ICOD

ACADIA UNIVERSITY
WOLFVILLE NOVA SCOTIA CANADA B0P 1X0

OFFICE OF THE VICE-PRESIDENT
ACADEMIC

MAR 1983

March 15, 1983

Dr. G. A. Klassen
Vice-President (Academic & Research)
Dalhousie University, Halifax, N. S.
B3H 4H6

Dear Dr. Klassen:

This will acknowledge receipt of your memorandum dated March 8, and to say that the administration at Acadia supports the concept of an International Centre for Ocean Development being established on the east coast.

I have discussed the content of the memorandum and the supporting documents with both Dr. Merritt Gibson, Head of our Biology Department, and Dr. Barry Cameron, Head of our Geology Department, who are interested and supportive of the locating of a Centre on the Atlantic Coast.

Dr. Graham Daborn of our Biology Department is presently in Holland presenting a series of papers on estuarine biology. Dr. Gibson feels that Dr. Daborn would have a real interest in ICOD and as soon as he returns from Holland we will ask him to forward to you any ideas related to your memorandum.

Dr. Cameron will likely be making a submission to you within the next week.

I trust that this is the information you are requesting.

Yours sincerely,

W. R. MacDonald
Vice-President (Academic)

WRM:hmd

March 28, 1983

DALHOUSIE UNIVERSITY -

1. International Centre for Ocean Development (ICOD) - A Working Brief Prepared by Dalhousie University, Halifax, Nova Scotia - February 1983.

2. International Centre for Ocean Development (ICOD) - The Nova Scotia Capability Base.

3. A Summary of Ocean-Related Activities at Dalhousie University.

4. A Report on the Activities of the International Development Council at Dalhousie.

5. The Law of the Sea, by Elisabeth Mann Borgese.

6. Halifax-Dartmouth Area - A World Leader in Marine Science.

DALHOUSIE UNIVERSITY

INTERNATIONAL CENTRE FOR OCEAN DEVELOPMENT

(ICOD)

A Working Brief

Prepared by

Dalhousie University

Halifax, Nova Scotia

February 1983

OUTLINE

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I. INTRODUCTION

Dalhousie University strongly supports the concept of an International Centre for Ocean Development (ICOD) and welcomes the opportunity for inputs at this formative stage. Wherever the organization is situated, we are certain it will have implications for the programs undertaken by many of our staff. Therefore, we hope that a dialogue can be established and continued during this planning phase in order to clearly define the nature and extent of mutually supportive activities to be undertaken once ICOD becomes a reality. Halifax can provide a suitable base for this Centre and Dalhousie University, as one of the senior ocean-related organizations in the Atlantic region, already has undertaken a number of international activities that may be considered possible precursors to what may emerge in ICOD programs.

The unique position of Canada in ocean affairs has been established not only by her position in the Law of the Sea deliberations but also by the innovative approaches to international development, especially of IDRC, over the past decade. These initiatives create a strong rationale for this country to take a leading role in assistance for ocean development. However, it is essential that ICOD not duplicate the work of existing agencies, nor be developed to merely serve as a transfer and consolidation point for various ocean program activities currently funded through agencies like CIDA and IDRC. It should be a Centre prepared to take bold initiatives in keeping with the strength and enterprise which have transformed perceptions of ocean use and management in the past decade. It

is perhaps the only organization which offers potential for cross-sectoral integration.

We argue against starting ICOD from a narrow conceptual base that will be difficult to broaden later and which will place the Centre in direct competition with existing international bodies. Starting ICOD with a relatively modest core program staffing will still permit the goal of breadth to be achieved if there is sufficient outreach to Canadians and Third World groups interested in international ocean development.

In this brief, we present concepts for ICOD structure and function as developed through an extensive interchange of ideas from the various ocean interest groups in the university coordinated by the Dalhousie Ocean Studies Council. These concepts are presented mainly in point form as we consider that they form a starting point for discussions. They are not intended to represent an inflexible point of view. A separate paper has been prepared on the ocean interests and experience currently available within Dalhousie. Earlier, upon the initial announcement of ICOD, Dalhousie developed a short paper on the Nova Scotia capability base for ICOD. We continue to underline the need for a cooperative rather than competitive approach if ICOD is established on the east coast. Thus, while this paper is primarily concerned with Dalhousie perspectives, we signal our interest in working together with other university, industrial and government ocean units in the region to maximize the effectiveness of ICOD activities.

II THE INTEGRATIVE APPROACH TO OCEAN DEVELOPMENT

In the planning of ICOD, it is of critical importance to ensure that the new organization will play an innovative role in ocean development and management around the world. A significant level of public funding is envisaged for ICOD after the start-up period, and it would be inexcusably wasteful to establish a structure, a staff, or a mandate that is likely to result in the duplication of activities undertaken elsewhere. The ocean specialists at Dalhousie are of the view that a serious attempt must be made to identify the deficiencies in the efforts of existing intergovernmental organizations in the field of ocean development and management, so that ICOD can be appropriately designed to remedy these deficiencies and offer a unique contribution to developing coastal states.

A survey of existing international organizations shows that virtually all of those contributing to national ocean research, training, information, and policy-making do so within a particular sector of ocean development or management. The sector of fishery development and management, for example, is served by FAO and several dozen regional organizations, both inside and outside the United Nations system. Marine pollution control efforts in the developing regions are mostly initiated and co-ordinated by UNEP. Shipping safety and vessel-source pollution problems are the responsibility of IMO, and oceanographic development that of IOC. Moreover, most international development agencies are so broadly conceived and designed that ocean development has to compete for attention with dozens of other non-oceanic areas or aspects of national

development. Even those funding and research agencies which are large enough to have complete divisions or programmes devoted to the ocean limit these efforts to a particular sector, usually fishery development. The result is that the ocean expertise available within the existing organizations is almost invariably skewed to one sector or another, and no institutional perspective on ocean problems as a whole can be found.

What is lacking, in short, is any organization that attempts to bring together various appropriate kinds and levels of expertise, which are needed to provide a comprehensive understanding of ocean resource problems in relation to social and economic development. As long as this deficiency remains uncorrected, efforts to provide such a perspective will be unsuccessful. The universities, government and industrial units concerned with ocean-related knowledge and skills do not possess the means to make their capabilities available to developing nations around the world. They require the direction and co-ordination of a sufficiently endowed international organization which ICOD could become.

A consideration of the general nature and structure of an organization such as ICOD must leave unresolved a number of important issues concerning its precise operational role and feasibility. To pursue these issues in any detail before the broad outline is defined would be premature, and yet it is worthwhile to have them in mind from an early stage. Some are more critical than others, and some are more readily resolved. Most of the issues identified in the following paragraphs expand upon the central notion put forth in this position paper - that

ICOD must balance considerable breadth of scope (to forge the integrative links between ocean research and development needs) with some strategic focus (to ensure effective use of available resources).

The focus might be expressed in terms of types of programming, fields of interest, geographic specification or on some other basis. It is helpful in defining focus to consider, firstly, what is implied by the new Law of the Sea for ocean development and management; secondly, what are the key constraints on existing development efforts; and thirdly, what are needs which reasonably might be met through ICOD coordinated with the efforts of other national and international development bodies.

What is implied by ocean development under the new Law of the Sea?

- redefinition of boundaries
- adequate understanding and management of living resources
- opportunities for exploitation of non-renewable resources, especially oil and gas
- greater national potential for food production from the sea
- surveillance strategy development and implementation
- expanded national and international responsibilities for navigation and environmental protection
- regional cooperation to optimize use of resources and ocean space

What are constraints to ocean development?

- knowledge of the potential resource base

- inadequate definition of ocean development opportunities within national development plans

- ineffective national and regional administrative structures

- poorly developed university and ocean industry base

- insufficient technical and managerial manpower

- lack of successful demonstration projects

- budgets which are insufficient or misdirected in relation to ocean development activities

- misguided development assistance which neglects social, ecological and economic limits on ocean use

What needs can be met by ICOD?

- transfer of technical knowledge from developed to developing countries and among developing countries

- assistance to realistically redefine the concept of ocean use and management in relation to national development plans

- interpretation of boundary matters in relation to their definition, resource management, surveillance navigation and regional arrangements

- non-degree and degree training needs relating especially to full utilization of the extended economic zone (EEZ), specialized concerns such as ocean-related project formulation and management; oceanographic analysis; management of living resources; social and economic impact of ocean resource development; planning, budgeting and administration in the ocean sector; various technical areas in aquaculture; post-harvest technology, surveillance, offshore technology, vessel traffic management and environmental protection

- over the long run, assist development of ocean research training and administrative facilities in selected countries or regions

- research and information dissemination on key ocean development problems as defined by client states, and by ICOD itself

III NATURE OF ICOD

(A) Overview

(1) A semi-autonomous international organization, primarily funded, with a long-term commitment, by the Canadian government;

(2) Concerned with ocean resource management in the broadest sense;

(3) Essentially a training, research and development organization with capability to:

- undertake research and training through Canadian institutions;
- fund external training, research and pilot projects in Third World countries;
- facilitate access to other research and training resources;
- provide consultative and information services.

(B) Objectives

(1) Generally:

To provide the link between knowledge of ocean resource potential and its application in support of the national development objectives of developing countries.

(2) Specifically:

To promote and facilitate a comprehensive approach to ocean management issues;

To assist developing countries in the formulation and implementation of ocean resource strategies;

To make worldwide technical and management capabilities in ocean resource management accessible to developing countries;

To encourage the development of local management, training and research capabilities.

(C) Types of Programs

ICOD presumably will create client-type relationships with some nations and regional organizations representing particular groups of developing countries. Any given client might tap one or more of the program areas in isolation. Alternatively, and preferably, an advisory program would provide the umbrella under which would fall a package of training, research and information assistance.

(1) Advisory Services

Would actively promote advisory services but actual projects would be in response to client demand;

Would focus on needs identification and priority setting in client countries with emphasis on broad strategic concerns, but would also deal with sectoral issues;

Activities would include:

- senior level consultations to assess issues and requirements;
- assessment of approaches and strategies;
- assistance in identification of funding sources, researchers, consultants;
- assistance in developing terms of reference, selecting and managing consultants and researchers;
- advice on implementation of strategies and plans.

(2) Practical Training

Would promote interdisciplinary training to emphasize integrative nature of ocean resource management and development;

Target groups would be ocean resource managers (senior technical and management personnel) in government, state corrorations, universities, private sector;

Activities would include:

- general advice and assistance:
  - advice on availablity of training resources;
  - advice and assistance with evaluation and follow-up of training programs.
- ICOD programs:
  - general offerings -- normally Canadian-based, medium duration;
  - client-specific programs -- normally on-site in client country or in regional location, short duration;
  - seminars -- targetted at senior managers/ academics/politicians
- non-ICOD programs:
  - advice and assistance (including funding) on programs mounted by client countries;
  - advice and participation in programs mounted by other agencies;
  - fellowship support for longer-term training (generally, Masters level and up).

(3) Research and Development

Emphasis on response to client-needs and application of existing basic research (but where necessary stimulate additional basic research)

Activities would include:

- funding outside research -- responsive primarily to clients, but also to unsolicited proposals from independent researchers;
- in-house research -- employing own staff and visiting fellows;
- brokerage: organize joint ventures bringing together people, organizations and funds for research and development;
- support for pilot projects on specific ocean development problems.

(4) Information Services

Activity roughly divided between support for in-house programs and for external services.

Activities would include:

- Baseline information:
    - monitoring and acquisition of information concerning ocean resource management and development;
    - bibliographic services and resource inventory (training programs, grant sources, research in progress).
- distribution and publication:
    - newsletter
    - bibliographies and catalogues
    - research summaries
    - in-house research papers and project reports
- special projects (in-house or client initiated), e.g.:
    - preparation of instruction manuals and A.V. packages
    - translation and non-technical summaries of research papers
    - literature searches and bibliographies.

IV STRUCTURE AND OPERATIONS

(A) Physical Nature and Location

Minimum head office facility would initially involve:

- administrative offices;
- staff and meeting space;
- library facilities.

Facility should be located within one metropolitan region to ensure close proximity to existing research and teaching establishments. For example, if the facility were to be established in Halifax, a downtown, waterfront location would be highly desirable to maximize interaction with the universities, government research and management agencies, and private industry. Advantages would include:

- professional links with research community could be developed and maintained;
- joint appointments and cooperative programmes could be readily established;
- teaching and consultative services available;
- extensive library, laboratory and other research support services nearby;
- professional interaction would ensure that staff maintain a state-of-the-art knowledge;
- a greater opportunity for the development of training programmes involving "hands-on" experience.

(B) Organization and Funding

Underlying principles should be maximum independence and flexibility and minimum bureaucracy.

Careful consideration should be given to the establishment of a crown corporation type of institution responsible through an appropriate Minister to Parliament.

Would receive annual appropriations from Parliament independent of any departmental budget.

IDRC may provide a partial model regarding organizational and function.

The general direction and policy framework should be provided by a Board of Directors with substantial international representation and covering a wide range of ocean interests.

Staff:

- on the order of 15-20 core program staff;
- additional staff in form of visiting fellows, and through work assignments, exchange of experts, etc.;
- staff cross-appointed with nearby research and teaching establishments;

- need to consider balance of effective managers, professionals as program officers and experts in various ocean fields.

Management:

- minimal hierarchy: a senior executive officer and two or three senior assistants;

- division of responsibilities should encourage an inter-disciplinary and integrative approach;

- organization could reflect either a program or geographical focus;

- could have three operational divisions (training, research and information services); each division also provides consultative services;

- staff could run projects in more than one area.

(C) Some Operational Considerations

Formal institutional linkages are required with selected marine-related bodies in Canada and perhaps in some other countries in order to implement ICOD training and research initiatives.

It may be desirable for ICOD to designate certain developing country institutions as potential centres of excellence, working partners, training units, etc., with the intention of building strengths that may be of use within particular regions.

Policy for interacting with other relevant Canadian government agencies, international aid agencies, subject-oriented bodies such as FAO and the private sector should be determined by the Board of Directors.

To promote interaction among key ocean-oriented units around the world and to help develc the position of ICOD it is suggested that every two years policy-makers from these units meet, at ICOD invitation, for a discussion of programming, research needs and training requirements and opportunities.

To ensure that ICOD is "needs responsive" and cooperative in its program thrust:

- nature and scope of activities should be determined more by external demands than by interests of staff;

- all staff working at the operational level should be encouraged to maximize their exposure to client

countries;

- projects should emphasize commitment of client nations by cost-sharing and by heavy involvement of local professionals.

V PHASED IMPLEMENTATION

(A) Need for Phasing

A phased build-up of ICODs organizational structure and programs is needed for:

- the development of credibility in the international environment;
- the gradual establishment of strengths in core functions;
- the integration with other complementary international agencies and programs;
- the refinement of organizational structures and staffing.

(B) The First Three Years

Phase I (Start-up -- 12 Months)

- Establish Board of Directors.
- Recruit senior management team.
- Establish headquarters and central administrative functions.
- Confirm basic organizational structure.
- Recruit remainder of core staff.
- Establish initial discussions on development of formal relationships with key organizations.
- Formulate initial program.

Phase II (Initial Operations -- 24 Months)

- Due to the interactive nature of the four program areas it is important that the sequence be carefully considered.

- Table 1 is illustrative of a reasonable sequence.

(C) Adjustment and Expansion

Create 3-5 year development plan.

Review programs, consider possibility of strengthening, expanding, downplaying particular aspects.

Review organizational structure including consideration of establishing additional field bases away from the headquarters location.

Adjust core staff size and support facilities in response to needs and organizational and program arrangements.

Strengthen international links and, if appropriate, broaden funding base.

VI CONCLUSION

Two points are particularly relevant to bear in mind during this formulation phase of ICOD. The development and management of ocean resources has a much higher profile as a consequence of the conclusion of Law of the Sea deliberations. The demand for information, and economically viable ocean development opportunities is certainly present and growing among coastal states in the Third World. Inappropriate commitment of resources based on unrealistic expectations of returns from exploitation is a real possibility in the absence of sound advice, trained people and accurate ocean knowledge. Therefore, it is essential for ICOD to begin its operations at the earliest moment possible. The multiplier effect of the research, training and advisory services undertaken by ICOD in these early years of the Extended Economic Zone concept will have great significance to major development funding plans for the late 1980s.

Table 1. Initial Operations of ICOD after start-up.

PHASE II	Advisory Services	Training	Research	Information Services
II A. 6 mos.	- needs assessment and promotion of ICOD services to clients	- adopt and modify existing programs - e.g. IOI-EEZ Training - plan further general training programs	- conduct overview of research needs and resources - promote research proposals program	- establish library data base, acquisition program - design publication program
II B. 12 mos.	- carry out initial advisory projects	- design focussed training efforts (needs response) - carry out training projects - start fellowship program	- start focussed research projects (needs response) - bring initial visiting fellows to ICOD headquarters	- start special projects (e.g. course material, special bibliographies, etc. as support to other programs) - begin regular publications at a modest level - data base operational
II C. 6 mos.	- expand advisory projects	- firm up ICOD curriculum - participate in outside programs - fellowship program operational	- design long-term research program - proposals program operational - begin long-term research programs on priority topics identified by ICOD	- start publishing research summaries - research papers and project reports - host first seminar of ocean study units

DALHOUSIE UNIVERSITY
HALIFAX, N.S.

INTERNATIONAL CENTRE FOR OCEAN DEVELOPMENT (ICOD)

THE NOVA SCOTIA CAPABILITY BASE

INTRODUCTION

Nova Scotia's historic and recent associations with the sea have stamped it as the most progressively ocean-minded province of Canada. For over two centuries Halifax has served as one of the major ports in North America for military and commercial purposes. Throughout this period fishing has dominated the Nova Scotian economy. The advent of the 200 mile fishing zone has generated a new wave of economic growth in this traditional industry. These new economic opportunities, in turn, have led to development and management innovations of striking relevance to many developing countries.

Within the last decade the Halifax-Dartmouth area has witnessed a transformation in the development of ocean-related activities. Already it is apparent that Halifax-Dartmouth is playing a major role in preparations for the production of

offshore hydrocarbons. These cities have joined with the Province of Nova Scotia and the Federal Government of Canada in a major effort to promote and strengthen a broad spectrum of marine industries, including container ports, ocean industrial parks, waterfront redevelopment for commerce and tourism, fishery technology and food processing.

Nothing, however, has been more internationally conspicuous than the emergence of Halifax-Dartmouth as one of the world's leading ocean scientific research centres (see Appendix). The Bedford Institute of Oceanography, is, of course, the centrepiece in a complex of marine scientific institutions which probably represents the second largest concentration of marine expertise in the world today. Dalhousie University is generally regarded as one of the most advanced academic centres for marine studies, not only in the oceanographic sciences but now also in the rapidly developing area of ocean policy and management. Located nearby are a number of other research and academic institutions participating in ocean-related programs.

As a consequence of expanding ocean technology and the extension of coastal state jurisdiction, federal and provincial governments have acquired an unprecedented level of responsibility for the regulation and management of ocean activities. The Canadian contribution to ocean regulation and management is recognized internationally as technically sophisticated, yet highly compatible with the special needs and interests of many developing countries. Halifax-Dartmouth, as the country's leading

operational centre for ocean management, has a special opportunity and obligation to contribute to the provision of such expertise in other parts of the world.

HALIFAX AS A POTENTIAL HOME FOR ICOD

The ocean affairs community of Halifax-Dartmouth perceives very clearly the leading role that Canada should play in the transfer of ocean-related research, training and related skills to developing countries. The addition of the International Centre for Ocean Development to existing institutions and capabilities would be an appropriate recognition of these regional skills. The placement of ICOD in Halifax would represent essentially a culmination of the history and development of the region.

Geographically, Halifax is well located for meeting the extensive travel and linkage requirements of ICOD. Canadian air carriers provide direct access from Halifax to London (Air Canada) and Amsterdam (CP Air), gateway cities to the rest of Europe, Africa and Asia. These air services would provide for the necessary and frequent contacts of ICOD personnel with such organs as the Commonwealth Secretariat and Intergovernmental Maritime Consultative Organization (London), the European Communities (Brussels), FAO (Rome), International Oceanographic Commission (Paris), UNEP Regional Seas Programme (Geneva) and the UNEP Head Office (Nairobi). Halifax is also well situated for further development of relationships with international development

agencies in the United States such as the World Bank (Washington) and, of course, the United Nations in New York. Moreover, the research and training institutions of Halifax-Dartmouth enjoy a special advantage by reason of their close relationship with important international ocean programs in New England (especially at Woods Hole Oceanographic Institution, University of Rhode Island, and the Universities of Maine and New Hampshire).

Halifax itself has changed dramatically its role and personality. Today, with a regional population approaching 300,000, it is one of the more lively and cosmopolitan cities of Canada, due in part to the steady incursion of highly educated Canadians from across the country and of immigrants from many lands. As the Atlantic region's centre for the performing and visual arts and the home of five universities, Halifax has become a sophisticated, modern, international city. Yet the traditional social fabric of Nova Scotia remains intact, offering newcomers a peaceful and hospitable environment. At a reasonable cost of accommodation, the Halifax-Dartmouth area is fully equipped to serve as host to an international organization such as ICOD.

OCEAN DEVELOPMENT EXPERTISE

An impressive array of ocean-related organizations in and around Halifax can be drawn upon by ICOD. Many of the organizations, listed below, have been conducting research and training activities in various developing regions, especially the

Caribbean, West Africa, Southeast Asia, and Latin America. The introduction of ICOD to Halifax would provide a sharper focus for these activities and new opportunities for the development and coordination of their collective efforts.

The ocean development expertise that would be available to ICOD is not confined to the immediate vicinity of Halifax and Dartmouth. Programs elsewhere in Nova Scotia and other areas of the Atlantic region could also be drawn into the network of institutions that should be affiliated with ICOD.

A. Universities

Dalhousie - Dalhousie Ocean Studies Programme, Department of Oceanography, Canadian Marine Transportation Centre, Institute for Resource and Environmental Studies, Centre for Development Studies, Marine and Environmental Law Programme, Centre for African Studies, Departments of Political Science, Biology, Geology, Sociology and Social Anthropology, Economics and Medicine.

- Training course in economic zone management (in conjunction with the International Ocean Institute, Malta).

Technical University of Nova Scotia - marine engineering, offshore technology, naval architecture, fisheries gear and food processing technology.

St. Mary's University - International Education Centre, Asian Studies Department, Department of Geography (specialization in

marine and coastal geography).

St. Francis Xavier University - Coady Institute.

Acadia University - Department of Economics (specialization in fisheries and transportation economics).

B. Government Research and Management Institutes

Bedford Institute of Oceanography - all aspects of marine science research.

Fisheries Resource and Development Branch, Fisheries and Oceans - seaweed assessment and resource economics.

Atlantic Regional Laboratory, National Research Council - seaweed biology and culture.

Nova Scotia Research Foundation - ocean engineering and applied marine biology.

C. Nautical Training and Education Institutes

N.S. Nautical Institute - major merchant marine training centre of Eastern Canada.

N.S. Fisheries College, Pictou - training for Canadian and Third World fishing vessel officers.

Canadian Coast Guard College, Sydney

N.S. Maritime Museum, Halifax

D. Surveillance and Enforcement Facilities

Fisheries and Oceans EEZ/Fisheries surveillance and enforcement - observer program and patrols.

C.F.B. Halifax, Greenwood and Summerside, P.E.I. - air

surveillance system.

ECAREG (Eastern Canada Traffic System - most advanced offshore vessel traffic control system in the world.

Eastern Canada Marine Search and Rescue Centre

E. Environmental Protection Agencies

Environment Canada - pollution control monitoring laboratories, emergency action and environmental protection planning, environmental impact assessment.

Coast Guard - oil spill cleanup.

Energy, Mines and Resources - offshore petrolum environmental controls.

F. Shipping Capabilities

Major Port on the East Coast (Halifax-Dartmouth) - Canada's largest container port and auto port.

Major Centre for Shipping Agencies - marine insurance brokerage, marine salvage, ship supply.

Offshore Oil Rig Supply Vessel Centre

G. Shipbuilding Expertise

Halifax Shipyards - oil rig construction/maintenance, fishing vessel construction, ship repair (Panama dry dock under vessel construction).

Ferguson Industries, Pictou - offshore supply and fishing vessel construction

H. Industrial Park Facilities

Dartmouth Ocean Industrial Park Canso Port and Industrial Zone

Marine engineering and consulting firms

J. Fish Industrial Development

K. Tourism and Commerce

Halifax and Dartmouth waterfront development corporations

Additional out-of-province expertise may be tapped from ocean-related institutions and industries located in Newfoundland, Prince Edward Island, New Brunswick, and Quebec. These include:

- Memorial University (specialization in ocean engineering, fisheries, coastal community studies)
- McGill University (Institute of Marine Sciences)
- Laval University (specialization in coastal community studies)
- University of New Brunswick
- University of Prince Edward Island
- Huntsman Marine Laboratory (St. Andrew's, N.B.)
- government marine laboratories in St. John's, Nfld., and St. Andrew's, N.B.
- various fishing and offshore-related industries in St. John's, Saint John, Quebec City and Montreal.

A SUMMARY OF
OCEAN-RELATED ACTIVITIES
AT DALHOUSIE UNIVERSITY

Through the Dalhousie Ocean Studies Council (DOSC), the university recently prepared a working brief on the proposal to establish an International Centre for Ocean Development (ICOD). As part of that initiative, various units on campus were asked to submit brief summaries of their ocean-related interests and activities. This is a consolidation of those summaries and provides a general understanding of the range of expertise, programmes and potential at Dalhousie University in relation to various aspects of the management and development of ocean resources. The individual submissions are available if required.

Overview

Dalhousie represents a very broad base of interests in the oceans. Virtually every major discipline involved in the management of the oceans is represented on campus - ranging from the physical and biological sciences, through medical, social and anthropological disciplines, to economics, administration and ocean law. Within this disciplinary breakdown exists an equally broad array of expertise and programmes in teaching, research and training supported by extensive technical and information systems.

Some of the units on campus, by the nature of their mandates, have a major focus on oceans. Others are involved in less comprehensive, but more specialized areas of interest. In virtually all cases, linkages have been established with foreign institutions leading to consultative activities, joint research or the involvement of foreign students in academic programmes at Dalhousie. Taken together these activities

represent probably the most comprehensive pool of ocean-related university expertise in Canada and should be considered as a major supporting infrastructure for ICOD.

Primary Ocean-Related Programmes

There are three major focal points for ocean related activities at Dalhousie. The first of these is the Department of Oceanography which involves about 16 faculty members and up to 50 graduate students divided among physical, chemical and biological disciplines. The Department also operates one of the few sea water aquatrons in the world. The Department has achieved a high international profile through such activities as co-hosting (with BIO) the Joint Oceanographic Assembly in 1982 and providing the secretarial support to the UN Scientific Committee for Ocean Research. Faculty members act as editors for over a dozen international journals on oceanography.

The second major concentration of expertise and interest in the oceans is the Dalhousie Ocean Studies Programme (DOSP). Established in 1979 under core funding from SSHRC, DOSP was mandated to explore new directions in ocean law policy and management. Through joint research programmes with other national and international institutions, and a focus on degree and non-degree training, DOSP is developing a Canadian centre of excellence in such areas as Law of the Sea, ocean policy, transportation and offshore development, resource management and coastal communities. Over 20 full and part-time staff are involved in twelve project areas, many of which are joint ventures with foreign institutions or agencies.

The third focus on ocean studies is the Centre for Foreign Policy Studies (CFPS) within the Department of Political Science. Since 1981 CFPS, in cooperation with the International Ocean Institute in Malta, has

been conducting a Training Programme on the Management and Conservation of Marine Resources. This comprehensive training programme involves middle-to-senior level managers from developing countries in 10-week courses held at Dalhousie and other centres throughout the world. The programme has been highly acclaimed as a model for international training and cooperation and staff of the Centre have achieved world-wide recognition for their efforts.

Ocean-Related Research

Nearly all of the respondents to the request for information indicated an active research programme in topics relevant to the management and development of ocean resources. The following comments will provide an indication of the range of such activities (the list is not meant to be complete):

Oceanography
- tides, circulation and mixing, nearshore dynamics, boundary layer movements;
- primary and benthic production, trace metals, dynamics of fish populations, marine systems modelling.

Biology
- 22 out of 32 listed research interests are ocean-related;
- seaweed growth, fish population biology, marine ecological genetics;
- stress induced by pollutants, genetics of oysters and lobsters;
- population and production ecology of marine copepods, pathology of algae;
- population and evolutionary studies on seals;
- breeding, growth and hatchery studies on oysters;
- over 50 publications on ocean topics in 1981-82.

Geology
- two prime areas of study:
- ocean crusts - $2 million project in Cyprus;
- continental margins including studies on coastal processes, continental margin history and micropaleontological studies;
- research efforts in past have included technological studies (cooperation with Malaysia); sediment studies off Australia, sea level changes and an Iceland Research Drilling Project.

DOSP	- 12 project areas including: - ocean policy and legislation, pollution control, shipping policy, marine policy and law in the Caribbean and Africa; - new directions in offshore business, bibliographical services, convergence/ divergence in ocean law, policy and management, ocean boundaries.
Canadian Marine Transportation Centre	- research activities include: - technological changes in shipping, analyses of shipping and port activities, economic impacts of shipping activities; - development of ship building and ship repairing data-banks, effects of shipping policies.
Institute for Resource and Environmental Studies	- research programmes in: - coastal zone management, fisheries management, coastal community development; - environmental impact assessment, marine environmental protection.
Institute of Public Affairs	- main research interest in urban and regional development with special focus on planning and development in coastal communities; - socio-economic impacts of offshore developments; - have active research programme related to offshore developments in Norway and Nova Scotia; - teaching and training programmes are relevant to ocean topics.
Medical School	- main research interest is offshore medicine; - becoming involved in occupational health related to offshore developments; - have plans to expand in four major areas: (1) education, (2) clinical services, (3) coordination management and (4) research (data-base management and behavioural sciences).
Economics	- have played an active role in offshore fisheries policy studies; - research on interjurisdictional conflicts regarding the fishery industry; - studies on regulation and licensing of fisheries; - research on the economic impact of offshore developments.

Centre for Development Projects	- major interests in project planning and management, and regional/community development; - these activities could be tailored to ocean-related issues; - have conducted studies on small craft harbours, socio-economic effects of tidal power and offshore fisheries.
School of Public Administration	- have conducted research on the socio-economic impacts of offshore fishing on coastal communities; - major publication on the politics and development of offshore fishing in eastern Canada.

Teaching in Ocean Studies

As would be expected, Dalhousie offers a very extensive range of ocean-related courses reflecting the comprehensive coverage of disciplines and research activities involved. Of particular interest are the post-graduate opportunities on campus. A consideration of graduate statistics from these larger teaching units provides an overview of this aspect of academic life on campus as it relates to ocean interests.

Oceanography	- 30-50 students registered at any one-time leading towards Masters or Ph.D. degrees in Oceanography.
Biology	- Out of 52 M.Sc. students, 20 are conducting research in ocean- or coastal-related topics; - out of 45 Ph.D. students, 28 theses are ocean-related.
Geology	- nearly all of the 32 graduate student theses completed or in progress since 1977 are ocean-related.
DOSP	- 16 student research associates working in a variety of ocean law, policy or management fields - associated with the Dalhousie Law School.
Institute for Resource and Environmental Studies	- the Institute annually accepts about ten candidates for the degree of Master of Environmental Studies; - about one half of the students undertake theses in ocean-related topics.

In addition to the degree-granting programmes on campus, there are a number of training programmes particularly relevant to ocean interests. The most comprehensive is that conducted by CFPS as previously discussed. However, the Institute of Public Affairs conducts numerous training and extension programmes in various management-related fields, many of which could be focussed on ocean management issues. Also, the Centre for Development Projects conducts extensive senior-management level training programmes for participants from African countries, and these too could be tailored to meet specific ocean-related issues and problems.

International Aspects

The various teaching and research units at Dalhousie have established an impressive record of international cooperation. Perhaps this is no more evident than in fields related to ocean studies.

Foreign Students
- Oceanography has established a $70,000 scholarship fund for students from Third World countries;
- In Biology, over one half (16/28) of the Ph.D. candidates are overseas students;
- Geology, IRES, DOSP and the Medical School all have significant numbers of foreign students, many from developing countries.

Linkage Programmes
- numerous cooperative research and/or training programmes related to ocean interests, are conducted, primarily with African and South-East Asian countries.

Consultative and Advisory Services
- an impressive range of consultative and contractual arrangements with national agencies (CIDA, IDRC), international agencies (IOI, IUCN), UN organizations (Law of the Sea, UNEP, UNEP, UNDP, FAO) and world financial agencies (World Bank).

A Support Base for ICOD

It should be obvious for this overview that Dalhousie University has an extensive and impressive array of ocean-related expertise and experience from which ICOD could draw support if it is located in the Halifax-Dartmouth region. It must also be borne in mind that Dalhousie has well developed working relationships with other teaching and research institutions in the area such as the Bedford Institute of Oceanography, the National Research Council, Technical University of Nova Scotia, St. Mary's University and the Nova Scotia Research Foundation. In aggregate, this pool of knowledge could provide ICOD with a scientific and technical support base for in excess of what might be reflected in its modest administrative structure and limited financial resources.

A List of Ocean-Related Units at Dalhousie

Individual summaries submitted by the following units are available:

- Department of Oceanography
- Department of Biology
- Department of Geology
- Department of Political Science
- Department of Economics
- Dalhousie Ocean Studies Programme
- Institute for Resource and Environmental Studies
- Institute of Public Affairs
- School of Public Administration
- Dalhousie Medical School
- Centre for Development Projects
- Canadian Marine Transportation Centre