development of peer-reviewed fisheries scientific advice for the Maritimes, Newfoundland and Quebec regions.

Program

The CSS *Hudson* investigated an oil slick off Scott Inlet, Baffin Island which was determined to be the result of a natural seepage.

Facilities

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*

In November, the CSS *Baffin* worked off Peru as part of a CIDA-sponsored Peruvian fishing project.

Technology

Meetings, Workshops and Conferences

The International Symposium on the Recovery Potential of Oiled Northern Environments was organized by BIO staff and held at the Lord Nelson

Hotel in Halifax.

Honours and Awards

Visitors

Key External Events

Canada extended its offshore fishing jurisdiction to 200 nautical miles. This move was made to take more direct control of fisheries which had become depleted in part because they were not being effectively managed under international agreements.

1978

Organization and People

Dr. William L. Ford retired as the Director-General of Ocean and Aquatic Sciences (OAS) Atlantic after 13 years as the leader of BIO. He was succeeded by Dr. Cedric R. Mann. Dr. George T. Needler became the new Director of the Atlantic Oceanographic Laboratory (AOL).

The Resource Management and Conservation Branch of the Department of Energy Mines and Resources became responsible for coal drilling off Cape Breton.

The Secretariat of the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) was established at BIO.

BIO was now organized as follows:

Department of Fisheries and Environment

Ocean and Aquatic Sciences, Atlantic (W.L. Ford, Regional Director-General)
- Program Analysis and Coordination (H.B. Nicholls)
- Public Relations (C.E. Murray)
- Management Services (G. Bowdridge)

Atlantic Oceanographic Laboratory (C.R. Mann, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (G.T. Needler)
- Hydrography (R.C. Melanson)
- Scientific Consultation (C.D. Maunsell)

Marine Ecology Laboratory (A.R. Longhurst, Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (R.F. Addison)
- Equipment Development (S.A. Paulowich)
- Fisheries Oceanography (R.W. Sheldon)
- Administration (M.F. Blaxland)

Institute Facilities (R. Gilbert, Manager)
- Ships (E.S. Smith)
- Engineering Services (D.F. Dinn)
- Computing Services (A. McEwan)
- Library Services (A. Nevill)
- Publication Services (M.P. Latremouille)

Resource Branch
Marine Fish Division (R.G. Halliday)

Canadian Wildlife Service
Seabird Research Unit (D.N. Nettleship)

Environmental Protection Service

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M. Keen, Director)
- Eastern Petroleum Geology (M.S. Barss)
- Environmental Marine Geology (D. E. Buckley)
- Regional Reconnaissance (R.T. Haworth)
- Program Support (K.S. Manchester)
- Administration (P. Stewart)

Resource Management and Conservation Branch, Operations Division, East Coast Office (T.W. Dexter)

Program

The *Amoco Cadiz* oil spill occured in Brittany, France. A team of BIO biologists, geochemists and geologists assisted French officials in deciding on a clean-up strategy for the *Amoco Cadiz* oil spill in Brittany, France, and conducted research on the persistence of spilled oil on the shorelines.

Facilities

The Strickland and Murray Buildings were finished and occupied. The Holland Building was under construction. The phase out of the trailer complex began.

Ships

The BIO research fleet consisted of the following vessels:
- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*

The CSS *Baffin* underwent a mid-life refit.

The *Lady Hammond* was acquired on a five-year charter. She was a converted fishing trawler and was used to conduct groundfish trawl surveys for the newly established Marine Fish Division.

Technology

Meetings, Workshops and Conferences

Honours and Awards

David Piper won the APICS/Fraser Young Scientist Medal.

Visitors

Key External Events

The *Amoco Cadiz* oil spill occurred in Brittany, France.

1979

Organization and People

The Government Organization Act of 1979 split the Department of Fisheries and Environment (DFE) into the Department of Fisheries and Oceans (DFO) and the Department of Environment (DOE). The Honourable Romeo LeBlanc was appointed Minister of DFO. Both Ocean and Aquatic Surveys (OAS) Atlantic and the Resource Branch became part of DFO. Other components of DFE became part of DOE.

The Fisheries Research Board of Canada was dissolved and staff transferred to DFO.

Later in the year, Ocean and Aquatic Science (OAS) became Ocean Science and Surveys (OSS). Mr. Gerry Ewing replaced Dr. Arthur E. Collin as ADM in Ottawa.

Dr. Cedric R. Mann departed BIO to become Director-General of OAS Pacific at the Institute of Ocean Sciences, Sidney, BC. He was succeeded as Director-General of OAS Atlantic by Dr. Alan R. Longhurst. Dr. Richard F. Addison became Acting Director of the Marine Ecology Laboratory (MEL).

Mr. Adam Kerr was appointed Director of the Canadian Hydrographic Service's Atlantic Region at BIO.

Program

China/Canada cooperation in oceanography began. A group of Canadian oceanographers, led by Mr. G. Ewing, visited 14 Chinese oceanographic institutes and discussed possible collaboration.

Due to renewed interest in the development of tidal power, MEL launched a large scale program to describe and understand the fundamental ecology of the Bay of Fundy. This program built upon related projects started earlier by AOL, AGC and universities.

BIO staff became involved in the Lomonosov Ridge Experiment (LOREX) and the Fine Resolution Antarctic Model I (FRAM I) expeditions. The LOREX ice camp in the Arctic Ocean was established under the Polar Continental Shelf Project.

On 15 March, the *Kurdistan*, a British oil tanker bound for Sept Isles, Quebec, broke up and spilled 7000 tons of Bunker C oil into ice-infested waters near the Cape Breton shoreline. BIO scientists advised the Regional Environmental Emergencies Response Team (REET) on cleanup procedures. A two-day workshop on the *Kurdistan* spill was later organized by BIO scientific staff.

MEL scientists conducted the first major biological expedition to the Canadian Arctic on the CSS *Hudson*.

Facilities

An arsonist set a fire which destroyed much of the BIO trailer complex that still housed approximately 75 people. No one was hurt but much was lost.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*

Technology

A CDC Cyber 1781 computer was installed as the new main frame computer for BIO.

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Meetings, Workshops and Conferences

Honours and Awards

Dr. Peter Hacquebard was awarded the Reinhard Thiesson Medal by the International Committee of Coal Petrology and the Gilbert H. Cady Award from the Geological Society of America.

Dr. Charlotte Keen was awarded the Past President's Medal of the Geological Association of Canada in recognition of her contributions to the understanding of continental margins.

Visitors

Key External Events

Oil was discovered at Hibernia on the Grand Banks. This same year the Venture gas field was discovered just east of Sable Island on the Scotian Shelf.

The Northwest Atlantic Fisheries Organization (NAFO) was established. NAFO replaced ICNAF (International Commission for Northwest Atlantic Fisheries) and had the mandate to promote optimum utilization, rational management and conservation of fisheries resources.

1980

Organization and People

BIO established the Marine Advisory and Industrial Liaison Office (BIOMAIL) under the lead of Mr.John Brooke. The BIOMAIL Office was intended as a point of entry to the Institute for anyone seeking information on Canadian oceanography and related topics.

Dr. Donald C. Gordon replaced Dr. Richard F. Addison as Acting Director of the Marine Ecology Laboratory (MEL) for 6 months. On 1 October, Dr. Kenneth H. Mann returned from Dalhousie to become Director of MEL. Martin Blaxland retired as the head of MEL administration.

The Northwest Atlantic Fisheries Organization (NAFO) moved into the Holland Building at BIO.

At the end of the year BIO was now organized as follows:

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst Regional Director-General)

- Program Analysis and Coordination (H.B. Nicholls)
- Public Relations (C.E. Murray)
- BIOMAIL (J. Brooke)
- Management Services (G. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (G.T. Needler, Director)

- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (J.A. Elliott)

Atlantic Region, Canadian Hydrographic Service (A.J. Kerr, Director)

- Field Surveys (T.B. Smith)
- Chart Production (R.F.J. Gervais)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (D.L. DeWolfe)

Marine Ecology Laboratory (K.H. Mann, Director)

- Biological Oceanography (T.C. Platt)
- Environmental Quality (R.F. Addison)

- Fisheries Oceanography (R.W. Sheldon)
- Administration (M.F. Blaxland)

Institute Facilities (R.L.G. Gilbert, Manager)
- Ships (E.S. Smith)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Atlantic Fisheries Service, Maritimes
- Marine Fish Division (R.G. Halliday) (included the CAFSAC Secretariat headed by D. Geddes)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J.Keen, Director)
- Eastern Petroleum Geology (G.L. Williams)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (R.T. Haworth)
- Program Support (K.S. Manchester)
- Administration (P. Stewart)

Resource Management and Conservation Branch, Operations Division, East Coast Office (T.W. Dexter)

Department of Environment

- Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)
- EPS (??)

Program

Scientists from BIO joined the Seabed Working Group of the Nuclear Energy Agency which coordinated international research on the feasibility of disposal of high level nuclear waste in deep sea sediments. This program lasted for six years and involved three major *Hudson* cruises to the Atlantic Ocean as well as joint expeditions with American and French research vessels.

In January, the CSS *Dawson* and the RRS *Discovery* worked south of Bermuda on the Lesser Antilles Deep Lithosphere Experiment (LADLE). One objective of this cruise was to evaluate the potential of deep sea sediments for the disposal of high level nuclear waste.

BIO scientists participated in studies of cadmium in lobsters in Belledune Harbour, NB.

This cadmium had been released through industrial discharges from Brunswick Smelting.

Facilities

The recently constructed Strickland, Holland and Murray Buildings were officially opened by the Honourable Romeo LeBlanc, Minister of the Department of Fisheries and Oceans, and the Honourable Judy Erola, Minister of the State of Mines, who represented the Department of Energy, Mines, and Resources.

Ships

The BIO research fleet consisted of the following vessels:

- CSS *Hudson*
- CHS *Maxwell*
- CHS *Baffin*
- CSS *Dawson*

Technology

The first ocean bottom seismometers built at BIO became operational.

Meetings, Workshops and Conferences

Following the opening of the new buildings, an Open House was held which attracted more than 25,000 visitors.

Canadian Hydrographic Service staff organized the 19th annual conference of the Canadian Hydrographer's Association held in Halifax.

Atlantic Geoscience Centre staff played a major role in organizing the 1980 joint annual meeting of the Geological Association of Canada and the Mineralogical Association of Canada.

Honours and Awards

Dalhousie University conferred the degree of Doctor of Laws upon Dr. Peter Hacquebard.

Dr. Kenneth H. Mann became a fellow of the Royal Society of Canada.

[Add other RSC fellows at BIO including L. Dickie, P. Hacquebard, T. Platt, C. Keen, and M. Keen.

The A.G. Huntsman Award was created by BIO to recognize excellence in and outstanding contributions to marine sciences. This international award honours those, of

any nationality, who have had and continue to have a significant influence on the course of marine scientific thought. It will be presented annually in one of three categories – marine geosciences, physical/chemical oceanography and biological/fisheries oceanography – except for this inaugural year when recipients were honoured in all three. The award was named after Dr. Archibald Gowanlock Huntsman (1883-1973), a pioneer Canadian oceanographer and fishery biologist.

The first three Huntsman Awards were given to Dr. D.P. McKenzie of England who contributed fundamentally to the field of continental drift studies with his research into the subcrustal dynamics and processes underlying ocean formation and deep-ocean ridge building, Dr. H.M. Stommel of the USA who studied and continues to contribute significantly to our understanding of the properties of major oceanic current systems, and Professor R. Margalef of Spain who was recognized for his life-long study of the processes governing the distribution of the world's oceanic plankton, the basis of the ocean's foodchain.

Visitors

- Captain Jacques Yves Cousteau and his vessel the *Calypso*.

The RRS *Discovery* from Britain called in on her way home from the Pacific.

Key External Events

1981

Organization and People

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst, Regional Director-General)
- Program Analysis and Coordination (H.B. Nicholls)
- Public Relations (C.E. Murray)
- BIOMAIL (J. Brooke)
- Management Services (G. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (G.T. Needler, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (J.A. Elliott)

Atlantic Region, Canadian Hydrographic Service. (A.J. Kerr, Director)
- Field Surveys (T.B. Smith)
- Chart Production (B.E. McCorriston)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (D.L. DeWolfe)

Marine Ecology Laboratory (K.H. Mann, Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (R.F. Addison)
- Fisheries Oceanography (R.W. Sheldon)

Institute Facilities (R.L.G. Gilbert, Manager)
- Ships (E.S. Smith)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Marine Fish Division (T.D. Iles), included CAFSAC Secretariat headed by D. Geddes.

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)

- Eastern Petroleum Geology (G.L. Williams)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (R.T. Haworth)
- Program Support (K.S. Manchester)
- Administration (P. Stewart)

Resource Management and Conservation Branch, Operations Division, East Coast Office (T.W. Dexter)

Atlantic Regional Office of the Canada Oil and Gas Lands Administration (COGLA)

Department of Environment

- Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)
- Analytical laboratories of the Environmental Protection Service, DOE (H. Samant)

BIO also housed the offices of NAFO (Capt. J.C.E. Cardoso)

The following marine science-related private companies occupied leased accommodations on the BIO campus:

- Huntec Ltd.
- Wycove Systems Ltd.
- Franklin Computers Ltd.

Program

BIO oceanographers participated in the Warm-Core Rings Experiment.

The first analyses of sedimentary facies on the continental shelf based on side scan sonar were conducted by BIO staff.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- *Lady Hammond* (charter)

Also trips on inshore vessels and USSR research vessels.

The CCC *Hudson* circumnavigated North America on nine-month expedition, passing through the Panama Canal. This was her second time through the Northwest Passage. Enroute she undertook a survey of a shipping corridor in the Beaufort Sea.

The MV *Pandora* and the submersible *Pisces* left BIO for a new home in Sidney, British Columbia after working for BIO on the east coast.

The CSS *Acadia* left her berth at BIO for the last time. After some minor restoration work, she was moored at the Maritime Museum of the Atlantic in Halifax as a National Historic Monument open to visitors.

The CSS *Baffin* completed her mid-life refit.

The research trawler *Wilfred Templeman* was delivered to the Newfoundland Region, replacing the *A.T. Cameron*.

Technology

Meetings, Workshops and Conferences

BIO organized and hosted an international symposium entitled The Dynamics of Turbid Coastal Environments. Over 150 people from many different countries participated. This was the first international symposium held in the new auditorium.

Soon after, BIO hosted, in collaboration with the Woods Hole Oceanographic Institution, the international Ocean Pollution 1981 conference in the new auditorium.

Honours and Awards

The Huntsman Award was given to Dr. J.Tuzo Wilson of Canada for his pioneering work in the field of global geology, for his contributions to the modern formation of continental drift theory and his activities introducing science to Canada's younger generations.

The APICS/Fraser Medal for outstanding research by a young scientist was awarded to Dr. Trevor Platt.

Visitors

The *Whiting*, a NOAA survey vessel from Norfolk, VA, visited BIO.

Key External Events

1982

Organization and People

Health Canada established an occupational health nursing service on site and the position was filled by Michelle Brackett. The BIO Ocean Information Division was formed and headed by Brian Nicholls. Dr. Steven J. Kerr became head of the Fisheries Oceanography Division.

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst, Regional Director-General)
- Ocean Information Division (H.B. Nicholls)
- Public Relations (C.E. Murray)
- BIOMAIL (G.R. Smith)
- Management Services (G. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (G.T. Needler, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (J.A. Elliott)

Atlantic Region, Canadian Hydrographic Service (A.J Kerr, Director)
- Field Surveys (T.B. Smith)
- Chart Production (vacant)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (S.T. Grant)

Marine Ecology Laboratory (K.H. Mann, Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (R.F. Addison)
- Fisheries Oceanography (S.J. Kerr)

Institute Facilities (R.L.G. Gilbert, Manager)
- Ships (E.S. Smith)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Marine Fish Division (T.D. Iles)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)
- Eastern Petroleum Geology (G.L. Williams)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (R.T. Haworth)
- Program Support (K.S. Manchester)
- Administration (P. Stewart)

Department of Environment

Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)

EPS

Program

Climate change and variability emerged as an issue that needed to be addressed by BIO (see 1984 BIO Review)

The first non-military use of the NAVSTAR Global Positioning System was undertaken by BIO on board the CSS *Hudson* while conducting research on the feasibility of high level radioactive waste disposal in the Nares Abyssal Plain.

The first hydrographic charts produced at BIO since the decentralization of the process covered the Bras D'Or Lakes and the Saint John River.

A BIO expedition probed the unexplored eastern Baffin Island fjords. Tests were conducted in the geology and geophysics of the Baffin Island Shelf.

Facilities

Ships

The following research vessels were used by BIO staff:
- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- *Lady Hammond* (charter)
- *Pandora II* (charter)(support for Pisces IV submersible)
- *Navicula*
- *EE Prince*

Also other trips on charter vessels plus cooperative cruises with the USSR.

The new research trawler *Alfred W. Needler* was built in Pictou, NS and delivered to BIO. It will be used to conduct fish surveys.

In February, the CSS *Hudson* departed BIO on a mid-winter expedition to study the region between Iceland and Spitsbergen in the Norwegian-Greenland Sea.

Technology

The BIO-developed plankton net BIONESS was commercially manufactured.

Meetings, Workshops and Conferences

In August, the 5th Joint Oceanographic Assembly was held at Dalhousie University in Halifax and many BIO staff participated. Associated events were held at BIO.

BIO scientists played a major role in a workshop organized by the APICS Fundy Environmental Studies Committee and held in Moncton during November to review recent Bay of Fundy environmental research and reconsider the possible impacts of most recent tidal power proposals.

Honours and Awards

The Huntsman Award was given to Dr. Christopher Garrett of Canada in recognition of his contributions to the understanding of mixing processes in the ocean and for his fundamental achievements in the field of internal wave dynamics.

Dr. Eric Levy was presented a merit award for his contributions to the Intergovernmental Oceanographic Commission's IGOSS Pilot Project on Marine Pollution (Petroleum) Monitoring.

Norman Fenerty received the William Gordon Memorial Award of the Biological Photographic Association for his outstanding achievements in scientific photography.

Visitors

- His Excellency, Governor General Edward Schreyer

Key External Events

The Ocean Ranger drilling rig sank on the Grand Banks during a severe winter storm. All hands were lost.

The Point Lepreau nuclear power station began operation.

10/01/2012

Opening of the Gulf Fisheries Centre in Moncton, NB

1983

This year marked the centennial of the Canadian Hydrographic Service.

Organization and People

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst, Regional Director-General)
- Ocean Information Division (H.B. Nicholls)
- Public Relations (C.E. Murray)
- BIOMAIL (B. Bennett)
- Management Services (G. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (G.T. Needler, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (J.A. Elliott)

Atlantic Region, Canadian Hydrographic Service (A.J. Kerr, Director)
- Field Surveys (T.B. Smith)
- Chart Production (S. Weston)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (S.T. Grant)

Marine Ecology Laboratory (K.H. Mann, Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (R.F. Addison)
- Fisheries Oceanography (S.J. Kerr)

Institute Facilities (R.L.G. Gilbert, Manager)
- Ships (J. Parsons)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Marine Fish Division (W.D. Bowen)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)

- Eastern Petroleum Geology (G.L. Williams)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (C.E. Keen)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Department of Environment

Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)

EPS

Program

The Fisheries Ecology Program on Browns Bank was initiated by MEL, MFD, AOL and Dalhousie University.

BIO participated in the Canadian Expedition to Study the Alpha Ridge (CESAR) in the Arctic Ocean and conducted geological and biological research from an ice island.

Using CSS *Hudson*, BIO completed a side scan survey of the epicentre of the 1929 Grand Banks earthquake on the continental slope of southern Newfoundland.

The first trials of Seabed II, a federally-funded project to develop 2000 metre and 500 metre ocean mapping systems through a Canadian company (Huntec ‘70 Ltd.) were conducted on CSS *Hudson*.

BIO participated in the Marginal Ice Zone Experiment (MIZEX) ‘83, an international, interdisciplinary study of marginal ice zones in the Strait between Greenland and Svalbaard.

With assistance of Dutch, German and British scientists and university colleagues, MEL began the development of a numerical model to simulate the ecological dynamics of the Cumberland Basin in the upper reaches of the Bay of Fundy, one the sites being considered for tidal power development.

A report was published on the pre-operational phase of BIO’s Point Lapreau nuclear generating station monitoring program.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- *Lady Hammond* (charter)
- *Navicula*
- *EE Prince*
- MV *Alfred Needler*

Plus other charters and cooperative voyages with the USSR.

Technology

The Dolphin (Deep Ocean Logging Profiler Hydrographic Instrumentation and Navigation) acceptance trials were held at BIO.

Meetings, Workshops and Conferences

Honours and Awards

The Huntsman Award was presented to Dr. R. Lasker of the USA in recognition of his fundamental contributions toward furthering understanding of the population biology of the California anchovy.

Visitors

Key External Events

1984

Organization and People

Dr. George T. Needler departed to head the World Ocean Climate Experiment (WOCE) based in London, UK. He was replaces as Director of AOL by Dr. James A. Elliott.

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst, Regional Director-General)
- Ocean Information Division (H.B. Nicholls)
- Public Relations (C.E. Murray)
- Management Services (G. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (J.A. Elliott, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Atlantic Region, Canadian Hydrographic Service (A.J. Kerr, Director)
- Field Surveys (R.C. Lewis)
- Chart Production (T.B. Smith)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (S.T. Grant)

Marine Ecology Laboratory (K.H. Mann, Director)
- Biological Oceanography (T. Platt)
- Environmental Quality (R.F. Addison)
- Fisheries Oceanography (S.J. Kerr)

Institute Facilities (R.L.G. Gilbert, Manager)
- Ships (J. Parsons)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Marine Fish Division (W.D. Bowen)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen)

- Eastern Petroleum Geology (J.S. Bell)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (C.E. Keen)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Department of Environment

Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)

EPS

Program

BIO staff participated in hearings concerning the Gulf of Maine boundary dispute before the International Court of Justice of the Hague. Prior to their testimony, Institute staff had been involved in preparing a range of technical documentation and advice pertaining to this case for the Department of External Affairs.

The Grand Banks became an area of research focus (see 1985 BIO report).

BIO initiated a new project to develop a numerical model to predict the possible effects of an oil spill on the Grand Banks ecosystem.

Geological and geochemical research in evaluating the feasibility of the seabed disposal of high level radioactive waste continued at BIO.

AGC staff completed a comprehensive review of all geological data pertinent to the Labrador Shelf. These data were compiled into a 1:2,000,000 Quaternary sediment map published in a new edition of the *Geology of Canada*.

AOL continued its assistance in the development of Korean oceanography through exchange visits with the Korean Ocean Research and Development Institute (KORDI).

The Atlantic Oceanographic Lab became a major participant in the pilot Humidity Exchange Over the Sea (HEXOS) Program. This series of tests was carried out in the North Sea off the coast of the Netherlands.

A team of MFD biologists spent February on Sable Island counting and tagging the year's crop of grey seal pups.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- *Lady Hammond* (charter)
- *Navicula*
- *EE Prince*
- MV *Alfred Needler*

Plus trips on other charter vessels and cooperative voyages with the USSR.

Construction of a new acoustic sweep vessel for BIO began in the Georgetown Shipyards in PEI. The vessel would be used in hydrographic surveys of harbour approaches.

Technology

An in-house image analysis system for remote sensing and other applications was installed at BIO.

For the first time BIO scientists had direct access to a Cray supercomputer through the DOE/AES facility in Dorval, Quebec.

The prototype Seabed II deep ocean mapping system was successfully tested in Verrill Canyon by the CSS *Hudson*. This system was developed in a special government-industry project by Huntec ’70 Ltd.

The prototype of an unmanned submersible, the Autonomous Remotely Controlled Submersible (ARCS), which operated under the ice and could be used for sounding surveys under areas of permanent ice cover, was exhibited at the Canadian Offshore Resources Exposition in Halifax.

Meetings, Workshops and Conferences

The Institute hosted an Open House. Over 30,000 visitors come to view the many exhibits, tour research vessels, witness equipment demonstrations, and attend a popular series of lectures by scientists on topics of interest to the public.

BIO staff contributed to the organization and participated in the 2nd joint annual congress of the Canadian Meteorological and Oceanographic Society (CMOS) and the Canadian Geophysical Union held at Dalhousie University.

A special meeting on the biology and ecology of squids in the northwest Atlantic has held at BIO. Organized by NAFO, it brought together 45 specialists from eleven countries to discuss recent research results and directions for future research.

BIO hosted the annual meeting of the International Commission for the Conservation of Atlantic Tunas (ICCAT).

BIO staff contributed to the fourth Canadian Offshore Resources Exposition (CORE) held in Halifax.

Honours and Awards

Three MEL scientists, Dr. Robert J. Conover, Dr. Lloyd M. Dickie and Dr. Kenneth H. Mann, had one of their published papers selected as a Citation Classic by the Science Citation Index.

Mr. Michael Latremouille won the Distinguished Technical Communication Award from the Society for Technical Communication's Eastern Ontario Chapter.

Dr. Raymond W. Sheldon was awarded the degree of Doctor of Sciences by the University of Manchester for his outstanding research on the linear biomass spectrum of the ocean.

Dr. Trevor C. Platt was awarded the 1984 Rosenstiel Award along with Dr. F. Azam of Scripps.

The Huntsman Award was presented to Dr. W.H. Berger of the USA in recognition of his important studies of deep-sea sediments and their chemistry.

Visitors

- President Eanes of Portugal and his Ministers for Affairs, and Sea and Foreign Trade
- The Canada-United States Military Cooperation Committee
- Captain A. Civetta, Chief Hydrographer of the Italian Navy
- Dr. Kathryn Sullivan, a mission specialist on NASA's 1984 shuttle flight 41G.

Key External Events

The Canada/US Gulf of Maine boundary dispute was settled by the International Court of Justice in Den Hague. Canada was awarded the productive northeast peak.

1985

Organization and People

The Environmental Quality Division of the Marine Ecology Laboratory (MEL) was renamed Environmental Oceanography and Dr. Barry T. Hargrave took over as Head. Dr. Donald C. Gordon took over as Head of the Fisheries Oceanography Division.

Department of Fisheries and Oceans

Ocean Science and Surveys, Atlantic (A.R. Longhurst, Regional Director-General)

- Ocean Information Division (H.B. Nicholls)
- Public Relations (C.E. Murray)
- Management Services (G.C. Bowdridge)
- Personnel Services (J.G. Feetham)

Atlantic Oceanographic Laboratory (J.A. Elliott, Director)

- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Canadian Hydrographic Service (Atlantic Region) (A.J. Kerr, Director)

- Field Surveys (R.C. Lewis)
- Chart Production (T.B. Smith)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (S.T. Grant)

Marine Ecology Laboratory (K.H. Mann, Director)

- Biological Oceanography (T.C. Platt)
- Environmental Quality (B.T. Hargrave)
- Fisheries Oceanography (D.C. Gordon)

Institute Facilities (R.L.G. Gilbert, Manager)

- Ships (J. Parsons)
- Engineering Services (D.F. Dinn)
- Computing Services (D.M. Porteous)
- Library Services (J.E. Sutherland)
- Publication Services (M.P. Latremouille)

Marine Fish Division (W.D. Bowen)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)

- Eastern Petroleum Geology (J.S. Bell)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (C.E. Keen)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Department of Environment

Seabird Research Unit, Canadian Wildlife Service (D.N. Nettleship)

EPS

Program

BIO staff participated in the discovery of the *Titanic* off the tail of the Grand Banks.

The CSS *Baffin* worked in the front of the ice fields off Labrador with scientists from BIO, the Smithsonian Institute of the United States and the Northwest Atlantic Fisheries Centre in Newfoundland. Various types of data were collected, including data on seals and phytoplankton physiology.

Marine geochemists participated in an international expedition on the French research vessel *Marion Dufresne* and obtained the longest piston core of deep sea sediments ever collected from deep ocean sediments. This work was done in Great Meteor East Abyssal Plain.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- CSS *Navicula*
- *Lady Hammond* (charter)
- *EE Prince*
- MV *Alfred Needler*

Plus cooperative voyages with the USSR.

Technology

Meetings, Workshops and Conferences

Honours and Awards

The Huntsman Award was presented to Dr. W.S. Broecker of the USA in recognition of his outstanding studies of geochemical processes determining concentrations of key elements and their role in the world's climate.

Visitors

Key External Events

1986

Organization and People

This year marked the beginning of major changes in the organization of the Department of Fisheries and Oceans in Ottawa which had a profound impact on BIO. The Honourable Tom Siddon was Minister of DFO and Peter Meyboom was Deputy Minister. Scott Parsons was appointed Assistant Deputy Minister of Science. The decision was made to disband Ocean Science and Surveys (OSS) and integrate it with the Fisheries Research Branch in all regions across the country. At BIO, the position of Director-General, OSS Atlantic, was abolished and Dr. Alan R. Longhurst moved to Biological Oceanography Division as a research scientist. In its place, the position of Regional Director of Science for the Scotia-Fundy Region was created in April and Dr. Barry S. Muir moved back to BIO from Ottawa to fill it.

There is no organizational list for this year, that in the 1986 annual review is for July 1987.

Program

The Canadian Hydrographic Service tested the efficiency and feasibility of transmitting and receiving mapping information via the ANIK-D Satellite Network.

A joint venture between BIO and the Extremely Low Frequency/Aquitaine of Paris was formed to study the sublethal effects of petroleum exposure in juvenile Atlantic salmon.

A major experimental study of the physical and chemical characteristics of the eastern Grand Banks was carried out by the Atlantic Oceanographic Laboratory using CSS *Hudson*.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- CSS *Navicula*
- *Pandora II* (charter by DFO as *Pisces IV* support vessel)
- *Lady Hammond* (charter)
- *EE Prince*
- MV *Alfred Needler*

Plus cooperative voyages with the USSR.

The new 35 metre acoustic sweep vessel *F. G. C. Smith* was commissioned and made her maiden voyage. She will be used to conduct hydrographic surveys in coastal areas of the Maritime provinces.

New computer systems were installed on BIO ships. Based on the Digital Equipment MicroVax II computer, these computers enhanced shipboard data acquisition and analysis capabilities.

Technology

Meetings, Workshops and Conferences

An oil spill impact assessment workshop was held at BIO

Honours and Awards

Dr. William Li won the APICS/Fraser Young Scientist Medal.

The Huntsman Award was presented to Dr. T.M. Fenchel of Denmark in recognition of his fundamental studies of microfauna in marine benthic and pelagic communities.

Visitors

Key External Events

The Chernobyl nuclear accident occurred in the USSR..

1987

BIO celebrated its 25th anniversary. In attendance at the commemorative ceremony on 25 October were the Lieutenant-Governor of Nova Scotia, the Premier of Nova Scotia, the Mayors of both Halifax and Dartmouth, the Deputy Minister of the Department of Fisheries and Oceans, the Assistant Deputy Minister of Department of Fisheries and Oceans, and the President of Dalhousie University.

Organization and People

Major changes in the organization of DFO and BIO continued. The Marine Ecology Laboratory (MEL) was officially disbanded on 1 April after 22 years of multidisciplinary ecological research. While the Biological Oceanography Division remained intact, the Environmental and Fisheries Oceanography Divisions were disbanded and staff transferred to divisions under the new Biological Sciences Branch (BSB) or the new Physical and Chemical Sciences Branch (PCSB). The Atlantic Oceanographic Laboratory (AOL) also ceased to exist as an entity but its four divisions remained intact under the new PCSB. Dr. James A. Elliott was appointed Director of PCSB and Dr. James E. Stewart was appointed Director of BSB. The BSB also included staff at the Halifax Fisheries Research Laboratory and the St. Andrews Biological Station. Mr. Steven B. MacPhee was appointed as the new DFO Regional Director of Science and Dr. Barry S. Muir returned to Ottawa.

As of July 1987 BIO was now organized as follows:

Department of Fisheries and Oceans

Regional Director Science (S.B. MacPhee)

- Marine Assessment and Liasion Division (MALD) (H.B. Nicholls)

Biological Sciences Branch (J.E. Stewart, Director)(located in the Hollis Building)

- Marine Fish Division (W.D. Bowen)
- Invertebrates, Plants and Environmental Ecology Division (M.M. Sinclair)(located in the Halifax Fisheries Research Laboratory)
- Biological Oceanography Division (T.C. Platt)
- Enhancement, Culture and Anadromous Fisheries Division (N.E. MacEachern)(located in the Hollis Building)
- Fish Aquaculture and Applied Physiology (R.H. Cook)(located in St. Andrews)

Physical and Chemical Sciences Branch (J.A. Elliott, Director)

- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Hydrography Branch, Canadian Hydrographic Service (Atlantic) (A.J. Kerr, Director)

- Field Surveys (T.B. Smith)
- Chart Production (S.L. Weston)
- Hydrographic Development (R.G. Burke)
- Navigation (R.M. Eaton)
- Planning and Records (R.C. Lewis)
- Tidal (S.T. Grant)

Management Services Branch (E.J. Maher, Manager)

- Marine Services (J.H. Parsons)
- Engineering and Technical Services (D.F. Dinn)
- BIO Library Services (J.E. Sutherland)
- BIO Administrative Services (J. Broussard)

Comptroller's Branch (G.C. Bowdridge, Manager)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)

- Eastern Petroleum Geology (M.E. Best)
- Environmental Marine Geology (D.J.W. Piper)
- Regional Reconnaissance (C.E. Keen)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Department of Environment

Seabird Research Unit, Canadian Wildlife Service (E.H.J. Hiscock)

Analytical Chemistry Lab of EPS (H. Samant)

BIO also housed:

- NAFO (Captain J.C.E. Cardoso)
- COGLA of DEMR

The following marine science-related industries now rented space at BIO:

- ASA Consulting Ltd.
- Brooke Ocean Technology
- Seakem Oceanography
- Seastar Instruments Ltd.
- Seimac Ltd.

<u>Program</u>

Development of the first electronic charts

Creation of haddock box on the Scotian Shelf to protect juvenile haddock.

The Atlantic Geoscience Centre successfully completed tests of the Long Coring Facility. This new system e
the recovery of core samples up to 20 metres in length.

AIMS-1, the first Arctic Ice Monitoring System, developed by the Atlantic Oceanographic Laboratory and S
Ltd., completed its tests in Halifax Harbour and was deployed in the Northwest Passage.
from eleven ice floes.

The German hydrographic ship *FS Polarstern* reached 86^0 11' N. with four BIO scientists aboard.
This was the most northerly point ever reached by a research vessel in the Arctic Ocean to date.

Technology

Meetings, Workshops and Conferences

BIO hosted the 9th Annual Canada-United States Scientific Discussions Conference. Canadian fisheries scientists from the Gulf, Newfoundland, Quebec and Scotia-Fundy Regions of DFO met with their counterparts from Woods Hole, Massachusetts to discuss a range of topics concerning the biology and management of coastal marine populations.

Students Day was held at BIO. This day allowed 450 students from 21 different schools to visit and tour BIO.

Honours and Awards

The Huntsman Award was presented to Prof. X. Le Pichon of France in recognition of his leadership and analytical skill in the formulation and application of the principles of plate tectonics.

Visitors

Key External Events

The amnesic shellfish poisoning incident occurred in PEI which was later attributed to domoic acid, a naturally occurring phytotoxin.

1988

Organization and People

Fine-tuning of the new DFO organization continued. Dr. M.M. Sinclair was appointed as Director of the Biological Sciences Branch (BSB) and Dr. J.D. Pringle became the new head of the Invertebrates, Plants and Environmental Ecology Division. The new Habitat Ecology Division was created with in BSB and Dr. D.C. Gordon was appointed head. Mr. Paul Bellemare was appointed Regional Director of Hydrography.

BIO was now organized as follows:

Department of Fisheries and Oceans

Regional Director of Science (S.B. MacPhee)

- Marine Assessment and Liasion Division (MALD) (H.B. Nicholls)
- Scientific Computing Services (D. Porteus)

Biological Sciences Branch (M.M. Sinclair, Director) (located in the Hollis Building)

- Marine Fish Division (W.D. Bowen)
- Invertebrates, Plants and Environmental Ecology Division (J.D. Pringle)(located in the Halifax Fisheries Research Laboratory)
- Biological Oceanography Division (T.C. Platt)
- Habitat Ecology Division (D.C. Gordon)
- Enhancement, Culture and Anadromous Fisheries Division (N.E. MacEachern)(located in the Hollis Building)
- Fish Aquaculture and Applied Physiology (R.H. Cook)(located in St. Andrews)

Physical and Chemical Sciences Branch (J.A. Elliott, Director)

- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Hydrography Branch, Canadian Hydrographic Service (Atlantic) (P. Bellemare, Director)

- Field Surveys (T.B. Smith)
- Chart Production (S.L. Weston)
- Hydrographic Development (R.G. Burke)
- Navigation (H. Boudreau)
- Data Management and Planning (R.C. Lewis)
- Tidal (S.T. Grant)

Management Services Branch (E.J. Maher, Manager)

- Marine Services (J.H. Parsons)

- Engineering and Technical Services (D.F. Dinn)
- Facilities Management (A. Medynski)
- Material Management (G. Hewett)
- Information Systems (C. Elson)
- BIO Library Services (J.E. Sutherland)
- Halifax Library Services (A. Oxley)
- Administrative Services (J. Broussard)

Comptroller's Branch (G.C. Bowdridge)

Communications Branch (J. Gough)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (M.J. Keen, Director)

- Eastern Petroleum Geology (M.E. Best)
- Environmental Marine Geology (R. Taylor)
- Regional Reconnaissance (R. MacNab)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Canada Oil and Gas Lands Administration (COGLA) Laboratory

Department of Environment

- Seabird Research Unit, Canadian Wildlife Service (E.H.J. Hiscock)
- Analytical Chemistry Lab of EPS (H. Samant)

BIO also housed:

- NAFO (Captain J.C.E. Cardoso)

The following marine science-related industries were located at BIO:

- ASA Consulting Ltd.
- Brooke Ocean Technology
- Seakem Oceanography
- Seastar Instruments Ltd.
- Seimac Ltd.

Program

Publication of the Labrador Sea basin atlas.

In response to the PEI domoic acid crisis, new resources were received for an expanded regional program on marine phycotoxins.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- CSS *Navicula*
- *Lady Hammond* (charter)
- *EE Prince*
- MV *Alfred Needler*
- CSS *J.L. Hart* (based in St. Andrews, NB)
- CSS *F.C.G. Smith*

Plus cooperative voyages with other countries.

The CSS *Hudson* found the burning wreckage of the *Athenian Venture*, a tanker carrying gasoline which exploded and broke into two off Newfoundland while enroute from Amsterdam to New York in the early hours on 22 April. At the time of the explosion, the *Hudson* was about three steaming hours away but could see the fire in the night sky as they approached. There were no survivors.

Technology

Meetings, Workshops and Conferences

The first national hydroacoustics workshop was held at BIO. It included presentations on the applications of acoustic technologies in fisheries research, biological and physical oceanography, hydrography, the geosciences and marine mammal research.

An exhibition of the cooperative programs between the Department of Fisheries and Oceans and the Department of Energy, Mines, and Resources was held at BIO with over 50 exhibitors.

Honours and Awards

Dr. A. R. Longhurst was elected as a fellow of the Royal Society of Canada.

The Huntsman Award was presented to Prof. C. Wunsch of the USA in recognition of his contributions to developing new global perspectives of the oceans and their integration into the global climate system.

Visitors

- The Senate of Canada's Standing Committee on Fisheries

Key External Events

A 12-year ban on hydrocarbon drilling on the Canadian sector of Georges Bank was announced.

1989

Organization and People

The Northwest Atlantic Fisheries Organization (NAFO) Secretariat left BIO for new offices at 192 Wyse Road in Dartmouth.

BIO was now organized as follows:

Department of Fisheries and Oceans
Scotia-Fundy Region Regional Director-General (J.-E. Haché)

Regional Director of Science (S.B. MacPhee)
- Marine Assessment and Liasion Division (MALD) (H.B. Nicholls)
- Scientific Computing Services (D. Porteus)
- Ocean Technology Promotion (C. Clute)

Biological Sciences Branch (M.M. Sinclair, Director) (R.E. Lavoie, Assistant Director) (located in the Hollis Building)
- Marine Fish Division (R.N. O' Boyle)
- Benthic Fisheries and Aquaculture Division (J.D. Pringle)(located in the Halifax Fisheries Research Laboratory)
- Biological Oceanography Division (T.C. Platt)
- Habitat Ecology Division (D.C. Gordon)
- Enhancement, Culture and Anadromous Fisheries Division (J.A. Ritter)(located in the Hollis Building)
- Fish Aquaculture and Invertebrate Fisheries Division (R.H. Cook)(located in St. Andrews)

Physical and Chemical Sciences Branch (J.A. Elliott, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Hydrography Branch, Canadian Hydrographic Service (Atlantic) (P. Bellemare, Director)
- Field Surveys (R.C. Lewis)
- Nautical Publications (S.L. Weston)
- Hydrographic Development (R.G. Burke)
- Data Management and Planning (S.T. Grant)
- Tidal Section (C. O'Rielly)

Management Services Branch (E.J. Maher, Manager)
- Marine Services (W. Cottle)

- Engineering and Technical Services (D.F. Dinn)
- Facilities Management (A. Medynski)
- Material Management (J. Broussard)
- Information Systems (C. Crowe)
- Library Services (A. Oxley)
- Administrative Services (D.Brown)

Comptroller's Branch (G.C. Bowdridge)
- Accounting and Treasury Operations (S. Lucas)
- Financial Planning and Analysis (L. Seto)
- OIperational Work Planning Division (R.A. Higgins)

Communications Branch (J. Gough)
- Science Communications (M. Roy)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (D.I. Ross, Director)
- Basin Analysis (M.E. Best)
- Environmental Marine Geology (D.B. Prior)
- Regional Reconnaissance (M.H. Salisbury)
- Program Support (K.S. Manchester)
- Administration (C. Racine)

Canada Oil and Gas Lands Administration (COGLA) Laboratory

Environment Canada

- Marine Wildlife Conservation Division (Canadian Wildlife Service) (E.H.J. Hiscock)
- Regional Laboratory (Environmental Protection) (H. Samant)

The following marine science-related industries leased space at BIO:
- ASA Consulting Ltd.
- Brooke Ocean Technology
- Seakem Oceanography
- Seastar Instruments Ltd.

<u>Program</u>

Joint publication with the Soviet Union of a circumpolar geology map of the Arctic Ocean.

A major new environmental study of Halifax Harbour was begun with

research emphasis on geology and sediment geochemistry.

The Hysub 5000 ROV (Remotely Operated Vehicle) held trials on the CSS *Dawson*.

The Ocean Production Enhancement Network (OPEN) was established as federal Centre of Excellence at Dalhousie University. Numerous BIO staff participate in research dealing with cod and scallops.

Facilities

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Maxwell*
- CSS *Navicula*
- MV *Lady Hammond* (charter)
- *EE Prince*
- MV *Alfred Needler*
- CSS *J.L. Hart* (based in St. Andrews, NB)
- CSS *F.C.G. Smith*

Plus cooperative cruises with other countries.

Upon the completion of a mid-life refit, CSS *Hudson* returned to BIO after an absence of over one year. The improvements made will enable the vessel to provide continued useful service to the scientific community on the Atlantic coast for many years to come.

The CSS *Baffin* returned to BIO after having completed a multiyear hydrographic survey of the Labrador coast.

The CSS *Frederick G. Creed* arrived at BIO for a three month period to assess her capability for hydrographic surveys, scientific research and fisheries patrol. The *Creed* is a 20 metre SWATH (Small Waterplane Area Twin Hull) vessel.

Technology

Meetings, Workshops and Conferences

The Canadian Continental Shelf Seabed Symposium was organized and run

by BIO staff.

Honours and Awards

The Huntsman Award was presented to Dr. L.R. Pomeroy of the USA for his contributions to broadening knowledge of the role of bacteria in oceanic food chains.

Visitors

Key External Events

The Halifax Harbour Task Force was formed by the Province to Nova Scotia to develop recommendations for sewage treatment. Four BIO scientists were appointed as members.

1990

Organization and People

No listing for this year. Annual report was for 90/91

Program

An international expedition aboard the Russian vessel *Akademik Keldish*, equipped with two Mir submarines, carried BIO scientist Dr. Steve Blasco to the sea floor site of the sunken wreck of the *Titanic*. Samples of the hull and other debris were retrieved for research on mechanisms of corrosion on the wreck.

Facilities

Ships

The CSS *Baffin* was decommissioned after 33 years of service.

Technology

The United Nations Educational, Scientific, and Cultural Organization (UNESCO)'s Stardent 3040 super mini-computer was introduced to BIO.

Meetings, Workshops and Conferences

The second Canadian Workshop on Harmful Marine Algae was held at BIO and attended by over sixty participants.

Another Open House was held at BIO. Over three days, more than 30,000 visited the BIO facilities. This was preceded by a Client Day during which industry, universities and other government departments and agencies got to view the facilities.

The Canadian Committee on Oceanographic Research held its General Meeting and Assembly at BIO.

Honours and Awards

The Huntsman Award was presented to Dr. N.J. Shackleton of England in recognition for his innovative work on paleoceanography and the development of oxygen isotopic stratigraphy.

Visitors

- The House of Commons Standing Committee on Industry, Science, and Technology

Key External Events

1991

Organization and People

Dr. M. J. Keen, former Director of the Atlantic Geoscience Centre, died suddenly on 8 January 1991.

Department of Fisheries and Oceans

Scotia-Fundy Region Regional Director-General (J.-E. Haché)

Regional Director of Science (S.B. MacPhee)
- Marine Assessment and Liasion Division (MALD) (H.B. Nicholls)
- Scientific Computing Services (D. Porteus)

Biological Sciences Branch (M.M. Sinclair, Director) (R.E. Lavoie, Assistant Director) (located in the Hollis Building)
- Marine Fish Division (R.N. O' Boyle)
- Benthic Fisheries and Aquaculture Division (J.D. Pringle)(located in the Halifax Fisheries Research Laboratory)
- Biological Oceanography Division (T.C. Platt)
- Habitat Ecology Division (D.C. Gordon)
- Freshwater and Anadromous Division (J.A. Ritter)(located in the Hollis Building)
- Fish Aquaculture and Invertebrate Fisheries Division (R.H. Cook)(located in St. Andrews)

Physical and Chemical Sciences Branch (J.A. Elliott, Director)
- Chemical Oceanography (J.M. Bewers)
- Coastal Oceanography (C.S. Mason)
- Metrology (D.L. McKeown)
- Ocean Circulation (R.A. Clarke)

Hydrography Branch, Canadian Hydrographic Service (Atlantic) (P. Bellemare, Director)
- Field Surveys (R.C. Lewis)
- Nautical Publications (S.L. Weston)
- Hydrographic Development (R.G. Burke)
- Data Management and Planning (S.T. Grant)
- Tides, Currents and d Water Levels (C. O'Rielly)

Management Services Branch (E.J. Maher, Manager)
- Marine Services (J. Wheelhouse)
- Engineering and Technical Services (D.F. Dinn)
- Facilities Management (A. Medynski)
- Material Management (J. Broussard)

- Information Systems Services (C. Crowe)
- Library Services (A. Fiander)
- Administrative Services (H.S. Leonard)

Comptroller's Branch (G.C. Bowdridge, Director)
- Accounting and Treasury Operations (S. Lucas)
- Financial Planning and Analysis (L. Seto)

Communications Branch (J. Gough)
- Science Communications (M. MacDonald)

Department of Energy, Mines and Resources
Geological Survey of Canada

Atlantic Geoscience Centre (D.I. Ross, Director)
- Basin Analysis (K.D. McAlpine)
- Environmental Marine Geology (D.B. Prior)
- Regional Reconnaissance (J. Verhof)
- Program Support (K.S. Manchester)
- Administration (G. McCormack)

Environment Canada

- Marine Wildlife Conservation Division (Canadian Wildlife Service) (E.H.J. Hiscock)
- Regional Laboratory (Environmental Protection) (K.G. Doe)

The following marine science-related industries leased space at BIO:
- ASA Consulting Ltd.
- Brooke Ocean Technology

Program

The first edition of the book *Dynamics of Marine Ecosystems: Biological-Physical Interactions in the Oceans* by BIO scientists Drs. K.H. Mann and J. Lazier was published.

Facilities

Ships

A year of many changes.

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Baffin*
- CSS *Dawson*
- CSS *Matthew*
- CSS *Navicula*
- MV *Lady Hammond* (charter)
- CSS *EE Prince*
- CSS *Alfred Needler*
- CSS *J.L. Hart* (based in St. Andrews, NB)
- CSS *F.C.G. Smith*

Plus cooperative voyages with other countries.

The CSS *Matthew*, constructed at Versatile Pacific Shipyards in 1990, arrived at BIO in May after being transferred from the Newfoundland Region. The CSS *Baffin* and CSS *Dawson* were both retired from active service. Part of *Baffin*'s workload was taken up by the CSS *Matthew*. The CSS *Dawson* was replaced by her sister ship, the CSS *Parizeau*, which transferred from DFO's Pacific Region.

Technology

Meetings, Workshops and Conferences

Honours and Awards

Dr. Lubomir Janse was presented with the Professor Purkyne Medal of the Czechoslovakia Geological Survey and Geological Societies at a ceremony in Prague.

Dr. Charlotte Keen was awarded honourary membership of the Canadian Society of Exploration Geophysicists.

Dr. Gus Vilks was awarded honourary membership of the North American Micropalaeontology Section of the Society of Exploration of Palaeontology and Mineralogyy.

Dr. A. R. Longhurst was awarded the 1991 Gold Medal by the Professional Institute of the Public Service of Canada.

Dr. Lloyd Dickie was presented the Oscar Sette Memorial Award by the American Fisheries Society.

The Huntsman Award was presented to Dr. G.T. Csanady of the USA in recognition of his fundamental contributions to the understanding of circulation and mixing on the continental shelf and in lakes.

Visitors

Key External Events

1992

Organization and People

Public Works and Government Services Canada (PWGSC) entered into an agreement with the Department of Fisheries and Oceans (DFO) to manage the operation and maintenance of BIO facilities.

The Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) was disbanded.

In April, Dr. D.I. Ross resigned as Director of AGC and moved to New Zealand. He was succeeded by Dr. D.B. Prior.

Dr. William L. Ford died on 15 January, 1992. Dr. Ford was appointed Director of the Institute in 1965 and remained there, through several major federal reorganizations, until his retirement. In his early years he worked at the Woods Hole Oceanographic Institute. He subsequently held several scientific positions with the Department of National Defence. Perhaps more than anyone else, he oversaw the development of BIO to its present stature as a world-class research organization.

No staff listing. Annual report for 92-93.

Program

Facilities

Ships

Technology

Meetings, Workshops and Conferences

Local ocean industry companies participated in a day-long event at BIO that focused on ocean technology development and transfer. The central part of the event was an exhibition involving several of the companies, together with exhibits from universities, non-government agencies and federal departments (including NRCan groups at BIO and DFO units at BIO and the SABS). Three hundred “outside” persons attended the event, plus many DFO and NRCan staff from BIO.

Honours and Awards

Drs. K.H. Mann and J. Lazier won a Government of Canada Merit Award for their book titled entitled *Dynamics of Marine Ecosystems: Biological-Physical Interactions in the Oceans*.

The Huntsman Award was given to Dr. T.C. Platt of BIO in recognition of his

fundamental and wide-ranging research into the functioning of pelagic ecosystems, especially of the open ocean, and critical computations of global oceanic algal productivity.

Visitors

- The Ministers of Agriculture and Fisheries and Commerce and Industry from the Sultanate of Oman
- John Savage, Premier of Nova Scotia
- The French Ambassador to Canada

Key External Events

Oil production started at the Cohasset – Panuke field on Sable Island Bank.

1993

Organization and People

On 25 June, the Department of Energy, Mines and Resources (DEMR) became Natural Resources Canada (NRCan)

Dr. R.A. Pickrill was appointed as the new head of the Atlantic Geoscience Centre's (AGC) Environmental Marine Geology Division.

The Route Survey Office of the Department of National Defence was established at BIO. The office provides detailed ocean bottom data to the navy in support of seabed surveillance and intervention operations. The group is part of a unit called TRINITY which is Maritime Forces Atlantic's Joint Oceanographic Surveillance and Information Centre.

Department of Fisheries and Oceans

Scotia-Fundy Region Director-General (N.A. Bellefontaine)

Regional Director Science (S.B. MacPhee)
- Marine Assessment and Liaison Division (MALD) (H.B. Nicholls)
- Scientific Computing Services (D. Porteus)

Biological Sciences Branch (M.M. Sinclair, Director) (R.E. Lavoie, Assistant Director)
- Marine Fish Division (R.N. O'Boyle)
- Benthic Fisheries and Aquaculture Division (J.D. Pringle)(located in the Halifax Fisheries Research Laboratory)
- Biological Oceanography Division (T.Platt)
- Freshwater and Anadromous Division (J.A. Ritter)(located in the Maritime Centre)
- Habitat Ecology Division (D.C. Gordon)
- St. Andrews Biological Station (W. Watson-Wright) (located in St. Andrews)

Physical and Chemical Sciences Branch (J.A. Elliott, Director)
- Marine Chemistry Division (J.M. Bewers)
- Coastal Oceanography Division (C.S. Mason)
- Metrology Division (D.L. McKeown)
- Ocean Circulation Division (R.A. Clarke)

Hydrography Branch, Canadian Hydrographic Service (Atlantic) (P. Bellemare, Director)
- Hydrographic Surveys (R.C. Lewis)
- Nautical Publications (S.L. Weston)
- Hydrographic Development (R.G. Burke)

- Data Management (S.T. Grant)

Aquaculture Coordination Office (R.H. Cook) (located in the Maritime Centre)

Management Services Branch (J. Wheelhouse, Manager)
- Marine Services (W. Cottle)
- Engineering and Technical Services (D.F. Dinn)
- Facilities Management (A. Medynski)
- Material Management (B. Tsinman)
- Information Systems Services (T. Wagg)
- Library Services (A. Fiander)
- Administrative Services (G. Browne)

Comptroller's Branch (G.C. Bowdridge)
- Accounting and Treasury Operations (S. Lucas)
- Financial Planning and Analysis (L.Y.N. Seto)

Communications Branch (J. Gough)
- Science Communications (M. MacDonald)

Natural Resources Canada
Geological Survey of Canada

Atlantic Geoscience Centre (D.B. Prior, Director)
- Basin Analysis (K.D. McAlpine)
- Environmental Marine Geology (R.A. Pickill)
- Regional Reconnaissance (J. Verhof)
- Program Support (K.S. Manchester)
- Administration (G. McCormack)

Environment Canada
- Marine Wildlife Conservation Division (E.H.J. Hiscock)
- Environmental Quality Laboratory (K.G. Doe)

Department of National Defense
- Route Survey Office

The following marine science-related industries rented space at BIO:
- ASA Consulting Ltd.
- Brooke Ocean Technology

Program

The Fisheries Resource Conservation Council (FRCC) was created to form a partnership between scientific and academic expertise and all sectors of the fishing industry with the

purposed of making recommendations to the Minister of Fisheries and Oceans on conservation measures for the Atlantic fishery.

AGC received one billion dollars worth of geological and geophysical data from Husky and PetroCanada.

Facilities

The DFO regional headquarters moved from the Hollis Building to the Maritime Centre in Halifax.

Ships

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Parizeau*
- CSS *Matthew*
- CSS *Navicula*
- MV *Lady Hammond* (charter)
- CSS *EE Prince*
- CSS *Alfred Needler*
- CSS *J.L. Hart* (based in St. Andrews, NB)
- CSS *F.C.G. Smith*

Plus cooperative voyages with other countries.

Technology

The Batfish towed vehicle was developed through an agreement between Focal Technologies Ltd., the Department of Fisheries and Oceans and Guideline Instruments Ltd.

Meetings, Workshops and Conferences

Honours and Awards

The Huntsman Award was presented to Dr. R.A. Berner of the USA in recognition of ideas on mathematical modelling of kinetics, which transformed sedimentary geochemistry from an almost purely descriptive science to one of prediction and quantitative understanding.

Visitors

Key External Events

1994

Organization and People

The Fishermen and Scientists Research Society (FSRS) was established with an office at BIO. It is a non-profit organization which is an active partnership between fishermen and scientists. The FSRS was developed with the overall objectives to establish and maintain a network of fishermen and scientists capable of conducting collaborative research and collecting information relevant and necessary to the long-term sustainability of marine fisheries, and to promote effective communication between fishermen, scientists and the general public.

On 11 January, a ceremony was held to officially name the Michael Keen Canyon in memory of Dr. Michael J. Keen. This canyon cuts across the edge of the continental shelf just east of the Grand Banks at the south end of the Flemish Pass between Beothuk Knoll and Flemish Cap.

No listing for this year. Annual report for 94/95

Program

A program of sentinel fishing surveys was implemented to obtain additional information on the status of fish stocks which were no longer fished commercially because of moratoria. Selected fishing vessels were allowed limited harvest of key stocks the stocks under a pre-determined protocol. The primary objective was to collect information on the trends in the stocks (i.e. whether stocks are increasing or decreasing), migration, condition and the maturity stage of the fish which could be compared with the data collected from the DFO research surveys.

Facilities

Ships

The CCGS *Louis St. Laurent* became the first Canadian ship to reach the North Pole.

Technology

Meetings, Workshops and Conferences

A Symposium on Cod and Environmental Change was held at BIO.

The American Fisheries Society held its 124th Annual Meeting in Halifax. BIO staff assisted in the organizing and over 1000 delegates attended this international event.

Honours and Awards

Dr. K.H. Mann was the first recipient of the American Society of Limnology and Oceanography (ASLO) Lifetime Achievement Award. [also get year that Alan Longhurst won]

The Huntsman Award was presented to Dr. E.A. Boyle of the USA in recognition of his fundamental work and leadership in developing an important discipline in marine geochemistry (paleo-oceanographic chemistry) that uses trace metal contents of foraminiferal shells to retrieve historical data on nutrients, productivity, and deep-water circulation of the oceans.

Visitors

- The Honourable Stan Dromisky, Member of Parliament and a Canadian Environmental Protection Act representative

Key External Events

1995

Organization and People

Significant changes were made in the organization and funding of programs at BIO as well as at the Halifax Fisheries Research Laboratory (HFRL) and St. Andrews Biological Station (SABS). These changes were mainly driven by a major program review of all federal programs in Canada.

The Scotia-Fundy and Gulf Regions of DFO were combined into a single Maritimes Region and Mr. Neil Bellefontaine was appointed Regional Director-General.

In January, Mr. S.B. MacPhee was transferred to Ottawa to become Director-General of the Canadian Hydrographic Service. He was replaced on an acting basis by Dr. J.A. Elliott. Later in the year, Mr. J.S. Loch was named Regional Science Director. The Biological Sciences Branch and the Physical Chemical Sciences Branch of DFO were merged under the Regional Science Director.

The Halifax Fisheries Research Laboratory on 1707 Lower Water Street in Halifax was closed and staff transferred to either BIO, St. Andrews or the Gulf Fisheries Centre.

On 1 April 1995. the Canadian Coast Guard was merged with DFO.

Listing in 94/95 review is for December 1996

Program

Facilities

Ships

Operation of the BIO vessels was taken over by the Canadian Coast Guard and the entire DFO fleet was integrated. Soon after, the BIO vessels, which had traditionally been painted white, were painted red according to Coast Guard practice.

The following research vessels were used by BIO staff:

- CSS *Hudson*
- CSS *Parizeau*
- CSS *Matthew*
- CSS *Navicula*
- CSS *EE Prince*
- CSS *Alfred Needler*
- CSS *J.L. Hart* (based in St. Andrews, NB)

Plus cooperative voyages with other countries.

Technology

Meetings, Workshops and Conferences

The Canadian Hydrographic Service, along with several local agencies and businesses, participated in Ocean Information Technology Showcase which coincided with the G-7 Summit.

The Walter Bell Memorial Symposium on Paleobotany and Coal Science was held at BIO.

Honours and Award

Dr. Peter Hacquebard was the first winner of the Walter Bell Silver Medal.

The Huntsman Award was presented to Dr. V. Smetacek of Germany in recognition of his fundamental and visionary contributions to the biogeochemistry of the ocean water column and its associated sediments in temperate and polar ecosystems.

Visitors

- The wife of Russian President Boris Yeltsin paid a private visit to BIO during the G7 Summit meetings in Halifax.

Key External Events

1996

Organizational and budgetary reductions decisions taken in 1995 began to take full effect. Reductions throughout the federal government under its Program Review meant an approximate 40% reduction in staff and financial resources in the DFO Maritimes Science Branch by the end of Fiscal Year 1998/99. Most of the impacts were felt in the first two fiscal years of the Program Review as many people accepted early retirement incentives. New staffing opportunities were scarce to nil and concerns over the aging of the Government of Canada's scientific population mounted. In the spring of 1996, the restructured DFO Maritimes Science Branch became fully operational. It had a new director, a new management structure with eight divisions, a program coordination office and an office for the coordination of the regional scientific advisory process (RAP). These units were spread across the three Maritime provinces (the Bedford Institute of Oceanography (BIO) in Dartmouth, N.S., the Gulf Fisheries Centre (GFC) in Moncton, N.B., the St. Andrew's Biological Station (SABS) in St. Andrews N.B., and the Halifax Fisheries Research Lab (HFRL) in Halifax, N.S.).

The Oceans Act, passed by Parliament in December 1996, outlined Canada's duties and responsibilities in its oceans territories and introduced a new oceans management model based on collaboration among stakeholders and on the principles of sustainable development, integrated management and the precautionary approach.

The Atlantic Geoscience Centre (GSC) of the Department of Natural Resources Canada, internally reorganized in May 1996. The program support subdivision ceased as a separate identity and was integrated within the three science subdivisions.

In Environment Canada, the Environmental Quality Laboratory (EQL) moved from BIO to the Environmental Science Centre at the Universite de Moncton campus. However, the Environmental Protection Microbiology Laboratory remained at BIO to continue shellfish water quality monitoring throughout the three Maritime provinces.

<u>Organization and People</u>

Dr. David Prior resigned as Director of the Atlantic Geoscience Centre (AGC) and was replaced by Dr. Jacob Verhoef.

Dr. Rene Lavoie was named Assistant Director of the DFO Science Branch and Branch Coordinator for scientific communications and liaison.

The Habitat Ecology and Marine Chemistry Divisions were merged to create the new Environmental Sciences Division. The initial head was Dr. John Pringle who moved over from the Halifax Fisheries Research Laboratory but soon after he was replaced by Mr. Paul D. Keizer.

The Marine Assessment and Liaison Division (MALD) was disbanded upon the retirement of Mr. Brian Nicholls and Dr. Gerald Siebert. The Diadromous Fish Division

divested itself of eight of its nine fish hatcheries. Only Mactaquac in New Brunswick was retained by DFO.

The Project Office of the International Ocean Colour Coordination Group was established at BIO. The Group reported to the Scientific Committee on Oceanic Research (SCOR) in Baltimore, USA. Dr. Venetia Stuart was appointed as the Executive Scientist.

Fisheries and Oceans Canada
Maritimes Region

Regional Director-General (N.A. Bellefontaine)

Science Branch (J.S. Loch, Regional Director( ) R.E. Lavoie, Assistant Directo)

- Aquaculture Division (W. Watson-Wright)(located at St. Andrews)
- Diadromous Fish Division (J.A. Ritter)(located in the Maritime Centre)
- Habitat Management Division (G. Sirois) (located in the Gulf Fisheries Centre)
- Hydrography Division (Canadian Hydrographic Service Atlantic)(P. Bellemare)
- Invertebrate Fisheries Division (M. Chadwick)(located in the Gulf Fisheries Centre)
- Marine Environmental Sciences Division (P.D. Keizer)
- Marine Fish Division (M.M. Sinclair)
- Ocean Sciences Division (J.E. Elliott)

Human Resources Branch (J. Feetham)

Finance and Adminstration Branch (G.C. Bowdridge)(located in the Maritime Centre)

- Library Services (A. Fiander)

Communications Branch (A.M. Lanteigne)(located in the Gulf Fisheries Centre)

Informatics Branch (E. Doucet)(located in the Maritime Centre)

Technical Support Services (M. Cusack)(located in Queen Square)

- Engineering and Technical Services (D. Dinn)
- Vessel Support (G. Putt)(located in Queen Square)

Aquaculture Coordination Office (R.H. Cook)(located in Maritime Centre)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (J. Verhof, Director)

- Marine Regional Geoscience (R. Courtney)
- Marine Resource Geoscience (K.D. McAlpine)
- Environmental Marine Geoscience (R.A. Pickill)
- Administration (G. McCormack)

Environment Canada

- Shellfish and Microbiology Laboratory (A. Menon)

Department of National Defense

- Route Survey Office

Program

Ocean Sciences Division scientists participated in Arctic '96 aboard the German icebreaker *Polarstern*.

BIO staff participated in the successful recovery of the *Irving Whale* which had sunk north of PEI in 1970.

Scientists at GSC Atlantic published a major review of the geological framework and petroleum potential of the Triassic/ Jurassic Fundy Basin. This study revealed the presence of thick fluvial and lacustrine sediments with good potential for oil and gas source rocks and reservoirs.

In 1996, GSC Atlantic carried out swath bathymetric surveys in three areas off western Newfoundland.

The CSS *Hudson* carried out its regular survey of the Labrador Sea section in the spring. Then in the fall, as part of the World Ocean Circulation Experiment (WOCE), the CSS *Hudson* set a large number of current meter moorings, acoustic sources, acoustic tomography moorings, subsurface and surface drifters and a large meteorological buoy to monitor conditions over the winter in the Labrador Sea. Collaborators in this project included US and German scientists.

BIO scientists from the Ocean Sciences Division took part in ARCTIC 96 on board the German icebreaker *Polarstern.* This international exposition, which explored the eastern Eurasian Basin of the Arctic Ocean, was motivated by concerns regarding global climate and climate change.

Facilities

DFO opens offices in Queen Square in downtown Dartmouth.

Ships

Technology

Meetings, Workshops and Conferences

BIO staff helped organize the Oceans Optics III conference was held in October in Halifax.

BIO staff helped organize the Canadian Hydrographic Conference CHC 96 that was held at the Halifax World Trade and Convention Centre.

Honours and Awards

The Huntsman Award was given to Dr. R. Detrick of the USA in recognition of his fundamental and pioneering contributions to our understanding of the genesis and evolution of oceanic lithosphere.

Dr. Graham Williams was awarded the annual E.R.Ward Neale Medal of the Geological Association of Canada) and the American Association of Stratigraphic Palynologists (AASP) Medal for Scientific Excellence.

Visitors

- Mr. Fred Woodman, Chair of the Fisheries Resources Conservation Council (FRCC)
- Twenty Fellows from the Center of International Affairs, Harvard University.

Key External Events

1997

Organization and People

The regional Oceans Act Coordination Office (OACO) was established to lead delivery of DFO's responsibilities under the Oceans Act and Ms. Faith Scattolon was appointed as Director.

Mr. Paul Bellemare accepted the position of Director, Policy, Planning, and Marketing at the Canadian Hydrographic Service Headquarters in Ottawa. He was replaced as Director of CHS by Laureen Kinney.

The Maritimes Regional Advisory Process (RAP) Office was established to provide pee-reviewed scientific advice to DFO clients on the management and conservation of Canadian marine and freshwater aquatic resources and their habitats. This new office took over the responsibilities of the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) that was disbanded a few years earlier.

No staff listing. That in 96/97 review for Sept 1998

Program

A collaborative project involving the Aquaculture, Marine Environmental Sciences, and Ocean Sciences Divisions and the New Brunswick Salmon Growers Association examined factors affecting the productivity of salmon farms in southwestern New Brunswick.

A three-year study on lobster catchability and juvenile recruitment of lobster in the Gulf of Maine was undertaken.

With funding from the Panel on Research Energy and Development (PERD), investigations were intensified to understand the impacts of hydrocarbon exploration and production activities on fish and fish habitat. Emphasis was placed on Georges Bank in order to provide scientific advice for the review of the drilling moratorium.

Scientists from BIO conducted the first in-depth stock assessments of the Northwest Atlantic porbeagle, blue and shortfin mako shark populations.

A collaborative study involving Dalhousie University and the Marine Fish Division addressed birth control of grey seals. The grey seal population on the eastern Scotian Shelf, which breeds primarily on Sable Island, has been increasing exponentially for several decades and there has been interest in developing new techniques for controlling population growth.

The Canadian Hydrographic Service (CHS) and the Geological Survey of Canada

Atlantic (GSCA) carried out an extensive multibeam sonar survey of Browns Bank and the data were interpreted in terms of scallop habitat. The relationship between marine geology and biological habitat characterization was a new and emerging activity expected to generate essential information for management of the scallop fishery.

GSC Atlantic, in collaboration with Mobil Oil Canada Ltd, quantified the hazards to seabed installations for gas production near Sable Island.

The PCB contamination of sediment in the Gulf of St. Lawrence, following the lifting of the *Irving Whale*, was carefully examined to determine the extent and potential biological effects and to ensure that commercial fisheries in the area remained closed until levels of contamination were well below those that might cause concern.

GSC Atlantic initiated a broad-based investigation of shore-zone stability, sediment budgets, and coastal response to sea-level rise along the north shore and off East Point, PEI. This project was designed to address widespread public concern about coastal sensitivity to climate change in PEI, one of the most vulnerable areas identified in a recent GSC analysis of the entire Canadian coastline.

GSC Atlantic commenced a major initiative in collaboration with the Cape Breton Development Company and the Canada Centre for Mineral and Energy Technology to determine the annual subsidence of the seafloor over the mine workings to help scientists determine the potential hazard of seawater flooding coal mines.

Operational research focused on development of accurate ocean forecast models for the Labrador/Newfoundland shelves and collection of sea ice data including ice drift, ice melt, ice thickness and ice pressure for model validation.

BIO scientists from the Ocean Sciences Division took part in the Joint Ocean Ice Study (JOIS 97) on board CCGS *Louis S. St-Laurent*. This international expedition was motivated by concerns regarding global climate and climate change. This expedition took place in the Canadian Archipelago and the Canada Basin of the Arctic Ocean.

GSC Atlantic undertook shoreline studies along the Beaufort Sea coast to improve understanding of coastal evolution in ice-rich permafrost terrain as a basis for better prediction of coastal response to changing climate.

GSC Atlantic released a catalogue of seismic refraction data of the Arctic. In addition to Canadian and Norwegian date, this catalogue made Russian refraction data available to Western scientists for the first time.

A joint study between DFO and NOAA analysed the groundfish survey data sets collected from 1970 to 1994 between Cape Hatteras to the Davis Strait to describe the assemblages and biogeography of the demersal fishes of the east coast of North

America. At a time when ecosystem approaches to management of fisheries were being promoted, the study represented the first attempt to examine ecosystem patterns at a spatial scale which properly addresses the distribution patterns of demersal marine fishes.

Studies by GSC Atlantic and CHS determined the offshore area over which Canada could have sovereign rights when it ratifies the United Nations Convention on the Law of the Sea (UNCLOS). Under UNCLOS, Canada's sovereign rights could extend well beyond the minimum 200 nm limit, particularly in the Atlantic and Arctic Oceans. Article 76 specifies how a coastal state may define the area of its continental margin over which it can exercise sovereign rights for the purposes of exploring it and exploiting its natural resources. Using these criteria, CHS and GSC compiled available bathymetric data in the Atlantic region and investigated its accuracy and completeness to determine whether it is sufficient to define the outer limits of the Canadian continental shelf or whether additional surveys are required.

The Canadian Hydrographic Service continued to increase its coverage of Electronic Navigational Charts (ENC). Recognized as a major improvement in navigation safety and efficiency, ENCs are quickly becoming a standard on large commercial vessels in Canada and the world.

Multibeam sonar technology has reached a stage where it can be used as a regular tool for mapping the seabed. The Canadian Hydrographic Service, with the support of Natural Resources Canada, is continuing to refine data collection, processing and related software. This technology represents a revolution for hydrographic surveying, ocean exploration and resource management.

A collaborative experiment on field evaluation of bioremediation of oil spills on mudflats was initiated in collaboration with IFREMER (France), AEA (UK) and TNO (The Netherlands).

Facilities

The Fish Laboratory had to be evacuated on short notice when a serious mould condition was discovered. The entire building was sealed off and it took several months to correct the problem. All staff had to be relocated.

Ships

Technology

Meetings, Workshops and Conferences

BIO hosted a meeting of one of the panels of the Ocean Drilling Project. The meeting was held concurrent with a visit of the ODP drill ship to Halifax.

Honours and Awards

The Huntsman Award was presented to Dr. R. Davis of the USA in recognition of his fundamental contributions to the understanding of Lagrangian circulation dynamics, including instrumentation development, observational programs and theoretical studies.

Dr. A.R. Longhurst was presented with the American Society of Limnology and Oceanography (ASLO) Lifetime Achievement Award. [double check year]

Visitors

- His Royal Highness, Prince Phillip chaired a World Wildlife Fund Workshop at BIO on Endangered Species
- The Honourable David Anderson, Minister of the Department of Fisheries and Oceans to participate in the Employee Awards Presentation Ceremonies
- The Honourable Gilbert Normand, MP and Secretary of State for Fisheries & Oceans and Agriculture and Agri Food

Key External Events

Oil production started at Hibernia on the Grand Banks.

Passage of the Canadian Oceans Act Bill C-26.

1998

Organization and People

The Diadromous Fish and Habitat Management Divisions moved from the Maritime Centre to BIO. Mr. Brian Thompson was the new head of Habitat Management.

The Bedford Institute of Oceanography – Oceans Association (BIO-OA) was founded to foster communication, organize events and preserve the history of BIO.

The BIO Gift Shop was established.

Department of Fisheries and Oceans
Maritimes Region

Regional Director-General (N.A. Bellefontaine)

Science Branch (J.S. Loch, Director) (R.E. Lavoie, Assistant Director)

- Aquaculture Division (T.W. Sephton)(located at St. Andrews)
- Canadian Hydrographic Service (Atlantic) (C. Stirling)
- Diadromous Fish Division (J.A. Ritter)
- Habitat Management Division (B.D. Thompson)
- Invertebrate Fisheries Division (E.M.P. Chadwick)(located in the Gulf Fisheries Centre)
- Marine Environmental Sciences Division (P.D. Keizer)
- Marine Fish Division (M.M. Sinclair)
- Ocean Sciences Division (R.A. Clarke)
- Oceans Act Coordination Office (F.G. Scattolon)
- Program Planning and Coordination (R.A. Eisner)
- Regional Advisory Process Office (R.N. O'Boyle)

Finance and Administration Branch (L.M. Thibeau)(located in the Maritime Centre)

- Assets Management Division (M. Chin-Yee) Library Services Division (A.R. Fiander)

Communication Branch (A.-M. Lanteigne)

Informatics Branch (J.E. Doucet) (located in the Maritime Centre)

- Application Services Division (T.H. Wagg) (located in the Maritime Centre)
- Technology Services Division (D.M. Porteous)

Canadian Coast Guard (L.J. Wilson)(CCG Base)

- Marine Programs (J. Calvesbert)(CCG Base)
- Operational Services (M. Cusack (Queen Square)
- Technical Support Services (D. Parkes)(CCG Base)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (J. Verhoef)

- Marine Resources Geoscience (K.D. McAlpine)
- Marine Environmental Geoscience (D. Pickrill)
- Marine Regional Geoscience (M. Williamson)
- Administration (G. McCormack)

Environment Canada

Environmental Protection Branch

- Shell Fish Section (A. Menon)

Department of National Defense

- Route Survey Office

Program

A map of coastal sensitivity was published.

BIO staff participated in the Swissair Flight 111 recovery operation off Peggy's Cove, Nova Scotia.

A helicopter-mounted Video-Laser-GPS system was used to collect video images for different backscatter regions seen in the RADARSAT imagery.

Facilities

Ships

Technology

Meetings, Workshops and Conferences

A BIO Open House, the first in eight years, was held in October.

Honours and Awards

Dr. Trevor Platt was elected to the Fellowship of the Royal Society of London.

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The Huntsman Award was presented to Dr. Paul Falkowski of the USA in recognition of his fundamental contributions to a broad spectrum of ocean sciences, from pico-second molecular biophysics to the billion-year evolution of ocean-atmosphere biogeochemistry.

Visitors

Key External Events

1998 was named the official International Year of the Oceans.

The Swissair Flight 111 crashed off Peggy's Cove.

1999

Organization and People

Dr. Mike Sinclair became the new DFO Science Director. The Oceans and Environment Branch was created and Ms. Faith Scattolon was appointed director. This new organization included the Environmental Sciences Division.

A Maritimes Aquatic Species at Risk Office (MASARO) was formally established at BIO and Dr. John Loch was appointed Manager.

The Centre for Marine Biodiversity was established as a non-profit society with membership from several Department of Fisheries and Oceans laboratories, Dalhousie University and the Atlantic Reference Centre of the Huntsman Marine Science Centre in St. Andrews, New Brunswick. The purpose of the Centre is to embrace scientific capacity in support and protection of marine biodiversity with a focus on the Northwest Atlantic. Dr. Ellen Kenchington was appointed as the Executive Director.

No staff listing available

Program

In partnership with the Nova Scotia Museum of Natural History and the Ecology Action Centre, BIO helped create the Marine Invertebrate Diversity Initiative (MIDI). The goal of MIDI was to increase the understanding of marine invertebrates in the waters of the Scotian Shelf, Bay of Fundy and the Gulf of Maine, specifically to develop an easily accessible database on distribution and ecology.

Special funding was provided for a two-year research program in the Gully to increase knowledge of the oceanography of this unique ecosystem. The Gully, a deep canyon on the slope off eastern Nova Scotia, has been designated as an area of interest for a potential marine protected area (MPA).

Facilities

The buildings at BIO received historical signs describing the origins of their respective names. The Trites Boardroom, named in honour of Dr. Ronald W. Trites who had been a prominent BIO physical oceanographer, was officially dedicated in the presence of his family. DFO Regional Headquarters moved from the Maritimes Centre in Halifax to Marine House in downtown Dartmouth.

Ships

Technology

Meetings, Workshops and Conferences

Environment Canada and the Department of Fisheries and Oceans co-hosted a workshop at BIO to evaluate the potential impacts of fishing activities in northern waters on seabirds.

Honours and Awards

The Huntsman Award was presented to Prof. I.N. McCave of England in recognition of his outstanding contributions to understanding the dynamics of fine sediments in a diversity of marine environments, ranging from the nearshore to the deep sea.

Visitors

- The President of Iceland, Mr. Olafur Ragnar Grimsson and his Minister for the Environment and Nordic Co-operation, Ms. Siv Fridleifsdottir

Key External Events

2000

Organization and People

The Maritimes Region of Fisheries and Oceans established an Aquaculture Coordination Office at BIO which will be the regional focus for the delivery of this commitment to further enhance public and industry confidence in the aquaculture sector.

The SeaMap Office was established at BIO supported by the Department of NationDr. Kate Moran was appointed Project Manager. SeaMap proposed a national program to create a base map for Canada's submerged lands which combined seabed shape, sediment type and plants and animal life.

The office for the Partnership for Ocean Global Observations (POGO) was established at BIO. A major role of POGO was to provide support for deep-ocean research and monitoring activities on a global scale. Dr. Shubha Sathyendranath was the Executive Director.

Fisheries and Oceans Canada
Maritimes Region

Regional Director-General (N. Bellefontaine)

Science Branch (M.M. Sinclair, Director)

- Canadian Hydrographic Service (R. MacDougall)
- Diadromous Fish Division (L. Marshall)
- Invertebrate Fisheries Division (R. Lavoie)
- Marine Fish Division (W. Stobo)
- Ocean Sciences Division (A. Clarke)
    - Biological Oceanography (T. Platt)
    - Coastal Ocean Science (P. Smith)
    - Ocean Circulation (M. Mitchell)
    - Ocean Physics (A. Herman)
    - Technical Operations (D.L. McKeown)
- Martimes Regional Advisory Process (RAP)(R. O'Boyle)
- Maritimes Aquatic Species at Risk Office (J.S. Loch)

Oceans and Environment Branch (F. Scattolon, Director)

- Habitat Management Division (B. Thompson)
- Marine Environmental Sciences Division (P.D. Keizer)
- Oceans and Coastal Management Division (J. Arbour)

Aquaculture Coordination (M. Murphy)

Finance and Administration

- Library (A. Fiander)

- Procurement
- Stores
- Material Services

Communications Branch

Informatics
- Technology Services (S. Gallagher)
- Records (J. Martell)
- Applications (J. O'Neill)

Canadian Coast Guard – Technical Services
- Mechanical and Oceanographic Systems Development (G. Steeves)
- Technical Maintenance (J. Wilson)
- Vessel Support (A. Muise)

Natural Resources Canada

Geological Survey of Canada (Atlantic) J. Verhoef, Director)
- Administration
- Marine Resources Geoscience (D. McAlpine)
- Marine Environmental Geoscience (D. Pickrill)
- Marine Regional Geoscience (M. Williamson)

Department of National Defense
- Route Survey Office (J. Bradford)

Environment Canada
- Shellfish Laboratory (C. Craig)

Public Works and Government Services
- (B. FitzPatrick)

Health Canada
- (M. Brackett)

National Research Council Canada
- (D. Douglas)

Others on the BIO campus included:
- International Ocean Colour Coordinating Group (IOCCG) (V. Stuart)
- Partnership for Observation of the Global Oceans (POGO) (S. Sathyendranath)
- SeaMap (K. Moran)
- Fisherman and Scientists Research Society (FSRS)
- Geoforce Consultants

Program

The Centre for Marine Biodiversity (CMB) was established at BIO in partnership with scientists and students principally from Dalhousie University and the Huntsman Marine Science Centre in St. Andrews, NB.

CHS became world leader in developing electronic navigation charts.

The Last Billion Years, the first modern book written for the general reader on the geological history of the Maritime provinces, was published. The project was conceived, managed and edited by Geological Survey of Canada, Atlantic scientists under the aegis of the Atlantic Geoscience Society.

The SIMBOL Project (Science for the Integrated Management of the Bras d'Or Lakes) was launched in collaboration with Cape Breton First Nations.

Under the umbrella of the new Ocean Act, BIO scientists were leaders in the preparation of a framework for the practical application of ecosystem-based management that was accepted as a national model by DFO. Two other initiatives under the Oceans Act were the Eastern Scotian Shelf Integrated Management (ESSIM) initiative and the evaluation of the Gully as a potential Marine Protected Area.

Several scientists at BIO were funded under the federal Climate Change Action Fund (CCAF) to study the potential impacts of sea level rise on the coastal regions of Atlantic Canada.

SeaMap planning workshops were conducted across Canada and attended by representatives from federal departments, ocean user industries, ocean mapping firms, other service industries, provincial government departments, universities, non-government organizations, and environmental groups.

The federal government has included in its present priorities an increasing role for partnerships in achieving its mandate. To this end, BIO strengthened working relationships with universities in the Maritime Provinces, the First Nations, other federal and provincial agencies, the private sector, and non-government organizations (NGOs).

GSC Atlantic was part of a Canadian consortium in the International Marine Global Change Study (IMAGES) investigating climate records on the Scotian Margin and in the Labrador Sea. These records are used in computer models that forecast long-term climate change in Canada and estimate changes from continued global warming.

GSC Atlantic took part in international meetings to explore collaborative projects involving the Ocean Drilling Program (ODP) and the petroleum industry. Eight proposals to drill on continental margins worldwide were put forward by industry and projects on the Grand Banks and in the Scotian Basin received a high priority. Both

projects would add significantly to the geoscience community's understanding of the history and architecture of the thick, oil-bearing sedimentary deposits along Canada's East Coast.

A Canadian consortium including GSC Atlantic and CHS was awarded a three-year contract to act as the external scientific consultant for a project by the Geological Survey of Ireland to map the offshore region of Ireland. The Canadian consortium designed the mapping survey, provided equipment specifications, and recommend training requirements. The awarding of this consulting contract underscored Canada's excellent capability in offshore mapping.

GSC Atlantic signed a five-year agreement with the Uruguayan Department of Defence under which the two organizations will collaborate and exchange marine geoscience knowledge and information. It is anticipated that this agreement will help Canadian geoscience businesses provide products and services that can support sustainable economic growth in Uruguay's marine sector.

Facilities

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
- C.C.G.S *Hudson*
- C.C.G.S *Parizeau*
- C.C.G.S *Matthew*
- C.C.G.S *J.L. Hart* (based in St. Andrews, NB)
- C.C.G.S *Opilio* (based in Shipigan, NB)
- C.C.G.S *Navicula*
- C.C.G.S *Pandalus III* (based in St. Andrews, NB)

The C.C.G.S *Hudson* completed the first phase of an extensive refit to prolong its working life another seven to ten years.

Shortfalls in funding have resulted in reduced vessel time at sea. Uncertainties made it challenging to plan national contributions to international programs and partnerships with universities or national/zonal initiatives.

Technology

Meetings, Workshops and Conferences

With the Sable Offshore Energy Environmental Effects Monitoring Advisory Group, BIO co-sponsered a highly successful workshop at BIO on Understanding Environmental Effects of Offshore Hydrocarbon Development. It was attended by over 300 people

representing government research laboratories, universities, regulatory agencies, the oil and gas industry, environmental consultants, the fishing industry, First Nations and environmental organizations.

Environment Canada and DFO co-hosted a workshop at BIO to evaluate the potential impacts of fishing activities in northern waters on seabird populations. The results of the workshop are being used to modify Canada's fishing practices in relation to our international sustainability obligations.

The Habitat Management Division of the Oceans and Environment Branch, in partnership with the Halifax Regional Municipality, sponsored and organized a major workshop entitled *Preserving the Environment of the Halifax Harbour*. This involved participants from all municipal, provincial and federal departments with regulatory and scientific responsibilities for Halifax Harbour and its watershed.

An Eastern Scotian Shelf Integrated Management (ESSIM) initiative workshop was held at BIO with major components of the meeting directed towards defining ecosystem objectives of integrated management and discussing monitoring needs for future ocean management activities.

Honours and Awards

Dr. Steve Blasco was made a member of the Order of Canada to honour his contributions to marine geosciences in Canada. This is the first such award made to a BIO scientist.

[check for date when Mike Eaton too]

The Huntsman Award was presented to Dr. W. Jenkins of England in recognition of his important contributions to the development of the tritium-helium dating technique and its application to studies of ocean circulation, mixing and productivity.

The Beluga Award was created by the Bedford Instutute of Oceanography Oceans Association. The first award was presented to Roger Belanger to honour his contributions to BIO over many years through his photographic technology and art.

Visitors

- The Honourable Herb Dhaliwal, Minister of the Department of Fisheries and Oceans
- Mel Cappe, Clerk of the Privy Council
- The Honourable Myra Freeman, Lieutenant-Governor of Nova Scotia
- Dr. Howard Alper, President of the Academy of Science of the Royal Society of Canada.

Key External Events

10/01/2012

The ban on hydrocarbon drilling on the Canadian sector of Georges Bank was extended to 2012.

2001

Organization and People

Department of Fisheries and Oceans
Maritimes Region

Regional Director-General (N.A. Bellefontaine)

Science Branch (M.M. Sinclair, Director)
- Canadian Hydrographic Service (Atlantic)(R. MacDougall)
- Diadromous Fish Division (L. Marshall)
- Invertebrate Fisheries Division (R. Lavoie)
- Marine Fish Division (W. Stobo)
- Ocean Sciences Division (A. Clarke)
    - Biological Oceanography (G. Harrison)
    - Coastal Ocean Science (P. Smith)
    - Ocean Circulation (J. Loder)
    - Ocean Physics (M. Mitchel)
    - Technical Operations (D.L. McKeown)
- Martimes Regional Advisory Process (RAP)(R. O'Boyle)
- Maritimes Aquatic Species at Risk Office (J.S. Loch)

Oceans and Environment Branch (F. Scattolon, Director)
- Habitat Management Division (B. Thompson)
- Marine Environmental Sciences Division (P.D. Keizer)
- Oceans and Coastal Management Division (J. Arbour)

Aquaculture Coordination (M. Murphy)

Finance and Administration
- Library (A. Fiander)
- Procurement (J. Hebert-Sellars)
- Stores

Communications Branch (C. Myers)

Informatics
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- Route Survey Office (J. Bradford)

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- Shelllfish Labortory C. Craig)

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- Partnership for Observation of the Global Oceans (POGO) (S. Sathyendranath)
- SeaMap (G. Rockwell)
- Fisherman and Scientists Research Society (FSRS)
- Geoforce Consultants

Program

As part of a Memorandum of Understanding with Dalhousie University, a DFO Chair in Resource Conservation Genetics was created and initially filled by Dr. Paul Bentzen.

The Canadian Hydrographic Service (CHS) obtained national ISO 9001-2000 certification from the International Organization for Standardization. This achievement was a result of more than two years of effort by CHS, at the national and regional levels, to meet the stringent ISO requirements. The ISO 9000 family of international quality management standards and guidelines has earned a global

reputation as the basis for establishing quality management systems.

A Memorandum of Understanding (MOU) between DFO and the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) was signed. This MOU established a formal process through which DFO and CNSOPB can work together to facilitate and promote the sound management of petroleum activities while protecting the marine environment.

BIO played a leadership role in the federal science and technology community by initiating the Hypatia Project. This project was designed to identify and develop a strategy to reduce the factors limiting the recruitment, participation, and retention of women in science and technology positions.

Facilities

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- C.C.G.S *Pandalus III* (based in St. Andrews, NB)

Technology

Meetings, Workshops and Conferences

BIO held another Open House. The theme was “Open House 2001: A Science Odyssey.”

The Marine Invertebrate Diversity Initiative (MIDI) hosted a workshop at BIO to discuss marine diversity and the use of the MIDI website.

The second Preserving the Environment of Halifax Harbour Workshop was held at BIO. The meeting brought together stakeholders from government, academia, industry and public interest groups to review the state of the Halifax Harbour environment, identify information gaps and recommend action for the preservation and restoration of habitat and aesthetic conditions of the Harbour.

A Coastal Climate Change Impacts and Adaptation (3CIA) Workshop was held at BIO and brought together coastal resource users and scientists from NRCan, DFO, EC, academia and the private sector to explore the potential impacts of climate change on coastal areas in Canada. The workshop focussed on the information and research needs of

coastal communities, including coastal responses to climate change and the formulation of appropriate strategies to cope with adaptation in the face of uncertainty.

The Gully Ecosystem Review meeting was held at BIO to review the results of the diverse studies conducted over the past two years and to provide an integrated view of the area. A roundtable discussion addressed the degree to which recent research has increased our understanding of the physical and ecological boundaries and the connections between ecosystem elements.

Delegates from five continents gathered at Saint Mary's University in Halifax in June for CoastGIS 2001, the fourth international symposium on computer mapping and GIS for coastal zone mapping. GSC Atlantic/Natural Resources Canada played a leading role in the scientific program and logistical organization of the meeting in collaboration with staff from the Department of Fisheries and Oceans, local universities, and the private sector. This was the first time this important meeting of geomatic researchers involved in coastal zone management had been held outside of Europe.

An international *ad hoc* working group meeting on The Northwest Atlantic Ecosystem - A Basin Scale Approach was held in Halifax. The meeting focussed on the ecosystem of the northwest Atlantic and the role of the zooplankton species, *Calanus finmarchicus*, within it. The aim of the meeting was to develop a research plan for the study of the space-time dynamics of *Calanus finmarchicus* and how they are affected by climatic changes in environmental conditions and circulation. Such effects may have implications in food chain dynamics and carbon flux both in the deep ocean and on the continental shelf.

The second meeting of the international joint Scientific Steering Group for the Arctic Climate System Study (ACSYS) and the Climate and Cryosphere (CliC) projects was held at BIO. These are the high latitude climate science programs of the World Climate Research Programme (WCRP).

A workshop on Carbon Storage in the Coastal Zone was held in Halifax. National and international experts developed new research initiatives to describe the export and storage of carbon in the Atlantic Canada Coastal Zone (ACCZ). Given the global importance of the ACCZ in the storage of carbon exported by rivers, the new initiatives were incorporated into a research plan highlighting the importance of Canada's coastal regions in the global carbon cycle.

The third meeting of the Partnership of the Observation of the Global Oceans (POGO) was held at White Point Beach Lodge. The major themes of the meeting were enhancing biological monitoring in the deep oceans and support for fixed deep ocean monitoring stations.

Under the auspices of the Regional Advisory Process (RAP), DFO Science and Oceans and Habitat Branches initiated a three-phase approach to outline how DFO should

manage impacts on the benthic habitat. Phase 1 involved examination of potential classification systems of benthic habitat which led to exploration of a classification system which categorized habitat according to its exposure to physical disturbance and the exposure of organisms living there to physiological stressors.

Honours and Awards

The first BIO-OA Beluga Award was presented to Roger Belanger, a member of the photographic unit from 1966 to 1991.

The Huntsman Award was presented to Dr. D.M. Karl of the USA in recognition of his fundamental contributions to improving understanding of the biochemistry, microbiology and genomics of ocean ecosystems and their role in global processes.

Dr. Steve Blasco was appointed a Member of the Order of Canada.

Dr. Dick Pickrill, Mr. Les Burke, Mr. Dick McDougall, Jim Bradford and Dr. Kate Moran were presented an award by the Nova Scotia Federal Council for their work in implementing the SeaMap initiative and enhancing interdepartmental relationships.

Dr. Donald Gordon was presented the 5NR Science Award to Leaders in Sustainable Development which pays tribute to outstanding contributions by federal scientists in their field. This award recognized the contributions made by Dr. Gordon over his career to understanding marine ecosystems and applying this information to sound management decisions that have affected the sustainability of marine resources.

Visitors

- Paul Kennedy, host of CBC Radio's *Ideas* program, visited BIO to talk with staff about ideas for a radio program titled *Oceans Exploration 2001: Learning from our Oceans.*

Key External Events

2002

This year marked the 40th anniversary of BIO. The annual report was dedicated to Dr. William van Steenburgh, Dr. William Cameron, Dr. William English and Dr. William L. Ford, the four Bills who were instrumental in founding and bringing BIO to the forefront as a world-class scientific Institute.

Organization and People

The DFO National Centre for Offshore Oil and Gas Environmental Research (COOGER) was established at BIO in November 2002 to facilitate the development of coordinated research programs in areas of marine environmental and oceanographic research related to oil and gas activities and DFO mandates. Dr. Ken Lee was appointed executive director. The Centre will provide a focus for research activities on offshore oil and gas in DFO as well as a single point of contact for external agencies and the industry.

The Marine Environmental Sciences Division moved back into the Science Branch. The Hypatia Project was launched under the lead of Dr. S. Nevin.

Defence Research Establishment Atlantic was renamed Defence Research and Development Canada Atlantic.

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- Maritimes Species at Risk Office (J. Loch)
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Hypatia Project (S. Niven)

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- Dartmouth Technical Workshop (P. Mckiel)

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- Fisherman and Scientists Research Society (FSRS)
- Centre for Marine Biodiversity
- Geoforce Consultants

Program

Natural Resources Canada (NRCan) established the office of the Climate Change Impacts and Adaptation Research Network Coastal Node at BIO. The office supports coastal research in Atlantic Canada that contributes to Canada's climate change program.

DFO's Aquaculture Policy Framework (APF) was announced. This framework orients DFO around a common vision for marine and freshwater aquaculture in Canada and provides guidance to employees in their daily regulatory and program decisions. The Aquaculture Coordination Office is leading a multi-disciplinary exercise to implement the principles of the APF within the Maritimes Region that is expected to be finalized in March 2003.

BIO scientists participated in a major international expedition in the Nordic Seas on board the Swedish icebreaker IB *Oden* as part of a major two-ship survey in the general region where major deep water masses are formed, and a region crucial to the thermohaline circulation system. IB *Oden* surveyed the ice-covered areas while the US RV *Knorr* surveyed ice-free areas in the same region.

The Honourable Robert G. Thibault and the Honourable Ernest Fage signed a renewed Canada/Nova Scotia Memorandum of Understanding (MOU) on aquaculture development. The renewed MOU enables both the federal and provincial governments to continue working together on the environmental management of the aquaculture industry in Nova Scotia.

In June, a new field study began to take multi-year moored measurements of the Labrador Current and other currents in Flemish Pass off the northeast Grand Bank. This work was part of the Ocean Climate and Variability Research Program and is jointly funded through the federal Panel on Energy Research and Development (PERD) and collaborative agreements with three oil companies.

Canada's Oceans Strategy (COS), the federal government's policy statement for ocean management in Canada, was released. Based on the authority and direction set out in the *Oceans Act*, COS defines the vision, principles, and policy objectives for the future management of Canada's estuarine, coastal, and marine ecosystems. It called for ocean governance that emphasized collaboration with all levels of government, shared responsibilities for common objectives and engaging Canadians in

oceans-related decisions.

An Oyster Spat Experimental Project in the Bras d'Or Lakes, N.S. began. The project involves the collection and harvesting of American oyster spat/seed from a contaminated/closed area. The objectives were to determine the success of such a collection area, and the volume and size of the seed from a closed/contaminated area. The experience and contacts developed under this project were expected to be invaluable in the efforts to respond to the oyster disease MSX.

DFO announced a project to create a detailed atlas of fish-spawning areas on the Scotian Shelf off the Atlantic coast of Nova Scotia. Through this project, DFO will indicate the time of year when spawning occurs, and map spawning areas, key nursery areas, and locations of larval concentrations of commercial finfish and shellfish. The project stems from increased petroleum exploration activity off Nova Scotia and will be useful to scientists, managers, regulators, industry, consultants, and fishermen in identifying potentially harmful environmental effects from exploration activities.

BIO, the Institute of Marine Biosciences of the National Research Council of Canada, the Biological Station in St. Andrews and the Gulf Fisheries Centre in Moncton signed an MOU to enhance collaborative research on mariculture and biotechnology among the four laboratories.

Environment Canada obtained a new mobile microbiology lab for the Shellfish Section at BIO. This lab, used throughout the Maritime Provinces, enables Environment Canada to sample the water quality for aquaculture and shellfish harvesting sites along coastal waters. The mobile lab complements the work conducted by the labs at BIO and the University of Moncton.

A BIO history project was begun to record the recollections of early staff in an attempt to capture the flavour of the BIO experience and document contributions to science and Canadian society. Interviews were held and transcripts prepared and archived in the BIO Library. This project was conducted in preparation for the 50th anniversary of the BIO in 2012.

Facilities

The new Needler Boardroom was dedicated in honour of Dr. George Needler, a physical oceanographer and science manager who spent most of his career at BIO.

Using energy efficient technology, a new cooling plant was constructed which utilizes cold Bedford Basin water pumped from 30 meter depth. At the same time, the BIO heating plant was modernized in order to reduce greenhouse emissions.

Ships

BIO now had following research vessels operated by the Canadian Coast Guard available for field programs:
• CCGS *Alfred Needler*, a 50m offshore fisheries research trawler;
• CCGS *Hudson*, a 90m offshore research and survey vessel;
• CCGS *Matthew*, a 50m coastal research and survey vessel;
• CCGS *J.L.Hart*, a 20m inshore research vessel;
• CCGS *Navicula*, a 20m inshore research vessel;
• CCGS *Pandalus III*, a 13m inshore research vessel.

In addition, BIO scientists were also able to use vessels of opportunity such as federal government buoy tenders and icebreakers, commercial fishing and survey vessels, and research vessels of other countries.

During the winter of 2001/2002, CCGS *Hudson* completed the final phase of an extensive refit to prolong its working life for another seven to ten years.

Technology

Meetings, Workshops and Conferences

On the occasion of the 40th anniversary of BIO, Fisheries and Oceans Canada and Natural Resources Canada hosted a special two-day symposium on the *Future Challenges for Marine Sciences in Canada*. Twelve speakers were invited to address diverse oceanographic research topics surrounding the future challenges and adventures in oceanographic research. The dates chosen corresponded exactly to the 40th anniversary of the opening of BIO in 1962. The symposium was opened by Peter Harrison (Deputy Minister, DFO) and Susan Till (Associate ADM, NRCan). Opening remarks were provided by Bosko Loncarevic who provided personal reflections on the achievements of BIO over the last 40 years and thoughts on the future. He also reminded us of the important role of four founders of this Institution, the four Bills. These were Bill van Steenburgh, Bill Cameron, Bill English and Bill Ford. Closing remarks were provided by Robert Fournier.

Symphony Nova Scotia performed a special concert to celebrate the 40th anniversary in the BIO Auditorium.

A workshop on Environmental Studies for Sustainable Aquaculture (ESSA) was held at BIO between ESSA science staff and members of the National Habitat Management Working Group on Aquaculture. Physical circulation models, new chemical and biological methods, environmental data, and habitat management questions relevant to predicting potential far-field environmental effects of salmon aquaculture were reviewed. Near-field impacts and recovery and evaluation of potential effects of toxic chemicals used in the aquaculture industry were also presented.

The second session of the 4th Annual Northwest Atlantic Herring Acoustic Workshop was held at BIO. This international workshop brought together fisheries researchers and

industry representatives with an ongoing involvement in the application of hydroacoustic techniques to herring stock assessment and management on the east coasts of Canada and the USA. The workshop allowed Canadian and American researchers to compare techniques and experiences in hydroacoustic assessment at a detailed technical level. It also afforded useful information exchanges between hydroacoustic equipment manufacturers and end-users.

The first workshop on the Eastern Scotian Shelf Integrated Management (ESSIM) Forum took place at Mount St. Vincent University. This meeting was organized by DFO's Oceans and Coastal Management Division for the purpose of initiating multi-stakeholder dialogue on integrated oceans management. The workshop objectives were to promote sectoral and cross-sectoral dialogue and capacity-building for integrated oceans management and planning and to discuss key elements of the initiative, including vision, objectives, and outcomes, a collaborative management and planning process and the future integrated oceans management plan.

The Centre for Marine Biodiversity (CMB) held a workshop on Canadian Marine Biodiversity at White Point Beach Lodge that was co-funded by DFO and the Census of Marine Life. Experts gathered from across Canada, the United States, and Europe to discuss current state of knowledge of marine biodiversity in Canada's three oceans. The deliberations were comprehensive and ranged from the manner in which historical patterns set the marine biodiversity stage in Canadian waters, the extent to which we know and do not know the true biological diversity of our oceans, to modern forces and processes affecting present day diversity. The workshop also discussed the urgent need to develop and implement effective plans for the conservation of Canada's marine biodiversity.

Environment Canada (EC) hosted the Ecological Risk Assessment Workshop at BIO. Case studies of how risk assessment has been applied to situations in the Atlantic Region were reviewed.

A Gulf of Maine Sewage Workshop took place at BIO. More than 110 individuals from nine jurisdictions attended the two-day meeting that focused on funding mechanisms, public education, regulation and enforcement and ecosystem health.

Natural Resources Canada and DFO organized a seminar at BIO to inform Canadian technology companies and researchers about opportunities for partnering with counterparts in the European Union.

Natural Resources Canada held a workshop to outline directions for the new Geoscience for Ocean Management Program. Staff from NRCan across Canada, as well as clients from other federal departments, the private sector, universities,
and the provinces attended.

A two-day professional development workshop on *Communicating Science* was held at BIO. Science, public relations, and journalism students from Dalhousie University,

Mount St. Vincent University, University of Kings College, and the College of the North Atlantic attended.

Honours and Awards

The BIO-OA Beluga Award was presented to Peter Vass of the Marine Environmental Sciences Division.

The Huntsman Award was presented to Dr. D.W. Forsyth of the USA in recognition of his outstanding contributions to understanding oceanic crustal structure and mantle dynamics.

Dr. Allyn Clarke was awarded the J.P. Tully Medal in Oceanography by the Canadian Meteorological and Oceanographic Society for his outstanding commitment to Canadian oceanography, his pioneering work on deep convection in the Labrador Sea and his national and international leadership in ocean and climate scientific research.

Dr. Allyn Clarke received an *Editor's Citation for Excellence in Reviewing* by the American Geophysical Union at their spring meeting in 2002. This award was presented on behalf of the editorial board of the Journal of Geophysical Research-Oceans.

Dr. René Lavoie received the Honorary Lifetime Achievement Award from the Aquaculture Association of Canada (AAC) at their Annual General Meeting in Charlottetown, P.E.I.

Visitors

- Dr. Wendy Watson-Wright, ADM Science, to discuss NRCan/DFO joint priorities and brief staff on the view from Ottawa
- The Indonesian Ambassador to Canada and an Indonesian delegation of senior officials
- The Honourable David Anderson, Minister of the Environment, to address provide background information on the science of climate change, social, and environmental information about predicted impacts of climate change in Atlantic Canada and a summary of the Government of Canada's strategy for meeting the climate change challenges.
- Dr. David Suzuki
- A 14-member Chinese delegation led by Mr. Wang Yanliang, President of the Chinese Academy of Fishery Science
- Dr. Peter Harrison, Deputy Minister of Fisheries and Oceans Canada, to discuss the peer review process of scientific advice and the manner in which horizontal research issues among departments are managed.

- The Honourable Herb Dhaliwal, Minister of Natural Resources Canada, to officially open the Climate Change Impacts and Adaptation Research Network office administered by NRCan.

- Mr. George Anderson, NRCan's newly appointed Deputy Minister
- Dr. Jean-Francois Minster, President of the Institut français de recherche pour l'exploitation de la mer (IFREMER) in France, as part of an IFREMER senior management team and gave a seminar on European marine research of relevance to climate change.
- Mr. Jean-Claude Bouchard, the new Associate Deputy Minster of Fisheries and Oceans Canada
- The Honourable Robert G. Thibault, Minister of Fisheries and Oceans Canada

Key External Events

United Nations Convention on the Law of the Sea (UNCLOS) was ratified by Canada.

2003

On September 29, Hurricane Juan made a direct and brutal hit on Halifax. Damage caused by the high winds and uprooted trees created havoc in transportation and electrical power transmission. Fortunately, damage to the Bedford Institute of Oceanography (BIO) campus was minor, but the facility was closed for six working days due to a downed power pole. The emergency brought out the best in BIO staff. During the difficult post-hurricane period, the DND Route Survey Office worked on the clean-up of the grounds, the DFO Technology Services Division did an excellent job sustaining their informatics system, and commissionaires and Public Works and Government Services Canada employees calmly and competently maintained the buildings and their security.

Organization and People

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    - Ocean Physics (M. Mitchel)
- Marine Environmental Sciences Division (P.D. Keizer)
- Martimes Provinces Regional Advisory Process (RAP)/Outreach (R. O'Boyle)
- Species at Risk Coordination Office

Oceans and Environment Branch (F. Scattolon/C.A. Rose, Director)
- Habitat Management Division (P. Boudreau)
- Oceans and Coastal Management Division (J. Arbour)

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Hypatia Project (S. Niven)

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- Material Services (Stores)

Communications Branch (C. Myers)

Informatics
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- Client Services (S. Gallagher)
- Application Services (J. Gale)
- Special Projects (J. O'Neill)
- Library (A. Fiander)
- Records (J. Martell)

Canadian Coast Guard – Technical Services
- Systems Engineering Group (G. Steeves)
- Marine Electronics (J. Wilson)
- Vessel Support (A. Muise)
- Marine Aids and Maintenance (P. Nelson)
- Dartmouth Technical Workshop (P. Mckiel)

Canadian Coast Guard – Operational Services (M. Brackett)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (J. Verhoef, Director)
- Administration (G. McCormack)
- Marine Resources Geoscience (M. Williamson)
- Marine Environmental Geoscience (D. Pickrill)

Department of National Defence
- Route Survey Offfice (R. Smith)

Environment Canada
- Shellfish Labortory (C. Craig)

Public Works and Government Services
- (L. Lohnes)

National Research Council Canada
- (D. Douglas)

Others on campus include:
- International Ocean Colour Coordinating Group (IOCCG) (V. Stuart)
- Partnership for Observation of the Global Oceans (POGO) (S. Sathyendranath)
- Fisherman and Scientists Research Society (FSRS)
- Geoforce Consultants

<u>Program</u>

The State of the Ecosystem for the Eastern Scotian Shelf report was published. This innovative report provides a synthesis of oceanographic, ecological, and ocean use trends over several decades. It provided the background information for the development of an integrated management plan to harmonize conduct of different ocean uses such as fishing, oil and gas developments, and transportation.

A national plan on marine biodiversity was developed from the deliberations arising from a national workshop and follow-up meetings. The plan, entitled *Three Oceans of Biodiversity, A Canadian National Plan 2004-2009,* provided guidance on inventory, monitoring, and research on marine biodiversity in support of Canada's commitment to the Convention on Biological Diversity.

As part of the DFO Geoconnections Program, the Marine Fish Division (MFD) took the lead in development of an integrated taxonomic information system for BIO. It has been used to develop an authoritative species list for the MFD trawl survey and ichthyoplankton data sets. The system also will be useful in validating scientific names against internationally accepted standards and in the provision of full taxonomic hierarchies.

The MFD developed an electronic atlas for ichthyoplankton on the Scotian Shelf of North America (EAISSNA). The EAISSNA database contains authoritative information on location and time of spawning, and abundance and distribution of eggs and larvae of marine fish on the Scotian Shelf, and it is intended for use in environmental assessment and management activities associated with offshore hydrocarbon development and production and ocean management.

The Ocean Sciences Division (OSD) collaborated with Dalhousie University and Environment Canada in a new three-year project on Interdisciplinary Marine Environmental Prediction in the Atlantic Coastal Region, funded in part through the Canadian Foundation for Climate and Atmospheric Sciences. The project involves an atmosphere-ocean observing system in Lunenburg Bay and predictive models for the atmosphere, ocean circulation and biology and waves.

The OSD is collaborating in two new programs related to improved observation and prediction of marine winds and waves. One is a joint initiative with Environment Canada, NRCan, the National Research Council, Defence Research and Development Canada, and Dalhousie and McGill Universities, to collect and analyze offshore wind and wave data during extra-tropical storms in order to help improve their forecasting. The second program is a joint initiative with Environment Canada, partly funded by the Canadian Space Agency, to develop methodologies for estimating marine wind fields from two types of satellite radar data for use in validating numerical weather prediction models.

Fifteen autonomous floats for profiling the ocean were deployed in the Labrador Sea and western North Atlantic, completing the three-year deployment of floats under the

international Argo program. A total of 78 floats supplied by Canada, France, Germany, United Kingdom and the United States are returning temperature/salinity profiles down to 2000 m every ten days to an international data centre and various ocean modelling groups.

The OSD is participating in an interdepartmental initiative to develop a Federal Climate Change Science Plan. Environment Canada is the lead department on this project intended to lay out a common, integrated approach for all federal departments and agencies involved in climate change science to ensure that the Canadian Government has the knowledge and tools to make informed policy and program decisions on climate change actions.

A complementary interdepartmental planning exercise with OSD participation is connected to an international initiative by the *ad hoc* Group on Earth Observations (GEO) to develop a global observing system. DFO's primary contributions to this project lie in determining the appropriate scales and accuracies of ocean measurements required for management of marine ecosystems, the prevention or mitigation of marine hazards and disasters and the monitoring of ocean climate.

The Oceans and Coastal Management Division (OCMD) co-led, with DFO Aboriginal Affairs, the regional development and implementation of the Aboriginal Aquatic Resource and Oceans Management (AAROM) program. The program is intended to assist Aboriginal groups acquire the capacity to successfully manage their resource activities and to participate more effectively in the processes used by DFO for aquatic resources and oceans management. The Unama'ki Institute of Natural Resources (UINR), representing the five Cape Breton First Nations bands, has been involved in developing, with a number of DFO sectors, a management plan for the Bras d'Or Lakes watershed.

A Joint Project Agreement (JPA) was made between the Centre for Offshore Oil and Gas Environmental Research (COOGER) and the US Environmental Protection Agency, the University of Cincinnati, and Temple University to build an experimental wave tank facility at BIO. The test system will have the capability to replicate physical oceanographic parameters including breaking waves, with initial studies focused on the influence of wave energy on the efficacy of chemical oil dispersants.

NRCan's Targeted Geoscience Initiative (TGI), in partnership with provincial and territorial agencies, industry and academia helps stimulate sustainable economic development across Canada by increasing the level and effectiveness of private sector exploration for energy and mineral resources. Initially funded for three years in 2000, TGI has been extended for two additional years. The first phase was devoted to minerals geoscience whereas the extension will focus on energy-oriented projects.

In collaboration with the Nova Scotia Department of Energy, Petroleum Research Atlantic Canada and Marathon Canada, COOGER began a program to investigate sound from seismic surveys and its impact on the behaviour of marine mammals.

A JPA with Corridor Resources Inc. supported an experiment addressing seismic impacts on snow crabs off the western coast of Cape Breton, Nova Scotia. The project, which was coordinated by COOGER at BIO, used Corridor's environmental effects monitoring workshop as a springboard to more fully investigate potential physical and reproductive effects in invertebrates.

The Canadian Hydrographic Service (CHS) initiated Remote Sensing Shoreline for Northern Labrador, a three-year project supported by the New Search and Rescue Initiatives Fund (NIF) that addresses the serious lack of up-to-date coastal information on CHS charts, particularly from Nain, Labrador north to the Button Islands. The objective is to collect shoreline information and provide it on provisional charts to improve search and rescue capability and reduce risk to mariners and the environment.

DFO Maritimes Region and the Atlantic Coastal Action's Program Clean Annapolis River Project signed a JPA with the intent to work together toward conservation, stewardship, outreach, education, and management of aquatic ecosystems in the Annapolis River Watershed Area for the benefit of present and future generations of citizens and coastal communities.

ACO personnel contined to work with the provinces of Nova Scotia and New Brunswick to pursue improvements in the marine aquaculture site review process. The main thrust of the strategy is to harmonize information requirements and eliminate duplication of the reviewing parties at both levels of government, with the objective of expediting marine aquaculture site reviews while ensuring all concerns, including environmental, are addressed. The ACO also participated in the development of the national policy for access to wild aquatic resources as it applies to aquaculture, and developed a logic model and performance measurement system that links the departmental Aquaculture Policy Framework objectives with program delivery activities within the department.

The Library published three issues of a new electronic newsletter. *The BIO Library Newsletter* highlights many of the information resources available in the library, provides updates on the services the library currently provides, and informs library users of special projects library staff have undertaken. Also, projects have been initiated to create an online bibliography of all publications written by BIO staff and to digitize all BIO reports.

A reef of the deep-water coral *Lophelia pertusa* was discovered by the CSS *Hudson* using Campod at the Stone Fence in the Laurentian Channel while Halifax was being pounded by Hurrican Juan. While specimens had been collected previously by fishermen, this was the first time that *Lophelia* was directly observed in Atlantic Canada.

Facilities

Renovations started on the north end of the Vulcan Building. Planning was underway for the new laboratory building to meet Level II bio-safety standards. Preparations were also underway for the complete renovation of the van Steenburgh Building.

Ships

Researchers at BIO continued to utilize the following research vessels operated by the Canadian Coast Guard:

CCGS *Alfred Needler*, a 50 m offshore fisheries research trawler
CCGS *Hudson*, a 90 m offshore research and survey vessel
CCGS *Matthew*, a 50 m coastal research and survey vessel
CCGS *J.L. Hart*, a 20 m inshore research vessel (based in St. Andrews, NB)
CCGS *Navicula*, a 20 m inshore research vessel

In addition, scientists at BIO sometimes conduct field programs on other regions' research vessels, vessels of opportunity such as federal government buoy tenders and icebreakers, commercial fishing and survey vessels and research vessels of other countries.

A fire on the CCGS *Needler* in September 2003 caused extensive damage. Major repairs were needed and she was removed from service for the rest of the year.

Technology

Meetings, Workshops and Conferences

The Workshop to draft the Regional Action Plan implementing the new (2002) Aquaculture Policy Framework (APF) was held at BIO with key personnel from most sectors of DFO Maritimes and the Office of Sustainable Aquaculture in Ottawa attending.

The second Eastern Scotian Shelf Integrated Management (ESSIM) Forum was held at Mount St. Vincent University in Halifax. The Forum was organized by the Oceans and Coastal Management Division and NRCan with the assistance of a multi-sectoral planning team. The purpose was to promote cross-sectoral dialogue and capacity building for integrated ocean management and planning, and to discuss key elements of the paper, *A Strategic Planning Framework for the Eastern Scotian Shelf Ocean Management Plan*.

A workshop on Objectives Based Fisheries Management (OBFM) was held in Halifax. Thirty-one participants represented stakeholders of the inshore scallop resource including fishermen, federal and provincial governments, Aboriginal communities, and NGOs. OBFM is a DFO joint Science and Fisheries Management initiative. The Bay of Fundy scallop fishery is one of two pilot projects in Scotia-Fundy designed to implement the OBFM concept. OBFM is the first nationally coordinated attempt to implement the precautionary approach to Canadian fisheries.

The BIO Library organized a workshop for the local library/archives community.

The Offshore Oil and Gas Environmental Effects Monitoring (EEM) Workshop: Approaches and Technologies was hosted by COOGER at BIO. The workshop provided a forum for sharing international knowledge and experiences and to address whether environmental effects monitoring programs are providing the necessary information, and how they might be improved.

The joint meeting of the Canadian Quaternary Association (CANQUA) and the Canadian Geomorphological Research Group (CGRG) was held at BIO and Dalhousie University and attracted 130 scientists from Canada, the United States, Europe, and Asia.

The Fourth International Conference on Arctic Margins (ICAM) was hosted by NRCan at BIO.

COOGER hosted an Oil Dispersant Research Planning Workshop at BIO. Participants identified the scientific information required to improve decision-making, operations, planning, and environmental analysis and emerging issues related to chemical oil dispersant use. Participants came from the DFO regions of Maritimes, Gulf, Newfoundland, and Quebec; Queens University; and France's Centre de documentation de recherche et d'expérimentations sur les pollutions accidentelles des eaux.

The Centre for Marine Biodiversity (CMB) held a workshop on data management challenges in support of biodiversity inventories, monitoring, and research.

Ten departments were represented at a workshop for the Science Opportunities System (SOS) held at BIO. A branch of the Career Opportunities System, SOS is aimed at providing learning and career opportunities for S&T leaders and workers. An initiative of the National S&T Secretariat in Ottawa, the workshop's purpose was to design the SOS pilot project which will come into effect in the Halifax area in 2004, with the goal of implementing the system at the national level.

Honours and Awards

The BIO-OA Beluga Award was presented to Arthur Cosgrove, head of DFO's drafting and illustrations group.

The Huntsman Award was presented to Dr. L.D. Talley of the USA in recognition of her outstanding contributions to the description and understanding of the circulation and ventilation of the global ocean.

On December 14, the Gulf of Maine Council Visionary Award for Nova Scotia was presented to Dr. Kenneth H. Mann for his outstanding contribution to the understanding of the coastal ecosytems of the northwest Atlantic Ocean.

Dr. Graham Williams was the winner of the Atlantic Provinces Council on the Sciences

(APICS)/Canpolar Sciences Communications Award in recognition of his record in science awareness efforts. He was a leading force in the publication of *The Last Billion Years: a Geological History of the Maritime Provinces.*

Visitors

- Mr. Larry Murray, DFO Deputy Minister
- Mr. Jorgen Holinquist, Science Director-General with the European Union
- The Honourable Robert Thibault, Minister of Fisheries and Oceans
- Mr. Fan Fengxin, Mr. Chen Changan, and Mr. Wang Weiyuan from the Chinese Academy of Science
- Seven government leaders from Nigeria to learn about the science knowledge necessary for supporting their UNCLOS claim

The sailing vessel *Sedna* visited BIO. From its home port of Cap-aux-Meules, Quebec, the 51-meter, three-masted, steel-hulled sailing vessel was on a mission to produce a five episode National Film Board television series on the Arctic and Climate Change for *The Nature of Things*.

Key External Events

2004

Organization and People

A United Nations Convention on the Law of the Sea (UNCLOS) office was established at BIO to support the preparation of the necessary technical material for Canada's claim for extended jurisdiction.

The Systems Engineering Section moved from the Coast Guard back to the Science Branch and incorporated into the Ocean Sciences Division.

Department of Fisheries and Oceans
Maritimes Region

Regional Director-General (N.A. Bellefontaine)

Science Branch (M.M. Sinclair, Director)
- Program Planning and Coordination (J. O'Neill)
- Canadian Hydrographic Service (Atlantic)(R. MacDougall)
- Diadromous Fish Division (L. Marshall)
- Invertebrate Fisheries Division (R. Lavoie)
- Centre for Marine Biodiversity (E. Kenchington)
- Marine Fish Division (W. Stobo)
- Ocean Sciences Division (P. Smith)
    - Biological Oceanography (G. Harrison)
    - Coastal Ocean Science (S. Prisenberg)
    - Ocean Circulation (J. Loder)
    - Ocean Physics (M. Mitchel)
    - Systems Engineering (G. Steeves)
- Marine Environmental Sciences Division (P.D. Keizer)
- Martimes Provinces Regional Advisory Process (RAP)/Outreach (R. O'Boyle)
- Species at Risk Office Coordination Office

Oceans and Habitat Branch (F. Scattolon/C.A. Rose, Director)
- Habitat Management Division (P. Boudreau)
- Oceans and Coastal Management Division (J. Arbour)

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- Geoforce Consultants Ltd.

<u>Program</u>

The Gully, a unique canyon on the slope of the eastern Scotian Shelf, was declared a marine protected area (MPA), the first in Atlantic Canada. This designation provides enhanced conservation for this diverse and important ecosystem.

As part of the global humanitarian response to the catastrophic tsunami off Indonesia, BIO staff provided technical and scientific assistance on such issues as early warning systems and coastal erosion.

NRCan/Geological Survey of Canada (GSC) and DFO/Canadian Hydrographic Service (CHS) initiated a mapping and surveying program to collect new data in support for Canada to submit a claim under UNCLOS for territory outside the existing 200 nautical mile exclusive economic zone. A successful claim would enhance Canadian control over this area and any possible mineral and hydrocarbon resources.

The Oceans Action Plan (OAP) was announced. The OAP articulates a government-wide approach and serves as the framework to seize opportunities for sustainable development of our oceans. BIO staff will have significant involvement in the OAP as NRCan and the CHS undertake seabed mapping to increase scientific understanding of the physical environment and associated habitats in support of integrated management planning and the identification of marine areas in need of protection.

A national plan for research on marine biodiversity, entitled *Three Oceans of Biodiversity*, was developed by the Centre of Marine Biodiversity (CMB). This plan outlined Canada's potential contribution to the global international initiative on marine biodiversity known at the *International Census of Marine Life (ICoML)*.

OSD completed the field phase of a continental slope moored-measurement program for currents and water-mass variability on the Halifax Line across the Scotian Slope. Current meter moorings were successfully recovered from three sites, providing multi-year time series going back to June 2000.

Experiments began at the new oil-spill-dispersant wave tank at BIO. Controlled studies with the wave tank will provide scientifically-based advice for the development of oil dispersant use guidelines. This research program will bring together experts from universities, other government departments and the offshore petroleum industry.

The Oceans and Habitat Branch, working with the fishing industry and the Resource Management and Science branches of DFO, created a 15 km^2 Coral Conservation Area n the Laurentian Channel to protect the *Lophelia* reef discovered last year from further damage from bottom-impacting fishing gear.

The Gully Seismic Research Program investigated the potential impacts of seismic sound on marine mammals along the Scotian Shelf, including the northern bottlenose whale, a species at risk living in The Gully MPA. The project was conducted in collaboration with industry and academic sectors. By monitoring operational seismic surveys, the project provided essential data to validate and improve sound propagation models used in environmental assessments.

The CCGS *Hudson* launched the 1500th profiling float in support of the International Argo Program. This achievement marked the launch of half of the planned global array

of 3000 profiling floats. For the first time, temperature and salinity profiles of the upper 2000 metres of the ocean are being observed in real time every 10 days. The profiling float, based on a French design, was built by Metocean, a Dartmouth ocean instrument manufacturer.

An interregional, interdepartmental group of scientists from DFO, Environment Canada, National Defence and academia spent almost a year planning the development of a national environmental forecast system to provide a foundation for integrated ocean management and the safe and efficient use of Canada's oceans. The incremental approach comprises two linked streams for ocean forecasting: a basin/global stream to predict conditions in the major ocean basins adjoining Canada, and a nested regional stream, dedicated to forecasting in regional shelf seas and inland waters, including biogeochemical and ecosystem applications. It is anticipated that the final, fully validated coupled ocean-ice-atmosphere forecast system will be linked to global data streams produced by the Canadian Group on Earth Observations System of Systems.

MFD's Shark Research Program prepared the first comprehensive analyses of the status of blue and shortfin mako sharks in the Canadian Atlantic Ocean. These analyses became part of an international effort coordinated by the International Commission for the Conservation of Atlantic Tunas (ICCAT) to determine the population health of large sharks in the North Atlantic. The Canadian results indicated that the blue shark population has declined by about 50% over the last ten years.

A collaborative field study between OSD and Swedish scientists indicated that the freshwater export in the East Greenland Current flowing from the Arctic Ocean is confined close to the Greenland coast. It is apparent that the fresh water is not easily transported to the region of deep convection in the Greenland Sea where it could impact the global thermohaline circulation, potentially creating entirely different climate regimes in North America and Europe. It appears that sea ice is the main source of fresh water to the convection region.

Facilities

Work was initiated on the final phase of reconstruction of the Vulcan Building and construction of the Level 2 laboratory building was started. This facility will house all of the laboratory work carried out at BIO and will result in an improved working environment for staff.

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
- C.C.G.S *Hudson*
- C.C.G.S *Matthew*
- C.C.G.S *J.L. Hart* (based in St. Andrews, NB)

This was a difficult year for the aging research fleet and there was considerable loss of programs due to breakdowns and last year's fire on the *Needler*. Modern, well-equipped and well-maintained research ships are a crucial requirement for a robust ocean science program at BIO. The issue of a modern research fleet is an important challenge facing BIO. The Canadian Coast Guard has prepared a long-term plan for fleet renewal, including the scientific research and monitoring component.

Technology

Meetings, Workshops and Conferences

Under the auspices of the Regional Advisory Process (RAP), DFO Science and Oceans and Habitat Branches, two workshops were held at BIO which addressed Phase 2 of the benthic habitat classification project. At the first, a classification of the benthic communities of the Scotian Shelf, based on the Southwood model, was presented and discussed by federal and provincial scientists, industry and NGOs. This approach brings together information on geology, oceanography, and benthic ecology. The second workshop further explored the concepts and application of the model to the Scotian Shelf. This work is considered innovative and very promising in its capacity to provide a scientific basis for the management of benthic ecosystems.

The first planning meeting for the *Gulf of Maine MarineBiodiversity Corridor of Discovery*, an initiative of BIO's Centre of Marine Biodiversity (CMB) which will involve several BIO staff in coming years, was held at the St. Andrews Biological Station (SABS). A Corridor of Discovery is tentatively defined as a swath of bottom and the water column above it, encompassing a variety of ecologically interlinked seascapes/habitats that may support a range of biodiversity and may contain previously unknown species and processes. The CMB has articulated a conceptual framework to define the scope of biodiversity study with the objective of undertaking, within five to ten years, as complete an inventory as possible of species and seascapes within a "proof of concept" corridor. Such an initiative would provide a focus for additional objectives, including: critical training in systematics, biodiversity education, and outreach (including data sharing), and a monitoring program related to long-term change. The Gulf of Maine was chosen for the pilot because of international, trans-boundary involvement; the variety of biogeographic regions, diverse habitats, and gradients; access to deep-water habitats relatively close to shore; and inclusion of both well- and poorly-known areas.

The workshop, Environmental Studies for Sustainable Aquaculture, was held at BIO. The workshop marked the completion of a three-year project that involved scientists from three DFO regions at study sites associated with concentrations of aquaculture activity—Baie d'Espoir (Newfoundland and Labrador); Letang Inlet (New Brunswick); and the Broughton Archipelago (British Columbia). Led by Maritimes Region scientists, the project evaluated the bay-wide impacts of extensive salmon aquaculture on environmental quality. The research results will be used to assist the industry in

evaluating management options and DFO Habitat Management in monitoring and regulating the industry.

NRCan hosted the Geoscience for Ocean Management (GOM) Workshop at BIO to present an overview of current work in the program, to solicit feedback from stakeholders and to identify both emerging and lower priority issues. The 125 attendees included representatives from other government departments, industry, and academia. The meeting identified new opportunities that will be pursued to strengthen the program as it evolves.

The DFO Oceans and Coastal Management Division (OCMD) hosted the Junior Shorekeepers Workshop at BIO. The workshop provided a group of 15 local teachers, NGO representatives, and government employees, with training on local habitats, intertidal species, physical measurement techniques, and conducting surveys. In the Halifax area, several surveys by school and university students were completed between June and August.

More than 25 delegates representing 12 member countries of the International Council for the Exploration of the Sea (ICES) Working Group on North Atlantic Salmon (WGNAS) met at BIO. The WGNAS meets annually to address questions relating to the status of Atlantic salmon in the North American, North-east Atlantic and West Greenland Commission areas.

A Canada-United States meeting to discuss mitigation for acid rain impacts on Atlantic salmon and their habitat was held at St. Andrews, New Brunswick under the aegis of the BIO-based Diadromous Fish Division and the Atlantic Salmon Federation. This workshop was held in response to increasing interest by stakeholders and the governments of Canada and the United States in considering jointly the causes, effects and mitigation options for acid rain.

The second SIMBOL (Science for Integrated Management of the Bras d'Or Lakes) Progress Review was held in Whycocomagh. BIO staff from Coastal Ocean Science played a lead role at the workshop. Since the 2001 Progress Review, much has been accomplished by DFO and their First Nations partners in this continuous planning process in which stakeholders and regulators reach general agreement on the best mix of conservation, sustainable resource use and economic development.

More than 150 people gathered at the Wagmatcook Culture and Heritage Centre at the Wagmatcook First Nation for the Second Bras d'Or Lakes Collaborative Environmental Planning Initiative (CEPI) Workshop. Hosted by the Unima'ki Institute of Natural Resources in conjunction with the Integrative Health and Healing Project, the workshop was a followup to the 2003 gathering and was designed to engage citizens and government in the process of planning for the Bras d'Or Lakes ecosystem. Participants developed a vision for a healthy, sustainable Bras d'Or; examined present environmental conditions; identified areas of emphasis; developed specific objectives for the planning

process; and provided advice including 13 recommendations for moving the initiative forward. The objectives represent a major milestone in the development of the CEPI and will provide direction for the further development of the plan. The OCMD supports and facilitates this collaborative initiative, which is being pursued as a Coastal Management Area under the *Oceans Act*.

NRCan hosted "Geology Rocks", the 10th anniversary of the Nova Scotia EdGEO Workshop Program, at BIO. Thirty-three teachers from schools across the province were immersed in three days of interactive learning through hands-on activities and field trips. The workshop's narrative thread was based on the geological history of Nova Scotia: the first two days focused on rocks and minerals, fossils, and geological time, while the third day offered choices among concurrent sessions on plate tectonics, soil, climate change, and offshore oil and gas. EdGEO, a national program that supports local workshops on earth science for Canadian teachers, is co-ordinated by the Canadian Geoscience Education Network of the Canadian Geoscience Council, and funded by various Earth Science-related associations. The workshops aim to cultivate a heightened awareness and appreciation of our planet by providing educators with enhanced knowledge and classroom resources.

A national workshop on marine biodiversity organized by BIO staff was held in Ottawa. Sponsored by DFO, NSERC and the Alfred P. Sloan Foundation Census of Marine Life (CoML) program, the prime objective of the workshop, which was attended by many of Canada's leading university researchers on marine ecology, was to develop a research outline that would implement the national plan entitled *Three Oceans of Biodiversity* and would lead to a funding strategy. The resulting program will be part of Canada's contribution to the CoML.

The Eastern Scotian Shelf Integrated Management (ESSIM) Planning Office organized a workshop to discuss coral conservation on the Scotian Shelf and Slope. The workshop focused on the components of a coral conservation strategy (including the overall goals for coral conservation) with an in-depth discussion of research needs, particularly the effectiveness of existing management strategies.

In response to recommendations from participants at previous workshops, the ESSIM Planning Office held workshops to expand opportunities for stakeholder participation in the ESSIM initiative. Community workshops held in Liverpool, Ship Harbour and Port Hawkesbury provided opportunities for coastal communities and other interested parties to learn more about the ESSIM initiative and to provide input to the future integrated ocean management plan.

The OCMD's ESSIM Planning Office hosted a Human Use Objectives Workshop to further develop social, economic, and institutional objectives and indicators to complement the ecosystem objectives in the ESSIM Plan. This workshop, involving 40 government managers, industry and academic/technical experts, and NGO representatives, built on the earlier work of a multi-stakeholder working group.

A DFO year-end media event took place at BIO. DFO Science Branch presented research at BIO on climate change with an emphasis on the Labrador Sea and Arctic oceanographic studies. Oceans and Habitat Branch provided an overview of oceans management highlights of the year, while the DFO Regional Office provided a summary of the performance of fisheries in the Scotia Fundy Region.

Honours and Awards

The BIO-OA Beluga Award was presented to Dave McKeown in recognition of his many innovative engineering developments in both hydrographic and oceanographic research during his 35 years at BIO.

Steven Campana was presented with the Lifetime Achievement Award at the *Third International Symposium on Fish Otolith Research and Application* in Townsville, Australia. The symposium's Steering Committee presents the award every five years to recognize individuals for outstanding international contributions to otolith science. Dr. Campana was selected for his research advances in fish-age determination and stock identification.

The Federal Partners in Technology Transfer (FPTT) Leadership in Technology Transfer Award honours a federal employee whose creativity and exemplary leadership have strengthened government's capacity to transfer technology or knowledge from federal laboratories to those who are able to exploit it most effectively. Dr. Kenneth Lee, Executive Director of the Centre for Offshore Oil and Gas Environmental Research, received the 2004 award for his leadership in the development and transfer of innovative technologies and strategies to alleviate the damage of oil spills and enhance recovery of the natural habitat.

Dr. Brian Petrie was awarded the J.P. Tully Medal in Oceanography for his outstanding contributions to oceanography in Canada. His early research led to a clearer dynamical understanding of important physical processes in the coastal ocean; more recently, his collaborative work in monitoring and interpreting the variability of marine ecosytems has led to significant breakthroughs in understanding long-term changes and regime shifts. The medal is awarded annually by the Canadian Meteorology and Oceanographic Society.

No Huntsman this year

Visitors

- Admiral Glen Davidson, Commander of Maritime Command, Atlantic
- The Honourable Reg Alcock, Minister of Public Works and Government Services
- The Honourable Geoff Regan, Minister of Fisheries and Oceans
- Mr. Leonard Hill, US Consul General in Halifax
- A French diplomatic party

Key External Events

2005

Organization and People

There were major changes in the organization of the Science Branch. The Diadromous Fish, Invertebrate Fisheries and Marine Fish Divisions were merged and became the Population Ecology Division headed by Dr. Ross Claytor. The Marine Environmental Sciences Division and the Biological Oceanography Section were merged to become the Ecosystem Research Division headed by Dr. Tom Sephton. The Environmental Assessment and Major Projects Division was created in the Oceans and Habitat Branch and headed by Mr. T. Potter.

Department of Fisheries and Oceans
Maritimes Region

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- Population Ecology Division (R. Claytor)
- Ocean Sciences Division (P. Smith)
    - Coastal Ocean Science (S. Prisenberg)
    - Ocean Circulation (J. Loder)
    - Ocean Physics (M. Mitchel)
- Science Informatics (J. O'Neill)
- Ecosystem Research Division (T. Sephton)
- Maritimes Regional Advisory Process (RAP)(R. O'Boyle)
- Species at Risk Coordination Office

Oceans and Habitat Branch (C.A. Rose, Director)
- Environmental Assessment and Major Projects Division (T. Potter)
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- Route Survey Office (J. Bradford)

Environment Canada
- (C. Craig)

Public Works and Government Services
- (L. Lohnes)

Others on campus include:
- International Ocean Colour Coordinating Group (IOCCG) (V. Stuart)
- Partnership for Observation of the Global Oceans (POGO) (S. Sathyendranath)
- Fisherman and Scientists Research Society (FSRS)
- Geoforce Consultants Ltd.

Program

Check out feature article on UNCLOS by Verhof and MacDougall

Facilities

Work began on the design of van Steenburgh renovations.

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
- C.C.G.S *Hudson*
- C.C.G.S *Matthew*

Replacement of the ageing Science fleet continued to be a high priority. Plans are underway to replace the *J.L. Hart*. Two replacement research trawlers, one for each coast, were announced in the 2005 spring federal budget.

Technology

Meetings, Workshops and Conferences

The 3rd Eastern Scotian Shelf Integrated Management (ESSIM) Forum Workshop was held in Halifax. Convened by the Oceans and Habitat Branch, the purpose was to discuss the draft ESSIM Plan with stakeholders. The 160 people attending represented federal agencies (the Canadian Environmental Assessment Agency, Environment Canada, Natural Resources Canada, Transport Canada, Industry Canada, and Parks Canada); United States government organizations (state and federal); academia; consultants; industry and industrial associations (particularly fisheries); and local and national NGOs, as well as DFO staff from Eastern Canada.

BIO hosted the inter-agency Atlantic Tsunami Warning Workshop, involving representatives from six federal or provincial agencies in Canada and the United States, and five DFO regions. An initial plan for the development and implementation of an interim Canadian Atlantic Coast Tsunami Warning System was produced.

The Second Session of the international Joint Commission for Oceanography and Marine Meteorology (JCOMM-II) was organized with the assistance of BIO staff and held in Halifax. JCOMM was set up in 1999 by the World Meteorological Organization and the Intergovernmental Oceanographic Commission to coordinate, regulate and facilitate a fully-integrated global marine observing, data management and services system. Over 130 delegates from 42 countries participated.

A JCOMM Science Conference on Operational Oceanography and Marine Meteorology for the 21st Century was also held in Halifax.

Honours and Awards

The BIO-OA Beluga Award was presented to Jackie Dale in recognition of her many and diverse contributions to the BIO community.

This year was the 25th anniversary of the A.G. Huntsman Award. To mark the occasion, four awards were given. Three were in the regular discipline categories plus a fourth in interdisciplinary marine sciences. Dr. S.W. Chisholm of the USA was honoured for her insightful contributions to the fields of biological oceanography and microbial ecology which have fundamentally changed our perspective of the nature of life in the sea. Dr. E. Bard of France was honoured for his significant contributions to isotopic dating and proxy thermometry techniques and their application to studies of the Earth's paleoclimate and, in particular, its ice-age climate and sea level dynamics. Dr. T.J. McDougall of Australia was honoured for his leading role in developing a practical understanding of important thermodynamic and dynamic processes in the ocean which are a key to the mixing motions that so strongly influence ocean circulation and heat transport. Dr. R.F. Anderson of the USA was honoured for his innovative contributions in the fields of biochemical cycles, ocean sedimentation and climate variability, through his development and use of pioneering radioisotope tracers.

Visitors

- Dr. Peter Harrison, Senior Researcher at the National Research Council of Canada and former Deputy Minister of DFO
- Dr. Arthur Carty, National Science Advisor to the Prime Minister of Canada
- Dr. Joe Borg, the European Union (EU) Commissioner of Fisheries
- Mr. John Richardson, the Director General of the EU directorate responsible for ocean activities
- Ms. Lucie McClung, DFO Associate Deputy Minister

Key External Events

2006

Organization and People

Mr. Neil A. Bellefontaine retired as Regional Director-General and was replaced by Ms. Faith Scattolon.

The Program Planning and Coordination Division was created in the Oceans and Habitat Branch and headed by Mr. Tim Hall.

Department of Fisheries and Oceans
Maritimes Region

Regional Director-General (F. Scattolon)

Science Branch (M.M. Sinclair, Director)
- Canadian Hydrographic Service (Atlantic)(R. MacDougall)
- Ecosystem Research Division (T. Sephton)
    - Marine Chemistry (P. Yeats)
    - Centre for Offshore Oil and Gas Environmental Research (COOGER)(K. Lee)
    - Habitat Ecology (T. Milligan)
    - Biological Oceanography (G. Harrison)
- Centre for Marine Biodiversity (E. Kenchington)
- Ocean Sciences Division (P. Smith)
    - Coastal Ocean Science (S. Prisenberg)
    - Ocean Circulation (J. Loder)
    - Ocean Physics (M. Mitchel)
- Science Informatics (J. O'Neill)
- Population Ecology Division (R. Claytor)
- Centre for Science Advice, Maritimes Region and Gulf Region (R. O'Boyle)

Oceans and Habitat Branch (C.A. Rose, Director)
- Environmental Assessment and Major Projects Division (T. Potter)
- Habitat Management Division (P. Boudreau)
- Oceans and Coastal Management Division (J. Arbour)
- Program Planning and Coordination Division (T. Hall)

Aquaculture Management (M. Cusack)

Finance and Administration
- Contract Services (J. Hebert-Sellars)
- Material Services (Stores) (L. MacDonald)

Real Property Safety and Security Branch (B. Thompson)

Communications Branch

Corporate Services (V. Bradshaw)

Species at Risk Coordination Office

Planning and Information Services
- Technology Services (G. Somerton)
- Client Services (S. Gallagher)
- Library (A. Fiander)
- Records (J. Martell)

Canadian Coast Guard – Technical Services
- Marine Electronics (J. Wilson)
- Vessel Support (A. Muise)
- Marine and Civil Infrastructure
- Dartmouth Technical Workshop (P. Mckiel)

Canadian Coast Guard – Operational Services (M. Brackett)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (J. Verhoef, Director)
- Shared Services Office (G. Mc Cormack)
- Marine Resources Geoscience (M. Williamson)
- Marine Environmental Geoscience (D. Pickrill)

Department of National Defence
- Route Survey Office (J. Bradford)

Environment Canada
- Shellfish Laboratory (C. Craig)

Public Works and Government Services
- (L. Lohnes)

Others on campus include:
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<u>Program</u>

Check feature article on oceans management by Breeze et al.

DFO's Habitat Ecology Section undertook a new project to study fluid mud in the Petitcodiac River, New Brunswick. With funding from the United States Office of Naval Research, the goal of the study was to understand how fluid mud forms and how it affects the movement of water and sediment in areas with large tides and high sediment loads.

The Inshore Ecosytem Research Project, a joint project between the Fishermen and Scientists Research Society (FSRS) and DFO, was initiated. To determine the distribution and relative abundance of the whole spectrum of species caught by commercial fishing gear, 42 samples of the commercial catch were collected aboard lobster fishing vessels. Fshermen also assisted in fishery-independent sampling at ten locations off the Atlantic coast of Nova Scotia. As well, fishermen's knowledge of the ecology of the Scotian Shelf is being mapped through a Local Ecological Knowledge Survey.

Facilities

By year end, the Level II lab was 90% complete. Design of van Steenburgh renovations continued.

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
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- C.C.G.S *Matthew*

For the first time, ROPOS (Remotely Operated Platform for Oceanographic Science), a 6000 m capable ROV, was deployed on *Hudson* and used to study biodiversity in the Discovery Corridor.

Technology

Meetings, Workshops and Conferences

The International Hydrographic Conference was held in Halifax. The organization was led by CHS staff at BIO.

Twenty-one RAP meetings were held, spanning the full spectrum of ocean advisory issues from the assessment of individual stocks to information needs and sources of entire ecosystems.

The Workshop on Inshore Ecosystems and Significant Areas of the Scotian Shelf was hosted by DFO Oceans and Habitat and Science branches and the Fishermen and

Scientists Research Society (FSRS) at BIO. Participants included government, university, industry and NGO-supported researchers.

The Population Ecology Division organized a workshop to present results from the bottom-mapping project in Scallop Fishing Area 29 (Southwest Nova Scotia). In 2002, a three-year joint project agreement was signed by the scallop fishing fleets, NRCan, and DFO, with all parties providing funds, to conduct multibeam sonar acoustic mapping of the sea floor and associated scientific work. Maps of high-resolution bathymetry, acoustic backscatter strength, and surficial geology have been produced from this project. In addition, benthic data were collected using photographic and video equipment for the analysis of the distribution of benthic assemblages in relation to bottom type.

The Ocean Physics Section hosted an internal workshop on ocean instrumentation. The main goals of the workshop were to highlight the capacity for technology development at BIO, to identify anticipated future areas of technology development required to address the needs of programs along the major BIO activity themes, and to determine resource requirements.

NRCan hosted a two day Nova Scotia Historic Gold Mines Workshop at BIO to highlight the results of recent multidisciplinary research on the environmental effects of historic gold mining in Nova Scotia.

BIO hosted the annual meeting of the DFO Fisheries Oceanography Committee. The major agenda item was the initiation of a comparison of the temporal changes in the structure of ecosystems on the shelf seas of Atlantic Canada, from the Labrador Shelf to the Gulf of Maine area. The focus was on the fish communities, primarily using the observations from the multi-species trawl surveys.

A Fisheries By-catch Workshop was convened at BIO to review analyses summarizing the observed catch, kept and discarded, from all Canadian fisheries on the Scotian Shelf, Georges Bank, and in the Bay of Fundy, based on at-sea observer recordings.

A team from the European Union (EU) whose primary interest was an introduction to Canadian approaches to involve the fishing industry in fisheries management activities visited BIO and participated in a meeting of the Industry Roundtable to discuss the ecosystem approach to fisheries management.

The Continuous Plankton Recorder (CPR) Workshop was held at BIO. CPRs provide a cost-effective way of monitoring plankton, the base of the aquatic food chain. Towed by ships of opportunity, they collect plankton samples which are analyzed at the Sir Alister Hardy Foundation for Ocean Science in Plymouth, United Kingdom. DFO is a partner in the operation of routes across the Newfoundland and Scotian Shelves and in the Pacific Ocean.

A reunion of staff who had worked in the Marine Ecology Laboratory (1965-1987) was held at BIO. The program included a history of the lab and a review of some of its most important contributions.

Honours and Awards

The BIO-OA Beluga Award was presented to Capt. Joe Bray for his dedication and professionalism over many years in support of BIO's research program.

Carl Myers was awarded the national Leadership and Excellence in Communications Award, given yearly to a federal government communicator who has demonstrated a high degree of professionalism and contributed to enhancing the profile and standards of communication within the federal government.

Dr. Graham Williams of NRCan was awarded the J. Willis Ambrose Medal by the Geological Association of Canada (GAC). Named after the first GAC president, the annual award recognizes sustained dedicated service to the earth science community in Canada. Graham was recognized "for his paleontological and stratigraphic research, for his fundamental role as an innovator in geoscience in Canada, and for his tireless mentorship to generations of young geoscientists."

Dalhousie University awarded Dr. Alan Grant of NRCan an Honorary Doctor of Laws degree in recognition of his contributions to understanding of sedimentary geology in Canada.

Dr. Trevor Platt and Dr. Ken Denman won the Timothy R. Parsons Award for excellence in ocean sciences.

No Huntsman this year

Visitors

- Representatives of the Northern Ireland Fish Producers Organization
- Peter Stoffer, MP for Sackville and Eastern Shore
- A diplomatic delegation from Kenya

Key External Events

2007

Organization and People

In 2007, the Maritimes Regional Advisory Process (RAP) became the Science Advisory Process (SAP). The RAP Office was renamed the Centre for Science Advice (CSA) – Maritimes Region and an independent CSA in the Gulf Region was created as of November 1, 2007.

Mr. Dick MacDougall became the Director of UNCLOS and Mr. Steve Forbes became the new Director of the Canadian Hydrographic Service (Atlantic). Mr. Michel Mitchell takes over as manager of the Ocean Sciences Division. Mr. Mike Murphy became the new director of the Oceans and Habitat Branch.

The Marine Chemistry Section in the Ecosystem Research Division was dissolved. This marked the end of marine chemistry as a distinct entity at BIO.

Department of Fisheries and Oceans
Maritimes Region

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    - Centre for Offshore Oil and Gas Environmental Research (COOGER)(K. Lee)
    - Habitat Ecology (T. Milligan)
    - Ocean Research and Monitoring (G. Harrison)
- Centre for Marine Biodiversity (E. Kenchington)
- Ocean Sciences Division (M. Mitchel)
    - Coastal Ocean Science (S. Prisenberg)
    - Ocean Circulation (J. Loder)
    - Ocean Physics
- Ocean Data and Information Services (J. O'Neill)
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- Centre for Science Advice, Martimes Region and Gulf Region (R. O'Boyle)

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- Environmental Assessment and Major Projects Division (T. Potter)
- Habitat Protection and Sustainable Development Division (P. Boudreau)
- Oceans and Coastal Management Division
- Program Planning and Coordination Division (T. Hall)

Aquaculture Management (M. Cusack)

Finance and Administration
- Contract Services (J. Hebert-Sellars)
- Material Services (Stores) (L. MacDonald)

Real Property Safety and Security Branch (B. Thompson)

Communications Branch

Species at Risk Coordination Office

Information Management and Technology Services (S. Graham)
- Technology Services (G. Somerton)
- Client Services (S. Gallagher)
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- Marine and Civil Infrastructure
- Dartmouth Technical Workshop (P. Mckiel)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (J. Verhoef, Director)
- Shared Services Office (G. McCormack)
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Department of National Defence
- Route Survey Office (J. Bradford)

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- Shellfish Labortory (C. Craig)

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Others on campus include:
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- Geoforce Consultants Ltd.

Approximately 650 scientists, engineers, technicians, managers, support staff and contractors from a variety of disciplines now worked at BIO.

Program

DFO Science funded a new five-year regional Ecosystem Research Initiatives (ERI) to advance the science foundation of ecosystem-based management. The Maritimes Region has opted to focus its ERI activities on the Gulf of Maine area.

Facilities

The Level II laboratory building was completed and named the Katherine Ellis Building. Katherine Ellis was a radiochemist who worked at BIO for many years. Reconfiguration of the Strickland and Vulcan buildings got underway and plans were made for the reconstruction of the entire van Steenburgh building. This required major moves of staff into temporary swing space.

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
- C.C.G.S *Hudson*
- C.C.G.S *Matthew*

Staff also use CCG vessels from other regions, vessels of opportunity and research vessels of other countries.

Replacement of the ageing scientific research fleet continues to be a high priority. A Statement of Requirements is being developed for the CCGS *Hudson* replacement.

Technology

Meetings, Workshops and Conferences

The 8th BIO Open House was held in October and attracted over 20,000 visitors.

Workshop to review the successes and challenges facing saltmarsh restoration in the Maritimes.

CHS was the official host of the VIIIth Meeting of the International Hydrographic Organization Tidal Committee (IHO-TC) held at the Maritime Museum of the Atlantic.

The Workshop on Long-Range, Low-Frequency Acoustic Fish Detection was held on 29-31 January.

The Fisheries Oceanography Committee (FOC) of DFO met at BIO on April 3-5.

A workshop to review the results of the DFO fish habitat project conducted on the Scotian Shelf was held 27-29 March 2007. Four external reviewers provided comments.

Honours and Awards

The Huntsman Award was presented to Dr. T. Kiørboe of Denmark in recognition of his original and provocative thinking that has led to pioneering contributions in many areas of marine ecology, particularly in linking individual and small scale processes to observed patterns in populations and communities.

The BIO-OA Beluga Award was presented to Borden Chapman

Dr. Donald Forbes, Dr. Allyn Clark, Dr. Trevor Platt and Dr. Igor Yashayaev were among those honoured for their contributions to the Fourth Assessment of the Intergovernmental Panel on Climate Change (IPCC). The IPCC shared the 2007 Nobel Peace Prize with former US Vice-President Al Gore for their efforts to build up and disseminate greater knowledge about climate change, and to lay the foundations for the measures that are needed to counteract such change.

Dr. Simon Prinsenberg was the recipient of the 2007 J.P. Tully Medal in Oceanography from the Canadian Meteorological and Oceanographic Society.

The Canadian Meteorological and Oceanographic Society conferred the title of CMOS Fellow on Dr. Allyn Clark in recognition of his major contributions to the physical oceanography of the North Atlantic and to global climate studies through research, management, and leadership at both national and international levels.

Dr. Mike Lewis, with the GSC Atlantic, NRCan, was awarded the Michael J. Keen Medal. This medal is awarded annually by the Marine Geoscience Division of the Geological Association of Canada to a scientist who has made a significant contribution to the field of marine or lacustrine science.

Visitors

Key External Events

2008

Organization and People

Dr. Sephen Locke became the new director of Geological Survey of Canada, Atlantic. Dr. Alain Vezina takes over as manager of the Ecosystem Research Division. The Oceans and Habitat Branch became the Oceans, Habitat and Species at Risk Branch.

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Maritimes Region

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- Centre for Marine Biodiversity (E. Kenchington)
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    - Coastal Ocean Science (S. Prisenberg)
    - Ocean Circulation (J. Loder)
    - Ocean Physics (T. Milligan)
- Ocean Data and Information Services (J. O'Neill)
- Population Ecology Division (R. Claytor)
- Strategic Planning, Advisory Activities and Outreach Division (T. Sephton)

Oceans, Habitat and Species at Risk Branch (M. Murphy, Director)
- Environmental Assessment and Major Projects Division (T. Potter)
- Habitat Protection and Sustainable Development Division (M. Cherry)
- Oceans and Coastal Management Division (T. Hall)
- Program Planning and Coordination (O. Murphy)
- Species at Risk Coordination Office (D. Millar)

Fisheries and Aquaculture Management (C. Webster)

Finance and Administration
- Material Services (Stores) (L. MacDonald)
- Real Property Safety and Security Branch (B. Thompson)

Communications Branch

Information Management and Technology Services (S. Graham)
- Infrastructure and Operation (Data Centre) (G. Somerton)

- Networks
- Service Desk
- Telephony
- Library (A. Fiander)
- Records (J. Martell)

Canadian Coast Guard – Technical Services
- Marine Electronics (J. Wilson)
- Vessel Support (D. Chipman)
- Marine and Civil Infrastructure
- Dartmouth Technical Workshop (P. Mckiel)

Natural Resources Canada

Geological Survey of Canada (Atlantic) (S. Locke, Director)
- Shared Services Office (G. McCormack)
- Marine Resources Geoscience
- Marine Environmental Geoscience
- UNCLOS Program Office (J. Verhoef)
- ESS Office (A. Sherin)

Department of National Defence
- Route Survey Office (J. Bradford)

Environment Canada
- Shellfish Laboratory (C. Craig)

Public Works and Government Services
- (L. Lohnes)

Others on campus include:
- International Ocean Colour Coordinating Group (IOCCG) (V. Stuart)
- Fisherman and Scientists Research Society (FSRS)
- Geoforce Consultants Ltd.

Program

Facilities

Renovations of the entire van Steenburg building got underway. The BIO jetty was extended by 33 m and the jetty's electrical system was upgraded.

Ships

BIO staff used the following research vessels operated by the Canadian Coast Guard, Maritime Region:

- CCGS *Alfred Needler*
- C.C.G.S *Hudson*
- C.C.G.S *Matthew*

Technology

Meetings, Workshops and Conferences

ICES Annual Science Meeting

Honours and Awards

Dr. Donald Gordon was awarded Timothy R. Parsons Award for excellence in ocean sciences.

The BIO-OA Beluga Award was presented to Murray Scotney, head of the field support group in the Ocean Sciences Division

The Huntsman Award was presented to Dr. R. François of Canada in recognition of his groundbreaking research in marine geochemistry, centered at the intersection of physical, chemical and biological processes, thereby influencing our understanding of climate-related changes in ocean circulation and ocean chemistry.

Visitors

Key External Events

2009

Organization and People

Dr. Michael M. Sinclair retired as Director of the DFO Science Branch and was replaced by Dr. Alain Vezina.

Death of Ced Mann

Program

Facilities

Ships

Technology

Meetings, Workshops and Conferences

Hudson 70 Event

Honours and Awards

Dr. Michael M. Sinclair was elected as President of ICES

The BIO-OA Beluga Award was presented to Bruce Anderson

The Huntsman Award was given to Dr. James Syvitsky

Visitors

Key External Events

2010

Organization and People

The Tuesday Club was renamed the BIO Campus Management Committee but its function remained the same. It is responsible for the management of all activities and processes common to all science, operational and policy organizations on the BIO campus. A new BIO Science Management Committee was established with membership from the four science organizations on the BIO campus (DFO Science Martimes, GSC Atlantic, DND Route Survey and EC Marine Water Quality Monitoring). This committee identifies gaps in the planning of each science organization and leads the integration to mitigate those gaps.

Death of Ken Mann

Program

Facilities

Construction starts on the new Coast Guard Building on the BIO campus.

Ships

Technology

Meetings, Workshops and Conferences

Honours and Awards

The BIO-OA Beluga Award was presented to Sherry Nevin

Huntsman Award given to

Visitors

Key External Events

10/01/2012

2011

Organization and People

Program

Facilities

Ships

Technology

Meetings, Workshops and Conferences

Honours and Awards

The BIO-OA Beluga Award is presented to

Huntsman Award given to

Visitors

Key External Events

10/01/2012

2012

50th anniversary of BIO

Organization and People

Program

Facilities

Ships

Technology

Meetings, Workshops and Conferences

Honours and Awards

The BIO-OA Beluga Award is presented to

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Key External Events