International Review Of Integrated Coastal Zone Management

Evelyne Meltzer

Meltzer Research and Consulting
1331 Brenton Street
Halifax
Canada B3J 2K5

emeltzer@fox.nstn.ca

Oceans Conservation Report Series

Integrated Coastal Zone Management - Marine Protected Areas - Marine Environmental Quality

Departement of Fisheries and Oceans
200 Kent Street
Ottawa, Ontario K1A 0E6

1998

*Evelyne Meltzer, President of Meltzer Research and Consulting, is an international marine lawyer and independent oceans consultant based in Halifax, Nova Scotia, Canada. She is a part time faculty member at Dalhousie Law School where she teaches Coastal Zone Management.

The Oceans Conservation Report Series is a newly established series published by Canada's Department of Fisheries and Oceans (DFO), as part of the 1998 International Year of the Oceans' celebrations. This report series is intended to serve a broad audience interested in coastal and oceans issues affecting Canada and the global coastal community. The subject matter reflects DFO's evolving interests and policies, pursuant to the *Oceans Act* (1996), in three key areas: Integrated Coastal Zone Management; Marine Protected Areas; and Marine Environmental Quality.

The views expressed in each report are solely those of the respective authors, and should not be characterized as reflecting the views or policies of the Department of Fisheries and Oceans.

The Oceans Conservation Report Series may be cited as full publications. The correct citation appears in each individual report. Copies may be obtained from the Department of Fisheries and Oceans, Ottawa.

INTERNATIONAL REVIEW OF INTEGRATED COASTAL ZONE MANAGEMENT

Potential Application to the East and West Coasts of Canada

Evelyne Meltzer, ed.
Meltzer Research and Consulting
1331 Brenton Street
Halifax, Nova Scotia
Canada B3J 2K5
emeltzer@fox.nstn.ca

1998

Published By
Department of Fisheries and Oceans
200 Kent Street
Ottawa Ontario
Canada K1A 0E6

Citation
Meltzer, E. (ed.). 1998. *International Review of Integrated Coastal Zone Management: Potential Application to the East and West Coasts of Canada.* Oceans Conservation Report Series. Can. Tech. Rep. Fish. Aquat. Sci. 2209. Ottawa, Ontario: Department of Fisheries and Oceans.

ISSN
1480-8005 (print)
1480-8013 (Internet)

ACKNOWLEDGMENTS

In 1996, the Department of Fisheries and Oceans, Dartmouth, contracted Meltzer Research and Consulting, through a competitive process, to prepare an international literature review of Integrated Coastal Zone Management (ICZM) models and an analysis of the potential applicability of the global experience to Canada's East and West coasts. The views expressed in the 1996 version and this updated paper are solely those of the authors, and should not be characterized as reflecting the views or policies of the Department of Fisheries and Oceans nor the Government of Canada. This Report includes the summary of the literature review and analysis as well as the papers commenting on the potential application of the international models in the Canadian context. Mr. Richard Paisley was contracted by Meltzer Research and Consulting in 1996 to prepare the chapter pertaining to the West Coast. His chapter appears in the last section of this Report.

Evelyne Meltzer, President of Meltzer Research and Consulting, wishes to gratefully acknowledge and express her sincere appreciation to the following individuals who contributed to the preparation of the 1996 version: Mr. Derek Fenton, Principal Research Assistant; researchers - Janet Salo, Jonathan Somers and Maureen Witney; to Michelle Fulford, Saudiel Ramirez-Sanchez, and Ted Potter for providing the missing ICZM laws; and to the technical advisors - Ray Côté, Aldo Chircop, and Peter Ricketts - for their careful review, comments and suggestions. The author derived the legislative section herein from a memo prepared for this study by Dr. Chircop for Meltzer Research and Consulting. Dr. Jens Sorensen and Mr. Larry Hildebrand kindly reviewed an earlier draft for which the author is most appreciative.

Ms. Meltzer would like to thank research assistant, Mr. Stefan Leslie, for his assistance in updating and preparing this paper for the Oceans Conservation Report Series.

ABSTRACT

There is an ever-growing volume of literature on the principles and practice of Integrated Coastal Zone Management (ICZM), a scholarship matched by the increasing number of ICZM programs and policies in place throughout the world. This Report is divided into six sections. The first part surveys the literature on ICZM, and reviews the programs of key coastal States. Common characteristics are identified, including: institutional arrangements; community involvement; defining the coastal zone; inability to incorporate the fisheries sector in CZM plans; types of ICZM legislation; and, the role of MPAs. From this survey, Sections II, III, and IV identify the lessons learned, provide recommendations on the design and implementation of an ICZM program in Canada, and suggest further studies. The remaining two sections examine the application of international ICZM models first to Atlantic Canada, and then to British Columbia.

TABLE OF CONTENTS

INTERNATIONAL REVIEW OF INTEGRATED COASTAL ZONE MANAGEMENT

I. SUMMARY OF LITERATURE REVIEW

Evelyne Meltzer*

A. GENERAL OBSERVATIONS ON THE LITERATURE

Terminology

Coastal areas throughout the world are under stress. There are five anthropogenic factors causing marine environmental degradation and depletion of coastal resources: population growth, pollution, habitat degradation, multiple resource use conflicts, and over-exploitation of resources (Norse, 1993). A variety of national, state and local initiatives have been developed to remedy these environmental concerns and manage the coastal zone in a sustainable way. Most conventional coastal management programs attempt to address coastal hazards such as erosion and flooding, land based pollution, and vessel-source pollution. These programs seek to reconcile resource conflicts, primarily affecting the fisheries sector, through sectoral planning and sectoral management, *i.e.*, in a non-integrated way. The on-going challenge is to reconcile multiple resource-use conflicts through integrated coastal zone management.

Conceptual beginnings of integrated coastal zone management date back to the mid 1960s. A wide array of terms have been used to describe the governance and management of human activities in the coastal zone, including 'coastal zone management', 'coastal area management', 'shore management', 'coastal resources management', 'sea-use planning', 'coastal management', 'cross-sectoral, integrated coastal area planning', and 'coastal planning' to name a few. The terms 'integrated coastal zone management' (ICZM) and 'integrated coastal management' (ICM) are now preferred by both academics and practitioners and are the terms most commonly used in the literature since 1990. These concepts are all similar in objective but vary considerably in approach and application.

ICZM Definition

There is no common approach to, nor one definition for ICZM. Various definitions have emerged from conferences and international agreements such as Agenda 21 (Chapter 17). The literature produces several definitions:

- "ICZM is a resource management system which employs an integrative, holistic approach and an interactive planning process in addressing the complex management issues in the coastal area" (Chua, 1993: 81). Planning is usually included in the concept of management in ICZM.

- In Canada, ICZM is a "dynamic process in which a coordinated strategy is developed and implemented for the allocation of environmental, social, cultural, and institutional resources

to achieve the conservation and sustainable multiple use of the coastal zone" (Environment Canada, 1994).

- ICZM may be described as "a dynamic and continuous process of administering the use, development, and protection of the coastal zone and its resources towards common objectives of national and local authorities and the aspiration of different resource user groups" (Coastal Area Management and Planning Network, in Knecht and Archer, 1993).

- The OECD stated that the overall purpose of ICZM is to maximize the benefits provided by the coastal zone and to minimize the conflicts and harmful effects of activities upon each other. Its goal has been defined as the production of the optimal mix of products and services from a coastal system, with 'optimal' being the mix that results in maximum social benefit (OECD, 1993). ICZM focuses on the interactions between activities that take place within the coastal zone and activities in other regions. It can guide the sustainable development of coastal areas by reducing the degradation of coastal ecosystems, providing a common framework for the management of multi-sectoral activities, and maintaining options for future uses of coastal resources.

- Integrated management provides policy direction and a process for defining objectives and priorities, and planning development beyond sectoral activities. It adopts a systems perspective and multi-sectoral approach which takes into account all sectoral interests and stakeholder interests, and deals with economic and social issues as well as environmental and ecological issues (Sorensen, 1993). Local, regional, national, and international goals and objectives should be integrated. By employing a holistic, ecosystem perspective recognizing the interconnections between coastal systems and uses, ICZM avoids traditional sectoral management approaches.

Most would agree with Chua (1993) that ICZM is built on the essential elements of coordination and integration. Both horizontal and vertical integration are required, and this integration can occur over five possible pathways (Ehler and Basta, 1993: 6):

- Across the management of regional economic sectors, such as agriculture and fisheries;
- Among agencies responsible for coastal zone management;
- Among authorities and resources of federal, state, regional, and local institutions;
- Within the management tasks themselves; and
- Across the disciplines of management, including science, engineering, economics and law.

It is also generally agreed that an ICZM program has the following characteristics (Sorensen, 1993):

- It is a dynamic process that continues over time;
- It has a governance arrangement to establish multi-sectoral policies and make allocation decisions;
- It uses one or more management strategies to rationalize allocation decisions;
- Its management strategies recognize the relationships between coastal systems; and,
- It has a geographic boundary with seaward and inland limits.

What is striking in reviewing the literature is the preponderance of conceptual articles and so few on the practical aspects of achieving the much needed, but elusive, integrated system of managing the coastal zone. As Sorensen, (1997) so aptly writes, "Although most of the

literature stresses the importance of integration, relatively few documents address the challenges and means to achieve it."

Proliferation of Literature and Programs

This study found an ever-increasing amount of both formal and 'grey' literature, growing in proportion to the expanding number of coastal zone management programs and initiatives world-wide. Most can be characterized as formal literature, obtained primarily from books and journals within the field of coastal and marine management. In addition, a considerable number of conference proceedings, case studies, program evaluations, and management guidelines have been produced in recent years. These documents are in the 'grey' or 'fugitive' literature and are difficult to identify using standard search methods; even when identified, they are difficult to locate and can be even more difficult to obtain. Keeping abreast of this rapidly growing body of literature and associated coastal zone programs is a full time pursuit.

This proliferation of programs is a direct response to the intense development of the coastal zone globally. ICZM is increasingly being developed and used by governments around the world as a distinct management approach to address coastal zone problems. In 1992, the Inter Coast Network newsletter identified 108 ICZM efforts in 44 coastal sovereign and semi-sovereign states (InterCoast, 1992). According to Sorensen (1993), there are currently approximately 150 CZM efforts throughout the world in over 60 sovereign or semi-sovereign states. In recent years there has been a particular increase in CZM *efforts* in developing nations. The word 'effort' includes ICZM feasibility studies, pilot projects, and programs (both on-going and defunct). To date, the United States still comprises the bulk of all initiatives established worldwide.

Quickly Evolving and Changing Field

Given the evolving and expanding nature of this field of study, both the models and related literature are in a constant state of change. Although this review focused on post-1989 literature, in several cases a reliable source published five years ago is now considered 'out of date'. Policies and programs change to remedy a perceived flaw in the system, to accommodate new issues, or expand a pilot project.

Disparity of Literature Available

There is a great disparity in the amount of literature written and published on each country. Management initiatives in industrialized countries, such as Australia or the United States, are extensively documented by academics and practitioners, affording a wealth of information on which to base a review. Comparatively little information is available in developing countries. Initiatives in most developing countries, even those such as Ecuador which are considered 'successes', rarely appear in the literature. Another disparity is in the issues addressed. Specific characteristics of the models, including critical issues such as funding, conflict resolution techniques, or the role of science, are generally not well documented. Additionally, program evaluation is increasingly required by legislation in industrialized countries such as the U.S. and is undertaken by donor agencies for specific projects in developing countries. These evaluations are often difficult to obtain. This disparity in the availability of country commentaries or assessments, combined with certain issues seldom addressed, results in an uneven review based on the formal literature alone.

Difficulty Assessing Success of Models

Assessing the success of national ICZM models through a literature review is limited in that independent program evaluation is still uncommon, program objectives are not always clear, and there is a general lack of program performance indicators for most ICZM projects.

Many of the authors in the formal literature are directly linked to the management initiatives, often as government representatives. Ideally, this should give an accurate insider's view of the management model. But this is not assured. In practice, independent, unbiased assessments of government programs are necessary. There are, however, few independent, critical assessments or program evaluations of many management systems. Accordingly, the accuracy and quality of the literature reviewed cannot be verified in a study of this kind, particularly given budgetary and time constraints. Without undertaking a rigorous evaluation by going to the countries and interviewing the stakeholders, it is difficult to assess the success of the reported models.[1]

Many models have multiple management objectives, including to protect biodiversity, involve communities, resolve jurisdictional conflicts, and promote multi-stakeholder approaches. Occasionally there are competing objectives. The intended scope of the programs' objectives is not always evident in the literature. Without performance indicators and professional evaluations, it is not possible to assess the success of these nation's efforts in realizing the stated objectives. Further, it is clear that assessing the governance component of ICZM programs "is not as well developed as methodologies to monitor and assess the condition of the natural system" (Olsen *et al.*, 1996: 19).

B. MODEL SELECTION GUIDELINES

Guidelines were identified to select ICZM national models applicable to the Canadian context. The following were used as a guide to select the literature and short-list national models for inclusion in the study:

1. The term 'model' can be ambiguous and is used here to describe a major program initiative or approach adopted by a coastal state, rather than a paradigm or exemplary approach.

2. Only coastal initiatives incorporating both land and marine program components were considered. Other management initiatives such as watershed management programs or marine parks, are included as contributing components of a broader coastal management initiative.

3. Models which strive to 'integrate' coastal issues, and reconcile multiple resource use conflicts in a coordinated and strategic manner, were considered (accordingly other environmental management and protection efforts such as waste disposal strategies or land-based pollution control were excluded).

4. Only national models which address the jurisdictional and sectoral conflicts of the coastal zone inherent in the Canadian context, were considered.

5. Only models with national or regional institutional structures established to develop and implement the ICZM program were considered.

6. State programs in the United States were also selected depending on the attributes of the program, geographic proximity to Canada, and physical environmental similarities.

C. GENERAL OBSERVATIONS ON THE ICZM MODELS

Whilst each model reviewed strives to overcome the existing fragmented approach and embrace a wide range of interests in the management process, models of truly integrated management do not exist at the national level. No model incorporates all the elements underlying the ICZM concept nor successfully integrates political, functional, and ecosystem factors. No model has achieved the level of integration and harmonization of decision-making required to achieve ICZM.

There is no unique recipe for ICZM. The process can be triggered by concern over sectoral issues, as in the case of Thailand,[2] Barbados,[3] and Malaysia,[4] or by regional issues as in the Netherlands,[5] and can be implemented through a number of different institutional schemes and management instruments (OECD, 1993). The very definition and delimitation of the coastal zone varies considerably among coastal States, as does the extent to which integration is desired; the scope of issues, environments, and stakeholders involved in the management process; and, the approaches and methods employed to achieve management objectives. Diverse factors such as the political and cultural nature of a country or region, the resources available for management, and the existing institutional structure, influence the approach adopted or adapted. As a result, the models do not easily lend themselves to comparison. Nevertheless, there are common features characterizing the national approaches which can provide insight into the trends and current practice of ICZM internationally.

Common Characteristics and Trends

Single Issue vs. Comprehensive Models

Coastal management efforts can be divided into two types: single issue versus comprehensive models. Single issue initiatives focus on a single or a limited number of coastal problems. For example, Sri Lanka,[6] Barbados,[7] Queensland,[8] and the United Kingdom[9] initiated their respective coastal zone management programs to address erosion control and shore protection. Many of these initiatives expanded their scope over time to address a wider array of issues and sectors.

Comprehensive coastal management models adopt a cross-sectoral approach. These models strive to incorporate a variety of issues in order to achieve sustainable development in the coastal zone. For example, New Zealand,[10] most U.S. state governments,[11] and the developing federal initiatives in Australia,[12] address a number of issues and activities in the coastal zone under a coordinated and comprehensive management regime. The scope of these management initiatives is often constrained by the mandate and responsibilities of the lead agency.

Approaches to Institutional Arrangements

In the models reviewed, no one government agency has the full jurisdictional responsibility or capability to address the complex issues affecting the coastal zone system. The institutional mechanisms, including the judicial, legislative, and administrative components, are generally not well developed, and existing agencies are typically relied upon to design and implement management strategies. Designing an effective institutional arrangement for ICZM is an important and challenging component of achieving integration. It is possible to identify three general types of approaches used to date:

1. Expanding the duties of an existing agency;

2. Concentrating the authority in a new agency; and,

3. Creating an inter-ministerial council or inter-agency coordinating committee under a lead agency.

The first is often termed the 'within-the-system' approach. Here the prevailing legal, institutional and policy structure for managing the coast remain, but the duties of an existing agency are expanded and enhanced. A management arrangement such as an *ad-hoc*, inter-departmental working committee, a joint task force, or an advisory group is often developed to provide a more coordinated effort. The LENKA project in Norway[13] (broad-scope sectoral planning) and the current South Africa[14] effort are examples of this approach. The within-the-system method is considered informal and some critics view it as incapable of effectively integrating sectoral activities and decision-making practices.

New Zealand has attempted to overcome the limitations of the within-the-system approach through comprehensive and formal changes to the decision-making and institutional structure, allocating specific roles and responsibilities to the national government and lower levels (New Zealand, 1991). Other models have broadened the scope of institutional arrangements to link the coastal/ocean management initiative with land-use and/or national economic planning issues as in France,[15] Tasmania,[16] Thailand,[17] and Indonesia.[18] Similarly, the state CZM programs in the United States are closely linked to land-use planning activities.[19] Fisheries, it should be noted, are generally managed sectorally, outside the ICZM program.

The second approach is a concerted effort to centralize authority in a new lead agency with the primary responsibility of implementing ICZM management tasks. Sri Lanka[20] and Barbados[21] are examples of this approach: new agencies were created to both develop and implement ICZM, with linkages with other sectoral agencies.

The third approach is to establish a formal, inter-agency coordinating committee. The Netherlands established and institutionalized an inter-agency coordinating committee. In Ecuador, CZM is governed through an inter-agency committee composed of the key ministries and is placed at the highest level of government, to serve both as a coordinating and decision-making body.[22]

Canada should pay particular attention to the *Intergovernmental Agreement on the Environment*, signed between the Commonwealth (federal) of Australia, nine other state and territorial governments and the Australian Local Government Association (Australia, 1992).[23] The structure of the Australian government system is perhaps closest to that of Canada and the

issues of governance, with particular regard to marine areas, will be very similar. The agreement is specifically designed to facilitate:

1. A cooperative approach to the environment;

2. A better definition of the roles of the respective governments;

3. A reduction in the number of disputes between the different governments on environmental matters;

4. Greater certainty of Government and business decision-making, and;

5. Better environmental protection.

The text of this agreement should be examined in detail to assess its potential application to ICZM in Canada.

From the national experience it appears that an organization or 'unit' specifically dedicated to CZM is instrumental in co-ordinating development and implementing policies. Human and financial resources can focus on specific coastal issues in a comprehensive, systematic and coordinated fashion, to provide long term commitment and continued support to ICZM.

Local Level and Community-based Involvement

There is an increasing shift in management responsibilities to local governments or coastal communities This trend is illustrated within both existing and proposed management initiatives in the Philippines,[24] Sri Lanka,[25] Barbados,[26] Tanzania,[27] Ecuador,[28] Bulgaria,[29] the U.S.,[30] and Australia.[31] The Tanga Coastal Zone Conservation and Development Programme in Tanzania has successfully introduced a particpatory, 'bottom-up' community-based and community led ICZM programme based on the principle of sustainable resource use, integration and primary environmental care (PEC).[32] Ecuador and Sri Lanka have placed particular emphasis on local level management through Special Area Management initiatives. The most successful local level efforts appear to be models in which the respective roles and responsibilities are clearly defined and entrenched as a key component of the management program; and, where the government provides adequate funding, information, training and technical assistance to community-led efforts.

There are numerous reasons for this shift to community or local level involvement in many ICZM programs. First, many communities want to be involved in the management and protection of their coastal resources. Second, community level efforts can often effectively achieve many of the ICZM program objectives, when other efforts fail. Third, the level of public support for a program generally corresponds to the level of community involvement in the planning and decision-making process. Four, since governments, increasingly constrained by shrinking budgets and staff, are unable to solve the environmental problems that persist in the community's back yard, coastal communities have endeavored to fill this void, often with government support.

Defining the Coastal Zone

The definition of the coastal zone varies with each model reviewed. With respect to the size of the coastal zone, there is a tradeoff between comprehensiveness (making it bigger) versus political acceptability and practicality (making it smaller). Some countries, such as Sri Lanka[33] and Costa Rica,[34] have adopted a narrow definition of the coastal zone -- encompassing only a small band of land and sea. In contrast, seaward boundaries can extend as far as the outer limit of the Exclusive Economic Zone (EEZ) as in Indonesia[35] and Brunei.[36] Landward boundaries often appear arbitrarily set, or include key geographic features, as in Oregon.[37] In many cases, the 'functional' definition of the coastal zone bears no relation to the 'legal' definition. Both New Zealand[38] and Ecuador[39] have attempted to define the coastal zone by the specific issue to be addressed, acknowledging the limitations of legally established boundaries for transboundary ecosystems. However, none of the models reviewed have adopted a definition of the coastal zone that incorporates the ecological boundaries of the entire coastal and marine ecosystem. An issue-driven, practical, and ecosystem-based definition is generally viewed as necessary to achieve the objectives of ICZM. Countries such as Korea,[40] India[41] and Canada[42] have sought to define the coastal zone in such a way as to bring together the coastal and ocean aspects of management from internal waters out to the 200nm limit. This is seen as a critically important linkage to make in order to manage marine areas on an ecosystem basis.

Incorporating the Fisheries Sector into ICZM

The Philippines is one of the few countries in the world to effectively incorporate the fisheries sector into its ICZM planning.[43] Among the reasons cited for failure to adequately integrate this sector is the controversial issue of quota allocation in fisheries management. Notwithstanding the difficulties that may be involved, ICZM cannot be achieved without such an important sector being factored into the planning process. Without question, habitat protection, marine environmental quality and a sustainable fishery fall under the ICZM umbrella. Canada has an ideal opportunity to accomplish this level of integration through the development of its Ocean Management Strategy[44] under the *Oceans Act* (Canada, 1996).

ICZM Legislation[45]

A variety of legislative instruments directed toward particular sectors, as well as some specific to CZM needs, have been developed to protect coastal environments. Based on their own particular context and experience, different countries have opted for their own unique legislative approaches. There is no one widely emulated model. However, it is possible to identify two general types of legislation, and these include CZM-specific legislation, and more general legislation which includes provisions for CZM.

CZM-specific Legislation

CZM-specific legislation can be subdivided into general CZM legislation, *eg.*:

- France's *The Protection and the Development of the Coastline* (France, 1986);
- US *Coastal Zone Management Act*, (United States, 1972);
- Ecuador's *Executive Decree 3399*, (Ecuador, 1992);
- Sri Lanka's *Coast Conservation Act* (Sri Lanka, 1981);
- Peoples Republic of China, *National Coastal Zone Management Act* .

and legislation for coastal protection, *eg.*:

- Italy's *Law Regarding Provisions for the Defence of the Sea* (Italy, 1992);
- Turks & Caicos' *Coast Protection Ordinance* ; (Turks and Caicos, 1970);
- Bahamas' *Coast Protection Act* (Bahamas, 1968);
- UK *Coast Protection Act* (United Kingdom, 1949);
- India's *Coastal Regulation Act* (India, 1991).

The breadth of general CZM legislation varies substantially. The U.S. legislation is extensive, comprehensive and complex, addressing national policy, responsibilities of the various levels of government, institutional roles, programs and financial support. In Ecuador, the CZM legislation is not as extensive, concentrating on declaring policy and designating and allocating institutional responsibilities. Coastal protection legislation also varies. For example, the UK legislation emphasizes the powers of the Minister and Maritime District Councils and Coast Protection Boards, whereas the Italian legislation focuses on the type of coastal uses that require impact statements and permits.

Legislation With CZM Provisions

This second major type of ICZM legislation is usually general legislation which provides for or permits coastal zone management initiatives. In turn, this general enabling legislation can be subdivided into oceans / maritime zone legislation, resource management legislation,

and environmental protection legislation. An example of oceans / maritime zone legislation addressing CZM is Mexico's *Federal Act Relating to the Sea* (Mexico, 1986). As it is modeled on the *Convention on the Law of the Sea* (United Nations, 1982), it focuses on defining maritime zones, and jurisdictional and related responsibilities. It does, however, also regulate the development of the coastal zone.

New Zealand's *Resource Management Act* (New Zealand, 1991) is perhaps the best example of resource management legislation. It attempts to implement the principles of sustainable development, broadly defines natural and physical resources, and emphasizes cultural sensitivity. Examples of environmental protection legislation which have specific provisions governing coastal zone management are Mauritius' *Environment Protection Act 1991* (Part VII Coastal and Maritime Zone Management) (Mauritius, 1991), and North Korea's *Environment Protection Act*. The Mauritian statute has few provisions on CZM and as expected, concentrates on the protection and preservation of the coastal and marine environment.

It is important to note that the enactment of ICZM legislation does not guarantee the successful implementation of a CZM program. There are many examples of coastal states with legal frameworks for ICZM, where no program is implemented because of lack of political will, technical or financial resources, or adequate training. However, having some kind of ICZM legislation appears from this survey to be a pre-requisite for successful ICZM.

Precautionary Approach

A growing trend in ICZM programs is the inclusion of the precautionary principle or approach as the basis upon which policy is formulated. The three basic tenets of the precautionary approach include (FAO, 1996):

1. Authorities must take preventative action if there exists are risk of severe and irreversible damage to humans or the environment;
2. Action must be initiated even in the absence of certainty that such damage will occur, and prior to full scientific proof of a cause and effect relationship;
3. In the event of disagreement over the need to take action, the burden of proof is on those who contend the activity will have no impact.

Canada's *Oceans Act* (Canada, 1996) mandates the creation of an Oceans Management Strategy. It is to be based on the precautionary approach, there defined as 'erring on the side of caution' (art. 30[c]). Other states have institutionalized the concept of precaution; for example, New Zealand adopts the precautionary approach towards proposed activities, "particularly those whose effects are as yet unknown or little understood" (Department of Conservation, 1994: 3.3.1).

Marine Protected Areas

Marine protected areas (MPAs) are increasingly recognized as a key component of coastal and marine biodiversity conservation and protection, fisheries management, and a means of insuring the sustainable development of the marine environment. The need to integrate and

protect terrestrial, marine and atmospheric systems imposes an urgent need for the establishment of comprehensive, protected area management within broader coastal zone conservation strategies. MPAs are an important part of the broader ICZM program (Kelleher *et al.*, 1995). They are one of many techniques and are not designed to address the breadth of concerns and conflicts in the coastal zone.

- In France, marine protected areas (MPAs) are the primary means of implementing coastal zone management policy. These are largely community-led initiatives.[46]

- In North Carolina, coastal Areas of Environmental Concern are subject to stringent regulation to avoid irreversible damage.[47] The *Ocean Sanctuaries Act* of Massachusetts designated most of that state's coastline below mean low water and 4.8 kilometres seaward as an ocean sanctuary, except for the area around Boston (Kelleher *et al*., 1995: Vol.1, p.120).

- In Australia, the Great Barrier Reef Commission introduced, as its flagship program, a multiple purpose zone to conserve and protect this important area. While the Commission's authority stops at the mean high tide mark, it coordinates its activities with Queensland and can enjoin projects that are detrimental to the Reef system.[48]

- In New Zealand, marine reserves provide complementary functions to the *Resource Management Act* (RMA) and fisheries legislation. The combination of the RMA and the *Marine Reserves Act* (New Zealand, 1971) is expected to result in effective coastal planning (Walls, 1995).

Population Growth and Concentration of Human Activities in the Coastal Zone

High population concentrations continue to increase in coastal areas around the world. As Olsen *et al.* (1996), state "Approximately half of humanity is already concentrated in a narrow ribbon of land around the planet's oceans, seas and great lakes...The proportion of the world's population that is coastal will increase as the population swells during the next century." The demand for declining coastal resources for socio-economic, cultural and recreational reasons is intensifying, further exacerbating existing resource-use pressures and the need for ICZM. Without effective controls in place to manage human activities in coastal environments, degraded terrestrial and nearshore marine ecosystems will continue to increase unabated.

The Global Agenda for Sustainable Use of Coastal Resources

The principles of sustainable development and recent international legal developments provide a supporting framework for national governments to introduce ICZM programs to protect and sustain coastal resources. This global agenda will facilitate the adoption of ICZM and will strengthen existing national programs. Some of the most significant international agreements are:

- The 1982 Convention on the Law of the Sea (CLOS) (United Nations, 1982)[49] which entered into force in 1994, is a comprehensive global legal framework governing ocean use. It is also considered the most significant international instrument dealing with the protection and preservation of the marine environment.

- The Convention on Biological Diversity (CBD) (United Nations, 1992) entered into force in 1994. More than 145 countries are Parties to this Convention. The CBD considerably strengthens CLOS in that it applies conservation and sustainable use obligations to marine resources throughout the EEZ. In November 1995, the Parties to the CBD agreed at their conference in Jakarta to a program of action with respect to coastal and marine biodiversity conservation and protection, identifying integrated marine and coastal area management as a key component (Conference of the Parties to the Convention on Biological Diversity, 1995).

- In response to CLOS and Agenda 21 (UNCED, 1992), 110 nations signed a non-legally binding agreement, the Global Program of Action for the Protection of the Marine Environment from Land-Based Activities in November 1995 (GPA) (UNEP, 1995). The GPA is an international framework to prevent and abate the degradation of the marine environment, ensure sustainable use of marine resources, and maintain biodiversity, through several initiatives, including ICZM.

- The UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks (the Straddling Stocks Agreement) (United Nations, 1995) was signed by more than 40 nations in 1995 and will enter into force following ratification by 30 countries. While the effect of most of the provisions are more pronounced on the high seas, the general objective also applies within the EEZ. This Agreement is important in that it applies the precautionary approach in adopting measures to prevent or eliminate overfishing on both target species and species belonging to the same ecosystem or dependent upon or associated with the target stocks. Impact assessments are required of fishing and other human activities.

- The FAO Code of Conduct for Responsible Fishing (FAO, 1995) is a non-binding international set of guidelines that prescribes conduct for fisheries and aquaculture within the EEZ.

Applicability of Models to Canadian Context

With the exception of the United States and Ecuador, ICZM is still in the developmental stage. Many national programs were recently established or are under development; there is no agreement on a specific approach to ICZM. Caution must therefore be exercised in adopting an external model. Instead, a Canadian ICZM program should be tailored or adapted to the specific needs and characteristics of the three coastal regions. This review of ICZM models indicates there are a number of trends and discrete lessons to be learned for a federally coordinated initiative in Canada. The East Coast and West Coast analyses (Sections V and VI, respectively) explore these issues and suggest an approach for Canada.

Canada's *Oceans Act* (Canada, 1996) embraces the concepts of sustainable development, integrated management and the precautionary approach, in keeping with recent developments in international marine and environmental law. This enabling legislation positions Canada to be a leader in ICZM, ensuring sustainable use and protection of its coastal and marine resources. This is an opportunity and a challenge.

The Canadian government, pursuant to the *Oceans Act*, should strive to:

- integrate the fisheries sector within a broader ICZM framework;

- introduce measures within the broader ICZM framework to reduce, remediate and control land-based sources of marine pollution;

- establish and support a network of community-based and regional ICZM initiatives to effectively manage and protect the coastal zone;

- establish an integrated national system of marine protected areas in accordance with Canada's commitments under the *Convention on Biodiversity*, and the accompanying *Jakarta Mandate.*

II. LESSONS LEARNED

There are several key conclusions and lessons learned from the literature of international ICZM experience. Twenty main findings follow:

- Moving from theory to practice is difficult.

- Government intervention, through a variety of regulatory, economic, and policy instruments, is necessary to: set minimum standards; control activities in the coastal zone; avoid needless and costly conflicts among stakeholders; sustain and conserve natural resources extending beyond or straddling the boundaries of many political units; and, achieve the broader sustainable development objectives.

- Leaders of the implementing agency must be committed to the goals and objectives of the ICZM program and have the full endorsement of other governmental leaders and key stakeholders. Integration at the senior policy level establishes the necessary political will required to achieve ICZM and broader sustainable development objectives.

- An ICZM program must be supported by a broad-based constituency. Constituency building is a key component of successful ICZM efforts to create public awareness of the need for ICZM; catalyze the necessary political support; and promote compliance.

- Both vertical (all levels of government, NGOs, indigenous peoples, communities, private sector) and horizontal (cross-sectoral) integration are required.

- National programs must have well defined, short and long-term goals and objectives, achieved through a harmonized, horizontal strategy (cross-sectoral) which adopts both top-down and bottom-up approaches.

- A harmonized and integrated legislative and policy framework, implemented through a cross-sectoral management coordination mechanism, with clear and consistent guidelines to lower levels of government, is critical to successful ICZM implementation.

- Horizontal integration is achieved over time. Typically, ICZM is attempted by adopting an incremental approach, gradually shifting from a sectoral approach to ICZM to initially resolve those conflicts, solve marine environmental problems, and realize opportunities which are the most serious and most likely of being accomplished.

- Public participation should be introduced at the early stage of policy formulation and program development to ensure collaboration, promote voluntary participation, coordination and compliance with ICZM plans. Traditions and social norms should be recognized.

- A wide range of interests need to be considered during the policy, planning, and decision-making processes to ensure that impacts of multiple activities are explored,

trade-offs examined, alternatives identified, and needless conflicts avoided and conflicts resolved, through consensus or mediation, wherever possible.

- Management efforts on a national scale must be flexible and broadly defined, with programs tailored to reflect the different spatial scales and desires of different socio-political groups.

- There is a need for a flexible and broadly defined coastal zone adopting a functional definition that recognizes the range of issues, the various administrative units and ecosystem parameters.

- Community-based and local level management initiatives are critical to the effective delivery of programs in the coastal zone.

- A network of local level pilot projects needs to be initiated during the early stages of program development to develop community experience in ICZM, build support and provide information on the design of a regional or national ICZM program.

- There is a need to build human capacity through training, education and applied research at each level of the management framework.

- Strong extension services, such as information and educational support, are required at each level of management.

- Adequate financial resources need to be provided at each stage of ICZM program development. A stable financial structure provides a more systematic and long term strategic framework for coastal management.

- Relevant information must be collected and updated, and provided in a format for decision-making purposes. Coastal environmental indicators are required to measure the success of management initiatives.

- Integration at the policy level will enhance the ability to reach broader sustainable development objectives, through linkages with resource management or economic planning processes; clearly identifying the roles and responsibilities for each stakeholder in the planning process. Monitoring and enforcement procedures for these objectives must also be established.

- ICZM planning and coordination efforts must be enhanced at the international level, through multilateral agreements and arrangements.

III. RECOMMENDATIONS

1. A four-prong approach to designing and implementing an ICZM program is recommended for Canada:

   - Develop a national ICZM policy framework and management system under the Oceans Management Strategy, defining the objectives, roles and responsibilities of key stakeholders through a collaborative, consultative process. This national policy should be harmonized with provincial, Aboriginal and community efforts, incorporating the principles of sustainability, precaution, coordination, integration and adaptability.

   - Implement an ICZM strategy that integrates all aspects of managing human activities in the coastal zone -- on land, at sea, and in the air, by harmonizing federal/provincial jurisdictions through 'interlocking' or mirror legislation or agreements.

   - Promote and support provincial ICZM initiatives to address regional concerns and needs, within the national policy framework.

   - Promote and support community-based and community-led ICZM. This can be effected through supporting and developing local ICZM demonstration projects (both established and new endeavours). These projects would not only create a network of community programs connecting the coast, but would also build capacity at the local level.

2. Enact federal legislation in addition to the *Oceans Act* (Canada, 1996), specifically to address the complex issues of coastal zone management. Interlocking or mirror legislation in each coastal province and territory would provide an integrated legislative and policy framework for the comprehensive protection of coastal and marine environments.

3. Recognize Aboriginal rights and interests in the coastal zone at the outset and enter into 'interlocking' agreements to form effective partnerships with federal, provincial, and community players.

4. Give effect to Canada's international commitments, particularly under the *Law of the Sea Convention* (United Nations, 1982), *Agenda 21* (UNCED, 1992), the *Convention on Biological Diversity* (United Nations, 1992), the *Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities* (UNEP, 1995), and the *FAO Code of Conduct for Responsible Fishing*[50] (FAO, 1995) through national ICZM policies, legislation and programs.

5. Establish minimum standards based on accepted international ICZM guidelines and sustainable development objectives.

6. Establish an effective institutional mechanism to coordinate federal, provincial, Aboriginal and community policies and activities. This coordinating mechanism should

institutionalize integration at the policy and program level: providing leadership, promoting partnership among stakeholders, and providing support for community-based and community-led activities.

7. Ensure the policy development and implementation process is transparent and inclusive, involving all relevant federal and provincial regulatory and administrative bodies, Aboriginal governments, local communities, and other key stakeholders.

8. Provide sufficient and consistent funding for federal, provincial, and community ICZM efforts. Stable funding for these initiatives is a critical feature in achieving ICZM development and implementation objectives.

9. Heighten public awareness of the value of ICZM through media, education and training programs to promote compliance and develop a supportive constituency for the policies and initiatives. ICZM media, education and training programs should be designed for the general public, government officials, public schools, universities, and particular stakeholders.

10. Ensure data requirements are met through the introduction of an interdisciplinary strategy that supports program management needs and decision-making, at every level -- from the community to the Minister(s). All stakeholders should contribute to the process of identifying key issues and determining information requirements. Once information requirements are identified and data collected, analysis is required with findings clearly communicated to policy / decision-makers and stakeholders.

11. Establish a coordinated, interdisciplinary extension service for ICZM initiatives through 'centres of expertise' which offer support from government, the private sector, universities, NGOs, Aboriginal organizations, and communities.

12. Establish a program modeled on Sea Grant to fund research activities in response to needs identified by coastal stakeholders.

13. Design and implement a practical process to avoid and resolve conflicts among coastal zone users and interests. Ensure conflict avoidance mechanisms and techniques are incorporated into the policy and planning guidelines. Institutionalize alternative dispute resolution for resource-use conflicts, notably, consensus-building, conciliation, negotiation, mediation and arbitration.

14. Adopt a flexible and functional definition of the 'coastal zone', recognizing the boundary may vary depending on the issue and the associated environmental and socio-economic impacts on land, at sea or in the air.

15. Enter into multilateral agreements and arrangements with other nations, both near and far, to promote compatible management initiatives and protect the integrity of Canada's coastal zone.

16. Provide overseas development assistance for ICZM initiatives recognizing the transboundary nature of ICZM and the global agenda.

17. The *Oceans Management Strategy* should strive to:

- integrate the fisheries sector within a broader ICZM framework;
- introduce measures within the broader ICZM framework to reduce, remediate and control land-based sources of marine pollution;
- establish and support a network of community-based and regional ICZM initiatives to effectively manage and protect the coastal zone; and,
- establish an integrated national system of marine protected areas in accordance with Canada's commitments under the *Convention on Biological Diversity* and the accompanying *Jakarta Mandate.*

IV. RECOMMENDATIONS FOR FUTURE STUDIES/PROJECTS[51]

1. Develop a collaborative vision and strategy on how to restore, protect, and sustainably develop coastal areas through a series of workshops attended by all relevant stakeholders. This is required early in the policy development process to effect partnerships and create the future ICZM policy and program. It is recommended that the Martin Weisbord approach be considered for these workshops (Weisbord, 1992; Weisbord and Janoff, 1995).

2. Critically assess the literature on integrated coastal management efforts and integrated resource management program evaluations, and interview key individuals in selected countries where evaluations are lacking or unreliable. The proposed study would focus on initiatives in the U.S., Australia, New Zealand, France, the U.K. and Scandinavia to determine the lessons learned, why policies succeeded or failed and to identify courses of action which might improve success of implementation.

3. Develop an alternative dispute resolution process for ICZM, including conciliation, mediation, negotiation, consensus-building, and conflict avoidance methodologies.

4. Assess and design the management framework required to support the coordination and integration of ICZM with the Oceans Management Strategy, land use planning, economic planning, and other environmental policies.

5. Investigate the legislative options to support ICZM at a national level.

6. Identify and design constituency-building and capacity building programs, including the necessary education, training and public outreach programs.

7. Develop a set of baseline economic and environmental indicators as well as indicators for program evaluation to measure the success of ICZM initiatives from the point of view of both process (i.e., outputs) and achievements.

8. Evaluation of ICZM development and practice in the United States, Australia, Ecuador, New Zealand, the United Kingdom, Norway, Sweden and Thailand, particularly with respect to integration of science and policy to achieve ICZM goals and objectives.

9. Assess the role of science, including support from universities and an ICZM-dedicated research program. Methodologies and approaches that foster an interdisciplinary approach need to be investigated.

10. Comparative analysis of the role of indigenous peoples in coastal and ocean governance in Norway, Australia, New Zealand, the U.S. and Canada with potential applications to the Canadian situation.

11. Assess the planning and management tools required to implement ICZM, including environmental impact assessment, land-use zoning, permitting processes, monitoring, taxation, etc.

12. Support a study to develop a comprehensive ICZM framework for Canada, identifying the international and domestic responsibilities and needs of the Department of Fisheries and Oceans and each of the relevant federal and provincial governmental agencies, aboriginal interests, and community stakeholders. This study would also assess the requirements to build an effective partnership with provincial governments, particularly with issues related to governance and the constitution; and would assess the linkages between ICZM and existing legislative / policy initiatives, *e.g. Fisheries Act* (Canada, 1985b), *Canadian Environmental Protection Act* (Canada, 1985a), Pollution Prevention Policy (Canada, 1991a; Canada, 1991b), Environmental Impact Assessment (Canada, 1992).

13. Develop a public awareness program in association with the 1998 UN International Year of the Ocean and actively participate in the Oceans Expo in Portugal in June, 1998.

V. POTENTIAL APPLICATION OF INTERNATIONAL ICZM MODELS FOR COASTAL ZONE MANAGEMENT IN ATLANTIC CANADA

Evelyne Meltzer

A. BACKGROUND

Physical and Biological Characteristics

Atlantic Canada has a temperate marine environment with 40,000 kilometers of coastline (Eaton *et al*., 1994: 37). Primarily characterized as an exposed rocky or cliff dominated coast, the East Coast is dotted with numerous bays, inlets, estuaries, fjords, wetlands, tidal flats, and beaches (Wells and Rolston, 1991: 79). This highly variable coastline provides productive coastal habitats for a variety of coastal wildlife including numerous marine mammal, bird, and fish species. Unlike the narrow, steep shelf and deep waters on the Canadian west coast, this region has a vast continental shelf (Eaton *et al*., 1994: 37; Hildebrand, 1984: 8). This expanse of shallow water enhanced by continuous oceanic mixing results in a highly productive region (Hildebrand, 1984: 19). The East Coast as a consequence is renowned for its fisheries and until the 1980s was among the largest fish exporters worldwide, with more than double the value of West Coast landings (Hildebrand, 1984: 23).

Few Population and Development Pressures

The Northwest Atlantic off eastern Canada is considered by some oceanographers to be a relatively *pristine* marine environment.[52] The health of the Canadian east coast hydrospace is in part related to the rate and nature of development in Atlantic Canada. The coastal zone of Atlantic Canada has not faced the population and development pressures experienced on the West Coast and in many other areas of the world. The region is generally considered sparsely populated. The coastal population is dispersed over numerous small areas of settlement with a few discrete pockets of industrial development. On a regional scale, input of human-induced contaminants into the coastal zone are therefore considered limited. These contaminants are assimilated quickly and widely-dispersed in the dynamic, turbid waters of the Northwest Atlantic.

Declining Marine Environmental Quality

Serious problems do exist in certain portions of this marine system. The Northwest Atlantic is increasingly under threat from human activities. The region is experiencing anthropogenic stresses in the coastal zone including pollution, depletion of renewable resources, destruction of habitat, and declining water quality (Wells and Rolston, 1991: 79; Waldichuk, 1988: 76-90). In particular, land-based sources of marine pollution are recognized as a serious threat. Large scale point sources of pollution, such as pulp and paper mills, or sewage and industrial discharges in urban centres, have created a number of contamination 'hot spots', such as the St. Lawrence Estuary, Boat Harbour, Halifax Harbour, Sydney Harbour, Saint John Harbour, and St. John's Harbour (Meltzer, 1995: 17). With future economic growth and industrial development, it is likely that such 'hot spots' will grow in number and extent. Additionally,

non-point sources such as agricultural or urban runoff have caused a number of water quality problems. A significant portion of the region's inshore bay and estuarine waters tend to become contaminated as the currents, and tidal systems are insufficient to assimilate toxic substances, excess nutrients, metals, and bacterial coliform (Meltzer, 1995: 16). These localized marine environmental quality problems result in extensive shellfish area and recreational beach closures, aquaculture siting restrictions, and generally limit development options (Environment Canada, 1991).

The impact of contaminated sites and declining marine environmental quality on the coastal ecosystem is difficult to predict, quantify, and isolate. Clean-up is costly, and often too expensive for many communities. With the higher, long term costs of not cleaning up, preventative strategies are increasingly important.

Threats to Sustaining Coastal Communities

The region's many coastal communities depend upon the resources of the coastal zone for fisheries, transportation, aquaculture, and tourism. The connection between economic survival and environmental protection is increasingly evident. Moreover, the coastal environment is intrinsically linked to the socio-cultural heritage of the region. Nevertheless, human induced stresses such as pollution, habitat degradation, and resource depletion continue to compromise both the productivity and sustainability of coastal communities. The collapse of the groundfishery, and the subsequent social and economic effects on coastal communities, is one example (See FRCC, 1997).

Use conflicts between traditional fisheries, aquaculture, oil and gas developments, and conservation initiatives are found throughout the region, resulting in loss of potential income. Without a strategic plan to protect and manage the coastal zone, increasing tourism, residential and commercial pressures, and the growing competition for coastal space threaten the integrity of the coastal environment. This situation is exacerbated by insufficient scientific understanding and knowledge about a marine environment that is delicately balanced, and interdependent.

Need for ICZM

To address these problems and concerns, a concrete, integrated and coordinated approach to the management of the coastal zone is increasingly recognized as necessary. At present, there is no formal comprehensive and integrated approach to address both current and future coastal zone problems on a regional basis. Rather, a wide range of legislative and regulatory instruments and policy and management initiatives have been developed by various levels of government, on a sector by sector, agency by agency basis, to address coastal issues.

Overlapping jurisdiction is a major issue in Atlantic Canada: the federal government through several departments shares management and conservation responsibilities with five provinces. The provinces are largely responsible for the management of land-based activities while the federal government has jurisdiction over marine areas (Canada, 1982). This poses a serious management problem, as activities occurring on land, under provincial jurisdiction, can impact the marine environment and vice-versa. Municipalities, which in effect control most land use activities, are assigned responsibilities by the provincial government (See Nova Scotia, 1989).

Regulating land-based water pollution is the shared responsibility of the federal and provincial governments, and in some cases the relevant municipality. Areas of common interest include agriculture runoff (non-point source pollution), industrial wastes and urban sewage effluent (point sources of pollution). As a result, co-management arrangements are necessary.

Initiatives at Regional and Community Level

Cooperation among different levels of governments and with coastal communities is possible, as demonstrated by several regional initiatives undertaken in the last five years.[53] Information development has been a particular focus of cooperative efforts in the region, with the establishment of the Atlantic Coastal Zone Information Steering Committee (ACIZSC) in 1991 to develop a regional strategy for information management in the coastal zone. The National Marine Status and Trends Monitoring Network is being developed through the partnership among various levels of government (mainly Fisheries and Environment departments) and local communities. The East Coast of North America Strategic Assessment Project (ECNASAP) and the Gulf of Maine Action Program (GMAP) cooperate on a variety of Canadian-U.S. CZM support activities.[54] On a provincial level, both Nova Scotia (Nova Scotia Department of the Environment and Department of Fisheries, 1994) and New Brunswick (New Brunswick, 1996) are developing coastal zone management policy and planning frameworks based on the principles of integration, broad-based participation, and community involvement.

Community level groups and non-governmental organizations in the region are responding to the problems in the coastal zone with their own management initiatives. The Atlantic Coastal Action Program (ACAP), established in 1991 by Environment Canada under the Green Plan (Canada, 1990), exemplifies effective community based management. The Community Coastal Mapping Program supported by DFO, is a successful community-led initiative creating an inventory of coastal zone resources (McCullough, 1998, pers. comm.). These programs illustrate a growing reliance upon community-based initiatives in the region to achieve CZM objectives.

Towards Sustainable Coasts

The Atlantic region has many of the necessary pieces required to develop a comprehensive, integrated coastal zone management policy. However, the current jurisdictional and institutional structures continue to impede the implementation of a coordinated approach required to preserve the ecological and economic integrity of the coastal region. Federal and provincial cooperation and coordination is essential for efficient and strategic decision-making. Resource exploitation and marine-based activities under federal jurisdiction must be compatible with provincial and regional interests and CZM programs. Community involvement, a fundamental component of ICZM program development, must become an intrinsic part of the federal/provincial policy and decision-making activities. This paper suggests options to address these institutional and jurisdictional complexities based on the international ICZM experience. Establishing an effective institutional framework will be a major step towards ensuring the sustainability of the coastal zone in Atlantic Canada.

B. POTENTIAL APPLICABILITY OF ICZM MODELS TO ATLANTIC CANADA

A review of the ICZM literature indicates there is no one model that could be readily adopted by the East Coast. Not only are there few, if any, successful models of ICZM, but also the particular context and experiences which generated each model are unique to that country or region. Further, with few exceptions, ICZM is still an evolving concept. Many national programs are recently established or are in the offing. Most programs are not nation-wide but are well-defined, local or regional initiatives. Moreover, the federal/provincial jurisdictional structure in Canada and the role played by DFO as the lead federal agency, create a fundamentally different management regime from which to draw comparisons with other models. Nevertheless, there are identifiable trends and discrete lessons to be learned from approaches considered successful. The ICZM initiatives in Australia, the United States, and Ecuador provide the more relevant models for application of a federal initiative in Atlantic Canada. These models merit further consideration and evaluation.

United States

With 25 years of experience in coastal zone management, the United States provides one of the few well-established ICZM models. Over this period, a number of management initiatives at both the federal and state levels have developed. On the whole, the federal government has taken a decentralized approach to ICZM, with support for a high degree of state and local level participation. Of particular interest to Atlantic Canada is the federal/state partnership and relationship which carefully balances federal involvement in regional and local coastal management activities.

Several of the state programs also have many lessons applicable to this region. Given the geographic proximity and socio-cultural similarities, together with the fact that many coastal U.S. states are the size of several countries reviewed in this study, the experience of different states is relevant to Canada. Oregon[55] and Florida[56] incorporate ICZM into state land-use planning; Massachusetts[57] and Washington[58] created an ICZM network with existing agencies; California,[59] New Jersey[60] and North Carolina[61] created new central authorities; and 13 states have a collaborative land use process at the local level working with local governments and local stakeholders. The U.S. has also developed both the National Marine Sanctuary Program[62] and the National Estuary Program[63] to reinforce the coastal zone efforts.

Australia

Australia's experience in establishing an ICZM program, within a complex jurisdictional structure similar to Canada, invites obvious comparisons. Its legislative and institutional structure merit examination. This island continent has formulated both formal and informal mechanisms to overcome jurisdictional barriers. The 1992 *Intergovernmental Agreement on the Environment* between the Commonwealth (federal), nine state and territorial governments, and the Australian Local Government Association is an innovative approach and could work here (Australia, 1992).[64] Their multi-stakeholder policy and program development process provide many lessons. Of particular note is the *Land Care* management initiative promoting active partnerships among the federal and state governments and local communities (Campbell, 1995). While Australia's national program is still in the

developmental phase, there are five state programs that have enjoyed varying degrees of success in achieving ICZM.[65] In addition, Australia has a well developed program of marine protected areas to protect particularly sensitive and important coastal habitats and marine wildlife (See McNeill, 1994).

Ecuador

Ecuador has established a successful ICZM program over the past twenty years.[66] Ecuador's 'parallel' approach to ICZM program design, including a national policy (Ecuador, 1992) and strategic framework, together with community level projects, is a practical route for consideration in Atlantic Canada. The Special Area Management projects are similar to recent community-based initiatives in Canada and merit consideration.

The following is a discussion of lessons learned for consideration in designing an ICZM program for the East Coast.

Coastal Zone Definition

Defining the coastal zone, *i.e.* identifying the geographical scope of concern, has proven to be one of the more important, and often problematic, components of ICZM programs. For many models, CZM statutes provide a coastal zone definition to identify the application or operation of the legislation. Examples include the U.S. *Coastal Zone Management Act* (United States, 1972); UK *Coast Protection Act* (United Kingdom, 1949); Mauritius' *Environment Protection Act* (Mauritius, 1991); New Zealand's *Resource Management Act* (New Zealand, 1991). With the possible exception of states within the U.S. federation, there seems to be little, if any, attempt to standardize the definition. The most common method of boundary definition is to delineate arbitrary boundaries both seaward and landward. In many cases, such as in Sri Lanka[67] and Costa Rica,[68] a narrowly defined coastal zone, based on arbitrary boundaries has frequently limited the ability to effectively address the broad range of issues in the coastal zone.

None of the boundary definitions in the selected models are completely applicable to the situation in Atlantic Canada, with its variety of coastal environments and issues, its multiple levels of government and related jurisdictional issues, and its large size and relatively small population. A flexible, issue-driven and ecosystem-based boundary would be preferable to a strict legal or administrative definition. This is the recommended approach in most multilateral agreements and international guidelines concerning ICZM. New Zealand[69] and Ecuador[70] are two national examples of this 'functional' approach where the landward delimitation of the coastal zone is determined by the local issues of concern. In Atlantic Canada, boundaries need to be defined at both the local and regional level, extending as far inland and seaward as necessary to achieve ICZM program objectives. This involves consideration of a variety of factors, including the relevant environmental and socio-economic concerns and the key issues to be addressed. The boundary would need to be subsequently refined to reflect administrative and practical considerations. A more legal definition of the coastal zone may be required and should be considered where important rights or legal procedures are involved.

Definition of the coastal zone should be considered a necessary component of the ICZM policy and program development process. The definition should closely correspond to the purposes and objectives defined for ICZM and reflect the views of key stakeholders.

Levels of Government

Governmental and institutional responsibilities concerning the coastal zone vary considerably from model to model, depending upon the division of powers allocated to resources in the coastal zone. Many of the countries reviewed have strong central governments, such as Brunei, United Kingdom, New Zealand and France, and therefore do not easily correspond to Canadian federalism. In federalist government structures, such as the United States and Australia, sub-national governments have a high degree of responsibility for coastal resources and have developed individual ICZM programs. In many of the models reviewed, jurisdictional conflicts and overlap is a key issue and challenge. The linkages between the national government and lower level governments are generally weak with many conflicts concerning jurisdiction and management responsibilities.

Prior to formulating a national ICZM program, governments must remove the jurisdictional and institutional constraints frustrating the development of a coordinated, strategic effort. Given the complex issues and diverse mandates, consensus building and partnerships in planning and management are *sine qua non* to ensure integration. In Atlantic Canada, federal and provincial co-operation and coordination are essential for progress to be made in ICZM. In developing an ICZM framework, there is a need to clarify responsibilities between different levels of government, defining the roles of individual ministries or departments, and developing inter-agency and inter-governmental coordination mechanisms and arrangements. Further, in today's depressed economic climate, a cooperative approach would help reduce costs and inefficiencies in managing the coastal zone.

There are three main institutional approaches used throughout the world to effect the required integration:

- Concentrate authority in a new centralized agency. In Sri Lanka, for example, the Coastal Conservation Department was formed to develop and coordinate management effort;[71]

- Expand and enhance the duties of an existing agency. In New Zealand, the Department of Environment was given significant powers under the *Resource Management Act*, (New Zealand, 1991), fundamentally redefining federal and lower level government responsibilities. In Washington State, the Department of Ecology was given responsibility for developing and coordinating the management effort;[72] and,

- Establish an inter-agency coordinating committee. The Netherlands made a conscious attempt to establish and institutionalize an inter-agency coordinating committee.[73] Similarly in Ecuador, an inter-agency committee was established and placed at the highest level of government.[74]

The United States provides an interesting example of federal and state level coordination, developing a 'within-the-system' approach to integration and ICZM program development. To overcome jurisdictional conflicts, a consistent national policy framework formulated by NOAA

was developed. Most states have followed this policy. The 1990 amendments to the federal *Coastal Zone Management Act* (United States, 1990) strengthen the consistency between state and federal coastal management initiatives, with federal entities required to conform to approved state level programs. One key lesson from the U.S. experience is the need to go beyond management guidelines and consistency requirements. Cooperative planning exercises among levels of government are critical. Joint planning processes provide the necessary interaction among governments and facilitate varying perspectives to be included and reflected in plans and management activities.

One approach often used in Atlantic Canada to overcome jurisdictional disputes over resource use is to negotiate intergovernmental cooperation agreements. These formal administrative agreements between provinces and the federal government define the respective roles and responsibilities, such as aquaculture in Nova Scotia, and offshore oil and gas development in Nova Scotia and Newfoundland. It is recognized that these are single sector arrangements. ICZM would require a multiple sectoral intergovernmental agreement, perhaps similar to the proposed Atlantic Accord (Copp, 1995). To ensure the implementation of such agreements, coordination committees composed of several federal and provincial departments would be necessary to focus joint planning exercises. Given the role of municipalities in land-use planning, a collaborative management process with other levels of government needs to be established, as demonstrated in many U.S. state programs such as California.[75]

Multiple Governments

There are many coastal zone activities that have an international dimension, including marine environmental quality, pollution, shipping, oil and gas drilling and production, and the exploitation of living marine resources. There are three adjacent sovereign states with an interest in the marine environment off the East Coast: Canada, the United States and France (representing the interests of the islands of St. Pierre and Miquelon). A successful ICZM program in Atlantic Canada must be capable of integrating transboundary issues with multiple sovereign governments. Many nations have coastal neighbours and have established multilateral agreements and mechanisms to address mutual concerns. The Netherlands is exemplary in effecting long standing cooperation with other nations bordering the North Sea (Cicin-Sain and Knecht, 1998; Ijlstra, 1991). UNEP's Regional Seas Programme has also been instrumental in coordinating a diverse number of countries to adopt a common management framework and action plan (see Jacobson, 1995). Similarly, an ICZM effort in Atlantic Canada will need to build a cooperative partnership with the United States and France, to integrate the management activities of the three sovereign coastal States.

The Gulf of Maine Action Program (GMAP) is a multilateral coastal zone initiative intended to address ocean use and river basin management in the Gulf of Maine (Underwood *et al.*, 1991). Nova Scotia and New Brunswick, together with the New England states, are members of the Gulf of Maine Council with the objective of developing an integrated management approach for the region. The GMAP provides a potential mechanism for multiple government cooperation concerning ICZM, however, it requires the participation of both the Canadian and U.S. federal governments to negotiate and enter into additional multilateral agreements and arrangements.

Physical

A number of the models reviewed share similar bio-physical and ecological characteristics as Atlantic Canada. Because of geographical proximity, Massachusetts, New Hampshire and Maine share many physical characteristics and features with this region, as do New Zealand, the United Kingdom, and France at the global level. The fjords of Norway are similar to those found along the West Coast of Newfoundland. The diversity of ecosystems and long coastline which characterize countries such as the United States and Australia, is also characteristic of the East Coast, although many of the specific coastal environments are different. Partial applications of some of the approaches adopted in these countries in response to physical features may be possible in specific parts of Atlantic Canada. Any ICZM initiative in Atlantic Canada will have to consider a wide range of coastal environments covering a very large area.

Socio-economic

Given that the majority of the population lives near the coast and are dependent on coastal resources for economic survival, sustaining coastal communities and the integrity of the coastal environment is a critical component of ICZM. In many of the models reviewed, community sustainability issues, often related to traditional resource usage, were a key management issue. New Zealand, the Australian states, and many U.S. states such as Massachusetts, appear to share similar socio-economic and often cultural conditions as those in Atlantic Canada. Overall, socio-economic considerations have been a weak component of many of the management models reviewed. South Australia and Tasmania,[76] and New Zealand,[77] are better able to integrate socio-economic factors into coastal zone planning. Other models, such as Sri Lanka[78] and the United Kingdom,[79] were initially concerned with erosion and shore development issues, but are expanding the scope of their programs to include broader social and economic concerns. Another concern, particularly to coastal communities and groups, is the public right of access to the coastal zone. This right is acknowledged and protected in Costa Rica, Ecuador, Mexico, Venezuela, Columbia, Chile, Uruguay, Australia (Crown lands for military purposes) and the United States (Sorensen, pers comm., 1996).

Any proposed ICZM initiative in Atlantic Canada must effectively integrate the key socio-economic issues of the region. At present, economic viability is the most pressing concern in sustaining coastal communities, particularly those linked to the groundfish fishery; sustainable development of these coastal communities would constitute an important component of any regional ICZM program. To achieve this, an ICZM initiative must be linked to: community development; federal / provincial land use and sea use planning; as well as economic planning at the national and regional level. In addition to addressing the key socio-economic concerns, such linkages will help provide support and commitment to ICZM.

Environmental Issues

Pressures from development and population have increased the overall vulnerability of the coastal zone in each of the models reviewed. Common environmental issues found in the models surveyed include contamination of coastal waters and an accelerated decline of natural resources, such as fish stocks, habitats, beaches and wetlands. With the exception of the

problems associated with mangrove wetlands and coral reefs, many nations confront similar environmental problems as those in Atlantic Canada.

Pollution of coastal waters from land based sources, both point and non-point, is a worldwide problem (UNEP, 1995). There are a number of site specific initiatives, such as harbour or estuary restoration projects, but few ICZM pollution prevention initiatives. The recent 1990 amendments to the U.S. *Coastal Zone Management Act* (United States, 1990) require non-point sources to be included under state and local level management. The *Land Care* program in Australia addresses land-based pollution concerns (Campbell, 1995). An ICZM program in Atlantic Canada must overcome the federal-provincial jurisdictional conflicts to control land-based sources of coastal pollution (as detailed in the Global Program of Action) (UNEP, 1995). Effective strategies must be developed and implemented to improve estuarine and nearshore water quality. Community-based ICZM plans need to be integrated into a regional initiative for assessing the impacts of and controlling land-based sources of marine pollution.

It is critical that any ICZM program in Atlantic Canada provide species and habitat conservation strategies and recognize the importance of MPAs, marine parks, and multiple purpose zones as innovative and essential mechanisms to conserve, protect and restore sensitive coastal ecosystems. In keeping with the Green Plan (Canada, 1990) commitment, marine protected areas should be established in the region. A variety of special area designations, such as sanctuaries, reserves, parks, could be introduced within an ICZM framework. In January of 1997, DFO began the process of public discussions of establishing and managing MPAs under the *Oceans Act* (DFO, 1997). The Fisheries Resource Conservation Council (FRCC) recommended in its July 1997 Report to the Minister of Fisheries and Oceans that marine protected areas be considered for use in groundfish conservation to protect spawning or juvenile fish (FRCC, 1997: 32). Many NGOs and some fisheries groups have endorsed such protected zones as a means of preserving biodiversity, restoring habitat and enabling the ecosystem to revert where possible to an earlier state, analogous to 'old growth' forests. Such zones would thus provide a natural laboratory and baseline data for ecosystem management research.

The *Oceans Act* (Canada, 1996) provides for the establishment of a national system of MPAs. This will facilitate and reinforce future coastal zone efforts. Legislative authority also exists under the *Canada Wildlife Act* (Canada, 1985c) and the *National Parks Act* (Canada, 1985d) to establish MPAs in the coastal zone out to 200 nautical miles. Presently, in the Atlantic region, there are two protected coastal areas established under the aegis of Parks Canada: the Saguenay National Marine Conservation Area and a marine component of Kouchibouguac National Park. There are also various provincial protected coastal areas. The Canadian Wildlife Service has also designated certain coastal areas as Ramsar sites[80] to protect seabirds and waterfowl and their habitat.

Resource Issues

Resources, particularly living resources, appear to be in decline in many of the models reviewed. Compared to other nations, Canada appears to have a record as good or better for controlling certain types of resource exploitation. For example, beach sand mining has been controlled for many years, while remaining a significant problem in a number of countries

reviewed. Regrettably, many commercial fisheries are overexploited throughout the world, including Canada.

Fisheries issues are generally not directly included in ICZM, presumably due to the frequently contentious allocation and gear issues. In Atlantic Canada, the future of the fisheries is under review: co-management and community quotas are two possible options. Both of these alternatives have direct coastal community and coastal environment implications. While coastal fisheries habitat protection and aquaculture are seen as obvious components of a proposed ICZM program, it is not clear whether additional fisheries management activities would be included in a coastal zone management program. This uncertainty should be resolved in favor of incorporating fisheries management into a broader ICZM program in Atlantic Canada.

Community Involvement

Public participation and local level involvement is recognized as an important component of coastal management in the models reviewed. Similarly, NGOs and community organizations are increasingly playing a major role in coastal zone management initiatives around the world. This is a documented international trend. There is a range of definitions in each model with respect to what constitutes 'community' or 'public' involvement in the planning and management process. As a result, it is difficult to assess how successful many countries have been in involving and incorporating community interests beyond formulating the vision and providing general objectives. In most of the models reviewed, communities have typically participated in coastal zone management through public meetings, hearings and inquiries, and as representatives on advisory committees or councils. This type of participation has been instrumental in the policy and program development process, as illustrated in the recent national ICZM initiative in Australia.[81] In the United States (specifically California and Oregon), public involvement is a federally legislated requirement for the development and implementation of all state level coastal zone management programs (United States, 1972). Community involvement is also a growing element in ICZM programs in Kenya (Okemwa and Wakwabi, 1995), Tanzania (Cicin-Sain and Knecht, 1998; Linden and Lundin, 1995; Meltzer, 1997), Ecuador,[82] Sri Lanka,[83] the Philippines[84] and Barbados.[85]

Active and often permanent community management initiatives appear to be an increasingly important component of successful ICZM efforts. Environmental quality problems and resource use conflicts typically occur at the local level. In Japan, local involvement has been included for a long time with traditional community approaches forming a key component of managing resources in the coastal zone.[86] Elsewhere, the special area management (SAM) approach has recently been adopted by a number of countries, including Ecuador,[87] Sri Lanka,[88] and Barbados.[89] SAMs involve coastal community and government partnerships. Management initiatives are developed and implemented at a local level, strongly driven by community interests and participation. In Ecuador, SAMs are the primary vehicle through which the national ICZM framework is implemented. Similarly, Bulgaria is currently developing a community-based coastal management program for the Black Sea, supported by the World Bank (Archer, 1995). The University of Massachusetts is assisting Bulgaria prepare local coastal plans for 14 municipalities on the Black Sea within a framework of national guidelines and standards and regulations (Sorensen, pers. comm., 1996). Australia is also pursuing a community-based approach, providing funding and commitment through such

initiatives as the Marine and Coastal Community Network and the Land Care, Coast Care, and Dune Care programs (Campbell, 1995; Haward, 1993; Ingram and Chapman, 1993). In the Philippines, coastal zone management is largely the responsibility of the municipal level of government.[90] These municipal governments rely on community-based and community-led efforts to plan and implement ICZM.

National and regional NGOs, interested in aspects of or the entire coast, have played an important role in supporting and coordinating coastal management efforts. For example, in Ecuador, the Fund-Acion Pedro Vicente Maldanado has played an important role in developing the partnership with government and communities (Robadue, 1995), and in California, the California Coastal Alliance have both greatly contributed to the management process.[91]

In Atlantic Canada, coastal communities actively seek economic stability and desire economic development. These communities understand the environment-economy balance: the need to use the resources while maintaining or improving the environmental integrity of the coastal/marine ecosystem. The equation may not be quantifiable, but it is understood. Sustainable development is the goal; how to achieve it is the challenge. Most coastal communities in the region want to play a direct role in planning and managing coastal resources.

Each level and method of public and community involvement described above will need to be provided and actively supported by government in any ICZM effort in the region. Involvement of communities and NGOs should be an important feature at the national, regional, and local levels. Participating in public meetings, hearings and inquiries, and as representatives on advisory committees or councils, is not enough in and of itself to constitute active participation or involvement. Many stakeholders are wary of government programs and skeptical of institutionalized consultation where they believe their views are neither heard nor considered. Instead, coastal communities in Atlantic Canada must be given an opportunity to apply innovative approaches, procedures, techniques and concepts in the conservation, management and development of the coastal zone. Community-based efforts will provide the practical experience and lessons-learned necessary for developing the national and regional frameworks for ICZM.

At present, there are a number of successful community-based initiatives in the region, notably ACAP (Donnelly, 1994; Ellsworth, 1994) and the Coastal Community Mapping Program (McCullough, pers. comm., 1998). These efforts, together with additional community-based and community-led ICZM pilot projects and programs, actively supported by the federal and provincial governments, are strongly advocated for Atlantic Canada. These efforts should be considered as active government/community partnerships. Governments will need to adapt and change current management structures and decision-making processes to embrace this new partnership and co-management paradigm. An important first step is identifying the community interests and participants in an ICZM effort.

Universities in the U.S., Australia, and the Philippines play an important role in providing technical assistance for coastal zone management, particularly at the community level.[92] Canada should consider adopting a Sea Grant Program[93] analogous to the agricultural research

network and extension service program in the United States and parts of Canada.[94] Universities and other entities would be funded to address the needs and problems of the coastal communities, ocean industries and sustain the marine environment. In this way, discrete, well-defined research, linked to ICZM, would receive multi-year funding. The East Coast has an internationally renowned human resource base in marine-related fields, in academia, in the private sector, and in government. A Sea Grant Program would strengthen and consolidate this multidisciplinary pool for communities.

Aboriginal Interests

The interests of indigenous peoples have been actively considered in Australia, New Zealand and in the United States. The New Zealand approach appears the most progressive as a result of the 1840 *Treaty of Waitangi* (see Ross, 1972) and the inclusion of Maori interests in the *Resource Management Act* (New Zealand, 1991). Clear guidelines have been established to facilitate consultation between Maori and Pakeha.[95] The Pacific Northwest region of the United States has had extensive experience with Native Americans on fisheries issues and aboriginal environmental rights.[96]

Aboriginal self government and the corresponding rights and interests in coastal/marine resources introduces another jurisdictional layer and element of complexity in Atlantic Canada. The strategies, approaches and decisions of Aboriginal peoples in the management and preservation of coastal and marine resources must be incorporated in a regional ICZM program. Governments and coastal communities must establish effective partnerships with Aboriginal communities to build trust and respect, and to recognize the importance of indigenous tenure, knowledge, and resource stewardship practices.

Compatibility with DFO as Lead Agency

The main objective of the lead agency is to facilitate the development and implementation of effective CZM, providing a key element of the institutional arrangements among and between levels of government. Based on the models reviewed, lead agencies for ICZM generally coordinate the national program, conduct the national policy and program development process, and provide support for regional and local level initiatives. In the United States, state program lead agencies typically provide a regulatory function in addition to the functions noted above.[97] The effectiveness of the lead agency to coordinate and implement the ICZM program depends on a variety of legal, political, and cultural characteristics of the country or region. The availability of financial resources is a particularly important factor in achieving success.

The *Oceans Act* (Canada, 1996) assigns the Department of Fisheries and Oceans (DFO) the lead role in developing a national oceans management strategy. The Act allocates principal responsibility for coordinating ocean affairs to the Minister of Fisheries and Oceans. How this role is defined is unclear and is primarily discretionary. Most models do not have an equivalent lead agency to DFO with similar ocean and CZM responsibilities. NOAA in the United States[98] and the State Oceanic Administration (SOA) in China[99] are the closest in terms of agencies having an ocean focus and corresponding responsibilities. Neither the SOA nor NOAA have any direct jurisdiction over land-use and terrestrial activities. Most other countries, with the

exception of Australia and the United States, have strong national governments with clear jurisdictional responsibilities to manage coastal resources on land and at sea. Many countries have established lead agencies dedicated to coastal management, *e.g.*, Coastal Zone Management Unit in Barbados[100], and the Coastal Conservation Department in Sri Lanka.[101] Others have developed an inter-agency approach for the purposes of management, such as the National Coastal Resources Management Commission in Ecuador.[102]

DFO will need to considerably expand beyond its fisheries portfolio, set clear objectives and goals for ICZM, and accurately define the role it wishes to play under the new regime. In many respects, the role of NOAA in the U.S. provides a general example of a federally-led effort. Coastal zone management is essentially a state/provincial and local level government responsibility. NOAA attempts to ensure consistency and coordination among the various state and federal management efforts and provides technical and financial assistance. Given the limited capability of DFO to influence land-based activities (without mirror legislation and/or federal/provincial agreements), a similar function would be played by DFO.

A separate management 'unit' within DFO charged with performing many of these functions is an option worth examining. The 'ICZM unit' would provide institutional cross-sectoral coordination, focus the ICZM initiative and centralize the ICZM policy and decision-making functions within DFO. To supplement the lead role and the functioning of the unit, committees comprised of key federal and provincial agencies, Aboriginal groups, and community level representatives are required. Such broad-based decision-making bodies are an important component for effective ICZM in many of the models reviewed. This would ensure broad based participation in the policy development and implementation process and contribute to the integration of governmental and community level activities and interests. In advancing the cause of sustainable, integrated coastal development, DFO may find itself in conflict if it promotes fishing sector's interests. This is an area of public concern DFO must address.

Within its legislative mandate under the *Oceans Act*, DFO has begun to facilitate, co-ordinate and guide the national ICZM policy and planning process (DFO, 1998). The department can provide guidelines, guiding policies and financial support to encourage consistency and linkages among various government and community level policies and activities. Its role as lead agency will evolve depending on the institutional structure developed to respond to the federal-provincial jurisdictional issue.

Multi-Sectoral Capacity

Multiple-use conflicts are a key problem in many of the models reviewed; there appears to be a limited capability to effectively address the issue. To reduce multiple use conflicts, a comprehensive, cross-sectoral approach is advocated. Many models are not comprehensive, but are single issue programs that expand over time to include other sectors. For example, Sri Lanka,[103] Barbados,[104] Queensland,[105] and the United Kingdom[106] initiated their respective coastal zone management programs to address erosion control and shore protection. Some of these initiatives recently extended their purview to address a wider array of issues. In New Zealand, the policy framework and planning activities cover many sectors.[107] Most state governments in the United States and the developing federal initiatives in Australia are attempting to coordinate and manage many sectors. It is therefore suggested that ICZM

policies and programs need to reflect the multi-sectoral nature of Atlantic Canada, considering both current and future uses.

The most common approach to building a multi-sectoral capacity has been to develop working groups, such as committees or advisory councils, composed of agencies responsible for each key sector in the coastal zone. Ecuador provides one of the more interesting approaches, with an inter-ministerial council composed of the seven key ministries, performing many of the key policy development and decision-making activities for ICZM at the national level. A similar system of federal-provincial coordinating and advisory committees comprised of various sectors together with community level interests, could be established in Atlantic Canada on a regional and sub-regional level to support a comprehensive planning and management effort. Through joint-planning and decision-making activities among a variety of sectors, a greater capacity to accommodate compatible uses of the coastal zone would be achieved.

Information Management Capacity

The strategic collection, management, and analysis of accurate and relevant information is essential to support effective decision-making in the coastal zone. Timely information must be synthesized and provided in a usable format to support policy level and day-to-day decision-making by managers at both the government and community levels. Information management and the development of decision-making support tools is a growing component of ICZM efforts worldwide. Australia has made considerable effort to develop comprehensive databases through such initiatives as the Environmental Resources Information Network (ERIN) and National Resources Information Centre (Australia, 1992). NOAA in the United States is beginning to effectively coordinate and consolidate coastal zone information through initiatives such as the Resource Information Delivery Team of the Coastal Ocean Program and the Coastal Services Center in Charleston, S.C.[108] The Coastal Services Centre has a multi-million dollar budget and is responsible for the National Estuary Program and the National Marine Sanctuary Program.[109]

The use of geographic information systems (GIS), environmental information systems (EIS), and remote sensing technologies is a crucial component of the information management capacity, providing both integration and analysis of coastal zone information. Massachusetts with Mass GIS;[110] NOAA with COMPAS, EMAP, and the National Wetlands Inventory;[111] and, Australia's National Marine Information System (NatMIS)[112] are key examples of this decision-support capability provided by GIS and EIS technologies.

The Atlantic Provinces are involved in developing similar approaches to information management, such as the FMG, ICOIN, and ECNASAP[113] projects. These projects have successfully incorporated information from a wide variety of users into a common database for the purposes of management. This information system must be expanded for ICZM to achieve greater cooperation between managers, scientists, and resource users in defining information needs. Information must be collected and analyzed in a comprehensible format for use in decision making at all levels. Strategic needs assessment of coastal zone management, as conducted by NOAA, is a useful tool for identifying management and stakeholder information needs. A single regional organization, responsible for key aspects of coordinating data

collection, analysis, and interpretation could be established to provide a common coastal zone 'data bank' for decision-making accessible by all user-groups and managers.

Funding Mechanisms

Funding is one of the most critical issues influencing the success of ICZM in the models reviewed. ICZM projects and programs in many of the ASEAN countries, such as Malaysia[114] and Brunei,[115] were heavily funded by USAID. When funding was withdrawn from in 1993, serious problems resulted in implementing management strategies. Programs such as these which promote a public good, are rarely self-sustaining. Ecuador,[116] Indonesia,[117] the Philippines,[118] Sri Lanka,[119] Thailand[120] and Vietnam[121] have received overseas development assistance from several countries to establish coastal zone programs. The United States model, where the federal government facilitates state initiatives through the federal consistency rules, is worth examining for the Canadian East Coast. Federal U.S. funding can be as high as 80% of the total state program costs.[122] The federal program and funding scheme in Australia is also interesting: their program is still in the development phase and should be followed for lessons learned.

An ICZM initiative in Atlantic Canada will require adequate and consistent funding throughout the program development and implementation process. Traditionally the federal government has funded up to 90% of federal-provincial subsidiary agreements. Under a system similar to the U.S. model, provinces, municipal governments, and community-based groups could apply for funding for their respective management initiatives after meeting established guidelines and consistency requirements. This type of approach can present a number of problems, particularly for those receiving funding resources. Careful attention should be paid to the criteria developed for funding eligibility and the ability to support a wide range of management efforts. Ideally, funding should come from a variety of sources. Funding needs to reflect the roles and responsibilities of each of the participants in the ICZM program. The community-based emphasis of ICZM in Atlantic Canada requires external funding to support these activities. Without a stable and adequate source of funding, the success of the program is limited from the outset.

Conflict Avoidance and Dispute Resolution Mechanisms

Given the diverse uses and ever-increasing demand for coastal areas, multiple use conflicts are a common feature of the coastal zone world-wide. Conflict, particularly between current coastal resource users, new development activities, and conservation interests is inevitable. These conflicts occur both within and across sectors. To avoid and resolve such conflicts, consensus-building and conflict resolution techniques are recognized as a critical component of ICZM. The literature reviewed, however, did not provide much information on this issue or techniques deployed. Only a few models have distinct mechanisms to resolve policy and resource-use conflicts. Japan and many other Asian countries have a cultural and legal tradition based on consensus, conciliation and mediation. The United States is developing alternative dispute resolution techniques in an otherwise litigious society.[123] Procedures for conflict resolution, including negotiation, mediation, consultation, coordination mechanisms, policy conferences and third party settlements, are used. The U.S. federal legislation, the CZMA

(United States, 1972), provides two formal mechanisms for resolving state-federal disputes: mediation and administrative appeals.

While recognizing that conflict sometimes cannot be avoided, identifying and anticipating conflicts wherever possible is a critical corollary to the alternative dispute resolution process. To successfully avoid conflict, an integrated consultation among industry, governmental agencies, non-governmental interests, communities and other stakeholders is required. By providing and obtaining relevant information, conducting broad-based consultations, coordinating the scoping exercise and legislating effective planning of the project, many potential conflicts can be identified and resolved during the project design phase.

In Atlantic Canada, when a dispute arises over coastal resources, there are notable cases of public confrontation and demonstrations by stakeholders as well as legal recourse through the judicial system and/or an inquiry. Unfortunately, these adversarial processes do not promote working relationships. An alternative dispute resolution approach must be incorporated into the ICZM regulatory regime ensuring the use of independent conciliation and mediation techniques. This is a growing trend in environmental law (afforded in the N.S. legislation) and is well established in B.C. In other countries, various councils, commissions, inquiries, or coordinating offices play an important role in resolving conflicts. Moreover, Ecuador[124] and the Netherlands[125] take a pro-active approach to resolving conflicts by establishing inter-ministerial commissions to address conflicts among responsible departments. A similar body could be established on the East Coast with the purpose of identifying and resolving conflicts at both the policy and operational level. This body would need to have broad representation, composed of relevant federal/provincial agencies, Aboriginal groups, NGOs, community organizations, and industry (see Multi-sectoral Capacity, above).

Legislative Instruments[126]

A world-wide survey of national legislation relevant for coastal zone management provides useful insights into how Canada might consider its options in pursuing legal development in this field. There exists a broad range of oceans/maritime zone and coastal zone management legislation. Most of the coastal zone management programs reviewed are supported by CZM legislation. Based on their own particular context and experience, different countries have opted for their own unique legislative approaches, with no one widely emulated model. The UK passed the *Coast Protection Act* (United Kingdom, 1949) with provision for the development of integrated management policies and plans. In the U.S., the *Coastal Zone Management Act* (United States, 1972; United States, 1990) has a relatively long history, and the only country with a national legislative scheme in the context of a federal state. Costa Rica passed a *Coastal Zone Management Law* in 1977 (Costa Rica, 1977) and France promulgated *Loi Littoral* in 1986 (France, 1986). New Zealand passed its comprehensive *Resource Management Act* (New Zealand, 1991). Following the adoption of the Act, New Zealand issued the first Coastal Policy Statement in 1992. Ecuador promulgated its *Executive Decree 3399* (Ecuador, 1992). In Australia, the closest situation to that of Canada, there has been discussion of a *Commonwealth Coastal Resources Act*, but this approach has been abandoned for more informal mechanisms.

In surveying oceans/maritime zone and CZM legislation, the *Oceans Act* is not able to provide for the full development of a federal ICZM effort. Canada has a number of options to develop

an appropriate legislative framework to support ICZM. We would recommend the third option.

Option 1 **Expand the *Oceans Act*.** The application of the national oceans management strategy and integrated management could be expanded to cover its application for ICZM, fully incorporating coastal areas and watersheds. For constitutional reasons, the emphasis of the Act is on oceans. The specific exclusion of rivers and lakes is a problem, restricting the management area covered in ICZM. If ICZM is to be meaningfully pursued, an amendment to include watersheds is required in the future. In the meantime, and for the future, a legislative framework for ICZM management could be developed through subsidiary legislation. A potential pitfall here is that what should be in essence a multi-departmental/multi-governmental level initiative would be developed under the auspices of one Minister at the Federal level.

Option 2 **Regional Initiatives and Legislation:** This option would permit individual provinces, or regions, to develop CZM initiatives within the framework of the *Oceans Act* and with federal support. This approach would be somewhat similar to the approach adopted in the *Gulf of Maine Action Plan* (Gulf of Maine Council, 1996), where the provinces in Canada and the states in the U.S. have taken the lead. The constraint on the applicability of provincial legislation to marine areas can be addressed in a manner similar to the *Canadian Laws Offshore Application Act* (Canada, 1990), which extends the application of provincial legislation to offshore oil and gas development activities. This *Act* has been incorporated into the *Oceans Act*, facilitating the adoption of this second option. This option would also enable the expansion of CZM to include watersheds within provincial jurisdiction, as may be necessary.

Option 3 **Enact Separate ICZM Legislation**: The *Oceans Act* could be left intact to address oceans issues only, as in the case of much of the international practice on this subject. The next step would be to develop a new ICZM partnership bill, that could declare ICZM policy and develop an appropriate multi-governmental level framework. This option could encourage the development of coastal zone management legislation at the federal and provincial level that references the interests, roles, rights and responsibilities of either level of government and commits the two levels of government to cooperation and partnership in the joint protection and management of the land and water areas of the coastal zone. Interlocking provincial/federal legislation would overcome jurisdictional problems that have historically hindered the implementation of ICZM in Canada. CZM is of such importance and cuts across so many different sectors that the development of a ICZM-specific statute, with mirror legislation at the provincial level, is worth exploring.

In terms of additional legislative instruments, most of the ICZM models reviewed have used permitting procedures, development setbacks, EIA, land acquisition, and zoning as key mechanisms for achieving management objectives. In particular, the use of setbacks and permitting procedures specific to coastal management purposes are the key means of limiting development and incompatible uses in the coastal zone. Sri Lanka,[127] Costa Rica,[128] Denmark[129] and many U.S. states[130] rely heavily upon these type of instruments to protect the coastal zone. For Atlantic Canada, a permitting scheme specific to the coastal zone provides an interesting

opportunity for municipal level governments to contribute practically to ICZM. A review of current legislative and regulatory instruments, which have been largely developed for terrestrial concerns, would be necessary and specific procedures to address issues in the coastal zone established.

Policy Instruments

A variety of policy and related planning instruments are used to support ICZM initiatives in the models reviewed. Legislation can constitute an expression of policy, *i.e.* ICZM policy is declared in the statute itself, or may simply be a tool for the implementation of declared policy. In either case, an ICZM policy is necessary to facilitate coherency, clarity, consistency, efficiency and equity in legislation. Moreover, the policy framework, often termed the policy statement, defines the roles and responsibilities of levels and units of government and outlines the basic means of achieving management objectives. In most of the models, a national policy framework was developed, or is currently under development, to direct and support ICZM programs. For example, Sri Lanka's Coastal Management Plan and related Coastal 2000 policy paper define the roles, responsibilities and management activities in greater detail than is provided in legislation.[131] Similarly in New Zealand, a well defined policy statement (New Zealand, 1994) was required to define in more practical terms the objectives of ICZM and the roles and responsibilities of each stakeholder than is provided in the *Resource Management Act* (New Zealand, 1991). Generally, most of the models examined were better at developing policy than implementing management strategies. This can partly be attributed to the recent development of most ICZM initiatives, and the monumental task of creating and restructuring government bodies, as is the case in the United Kingdom,[132] Australia,[133] and Singapore.[134]

Canada will need to develop a comprehensive policy and planning framework that clearly identifies the goals and objectives of ICZM and defines the roles and responsibilities of each relevant federal and provincial agency and other stakeholders. Moreover, the policy framework needs to apply the full range of human activities and ecosystems within the Canadian coastal zone. The policy framework at the national level needs to accurately reflect the jurisdictional and practical realities of Canada's coastal areas, taking a decentralized approach, recognizing the crucial role of individual provincial and community level programs. The United States provides useful guidance regarding the design of a policy framework within a federalist structure. This model is built upon inter-agency and inter-governmental partnerships to facilitate management among a diverse number of governments. To facilitate this cooperation, the U.S. federal policy is built upon a voluntary system for states based on a number of incentives to induce participation.[135] The U.S. government has identified clear requirements and principles intended to influence the design of separate state and local level initiatives. At the state level, Washington is an example of a decentralized approach that advocates policy implementation at the local level, while maintaining common objectives for the coastal zone at the state level.[136]

The Canadian federal government should provide national guidelines and principles in keeping with the statutory objective in the *Oceans Act* to achieve sustainable development through integrated management and the precautionary approach. Such a framework, if undertaken in collaboration with the provinces, would harmonize provincial and local initiatives and provide minimum national standards. Canada should follow the lead of New Zealand, establishing national principles, goals and objectives for the sustainable development of Canada's coastal and ocean resources and the conservation, protection and restoration of the coastal and ocean environments on all three coasts. Similarly, these policies should incorporate internationally and nationally recognized principles of ICZM.

The national policy and planning framework needs to reflect the current movement towards community-based initiatives, building cooperative working relationships between each level of government and communities. The policy framework design and implementation aspects of the Ecuador[137] model could be adapted for the East Coast. Ecuador has established a 'parallel' management program, combining the development of a national policy framework with the promotion of community-based efforts. The Ecuador model is a good example of an evolving management program approach: it builds joint decision-making relationships among a variety of stakeholders and develops local level capacity to implement policy objectives.

The lessons learned from the policy formulation process in other models is helpful. The experiences in Australia,[138] the UK,[139] and in South Africa[140] illustrate the need for multi-stakeholder involvement throughout the policy development process. Policies and plans need the support and input of existing agencies with responsibilities for the regulation, monitoring, and use of the coastal zone. The policy must promote and facilitate 'on the ground' activities (both by governmental entities and the community). The use of workshops and inquiries, such as the *Coastal Inquiry* in Australia,[141] have allowed for participation and input from many stakeholders, building critical support for the initiative. Given the diverse interests in the Atlantic region, stakeholder cynicism and skepticism with government consultation, and an increasing desire for a transparent approach to governance, a different policy development process will need to be adopted. The federal government may want to refer to the "Coastal Zone Management: A Framework for Action", from the Coastal Zone '94 Conference, for a broader consultation process (Wells and Ricketts, 1996). Martin Weisbord also presents an innovative and proven technique for conducting visioning exercises which achieve consensus and multi-stakeholder collaboration to effect change (Weisbord and Janoff, 1995).

The federal government should adopt a four prong approach to ICZM policy and program development in Atlantic Canada:

1) develop the national ICZM program under the Oceans Management Strategy over the next two years through a transparent, multi-stakeholder process to provide a national vision and an ICZM framework establishing minimum standards and national guidelines;

2) promote and support provincial ICZM initiatives that address regional concerns and needs, within the agreed national policy framework;

3) develop an institutional structure to overcome jurisdictional conflicts and overlaps (both federal/provincial and inter-provincial), integrating federal and provincial responsibilities and harmonizing the coastal zone efforts within the region; and,

4) initiate well defined, community based, coastal zone management pilot projects to develop capacity and obtain the practical experience required to test national policies and guidelines.

Role of Science

The role played by the natural and social sciences in ICZM varies in each of the models, depending upon the issue and the institutional arrangement. In general, science is a weak component of existing ICZM programs: the necessary scientific expertise is not linked to the policy and decision-making process. There is a trend towards developing 'applied' research

programs to support coastal management efforts, notably in Barbados,[142] the Netherlands,[143] Brazil,[144] China,[145] Denmark,[146] Sri Lanka,[147] and Australia.[148] Many research programs emphasize the natural sciences and coastal engineering. The United States has a greater degree of scientific input, with agencies such as Environmental Protection Agency or NOAA.[149] These agencies have considerable science capacity, cooperating with and supporting state level agencies and programs. The United States also has a well-established Sea Grant Program, providing federal funding for coastal and marine research.[150] Sea Grant is an important source of funding for science related activities, particularly at the state and local level, promoting partnerships between ICZM initiatives, universities and research institutes. Such a program would be particularly beneficial for Atlantic Canada.

Atlantic Canada possesses many of the world's best researchers and practitioners in the field of coastal and ocean studies. Strong, formalized linkages with these experts is necessary to assist in identifying and addressing the key issues. The Gulf of Maine Program[151] illustrates the significant contribution these linkages make to the management process. Another important source of scientific and socio-economic information is the traditional knowledge base of resource users, eg. fishers, and individuals within the coastal communities. Multidisciplinary teams including lawyers, social scientists, biologists, oceanographers, fishers, and community representatives are needed to compile research, analyze the data and formulate recommendations for decision-makers.

It is recommended that a Sea Grant Program be established for Atlantic Canada, adapting aspects of the U.S. Sea Grant Program and the Canadian Land Grant Program (providing extension services directly to the user groups). This program would define and coordinate research and allocate funds in response to needs identified by a multi-stakeholder committee. Such funding for basic and applied ICZM research is imperative to address the specific needs of the program, to ensure a precautionary approach is being taken to resource management, and to achieve sustainable development. Such knowledge will underpin policy and decision-making.

Education, Capacity Building, and Constituency Building

In many models reviewed, capacity development through ICZM education and training is essential. Many programs and workshops have been conducted in the ASEAN countries (Indonesia, Malaysia, Brunei, Thailand, Philippines),[152] Ecuador[153], Sri Lanka[154], and Singapore[155]. In Ecuador, training for community level management has contributed to local management capacity[156]. Both Ecuador and Australia (through the Great Barrier Reef Marine Park Authority activities and the recent National Marine Education Program), educate the general public regarding the need to protect the coastal zone. The Great Barrier Reef Marine Park allocates a significant percentage of their budget to public education.[157] New Zealand also dedicates a large percentage to public education and educating school children.[158] These efforts have resulted in public support for the coastal zone management activities and increased compliance. These models deployed a variety of methods and media to target a wide range of existing and potential coastal users, young and old. By contrast, without an educated and supportive public, developing and implementing ICZM programs has been fraught with problems in other countries.

The development of 'centres of excellence', such as the Coastal Management Centre in the Netherlands[159] or the Coastal Resources Center at the University of Rhode Island,[160] provide an important resource to contribute to training and education, not only in their countries but also internationally. There have also been a number of international efforts, such as the TRAIN-SEA-COAST program[161] offered through the United Nations Office of Ocean Affairs and Law of the Sea, TRAINMAR[162] offered by UNCTAD, and specific courses offered by UNEP.[163] The international biosphere reserve program, under UNESCO's Man and the Biosphere Program (MAB),[164] has an Outreach Coordinator whose responsibilities include going to schools to promote awareness of the importance of protecting biosphere reserves.

Education and capacity building is an important element in CZM for Atlantic Canada; it was recognized in the first symposium on shore zones held in 1978 (CCREM, 1978). Public education programs and media campaigns are necessary. Education of children from pre-school through to university is critical. Beginning at pre-school is not too soon. Such education will help to instill values ascribing worth to the sustainability of natural resources and the need to carefully manage people's use of these resources. Attitudinal change, stewardship and compliance can only occur with such education and experience. Education about sustainable development and the marine environment must be included in the curriculum at all levels in public schools in the region. Funding for curriculum development is required to provide teachers with the necessary resource materials. The federal government must cooperate with provinces to promote and facilitate education, training and capacity-building in integrated coastal and marine management and sustainable development for all stakeholders (including civil servants, politicians, scientists, technologists, community leaders, indigenous peoples, fishers, women and youth). Beyond education and capacity building, building a constituency of support for coastal zone management is an essential requirement for success.

C. CONCLUSIONS

With the exception of the United States and Ecuador, ICZM is still in the developmental stage. Many national programs were recently established or are under development: there is no agreement on a specific approach to ICZM. Caution must therefore be exercised in adopting an external model. Instead, a Canadian ICZM program should be tailored or adapted to the specific needs and characteristics of the East Coast. This review of ICZM models indicates there are a number of trends and discrete lessons to be learned for a federally coordinated initiative in Atlantic Canada. The federal government should adopt seven measures to effect ICZM policy and program development on the East Coast:

1) develop the national ICZM program under the Oceans Management Strategy over the next two years, establishing minimum standards and national guidelines based on accepted international ICZM guidelines and sustainable development objectives;

2) promote and support provincial ICZM initiatives that address regional concerns and needs, within the agreed national policy framework;

3) develop an institutional arrangement to overcome jurisdictional conflicts and overlaps (both federal/provincial and inter-provincial), integrating federal and provincial responsibilities, and harmonizing coastal zone efforts within the region;

4) initiate and fund well defined, community-based, coastal zone management pilot projects in the region to develop capacity and obtain the practical experience required to test national policies and guidelines;

5) establish a Sea Grant Program to support the research needs of the coastal programs and link researchers in the private sector and academia with the coastal zone program;

6) establish 'centres of excellence / expertise' to support ICZM pilot projects and assist with the development of policies and programs for the region providing expertise from government, the private sector, universities, NGOs, Aboriginal organizations, and communities; and,

7) heighten public awareness of the value of ICZM and build capacity through media, education and training programs at all levels to promote compliance, develop a supportive constituency for the policies and initiatives, and create a skilled human resource base.

Canada's *Oceans Act* (Canada, 1996) embraces the concepts of sustainable development, integrated management and the precautionary approach, in keeping with recent developments in international marine and environmental law. This enabling legislation positions Canada to be a leader in ICZM, ensuring sustainable use and protection of its coastal and marine resources. This is an opportunity and a challenge.

The *Oceans Act* should strive to:

- integrate the fisheries sector within a broader ICZM framework;
- introduce measures within the broader ICZM framework to reduce, remediate and control land-based sources of marine pollution;
- establish and support a network of community-based and regional ICZM initiatives to effectively manage and protect the coastal zone;
- establish an integrated national system of marine protected areas in accordance with Canada's commitments under the *Convention on Biodiversity* (United Nations, 1992), and the accompanying *Jakarta Mandate* (Conference of the Parties to the Convention on Biological Diversity, 1995).

VI. POTENTIAL APPLICATION OF INTERNATIONAL ICZM MODELS FOR COASTAL ZONE MANAGEMENT IN BRITISH COLUMBIA

Richard K. Paisley*

A. BACKGROUND

Physical and Biological Characteristics

According to a recent study produced for the IUCN (Kelleher *et al.*, 1995), the West Coast of Canada is part of the West Coast Fjords Province of the North East Pacific Marine Region, bounded by Cape Spencer to the north and Vancouver Island and Puget Sound to the south. This is a transition zone, containing some subpolar fauna in their southern ranges and some temperate species in their northern range. The southern boundary is identified primarily on the basis of the distribution of demersal fishes, especially sculpins.

From an oceanographic perspective the Alaska Coastal Current strongly influences the West Coast Fjords Province as it flows northward along the continental shelf. Tidal movement is strong along inside waters, especially in restricted passages. Water temperatures are fairly constant throughout the year: 8-14 degrees Celsius at the surface along the outer coast, with cooler minimum temperatures likely in the headwaters of the northernmost fjords (Kelleher *et al.*, 1995). Observed water temperatures suggest that some upwelling is also likely to occur along the west coast of Vancouver island. Upwelling is an important phenomenon for the production of marine life as it brings nutrients up from deeper areas to the surface where primary production occurs.

The British Columbia coast in general is dominated by fjords and rocky coastlines. Only a few relatively small estuaries are found, although the entire southern Strait of Georgia and the Puget Sound region is often considered a form of modified estuary: a semi enclosed fjordal embayment with extensive freshwater input. The geological composition of the West Coast is predominantly of older resistant material, except in Georgia Strait and Puget Sound where glacial fluvial material is found. Mudflats often occur at the very head of fjords, especially in the south. Deltaic deposits are found at the mouths of the major mainland rivers such as the Stikine, the Skeena, and the Fraser. This extremely rugged coastal province is also characterized by a very narrow continental shelf. Seaward of the coastal islands, the shelf is sometimes less than 8 km wide, although it is more typically 16 - 32 km wide. In inside waters, the shelf width is highly irregular, varying from 48 - 80 km between offshore island groups and the mainland to less than two km elsewhere.[165]

Several hundred fish species are found in this region, including very abundant marine forms such as walleye pollock, Pacific cod, numerous rockfishes, Pacific halibut, sole, flounder, lingcod, Pacific herring and Irish Lords, as well as anadromous species such as steelhead, and

* *Richard Paisley, a marine lawyer affiliated with Westwater Research Centre, University of British Columbia, Vancouver, B.C., V6T 1Z2, was contracted by Meltzer Research and Consulting to prepare the West Coast analysis for this study.* *Mr. Paisley wishes to express his sincere appreciation to his colleague, Mr. Anthony Dorcey, for carefully reviewing and contributing to the drafts and final manuscript. The author would also like to thank Evelyne Meltzer for her contribution, and acknowledges that many sections of the chapter on Atlantic Canada were incorporated in this analysis.*

all five species of Pacific salmon (sockeye, chinook, chum, pink and coho). Marine mammals feed and migrate through these waters. Species commonly seen include sei, humpback, orca, gray, minke, short finned pilot, and fin whales. Large cetaceans seen less commonly or further offshore include the sperm, blue and right whales. Other cetaceans include harbour porpoise, Dall's porpoise, Pacific Whiteside dolphin and common dolphin. There are also isolated populations of sea otters and more commonly California sea lion, Stellar sea lion, harbour seal, northern elephant seal and northern fur seal. The West Coast Fjords Province also contains over seven million sea birds (Kelleher *et al.*, 1995).

Population and Development Pressures

The West Coast is generally thought of as being a relatively pristine marine environment. Increasingly, however, serious environmental problems are starting to develop in certain areas: the waters and adjacent uplands of the Georgia Basin are experiencing tremendous population growth and development pressures. Among those portions of the marine and coastal system that are particularly threatened are coastal waters that receive waste discharges from pulp and paper mills, mine tailings, dumping of dredged and contaminated materials, municipal wastewater, industrial discharges, urban and agricultural runoff, and oil and chemical spills. Water quality objectives are currently exceeded in several locations in British Columbia, usually adjacent to urban areas or in poorly flushed locations. To cite one example, Boundary Bay shellfish harvesting has been closed since 1962. Currently over 72,000 hectares of coastal waters are currently closed to shellfish harvesting primarily due to sewage contamination (Canada, 1991).

Recent media reports have dwelt at length on the perception of crisis in the British Columbia sport and commercial salmon fishery. Many areas of the coast appear to be experiencing increasing losses of critical habitat and biodiversity. Environmental advocacy groups such as the David Suzuki Foundation (Walters, 1995) and the Save Georgia Strait Alliance (McBride, Pers. Comm., 1998) have also identified a variety of British Columbia fish species that appear to have populations significantly below historical levels, including chinook and coho stocks in Georgia Strait and various species of groundfish, including copper rock fish, quill back rock fish and black rock fish.

In the United States the words 'threatened' and 'endangered' have a particular legal meaning pursuant to the federal United States Endangered Species Act (United States, 1973).[166] Under this legislation a number of West Coast species have been listed as either threatened or endangered: southern sea otter; Stellar's sea lion; Guadalupe fur seal; Blue Whale; Bowhead Whale; Fin back Whale; Grey Whale; Humpback Whale; Right Whale; Sei Whale; Sperm Whale; Short Tailed albatross; Spectacled Eider; Eskimo Curlew; American Peregrine Falcon; Arctic Peregrine Falcon; Aleutian Canada Goose; Marbled Murrelet and various stocks of Chinook and Sockeye Salmon. In Canada, the sea otter, Nooksack dace (fish) and Salish sucker are endangered, the Humpback Whale, Enos Lake stickleback and Shorthead culpin are threatened, and the Blue whale, Fin Whale, Ancient Murrelet, Ivory Gull, Pacific Great Blue Heron, Peale's Peregrine Falcon, Cultus Pygmy Sculpin, and Stickleback are vulnerable.

Sustaining Coastal Communities and the Need for ICZM

The West Coast's many coastal communities depend upon coastal resources for fisheries, transportation, and increasingly aquaculture and tourism. Unlike the general situation on the Atlantic coast, a significant number of coastal communities are also heavily dependent on the forest industry. On the West Coast, like the East Coast, the coastal environment is also very much linked to the socio-cultural heritage of the region. Human-induced stresses such as pollution, habitat degradation and resource depletion are increasingly thought to be compromising both the productivity and sustainability of coastal communities. Use conflicts between traditional fisheries, aquaculture, and conservation initiatives are also increasingly found throughout the region.

There is also a perception on the West Coast that in the absence of a strategic plan to protect and manage the coastal zone of British Columbia, increasing tourism, residential and commercial pressures, and the growing competition for coastal space will eventually compromise the integrity of the West Coast coastal environment. Both studies funded and sponsored by various levels of government and independent assessments have concluded that British Columbia has the potential to benefit from a more integrated and co-ordinated approach to the management of the coastal zone (Dorcey, 1986; McFee and Wolfe, 1993; Owen, 1988; Truscott and Dunn, 1994). An Integrated Coastal Zone Management (ICZM) Program for the West Coast region would arguably provide a strategic mechanism to address the current jurisdictional and institutional complexities that impede a co-ordinated approach to preserving the ecological and economic integrity of the coastal zone.

History of CZM and ICZM in British Columbia

On the West Coast, the federal and provincial governments, along with various municipal and regional governments, have been flirting with ICZM for many years. The driving force behind these initiatives has been an increasing perception that key resource issues are not being adequately and properly dealt with by current initiatives. These key resource issues include lack of a growth management strategy, increasing loss of critical fisheries and wildlife habitat, increasing loss of biodiversity, and increasing loss of economic development opportunities. Recent initiatives at a variety of levels have suggested that the resolution of resource issues on the West Coast could benefit from ICZM:

Federal:

1. The federal Department of Environment (DOE) and the federal Department of Fisheries and Oceans (DFO) were active participants in Coastal Zone Canada '94 held in September, 1994 in Halifax (Wells and Ricketts, 1996).
2. The federal DOE has constructed a draft policy document 'Coastal Zone Management: A Framework for Action' (Environment Canada, 1993).
3. Various federal departments, along with the province and other interested parties, are actively participating in the Georgia Basin and Pacific Marine Heritage Legacy initiatives.
4. DFO has taken the lead in funding a number of local 'sustainability' initiatives, e.g. Comox Valley Round Table, Howe Sound Round Table.
5. The Fraser River Management Estuary Program (FREMP) and the Fraser Basin Management Board (FBMB) are important models to consider for both their successes and their failures to co-ordinate different levels of government.

Provincial:

1. A provincial Coastal Resource Strategy Study Steering Committee, created in 1993, published a report entitled 'Towards a Coastal Resource Strategy' outlining the possible contents of a provincial ICZM strategy (Wolfe, pers comm., 1998).
2. The provincial government has been an active participant with stakeholders, and other levels of government, in working towards the establishment and maintenance of a systematic network of Marine Protected Areas on the West Coast.
3. The work of the now disbanded Commission on Resources and Environment (CORE) has underscored the need for ICZM on the West Coast by demonstrating that it is possible to successfully involve the public in land use planning processes.

Many First Nations (aboriginal governments) in British Columbia are also genuinely concerned about ICZM issues and are committed to the more enlightened stewardship of natural resources. However, many First Nations communities are also justifiably reluctant to become involved in planning exercises that they feel might potentially prejudice their resolved aboriginal land and sea claims.

B. POTENTIAL APPLICABILITY OF ICZM MODELS TO THE WEST COAST

Coastal Zone Definition

Defining the breadth of the coastal zone over which any particular ICZM initiative is to operate has proven to be challenging throughout the world. The two predominant methods that have been used to provide a definition of the appropriate physical extent of the coastal zone have been the 'legislative' method and the 'functional designation' method. Among those jurisdictions that have used the legislative method have been the U.S., *Coastal Zone Management Act* (United States, 1972); the UK, *Coast Protection Act* (United Kingdom, 1949); Mauritius, *Environment Protection Act* (Mauritius, 1991); and New Zealand, *Resource Management Act* (New Zealand, 1991). Among those jurisdictions that have used the more common functional designation have been Sri Lanka,[167] and Costa Rica.[168]

Experience in other jurisdictions suggests that a modest landward boundary in the definition of the coastal zone facilitates implementation and engenders less local opposition (*e.g.* Washington State CZM Program,[169] San Francisco Bay ICZM Program).[170] However, if the landward boundary of the coastal zone is defined too modestly then the ICZM program to which the definition applies will usually be less capable of facilitating an ecosystem-based approach for addressing resource allocation and management challenges (e.g. Washington state) (See Canning, 1992).

Experience in some jurisdictions also suggests that coastal communities are inevitably the best initiators of ICZM and that the stronger the community support the easier it is to adopt a more extensive coastal zone boundary (e.g., Oregon).[171] Conversely, the weaker the perception of community support the harder it is to adopt a more extensive coastal zone boundary (*e.g.*, Washington state where initially limited boundaries are thought to have constrained the implementation of the ICZM program to the point of ineffectiveness). Finally, experience in other jurisdictions suggests that it is important to have a well thought out strategy to deal with anticipated opposition to ICZM, especially from real estate and local government interests (*e.g.*, in Oregon, Washington and California such strategies were largely absent and as a result it took a lot longer for ICZM to be successful than had originally been anticipated).

None of the boundary definitions used elsewhere in the world appear to be completely appropriate to the situation on the Canadian West Coast with its unique mix of coastal environments and issues, its multiple levels of government and related jurisdictional issues, and its large size and relatively small population. For these reasons, a flexible coastal zone management definition would be favoured, and the best approach may be to adopt an issue-driven and ecosystem-based boundary rather than a strict legal or administrative definition. This would represent a 'functional' boundary in a biological sense and, provided an ecosystem approach to management was adopted, it would also prove to be 'functional' in a stewardship sense. Such an approach is also amenable for use as part of an active, adaptive management strategy, which is increasingly being used in internationally developed agreements and guidelines concerning ICZM, such as the UN Convention on Straddling and Highly Migratory Stocks (United Nations, 1995). New Zealand[172] and Ecuador[173] are examples of jurisdictions that have implemented this 'functional' approach, where the landward delimitation of the coastal zone has essentially been determined by the issues of concern at the local level.

On the Canadian west coast, boundaries will need to be defined at both the local and regional levels, extending as far inland and seaward as necessary to achieve ICZM program objectives. As a practical matter, this means that it will be important to give consideration to the relevant environmental and socio-economic concerns and problems to be addressed.

Levels of Government

The federal structure of government in Canada provides an interesting challenge to ICZM proponents on both coasts. In Canada. the federal government pursuant to the *Constitution Act* (Canada, 1982), has legislative jurisdiction over living marine resources, as well as other matters affecting ICZM, such as transportation, navigation, and the environment. In comparison, the government of British Columbia has jurisdiction over a number of matters affecting ICZM, such as provincial lands, the shoreline, freshwater resources, and many landbased activities affecting the coastal environment. In addition, First Nations governments on the West Coast have an evolving, but not yet fully defined, role to play in the governance of West Coast resources. The current political ethos that has seen various levels of government attempting to 'download' responsibilities and expenditures, also has important ramifications for the possible implementation of an ICZM initiative on the West Coast.

Governmental and institutional responsibilities for management of the coastal zone vary considerably throughout the world depending, among other things, on the division of powers allocated to resources in the coastal zone. Many of the countries reviewed have strong central governments *e.g.* Brunei, United Kingdom, New Zealand, and France, and therefore do not easily correspond to Canadian federalism. The two countries which have both a form of ICZM, and a government structure that is most like Canada, are the United States and Australia. Both the United States and Australia have sub-national (state) governments with a relatively high degree of responsibility for coastal resources. Many have developed their own ICZM programs.[174] However, the federal governments in both Australia and the United States have reserved a strong role for themselves in the design and implementation of ICZM.

The lesson from other jurisdictions with regard to ICZM governance on the West Coast is that all four levels of government -- federal, provincial, municipal and First Nations, will unquestionably need to be part of the process for real progress to be made. If any of the four are left out, it is likely that any new ICZM initiative, however structured, will go nowhere. The lesson to be learned in this regard, particularly from the United States and Australia ICZM experience, is that responsibilities between different levels of government will need to be distinctly defined, the roles of individual ministries or departments clarified, and inter-agency and inter-governmental co-ordination mechanisms and arrangements, including dispute resolution mechanisms, developed.

As noted in the section on ICZM in the Atlantic, there appear to be at least three main institutional approaches used throughout the world to effect the kind of integration and co-ordination within government that will be required if ICZM is going to work on the West Coast:

- Concentration of authority in a new centralized agency, *e.g.* Sri Lanka, where the Coastal Conservation Department was formed to develop and co-ordinate management efforts,[175] and California, where the California Coastal Commission was created.[176]

- Expansion and enhancement of the duties of an existing agency *e.g.*, New Zealand, where the Department of Environment was given significant powers under the Resource Management Act (New Zealand, 1992) which fundamentally redefined federal and lower level government responsibilities, and Washington state, where the Department of Ecology

was given responsibility for developing and co-ordinating the management effort among state and local governments.[177]

- Establishment of an inter-agency co-ordinating committee, *e.g.* Ecuador, where an inter-agency committee was established and placed at the highest level of government to co-ordinate ICZM.[178]

British Columbia has had particular and recent experience with the first and third of these approaches in a resource management context. More specifically, the province recently experimented with the creation of an agency charged with developing land use allocation strategies and priorities, called the Commission on Resources and Environment (CORE). British Columbia has also experimented with the inter-agency co-ordination model in the form of the powerful Land Use Co-ordination Office (LUCO), which continues to play a key role in provincial land use planning decisions. FREMP and the FBMB are also important West Coast examples of an on-going and apparently successful inter-agency (and intergovernmental) approach to resource management issues.

In launching a new initiative it is often thought to be expedient to mimic the form of existing initiatives perceived as having been successful. On this basis, Option 3, an inter-agency approach to ICZM in British Columbia, would be favoured at this time. This conclusion is buttressed by the increasing fiscal constraints under which the provincial government is now operating.

Multiple Governments

There are many activities in the coastal zone with an international dimension. They include water quality, pollution management, shipping, marine tourism and the exploitation of living marine resources. As noted in the section on the potential application of ICZM to Atlantic Canada, most of the international models of ICZM that have been reviewed in the context of this project have coastal neighbours and several have established multilateral agreements and mechanisms to address mutual concerns.

British Columbia's immediate maritime neighbours are the states of Washington and Alaska. Both of these jurisdictions are engaged in some form of ICZM planning. Any successful ICZM program on the Canadian west coast must be capable of integrating transboundary environmental and resource management issues involving multiple sovereign governments. Co-operative management agreements and joint assessments and planning activities will unquestionably be crucial to developing the necessary integration between multiple governments in the region. The Georgia Basin Initiative and the British Columbia - Washington Environmental Co-operative Agreement (Kangasniemi, 1994) are examples of current initiatives addressing ocean use and river basin management between British Columbia and Washington. They may well serve as an important basis on which the two jurisdictions can work co-operatively on ICZM issues.

Physical

Due to their geographical proximity, Washington, Oregon, and Alaska share key physical characteristics with British Columbia. Each of these jurisdictions, to some extent, feature a large

temperate rain forest, a relatively wet coast, a relatively dry central interior and varying degrees of exposed coastline.

Socio-economic

Washington state and Oregon are again similar to British Columbia -- the economies of all three were initially natural resource-based but are now giving way to more service based economies. All three jurisdictions have a relatively high standard of living where the environment continues to be a relatively important political issue. Growth management issues are also important in all three jurisdictions. From a comparative international perspective, socio-economic considerations appear to be a weak component of many of the ICZM management models reviewed. Only a limited number of jurisdictions, *e.g.* South Australia / Tasmania and New Zealand, appear to have successfully integrated socio-economic factors into coastal zone planning. Other jurisdictions, such as Sri Lanka, France and the United Kingdom, were initially concerned with erosion and shore development issues and have only recently expanded the scope of their programs to try to include broader social and economic concerns.[179]

In order to be successful, any ICZM initiative in British Columbia will need to effectively integrate the key socio-economic issues of the region and be linked to community development as well as federal / provincial land use, sea use and economic planning. In British Columbia this will require, among other things, close cooperation and integration with current LRMP and OCP (Official Community Plan) land use planning initiatives and First Nations land and sea claim negotiations.

Environmental Issues

As noted in the section on the potential application of ICZM to Atlantic Canada, pressures from development and population growth have increased the overall vulnerability of the coastal zone in each of the models reviewed. Among the common environmental issues found in the various ICZM models surveyed were contamination of coastal waters and an accelerated decline of natural resources, such as fish stocks, and habitats, such as beaches and wetlands. Pollution of coastal waters from land based sources, both direct and diffuse, is a world-wide problem. There are a number of site specific initiatives, such as harbour or estuary restoration projects, but few ICZM pollution prevention initiatives. The 1990 amendments to the US *Coastal Zone Management Act* (United States, 1990) require non-point sources to be included under state and local level management . The Land Care program in Australia is also intended to address land-based pollution concerns (Campbell, 1995).

The major causes of marine degradation in the marine / coastal system on the West Coast of Canada appear to be:

1. *Urban encroachment into the coastal zone.* This is the most serious challenge to coastal environmental quality in the lower mainland area of British Columbia where the vast bulk of the population currently resides and a challenge that will undoubtedly intensify as the population of the region increases. Economic growth forces are pushing this development and current control mechanisms do not appear to be strong enough to resist this trend or may be largely absent altogether. Population movement to, and settlement at, the coast are

major factors contributing to this problem. These factors are also generating increasing pressures on infrastructure, social services and housing.

2. *Leisure, tourism and recreational developments.* Tourism is now the largest industry in British Columbia and a significant portion of that industry is increasingly being located on the coast. Concomitant seasonal pressures are outstripping the capability of infrastructures, resulting in serious local and regional impacts. The rapid growth of tourism developments has also exacerbated impacts in certain areas, as evidenced by drainage of wetlands and marshes, water pollution, traffic congestion, and waste disposal problems.

3. *Pollution of coastal and estuarine waters.* Both point and non-point source discharges are increasingly serious problems. Most contamination in the British Columbia coastal zone is attributable to land-based sources, both along the coasts and from adjoining watersheds. The raw sewage that continues to be dumped into the ocean at both Vancouver and Victoria is a volatile political issue. Oil discharges from ships passing through coastal waters represents a marine based pollution source. The impacts of pollution on living marine resources are also increasingly significant and have been attributed as a cause of recent declines in certain salmon runs (Fraser Sockeye Public Review Board, 1995).

4. *Aquaculture impacts.* Aquacultural operations and the possible environmental impacts that such operations can have on traditional fishing grounds is an area of occasional concern in British Columbia. Reduced visual amenities, noise, pollution associated with increased organic loading on the ambient environment, the potential for escape for farmed species, restrictions on the types of activities permitted, and the public use of water space near aquaculture operations are of particular concern.

5. *Unsustainable harvesting of living marine resources.* Technological improvements and extensive capital investments have increased the geographic range of fishing vessels and the efficiency of their operations. Success in addressing fundamental issues of over capacity in the fishing fleet has been elusive. The basic problem of too many fishermen chasing too few fish remains conspicuously unresolved on the West Coast, despite recent well-publicized initiatives, including the Mifflin Plan for fleet restructuring (Curtis, 1997).

6. *Coastal hazards.* Coastal hazards of flooding and erosion are problems likely to increase as sea levels rise on the West Coast resulting from climatic change. The inundation of wetlands, accelerated coastal erosion, increased threat of coastal flooding and changes in the salinity of rivers, bays and aquifers are possible impacts of sea level rise.

In order to be successful, it is highly likely any new ICZM initiative on the Canadian West Coast will have to overcome the federal-provincial jurisdictional conflicts inherent, among other things, in the control of land-based sources of coastal pollution. Effective strategies must be developed and implemented to improve estuarine and nearshore water quality. These strategies must be capable of being implemented at the community level. Many ICZM programs world-wide also strongly acknowledge and affirm the importance of MPAs, marine parks, and multiple purpose zones as innovative and essential mechanisms to conserve, protect and restore sensitive coastal ecosystems.

On the West Coast, DFO, together with Heritage (Parks) Canada, BC Parks and the Canadian Wildlife Service, has been at the forefront in helping to establish and maintain an intergovernmental steering committee dedicated to the establishment and maintenance of

MPAs on the West Coast (Henwood, pers. comm., 1996). This existing intergovernmental initiative could arguably provide a particularly important springboard from which to launch a broader successful ICZM initiative on the West Coast. This is not to say that the current initiative is perfect. Among other things, the current federal-provincial MPA initiative needs to be broadened to more directly involve environmental non-governmental organizations, academic stakeholders, the First Nations, and coastal communities in decision making and policy development.

Resource Issues

Few of the ICZM models we studied in other jurisdictions featured comprehensive resource management mechanisms which adequately addressed resource issues and conflicts within an ICZM framework: few jurisdictions have chosen to directly include fisheries issues in the ICZM planning initiatives. Presumably this is because the issue of allocation of the resource among and between user groups is invariably the subject of dispute. Fish and wildlife habitat destruction, preservation of habitat and over harvesting of fish are also major issues in British Columbia. Forces that may be opposed to ICZM in British Columbia include actors similar to those who challenged the implementation of ICZM in jurisdictions such as Washington, Oregon and California (*e.g.* real estate developers). Recent controversies over job losses in British Columbia's resource based industries are another reason why a new ICZM initiative will have to be carefully marketed on the West Coast.

In British Columbia, the future of the fisheries is currently under review with co-management and community quotas suggested as two possible options for redressing current difficulties. Both of these alternatives have direct implications on the socio-economic survival of coastal communities and the health of the coastal environment. The current situation on the West Coast is complicated by the negotiations now going on to possibly devolve jurisdiction over fisheries habitat and other matters from the federal to the provincial, local and First Nations levels of government. It is still too early to predict what the precise results of these ongoing negotiations will be for the future of ICZM on the West Coast but the impact is likely to be significant.

Community Involvement

Of all jurisdictions looked at in this study, British Columbia may currently have one of the highest levels of community involvement in resource allocation decision making. The British Columbia Round Table on Environment and Economy, the British Columbia Energy Commission and the British Columbia Commission on Resources and Environment (CORE) (all now disbanded) made land use planning and resource allocation decisions politically possible that were previously not imaginable. More significantly, each of these pioneering processes had a relatively vibrant public participation/community involvement component which would seem to be worthy of emulation in any new West Coast ICZM initiative.

As noted in the section on Atlantic Canada, public participation and local level involvement have been increasingly recognized as an important component of coastal management in virtually all of the ICZM models reviewed. Similarly, NGOs and community level organizations increasingly appear to be playing a major role in coastal zone management initiatives around the world. It is important to note that each model reviewed appears to have a

different definition for the terms 'community' and 'public'. For this reason alone it has been challenging to assess how successful many countries have been in involving and incorporating community interests beyond formulating the vision and providing general objectives. In most of the models reviewed, communities have typically participated in coastal zone management through public meetings, hearings and inquiries, and as representatives on advisory committees or councils.

In the United States, public involvement is a federally legislated requirement for the development and implementation of all state level coastal zone management programs, making comparisons difficult (United States, 1990). The role of national or regional environmental non-governmental organizations (ENGOs) interested in specific aspects of the coastal zone or the entire coast have played a particularly important role in supporting and co-ordinating coastal management efforts in some jurisdictions. More specifically, as noted in the section on Atlantic Canada, the Fund-Action Pedro Vicente Maldanado in Ecuador[180] has played a significant role in developing the partnership with government and communities. Similarly, in California, the California Coastal Alliance has greatly contributed to the management process. In British Columbia, a number of environmental organizations are particularly active in the marine area including the Canadian Parks and Wilderness Society, WWF Canada, Greenpeace, the Marine Life Sanctuaries Society, and the Outdoor Recreation Council of British Columbia. However, each of these is sector or interest specific and none of them represent an integrated view of coastal management.

Various universities, especially in the U.S., Australia, and the Philippines, currently play an important role in providing technical assistance for coastal zone management, particularly at the community level.[181] This has greatly assisted these countries to design and implement thoughtful ICZM programs. There is a tremendous opportunity to build similar linkages and partnerships with academic institutions on the West Coast, such as with the Institute for Resources and Environment and the Westwater Research Centre at the University of British Columbia, the School of Resource Management and Environmental Studies at Simon Fraser University and the Environmental Studies Graduate Program at Capilano College.

Experience with ICZM models internationally, together with recent experience with land use planning in British Columbia, suggests a number of implications for the scope and content of an appropriate public participation component to an ICZM initiative on the Canadian West Coast:

1. Environmental policy making should, to a much greater extent, begin from the 'bottom up' incorporating the concerns, fears and knowledge of community groups, and from local small scale environmental activities already underway.

2. Efforts should be made to help educate a much larger and more diverse array of local associations involved in activities affecting the coastal zone. Most obviously, serious attention needs to be paid to ethnic minorities which to this point have been little engaged in environmental issues on the Canadian West Coast.

3. Environmental education in the schools deserves strong support. Experience in other jurisdictions (e.g. the United States) suggests that youth are among the most ardent environmentalists and moral agents.

4. 'Demonstration projects' are crucial to build public trust, understanding and support for ICZM.

Aboriginal Interests

Aboriginal self government and the corresponding rights and interests of First Nations and other indigenous peoples in coastal/marine resources introduces yet another jurisdictional layer and element of complexity to any proposed ICZM initiative on the West Coast. The interests of indigenous peoples have been actively considered in ICZM in a number of jurisdictions, especially in Australia, New Zealand and the United States.[182] More specifically, the New Zealand approach appears the most progressive as a result of the *Treaty of Waitangi* (see Ross, 1972) and the inclusion of Maori interests in the *Resource Management Act* (New Zealand, 1991). Resource management agencies in the Pacific Northwest region of the United States have also had extensive experience with Native Americans in connection with fisheries and aboriginal environmental rights issues.[183]

Aboriginal or First Nations participation in resource management have periodically been viewed with apprehension by some non-aboriginal people on the Canadian West Coast, especially non-aboriginal commercial and sport fishers. However, governments and coastal communities on the West Coast will unquestionably need to establish effective partnerships with aboriginal communities, to build trust and respect, and to recognize the importance of indigenous tenure, knowledge, and resource stewardship practices if ICZM is to be successfully implemented. Probably the most effective way of dealing with these contentious issues on the West Coast will be to work within the ambit of existing initiatives such as the current attempt to resolve outstanding First Nations land and sea claims through a treaty negotiation process.

A specific body could be created by the provincial government to specifically address this issue. Such a body would be able to scope out and determine, through negotiations with applicable First Nations groups, what the issues are and how they might be resolved. This would help save time and expense during treaty negotiations by having a clear set of issues and solutions laid out. Instead of having to determine these issues and develop solutions during the negotiations themselves. Such a body would not be formed solely of government people, but rather include members of community groups, First Nations, academics, and people versed in policy negotiations.

Compatibility of DFO as Lead Agency for ICZM

The idea behind a 'lead agency' for ICZM is to facilitate the development and implementation of effective ICZM policy and planning, and assist in developing and implementing institutional arrangements among and between levels of government. The potential compatibility of DFO as a lead agency for ICZM on the West Coast raises several considerations:

- Is a lead agency necessary or desirable in order to facilitate ICZM on the West Coast.
- Assuming that a lead agency is either necessary or desirable, is it better to create an entirely new agency or is it better to add responsibilities to an already existing entity in order to facilitate ICZM.
- Assuming there is a compelling argument for an existing agency to be the lead agency for ICZM on the West Coast, is DFO the entity best suited for that role.

Examination of various ICZM models throughout the world suggests, as a practical matter, ICZM is difficult to establish and maintain without some form of a lead agency. In other jurisdictions there appears to be a variety of costs and benefits associated with creating a new lead agency versus designating authority to an existing entity. In general, an existing agency will carry political and other 'baggage' into any new initiative, but there is the advantage of already having an established constituency and lines of communication with senior government officials, e.g. Washington State Department of Ecology.

By comparison, new agencies must invariably establish new ties with stakeholders, and are subject to the continual risk of being sidelined by existing agencies who feel threatened. On the other hand, new entities have the advantage of being able to operate with less entrenched bureaucratic constraints. There is often also a lot of public support that can be engendered by a new entity that promises to do business in a creative or innovative way. The CORE Commission was a new agency created to direct an important land use planning initiative in British Columbia. Similarly, the California Coastal Commission was a new agency set up to initially champion ICZM in California. Both of these entities appear to have been forced to spend a lot of their time defending themselves against their bureaucratic rivals as well as external stakeholders. By comparison, ICZM in Oregon and Washington state relied more on existing agencies to initiate and implement ICZM.

The current political and fiscal situation in British Columbia is such that it is probably unlikely there would be political support for a new entity to quarterback ICZM. Indeed, a number of the resource-focused entities created in the past few years, such as CORE, the Roundtable on the Environment and the Economy and the Energy Commission have all been disbanded.

Is DFO best suited as lead agency to champion ICZM in British Columbia? On the one hand, the provincial government has a lot invested in its leadership role in dealing with environmental, land use and sustainability issues on the West Coast. Therefore, any overtly federal initiative to develop ICZM on the West Coast might well be viewed antagonistically by the province. Recent adverse media coverage of DFO on the West Coast in connection with ongoing salmon stock assessment and fishing controversy, might prejudice DFO's efforts to lead a new West Coast ICZM initiative. On the other hand, most ICZM lead agencies in other jurisdictions do not have as much broad constitutional responsibility for fisheries and oceans matters as does DFO, especially following the passage of the *Oceans Act* (Canada, 1996).

If DFO is to successfully coordinate and facilitate ICZM on the West Coast, it must expand beyond its fisheries portfolio, set clear objectives and goals for ICZM, and accurately define the role it wishes to play under the new regime. As suggested in the section on the potential implementation of ICZM in Atlantic Canada, DFO also could provide guidelines and guiding policies to encourage consistency and linkages among various government and community level policies and activities. DFO could also take on an important advisory role for other agencies and groups assisting in the co-ordination, preparation, and implementation of ICZM programs and plans. As discussions about a national oceans management strategy begin, this process has begun. In the final analysis, strong formal and informal linkages with other sectoral agencies at both the provincial and federal level will be crucial to the success of DFO in fulfilling these roles and responsibilities.

Multi-Sectoral Capacity

According to Hildreth and Johnson (1985), the most significant failing of ICZM throughout the world is the failure to develop and maintain true multi-sectoral capacity. More specifically, multiple-use conflicts have been a key problem in many jurisdictions, largely because of a limited capability within ICZM frameworks to effectively address the interests of different sectors. Many international ICZM models are not comprehensive, but single issue programs that expanded over time to include other sectors and a wider array of issues (*e.g.* Sri Lanka, Barbados, Queensland, and the United Kingdom first initiated their respective coastal zone management programs to address erosion control and shore protection).[184]

As noted in the section on Atlantic Canada, the most common approach to building a successful, multi-sectoral capacity is to develop working groups, such as committees or advisory councils, composed of agencies responsible for each key sector in the coastal zone. Ecuador provides one of the more interesting approaches, with an inter-ministerial council composed of the seven key ministries, performing many of the key policy development and decision-making activities for ICZM at the national level. The lesson derived from experience in other jurisdictions is that a successful West Coast ICZM initiative will unquestionably need to reflect the multi-sectoral nature of the West Coast, considering both current and future uses in the coastal zone and that a federal-provincial co-ordinating and advisory committee comprised of various sectors together with community level interests may well be the best route to go. This is an area that will require significant thought.

Information Management Capacity

As noted in the section on Atlantic Canada, the strategic collection and management of accurate and relevant information is essential to support effective decision-making in the coastal zone. Timely information must be synthesized and provided in a usable format to support policy and day-to-day decision-making at both government and community levels. Traditionally, data are collected for a specific purpose and analyses have been undertaken primarily by scientists and researchers in both government and the private sector. To address this issue, information management and the development of decision-making support tools is a growing component of ICZM efforts world-wide. Considerable effort has been made in Australia to develop comprehensive databases through such initiatives as the Environmental Resources Information Network (ERIN) and National Resources Information Centre (Australia,

1992). Similarly, NOAA in the United States has begun to effectively co-ordinate and consolidate coastal zone information through initiatives such as the Resource Information Delivery Team of the Coastal Ocean Program and the recently established Coastal Services Centre in Charleston, S.C.[185]

As noted in the section on ICZM in Atlantic Canada, the use of geographic information systems (GIS), environmental information systems (EIS), and remote sensing technologies is a crucial component of the information management capacity, providing both integration and analysis of coastal zone information. Massachusetts with MASS GIS; NOAA with COMPAS, EMAP, and the National wetlands inventory; South Africa with COAST; and Australia with the National Marine Information System (NatMIS) are key examples of this decision-support capability provided by GIS, EIS, and remote sensing technologies.[186] These efforts need to be expanded to provide greater levels of cooperation between managers, scientists, and resource users in defining information needs. Moreover, these efforts must focus on providing information for decision-making needs at the community level, ensuring both accessibility and usability. Strategic assessments of coastal zone management needs, as conducted by NOAA, provide a useful tool for identifying management and information needs. A single regional organization could be responsible for key aspects of co-ordinating data collection, analysis, and interpretation, providing a common coastal zone 'databank' for decision-making.

Funding Mechanisms

Funding is clearly the most critical issue influencing the success of ICZM in the models reviewed. ICZM projects and programs in many of the ASEAN countries, such as Malaysia and Brunei, were heavily funded by the United States through USAID.[187] When funding was withdrawn in 1993, serious problems resulted in implementing management strategies. Programs that promote the public good are rarely self-sustaining. Ecuador, Indonesia, the Philippines, Sri Lanka, Thailand and Vietnam have received overseas development assistance from several countries to establish coastal zone programs.[188] In the United States, the federal government has facilitated state initiatives through the federal consistency rules. Federal U.S. funding has been as high as 80% of the total state program costs. Similarly, the federal program and funding scheme in Australia is also potentially interesting as a model, although it is still in the development phase.

Funding for any kind of new ICZM initiative is likely to be problematic on the Canadian West Coast. Historically, some form of federal-provincial partnership has funded such new environmental/resource management initiatives as have been implemented on the West Coast, e.g. the FBMB and the Georgia Basin initiative. Unfortunately, such initiatives have generally been for finite time periods; ICZM requires a longer term commitment. A successful ICZM initiative on the Canadian West Coast will require adequate and consistent funding throughout both the program development and implementation process. One possibility, based on experience in the United States, is that the province, municipal governments, and community-based groups could apply for funding grants for their respective management initiatives after meeting established guidelines and consistency requirements. One area that warrants further exploration is the development of economic instruments to fund management activities.

Conflict Resolution Mechanisms

Multiple use conflicts, particularly between traditional coastal users, new development activities such as tourism, and conservation interests, are a common feature of many coastal zones around the world. However, conflict resolution has not been particularly well addressed by fledgling ICZM programs throughout the world. Conflicts occur both with institutions responsible for certain sectors and among the coastal resource users themselves. To address multiple use conflicts, consensus-building and conflict resolution techniques are increasingly recognized as an important component of ICZM. However, few models of ICZM in other jurisdictions describe specific mechanisms to resolve policy and resource-use conflicts.

In the United States, procedures are evolving for conflict resolution and include mediation, consultation, co-ordination mechanisms, policy conferences and third party settlements.[189] Also in the United States, the CZMA (United States, 1972) provides two formal mechanisms for resolving state-federal disputes: mediation and administrative appeals. The lesson from international models of ICZM is that identifying and anticipating conflicts is critical if ICZM is to be successful. This requires active partnerships among both governmental agencies and non-governmental interests.

Emphasis should be placed on conflict avoidance wherever possible, through information exchange, consultation and co-ordination. This is an area where British Columbia has been recognized as a world leader, in part through the work of the Roundtable and the CORE Commission. A comprehensive review of this experience is beyond the scope of this paper. However, what is likely to work with regard to dispute resolution and ICZM in British Columbia, is likely to be determined from a study of previous British Columbia experience, rather than from a study of ICZM dispute resolution in other jurisdictions with very different legal, political and social traditions.

Legislative Instruments

A world-wide survey of national legislation relevant for ICZM provides limited insight into which options Canada might consider in pursuing legal development in this field. Based on their own particular context and experience, different countries have opted for their own unique legislative approaches to ICZM, with no single model being emulated widely. As stated in the chapter on Atlantic Canada, the UK, the U.S., Costa Rica, France, New Zealand, Ecuador, and Australia have all chosen their own paths.[190] Canada, with the passage of the *Oceans Act* (Canada, 1996) has now gone the route of lead agency, with the mandate to produce an Oceans Management Strategy.

In British Columbia, legislative initiatives are usually preferred to policy initiatives where there is a strong symbolic component to the proposed policy, especially in defining authority and responsibility. Recent experience in British Columbia with land use planning, in particular, also suggests it is best to mimic forms of legislation currently in vogue with a view towards ensuring affected departments and ministries do not feel their mandates and responsibilities are being usurped.

From a West Coast perspective, a new ICZM joint federal provincial legislated initiative would be favoured to give ICZM the public and political profile it will need to resolve intergovernmental and interdepartmental intransigence. Unfortunately, the majority of the legislative packages developed by other countries are not particularly helpful in a West Coast

Canadian context because of the very different legal, political and social contexts in which they were developed.

In terms of additional legislative instruments, most of the ICZM models reviewed have used permitting procedures, development setbacks, EIA, land acquisition, and zoning to achieve management objectives. In particular, the use of setbacks and permitting procedures, specific to coastal management purposes, are the key means of limiting development and incompatible uses in the coastal zone. Sri Lanka, Costa Rica, and many U.S. states rely heavily upon these types of instruments to protect the coastal zone.[191] For the Canadian West Coast, a permitting scheme specific to the coastal zone would need to be developed on a provincial basis, and implemented to a large degree at the municipal level, providing an interesting opportunity for municipal governments to contribute practically to ICZM. A review of current legislative and regulatory instruments, largely developed for terrestrial concerns, would be necessary, and specific procedures to address issues in the coastal zone would have to be established. Again, what is likely to make the most sense from a British Columbia perspective is likely to be gleaned more from a study of previous British Columbia experience with land use planning, and other similar initiatives, rather than from a study of ICZM in other jurisdictions with very different legal, political and social traditions.

Policy Instruments

A variety of policy and related planning instruments are used to support ICZM initiatives in the international ICZM models reviewed. As noted in the section on Atlantic Canada, some form of ICZM policy is necessary to facilitate coherency, clarity, consistency, efficiency and equity in legislation. Moreover, the policy framework, often termed the policy statement, defines the roles and responsibilities of levels and units of government, and outlines the basic means of achieving management objectives. In most of the models reviewed, a national policy framework has been developed, or is currently under development, to direct and support ICZM programs. For example, the Coastal Management Plan of Sri Lanka, and related Coastal 2000 policy paper, define the roles and responsibilities and management activities in greater detail than provided in legislation.[192] Similarly, in New Zealand, a well defined policy statement was required to define in more practical terms the objectives of ICZM and the roles and responsibilities of each stakeholder, than is provided in the Resource Management Act.[193]

As with legislative instruments, in order to be truly effective on the West Coast, any successful new ICZM initiative will probably have to mimic the form of initiatives currently in vogue at both the federal and provincial levels. In this regard, new ICZM efforts in BC will have to face a number of interesting and important challenges, including: divisions between urban and non-urban coastal communities; divisions among ocean and coastal interests; divisions within and between local, federal, provincial, municipal, regional and First Nations governments; marine industries that are relatively small in comparison to other land based industries; the relatively low priority traditionally accorded to ocean affairs in the provincial hierarchy and the traditional absence of explicit policy priorities with regard to marine affairs.

Balancing these factors is a recent renewal of public interest in the oceans, including recent grass roots initiatives, *e.g.* the work of FREMP and CORE as well as recent attempts to catalyze awareness and appreciation in the establishment and maintenance of a systematic representative network of British Columbia marine protected areas. To capitalize on possible

public interest in the objectives of ICZM, efforts in British Columbia will need to meet a number of particular challenges including:

- surmounting the problem of competitive federal and provincial government agencies, each with a mandate on ocean issues;
- the need to establish specific policy objectives, priorities and guidelines;
- the need to build capacity for ICZM in the provincial education system.

Role of Science

The role of science, both natural and social, for ICZM varies significantly in each of the models reviewed. As noted in the section on Atlantic Canada, science appears to have been recognized as a relatively weak component of the ICZM framework internationally. More specifically, there often appears to have been an inability to sufficiently link necessary scientific expertise with decision-making processes. A number of jurisdictions have had some success experimenting with the development of 'applied' research programs for the purposes of supporting coastal management efforts (e.g. Barbados, the Netherlands, Sri Lanka, and the Great Barrier Reef in Australia).[194]

The orientation of many of these research programs appears to concentrate on the natural sciences and coastal engineering. In contradistinction, the United States has achieved a greater degree of scientific involvement, with agencies with a significant science capacity such as the Environmental Protection Agency and NOAA, co-operating with state level agencies and programs. In addition, the United States has developed the Sea Grant Program, a long-term federal funding program for coastal and marine research.[195] Sea Grants have been an integral part of funding for science-related activities, particularly at the state and local level, and they have been used to promote greater partnerships between ICZM programs universities and research institutes.

The lesson that flows from an examination of the role of science in ICZM decision-making in other jurisdictions is that an active, adaptive approach, where policy initiatives are treated as exercises in adaptive learning, appears to be more likely to be successful than the traditional approach of involving science in decision-making episodically. Perhaps the best known example of the successful application of active adaptive management to environmental decision making is the work of the Northwest Power Planning Commission in Oregon and Washington (Lee and Lawrence, 1986). The whole area of the use, and misuse, of science in environmental decision-making is important and deserves further study.

Traditional knowledge based in the communities of the region also needs to be recognized as a essential contribution to the conventional understanding of coastal zone activities and ecosystem functions. In addition, DFO, Environment Canada and the province of British Columbia have some of the best scientists in the world. The challenge is to stop the steady decline in financial resources available to do their research as well as find better ways to involve them in policy development processes.

Education and Capacity Building

In the international ICZM models reviewed, education and training are key elements in developing the human capacity to achieve ICZM. In the chapter on Atlantic Canada, these efforts are reviewed in detail. These efforts have invariably attracted national attention and have generated much needed public support for coastal zone management activities. The key to their success appears to have been the broad approach taken, in which a variety of methods and media have been used, and a wide range of coastal users targeted. By contrast, the lack of education among coastal users and responsible authorities in some jurisdictions has caused problems in developing and implementing ICZM programs (e.g., Thailand).[196]

The development of 'centres of excellence', such as the Coastal Management Centre in the Netherlands, or the Coastal Resources Centre at the University of Rhode Island, appear to provide particularly important contributions to training and education. Currently on the West Coast only two institutions, the Westwater Research Centre at UBC and the Resource Management and Environmental Studies Program at Simon Fraser University, have the needed aptitude and experience in ICZM. Both these programs are chronically underfunded.

Another potential lesson from international ICZM experience is that public education programs and media campaigns are important, including education of children from pre-school through to university. As noted in the section on Atlantic Canada, such education is critical to instill values ascribing worth to the sustainability of natural resources and the need to carefully manage people's use of these resources. Attitudinal change and stewardship can only occur with education and experience, beginning at pre-school. Education about sustainable development and the marine environment is not included in the curriculum in many schools in the region. Funding for curriculum development at all levels is required to provide teachers with the necessary resource materials.

C. CONCLUSIONS

A review of the literature pertaining to ICZM indicates there is no one model that could be easily adapted to the Canadian West Coast context. There are at least five reasons for this:

1. There are relatively few, if any, successful models of ICZM internationally, although much can be learnt from their analysis, and potential mistakes can be avoided;
2. The objectives of ICZM vary significantly from region to region (e.g., in many jurisdictions the objective may be as simple as minimizing shoreline erosion while in other jurisdictions the objective is to manage the coastal zone in an integrated fashion). These differences in the fundamental objectives of ICZM inevitably make comparisons difficult;
3. The particular context and experiences that generated each ICZM model appear to be unique to that country or region and are a function of a host of legal, political, social and cultural factors;
4. With few exceptions, ICZM is still an evolving concept. Many national programs are recently established or are still in the offing. Most programs are not nation-wide but are more local or state / provincial level initiatives;
5. The federal / provincial jurisdictional structure in Canada and the constitutionally mandated role played by DFO create a fundamentally different management regime for comparison with most ICZM models, other than Australia and the United States.

Despite these limitations, there are a number of identifiable trends and discrete lessons to be learned from approaches to ICZM in other jurisdictions. More specifically, ICZM initiatives in Australia and the United States provide particularly interesting comparisons to help guide a potentially successful ICZM initiative on the Canadian West Coast. Also warranting further consideration and evaluation for the lessons that can be gleaned from both their successes and their failures are the now defunct British Columbia CORE land use planning process, the FREMP initiative, the Fraser River Management Board initiative, the Georgia Basin Initiative, and the British Columbia Round Table on the Environment and the Economy.

United States

As noted in the chapter on Atlantic Canada, the United States provides one of the few well-established ICZM models for comparison purposes. Over the past 25 years, a number of management initiatives at both the federal and state levels have been developed. On the whole, the federal government in the United States has taken a relatively decentralized approach to ICZM, with a high degree of state and local level participation. Several of the state programs in the United States also have generated many lessons applicable to the Canadian West Coast. Given the geographic proximity and cultural similarities, the experience of different West Coast states is relevant in the British Columbia context (*e.g.* Oregon has incorporated ICZM into state economic planning; Washington has created an ICZM network with existing agencies; California has experimented with the creation of new central authorities; and 17 American states have a collaborative land use process at the local level working with local governments and stakeholders).

Australia

As noted in the chapter on Atlantic Canada, Australia's experience in establishing an ICZM program within a similarly complex jurisdictional structure as Canada invites obvious comparisons. Canada should pay particular attention to the *Intergovernmental Agreement on the Environment* that has been signed between the Commonwealth (federal), nine other state and territorial governments and the Australian Local Government Association (Australia, 1992).[197] The multi-stakeholder policy and program development process in Australia also provides many lessons. Of particular note is the Land Care management initiative promoting active partnerships among the federal and state governments and local communities (Campbell, 1995). While Australia's national program is still in the developmental phase, there are also five State programs that have enjoyed varying degrees of success in achieving ICZM.

Among the features which appear to be common to all 'successful' ICZM initiatives are the following:

- the governance system should emerge from an analysis of the problem to be solved rather than imposed on the problem from outside;

- the governance system should involve as many relevant powerful regulatory and administrative bodies as possible, while at the same time not be burdened by an over bureaucratic system. This implies that different regulatory bodies should be involved in the decision making, but once decisions are made it is not necessary for all bodies to approve of them, etc.;

- the system must have public representation or at least an open public process. This is important not only from the aspect of having public input in the decision-making process, but also as a watch-dog for the implementation of decisions and for accountability to the public;

- the system must have real authority and responsibility so that deliberations and decisions have real influence on real events;

- the system must be accountable through appropriate elected officials;

- the system must have a functional dispute resolution mechanism; and,

- an ICZM initiative is more likely to be successful when an active, adaptive management strategy is a prominent feature of the initiative.

Based on this analysis, a three prong strategy should be used to advance the objectives of a coast wide ICZM initiative in British Columbia:

1. DFO should initiate unilateral actions that are clearly within its legal and political mandate that will, among other things, raise public awareness and bring the federal interest in ICZM to the fore. The most obvious and politically palatable of these initiatives will be for DFO to use recent grassroots initiatives in British Columbia to establish and maintain a systematic representative network of British Columbia marine protected areas as a springboard.

   This will also compel DFO to:

   - maintain its current commitment to the *ad hoc* federal provincial MPA working group; and

   - resolve internal conflict with respect to leading coastal management;

2. DFO should pursue discussions among a wide range of key federal officials regionally (*e.g.* Environment Canada, Parks Canada, CWS, Transport) about common interests and how they might work jointly with the province. Again these discussions should be initially centred around a relatively popular and achievable issue like MPAs; and,

3. DFO should pursue discussions with the Province and First Nations about options for governance in connection with potential 'demonstration projects' that would result in the necessary federal/provincial/First Nations partnerships. The establishment of a

national system of MPAs could provide an ideal basis on which to demonstrate the practice and the principles of active, adaptive management.

NOTES

[1] According to the World Coast Conference Report (Intergovernmental Panel on Climate Change, 1994) the most important lessons about ICZM result from the differences between successful approaches. However, this is problematic as it is difficult to measure success when different programs have obscure, different, or competing objectives.

[2] See Cicin-Sain and Knecht, 1998; Kiravanich and Buqnpapong, 1989; Sudata, 1995; Tabucanon, 1991.

[3] See Atherly *et al.*, 1993.

[4] See Ch'ng, 1994; Ch'ng, 1995; Cicin-Sain and Knecht, 1998.

[5] See Cicin-Sain and Knecht, 1998; Koekebakker and Peet, 1987.

[6] See Cicin-Sain and Knecht, 1998; Premaratne, 1991.

[7] *Op Cit*. at note 3.

[8] See Cicin-Sain and Knecht, 1998; Division of Coastal Protection, Department of Environment and Heritage, 1991; Hildreth, 1992.

[9] See Cicin-Sain and Knecht, 1998; Gubbay, 1990; Smith, 1991.

[10] See Cicin-Sain and Knecht, 1998; Davidson, 1995; Department of Conservation, 1994; New Zealand, 1991; Walls, 1995.

[11] See Beatley *et al.*, 1994; Cicin-Sain, 1991 [California]; Cicin-Sain and Knecht, 1998; Grenell, 1991 [California]; Maragos, 1995 [Hawaii]; Sorensen and Hershman, 1990 [Oregon].

[12] See Cicin-Sain and Knecht, 1998; Haward and Davis, 1994; Holmes and Saenger, 1995.

[13] See Ibrekk *et al.*, 1993; Kryvi *et al*., 1991; Stewart *et al*., 1993.

[14] See Coetzee and Geldenhuys, 1989; Gaigher, 1989; Malan, 1994; Sowman, 1993.

[15] See Boelaert-Suominen and Cullinan, 1994; Cicin-Sain, 1998.

[16] *Op Cit*. at note 12; see also Goldin and Sann, 1993.

[17] *Op Cit*. at note 2.

[18] See Cicin-Sain and Knecht, 1998; Dahuri, 1995; Sloan and Sugandhy, 1994.

[19] *Op Cit*. at note 11.

[20] See Cicin-Sain and Knecht, 1998; Coast Conservation Department, 1990; Premaratne, 1991.

[21] *Op Cit*. at note 3.

[22] See Cicin-Sain and Knecht, 1998; Epler and Olsen, 1993; Robadue, 1995.

[23] See Bates, 1995; Haward and Davis, 1994; Kriwoken *et al.*, 1996.

[24] See Alcala *et al*., 1994; Cicin-Sain and Knecht, 1998; Ferrer, 1989; Kalaw, 1991; Munoz, 1994; White and Lopez, 1991.

[25] *Op Cit*. at note 6.

[26] *Op Cit*. at note 3.

[27] See Meltzer, 1997.

[28] See Cicin-Sain and Knecht, 1998; Coello *et. al.*, 1993; Robadue, 1990; Robadue, 1995; Robadue and Arriaga, 1993.

[29] See Borissova, 1995; Borissova *et al*., 1994.

[30] See Brindell, 1990; Cicin-Sain and Knecht, 1998; Collins and Waters, 1989; Department of Ecology, 1995b; Hiller, 1991; Nitz, 1989; Rose *et al*., 1995.

[31] See Cicin-Sain and Knecht, 1998; Haward and Davis, 1994; Holmes and Saenger, 1995; Ingram and Chapman, 1993; Westcott, 1989.

[32] *Op Cit*. at note 27. The concept of Primary Environmental Care (PEC) has recently developed in the literature. An approach to community-based sustainable development, PEC has three principles (Barton *et al.*, 1997):

a. Meets local needs: community members maintain, produce or gain access to the goods and services they require.
b. Protects the local environment: Activities undertaken support sustainable development by meeting the needs of the current generation without jeopardizing environmental quality, or the opportunity for future generations to meet their needs.

b. Empowers local communities: The communities gain greater control over the factors and circumstances that influence their lives. By securing this tenure, the long term economic interests of the community tend to merge with the long term 'interests' of the environment.

33 *Op Cit*. at note 18.

34 See Sorensen, 1990.

35 *Op Cit*. at note 18.

36 See Tobin, 1991; Sirinanda, 1995.

37 See Cicin-Sain and Knecht, 1998; Hildreth and Johnson, 1985.

38 *Op Cit*. at note 10; See also Haward, 1995.

39 *Op Cit*. at note 27.

40 See Cicin-Sain and Knecht, 1998; Huh and Less, 1995.

41 See Cicin-Sain and Knecht, 1998; Nayak, 1992.

42 See Canada, 1996; Cicin-Sain and Knecht, 1998; Department of Fisheries and Oceans, 1998.

43 *Op Cit*. at note 24; See also Vande-Vusse, 1991.

44 As of March, 1998, the Department of Fisheries and Oceans has circulated a discussion paper to stimulate public debate on the formulation of an Ocean Strategy (Department of Fisheries and Oceans, 1998).

45 The legislative section is based on a report prepared by Dr. Aldo Chircop for Meltzer Research and Consulting for this study.

46 *Op Cit*. at note 15.

47 See Beckner, 1993; Cicin-Sain and Knecht, 1998.

48 See Craik, 1992; Great Barrier Reef Marine Park Authority, 1994.

49 Canada has signed but not yet ratified LOSC. However, most legal authorities consider the Convention to be accepted as customary international law.

50 The FAO Code of Conduct for Responsible Fishing includes guidelines for both fishing and aquaculture activities.

51 The author would like to recognize the contributions of Dr. Aldo Chircop, Mr. Ray Côté, Mr. Derek Fenton, Mr. Richard Paisley, and Dr. Peter Ricketts.

52 Senior research scientists interviewed at Bedford Institute of Oceanography and at Dalhousie University consider the Northwest Atlantic off eastern Canada to be relatively pristine. This appears to be an interpretation of the meaning of 'pristine'. However, many others take issue with this assessment given the ocean dumping, industrial and sewage outflows as well as the collapse of the groundfish stocks.

53 For an inventory of initiatives in the Maritimes, see *Model Coasts: A Proposed Pilot Program for the Maritimes*, in this Oceans Conservation Report Series.

54 For details on these programs, see ACZISC, 1998; Brady and Snow-Cotter, 1997 [Gulf of Maine]; Brown and Butler, 1994 [ECNASAP]; Gulf of Maine, 1998.

55 *Op Cit*. at note 37.

56 See Bernd-Cohen, 1993; Brindell, 1990.

57 See Courtney, 1991.

58 See Day and Gamble, 1990; Department of Ecology, 1995; Sorensen and Hershman, 1990.

59 See Cicin-Sain, 1991; Wakeman and Domurat, 1991.

60 See Abel, 1989.

61 *Op Cit*. at note 11. See also Cunningham, 1988.

62 See Galasso, 1994.

63 See Colt, 1994; Imperial *et al*., 1992; Imperial and Hennessey; Hiller, 1991.

64 *Op Cit*. at note 12.

65 See Haward, 1993; Haward and Davis, 1994;

66 *Op Cit*. at note 28.

67 *Op Cit*. at note 6.

68 *Op Cit*. at note 34.

69 *Op Cit*. at note 10.

70 *Op Cit*. at note 28.

71 *Op Cit*. at note 6.

72 *Op Cit*. at note 58.

[73] *Op Cit*. at note 5.
[74] *Op Cit*. at note 28.
[75] *Op Cit*. at notes 11 and 59.
[76] *Op Cit*. at note 16.
[77] *Op Cit*. at note 10
[78] *Op Cit*. at note 6.
[79] *Op Cit*. at note 9.
[80] The Ramsar list of Wetlands of International Importance was created at the Convention on Conservation of Wetlands of International Importance Especially as Waterfowl Habitat. 11 I.L.M. 963 (1972).
[81] *Op Cit*. at note 12.
[82] *Op Cit*. at note 28.
[83] *Op Cit*. at note 6.
[84] *Op Cit*. at note 24.
[85] *Op Cit*. at note 3.
[86] See Fukuya *et al*., 1989; Itosu, 1995.
[87] *Op Cit*. at note 28.
[88] *Op Cit*. at note 6.
[89] *Op Cit*. at note 3.
[90] *Op Cit*. at note 24.
[91] *Op Cit*. at note 59.
[92] See Chou, 1995; Crawford, 1995.
[93] Sea Grant is a partnership of academia, government, and industry that focuses on coastal and marine resources. It is a university-based network that funds research, education and outreach that encourage stewardship and a sustainable economy and environment.
See: <http://bubo.hmsc.orst.edu/education/whales/seagrant.htm>
and <http://www.mdsg.umd.edu/NSGO?WhatisSeaGrant.html>
[94] The United States Land Grant Program funds universities to conduct applied and basic agricultural research, and funds an extension service for farmers and others in the industry. A network of scientists and the agriculture industry identifies the major agriculture-related problems and determines how research funds should be allocated to universities and other research institutions/companies. (The U.S. also introduced the Sea Grant program but unfortunately this was never adopted in Canada). Unlike its agricultural counterpart, the U.S. Sea Grant program does not support extension agents.
[95] Non-Maori, or of European descent.
[96] See Valencia and VanderZwaag, 1989.
[97] See Beatley *et al*., 1994; Brower *et al.*, 1991; Cicin-Sain and Knecht, 1998; Cunningham, 1988; Hartman and Raclin, 1994; Owens, 1992.
[98] See Godschalk, 1992; NOAA, 1992; Wood-Thomas, 1994.
[99] See Lu, 1990; Wang, 1995; Zhijie and Cote, 1990.
[100] *Op Cit*. at note 3.
[101] *Op Cit*. at note 6.
[102] *Op Cit*. at note 28.
[103] *Op Cit*. at note 6.
[104] *Op Cit*. at note 3.
[105] *Op Cit*. at note 8.
[106] *Op Cit*. at note 9.
[107] *Op Cit*. at note 10.
[108] For further information on NOAA and its programs, see <http://www.noaa.gov>
[109] See <http://www.csc.noaa.gov/>
[110] See <http://www.state.ma.us/mgis/massgis.htm>
[111] See <http://www.noaa.gov>
[112] See <http://www.erin.gov.au/other_servers/category/Marine.html>

113 FMG (Fundy, Gulf of Maine, Georges Bank); ICOIN (Inland Waters, Coastal and Ocean Information Network); ECNASAP (East Coast of North America Strategic Assessment Project). See ACZISC, 1998; Brown and Butler, 1994; Clayton, 1991; ICOIN, 1998; Roberts and Ricketts, 1990; Sherin and Edwardson, 1996.

114 *Op Cit*. at note 4.

115 *Op Cit*. at note 36.

116 *Op Cit*. at note 28.

117 *Op Cit*. at note 35.

118 *Op Cit*. at note 24.

119 *Op Cit*. at note 6.

120 *Op Cit*. at note 2.

121 See Chu Hoi, 1995; Hanson, 1988.

122 *Op Cit*. at note 30; See also NOAA, 1992.

123 The United States Congress has passed the Alternative Dispute Resolution Act to avoid the often costly, lengthy and contentious traditional legal methods (United States, 1990b).

124 *Op Cit*. at note 28.

125 *Op Cit*. at note 5.

126 The author wishes to acknowledge the direct contribution of Dr. Aldo Chircop to this section. Dr. Chircop prepared a larger paper for Meltzer Research and Consulting from which parts of that report were extracted for this section. The options have been modified to reflect Ms. Meltzer's views.

127 *Op Cit*. at note 6.

128 *Op Cit*. at note 34. It should be noted that some commentators have noted that the implementation of the Costa Rica ICZM legislation has been uneven as it relates to setbacks and development; "the law does not halt construction activities; the emphasis is on orderly, planned development of tourism facilities" (Boelaert-Suominen and Cullinan, 1994). Furthermore, "the overall authority for the law does not fall on environmental authorities, but on the Costa Rica Institute for Tourism (ICT). The later reportedly is neither equipped nor authorized to do anything beyond the promotion of tourism" (Boelaert-Suominen and Cullinan, 1994). This assessment appears to hold true (Potter, pers. comm., 1998): a remote beach in 1991, had by 1997 become the site of a resort development that required the cutting and filling of a mangrove area, built with a buffer area half the width the law requires.

129 For a comparison of OECD CZM programs, see Boelaert-Suominen and Cullinan, 1994; Chung and Hildebrand, 1994; Juhasz, 1991; Nedham *et al*., 1995; OECD, 1993; Sorensen, 1993.

130 *Op Cit*. at notes 11, 30.

131 *Op Cit*. at note 6; see also Olsen *et al.*, 1992.

132 *Op Cit*. at note 9; see also King and Bridge, 1994.

133 *Op Cit*. at note 12.

134 See Chia and Chou, 1991; Tiwari, 1991.

135 *Op Cit*. at notes 30, 122.

136 *Op Cit*. at note 11.

137 *Op Cit*. at note 28.

138 *Op Cit*. at note 12.

139 *Op Cit*. at note 9.

140 *Op Cit*. at note 14.

141 See Standing Committee on Environment, Recreation and the Arts, Commonwealth of Australia, 1991; Taberner, 1993.

142 *Op Cit*. at note 3.

143 *Op Cit*. at note 5.

144 See Cicin-Sain and Knecht, 1998; Herz and Mascarenhas, 1993.

145 *Op Cit*. at note 99.

146 *Op Cit*. at note 129.

147 *Op Cit*. at note 6.

148 *Op Cit*. at note 12.

149 *Op Cit*. at notes 98, 109.

150 *Op Cit*. at note 93.
151 *Op Cit*. at note 54; See also Gulf of Maine Council, 1996.
152 See Alcala *et al*., 1991; Chua and Scura, 1991; Chua and Scura, 1992; Gomez 1995; International Center for Living Aquatic Resource Management, 1990; Tobin, 1992; Scura *et al*., 1992; Vietnam-Canada Ocean and Coastal Cooperation Program, 1995.
153 *Op Cit*. at note 28.
154 *Op Cit*. at note 6; See also Coastal Resources Management Project, 1993.
155 *Op Cit.* at note 134.
156 *Op Cit*. at note 28.
157 Great Barrier Reef Marine Park Authority, 1994; Great Barrier Reef Marine Park Authority, 1996.
158 See Ballantine, 1995; Wolfenden *et al.*, 1994.
159 See <http://www.minvenw.nl/projects/netcoast/info/info.htm>
160 See <http://brooktrout.gso.uri.edu>
161 See <http://www.un.org/Depts/los/los_educ.htm#TSCWHAT>
162 See <http://www.unctad.org/en/techcop/tran0104.htm>
163 See <http://www.unep.org>
164 See <http://www.unesco.org/mab/home/home/htm>
165 For an overview of the oceanography of the British Columbia coast, see Thomson, 1981.
166 See also the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973.
167 *Op Cit*. at note 6.
168 *Op Cit*. at note 34.
169 The analysis of coastal management in Washington is taken from the survey performed as part of the study, and a literature review, including: Canning, 1992; Department of Ecology, 1995a, 1995b; Gamble and Day, 1989; Leschine, 1990; Lind and Hershman, 1993; Sorensen and Hershman, 1990.
170 See McCreary and Tietke, 1993.
171 The analysis of coastal management in Oregon is taken from the survey performed as part of the study, and a literature review, including: Good, 1994; Hout, 1990; Medler and Mushkatel, 1992; Moore and Nelson, 1993.
172 *Op Cit*. at note 10.
173 *Op Cit*. at note 28.
174 *Op Cit*. at note 11.
175 *Op Cit*. at note 6.
176 See California Coastal Zone Conservation Commissions *et al*., 1975; Cicin-Sain, 1991; Grenell, 1988; Wakeman and Domurat, 1991.
177 *Op Cit*. at note 58.
178 *Op Cit*. at note 28.
179 *Op Cit*. at notes 6, 15, 9.
180 *Op Cit*. at note 28.
181 *Op Cit.* at notes 11, 12, 24, 30.
182 *Op Cit*. at note 30.
183 *Op Cit*. at note 96.
184 *Op Cit*. at notes 3, 6, 8, 9.
185 *Op Cit*. at note 108.
186 *Op Cit*. at notes 110, 111, 112.
187 *Op Cit*. at notes 4, 36.
188 *Op Cit*. at notes 2, 6, 24, 28, 35, 121.
189 *Op Cit*. at note 123.
190 *Op Cit.* at notes 9, 10, 12, 15, 28, 30, 34.
191 *Op Cit.* at notes 6, 11, 34.
192 *Op Cit.* at note 6.
193 *Op Cit.* at note 10.

194 *Op Cit.* at notes 3, 5, 6, 12.
195 *Op Cit.* at note 93.
196 *Op Cit*. at note 2.
197 *Op Cit.* at note 23.

References

Abel, R.B. 1989. Impact of the CZM Act (1972) on New Jersey - Overview. *Coastal Zone '89*, Proceedings of the Sixth Symposium on Coastal and Ocean Management, Charleston, SC, USA. July 11-14, 1989. American Society of Civil Engineers, New York, pp. 4592-4594.

Alcala, AC, Chou, LM, Miclat, R, Kastoro, W, Fortes, M, Gong, WK, Sasekumar, A, Bina, R and Tridech, S, (Eds.). 1991. *Proceedings of the Regional Symposium on Living Resources in Coastal Areas.* Marine Science Institute, University of Philippines, Quezon City.

Alcala, A.C., Vergara, S.G., and Palaganas, V.P. 1994. The Coastal Environment Program: The Philippine Situation. *Coastal Zone Canada '94, Cooperation in the Coastal Zone*, Halifax, NS, Canada (Eds. Wells, P.G. and Ricketts, P.J.). pp. 100-108

Atherley, K.A. Smith, D.A. and Nurse, L.A. 1993. An Integrated Coastal Zone Management Programme for Barbados. *Coastal Zone '93*, Proceedings of the Eighth Symposium on Coastal and Ocean Management, New Orleans, Louisiana, July 19-23, 1993. American Society of Civil Engineers, New York, pp. 2653-2667.

Archer, J.H. 1995. Bulgaria's Coastal Management Program: the World Bank Funds Development of the First Black Sea ICAM Effort. *Ocean and Coastal Management*. 26 (1), pp. 77-82.

Atlantic Coastal Zone Information Steering Committee (ACZISC). 1998.
<http://is.dal.ca/aczisc/aczisc>

Australia. 1992. *Intergovernmntal Agreement on the Environment*. May 1, 1992. Special Premiers' Conference, Brisbane, Australia, 31 Oct., 1990.
Available at <http://environent.gov.au/portfolio/igar.html>

Bahamas. 1968. *Coast Protection Act*. 37 of 1968 E.L.A.O. 1974. Ch. 190, 2325-2332.

Ballantine, W.J. 1991. *Marine reserves for New Zealand.* University of Auckland Leigh Laboratory Bulletin No. 25. Warkworth, New Zealand. 200 pp.

Barton, T., Borrini-Feyerabend, G., de Sherbinin, A., Warren, P. 1997. *Our People, Our Resources: Supporting Rural Communities in Participatory Action Research on Population Dynamics and the Local Environment*. Gland, Switzerland and Cambridge, UK: IUCN.

Bates, G. 1995. *Environmental Law in Australia.* Sydney: Butterworth.

Beatley, T., Brower, D.J., and Schwab, A.K. 1994. *An Introduction to Coastal Zone Management*. Island Press, Washington D.C.

Beckner, A. L. 1993. Coastal Zone Management on the Atlantic Seaboard: Two Different Approaches by the Carolinas. *University of Baltimore Journal of Environmental Law*. 3 (1), pp. 62.

Bernd-Cohen, T. *et al.* 1993. Revitalizing the Florida Coastal Management Program. *Coastlines of the Gulf of Mexico*. (Eds. Laska, S. and Puffer, A.) American Society of Civil Engineers, New York, pp. 29-33.

Boelaert-Suominen, S. and Cullinan, C. 1994. *Legal and Institutional Aspects of Integrated Coastal Area Management in National Legislation*. FAO Legal Office, Rome.

Borissova, P. 1995. Some Aspects of Coastal Zone Management in Bulgaria During the Transition Period 1985-1995. *Proceedings of the Second International Conference on the Mediterranean Coastal Environment, MEDCOAST '95* October, 1995, Tarragona, Spain (Ed. Ozhan, E.).

Borissova, P, Tzwetanov, B., and Savov, B. 1994. Inter-institutional and Interdisciplinary Co-operation for a New Coastal Zone Management Policy of Bulgaria. *Coastal Zone Canada '94, Cooperation in the Coastal Zone,* Halifax, Canada (Eds. Wells, P.G. and Ricketts, P.J.). pp. 64-70.

Brady, P. and Snow-Cotter, S. 1997. Gulf of Maine Council for the Marine environment: An Exercise in Regional Ocean Governance. *Coastal Zone '97*, Abstracts of Presentations, Vol. II. ed. M.C. Miller and J. Cogan. Boston, July 19-25, 1997. pp. 889-890.

Brower, D.J. *et. al*. 1991. *Evaluation of the National Coastal Zone Management Program*. The Center for Urban and Regional Studies of the Department of City and Regional Studies of the Department of City and Regional Planning, The University of North Carolina at Chapel Hill. Funded by the National Coastal Resources Research and Development Institute, Newport, Oregon.

Brown, S. K. & Butler, M. J. A. 1994. ECNASAP: Towards international collaboration in strategic environmental assessment. *Coastal Zone Canada: Conference Proceedings*. P. G. Wells & P. J. Ricketts, eds. Coastal Zone Canada Association. pp. 860-874.

Brindell, J.R. 1990. Florida Coastal Management Moves to Local Government. *Journal of Coastal Resources*. 6 (3), pp. 727-733.

California Coastal Zone Conservation Commissions *et.al*. 1975. *California Coastal Plan*. California Coastal Zone Conservation Commission, San Francisco, California.

Campbell, C. A. 1995. Landcare: Participative Australian approaches to inquiry and learning for sustainability. *Journal of Soil and Water Conservation*. 50(2), pp. 125-131.

Canada. 1982. *Constitution Act* (Schedule B of *Canada Act*, 1982). U.K. 1982, c.11.

Canada. 1985a. *Canadian Environmental Protection Act*. R.S.C. (4th Supp.), c.16.

Canada. 1985b. *Fisheries Act*. R.S.C. c. F-14, s.36.

Canada. 1985c. *Canada Wildlife Act*. R.S.C. 1985, c.G-1.

Canada. 1985d. *National Parks Act*. R.S.C. 1985, c.N-7.

Canada. 1990. *Canadian Laws Offshore Application Act*. S.C. 1990, c.44

Canada. 1991a. *Non-Pleasure Craft Sewage Pollution Prevention Regulations.* SOR/91-659.

Canada. 1991b. *Pleasure Craft Sewage Pollution Prevention Regulations.* SOR/91-661;

Canada. 1992. *Canadian Environmental Assessment Act*. S.C. 1992, c.37.

Canada. 1996. *Oceans Act*. S.C. 1996, c.31.

Canadian Council of Resource and Environment Ministers (CCREM). 1978. *Shore Management Symposium Proceedings.* Victoria, BC.

Canning, D. J. (ed.). 1992. *Washington State Coastal Zone Section 309 Assessment and Strategy. Part 1: Assessment*. Shoreland and Coastal Zone Management Program. Olympic: Washington Department of Ecology.

Chia, L.S. and Chou, L.M. (Eds.) 1991. *Urban Coastal Area Management: The Experience of Singapore.* Proceedings of the Singapore National Workshop on Urban Coastal Area Management (ICLARM), Republic of Singapore, November 9-10, 1989. International Center for Living Aquatic Resources Management, Philippines.

Ch'-ng, K-L. 1994. Coastal Zone Management Plan Development in Malaysia with Particular Reference to the Management of Fisheries Resources. *Proceedings of the IPFC Symposium in Conjunction with the twenty-fourth session of IPFC,* Bangkok Thailand, 23-26 November 1993. FAO Indo Pacific Fisheries Comm., Bangkok, Thailand, pp. 237-247.

Ch'ng, K.-L. 1995. Malaysia - Chapter 18. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 243-252.

Chou L.M. 1995. The Role of Tertiary Institutions in Integrated Coastal Zone Management Training. *Contributions to Training in Coastal Zone Management in the Asia-Pacific Region: Resources Development Workshop for Education and Training in Coastal Zone Management at the Tertiary Level.* Publication No. 12, Regional Office for the and the Pacific, United Nations Environment Programme, Bangkok.

Chua, T.-E. 1993. Essential elements of integrated coastal zone management. *Ocean & Coastal Management*. 21 (1), pp. 81-109.

Chua, T.E. and Scura, L.F. (Eds.). 1991. *Managing ASEAN's Coastal Resources for Sustainable Development: Roles of Policy Makers, Scientists, Donors, Media, and Communities*, Proceedings of the ASEAN/US Policy Conference on Managing ASEAN's Coastal Resources for Sustainable Development, Manila and Baguio, Philippines, 4-7 March 1990. ICLARM Conference Proceedings No. 30, pp. 125.

Chua, T.E. and Scura, L (Eds.) 1992. *Proceedings of the Regional Workshop on Coastal Zone Planning and Management in ASEAN: Lessons Learned.* Bandar Seri Begawan, Brunei Darussalam 28-30 April 1992. Association of Southeast Nations/United States Coastal Resources Management Project Conference Proceedings No. 12.

Chu Hoi, N. 1995. Viet Nam - Chapter 15. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 209-224.

Chung, C. and Hildebrand, L.P. 1994. A Multinational Assessment of Coastal Zone Management in OECD Countries. *Ecodecision*. January, pp. 44-49.

Cicin-Sain, B. 1991. California and Ocean Management-Problems and Opportunities. *The California Coastal Zone Experience* (Eds. Domurat, G. and Wakeman, T.). American Society of Civil Engineers, New York, pp. 5-12.

Cicin-Sain, B. and Knecht, R. W. 1998. *Integrated Coastal and Ocean Management: Concepts and Practices.* Washington, DC: Island Press.

Clayton, I. 1991. Gulf of Maine GIS Database Aids Oceanographers, Resource Managers. *Se Technology*. Nov. 1991.

Coastal Resources Management Project. 1993. Are Coastal Zone Management and Economic Development Complementary in Sri Lanka? *Proceedings of the Seminar on Coastal Zone Management and Economic Development*. Colombo, Sri Lanka.

Coast Conservation Department (Sri Lanka). 1990. *Coastal Zone Management Plan*. Coast Conservation Department, Colombo.

Coello, S., Proano-Leroux, D., and Robadue, D. 1993. Special Area Management Planning in Ecuador's Rio Chone Estuary. *The Management of Coastal Lagoons and Enclosed Bays.* (Eds. Sorensen, J. *et al*.) American Society of Civil Engineers, New York., pp. 78-94.

Coetzee, M.J. and Geldenhuys, N.D. 1989. Progress with the Implementation of Coastal Management in Southern Africa. *Coastal Zone '89,* Proceedings of the Sixth Symposium on Coastal and Ocean Management. Conference Charleston, SC, USA, July, 1989. pp. 1479-1491.

Collins R.C. and Waters, E.B. 1989. Building Consensus on Land Use and the Chesapeake Bay. *Coastal Zone '89, Proceedings of the Sixth Symposium on Coastal and Ocean Management*. Charleston, SC, USA, July 11-14, American Society of Civil Engineers, New York, pp. 4029-4035.

Colt, A.B. 1994. The Challenges of Integrated Estuarine Management in the United States. *Coastal Management*. 22 (4), pp. 369-387.

Conference of the Parties to the Convention on Biological Diversity. 1995. *Jakarta Mandate on Marine and Coastal Biodiversity*. UNEP / CBD / COP / 2 / 19; UNEP / CBD / COP / 2 / 5.

Copp, D. A., 1995. *The Atlantic Accord on Integrated Management of the Coastal Zone.* Report prepared for the Ocean's Institute of Canada. Halifax, N.S.: Ocean's Institute of Canada.

Costa Rica. 1977. *Le Ley sobre la Zona Maritimo Terrestre, de 2 de marzo de 1977*. La Asambla Legislativa de la Republica de Costa Rica, Jan. 4, 1978.

Courtney, F. 1991. A Regional Approach to State Coastal Management. *Coastal Zone '91,* Proceedings of the Seventh Symposium on Ocean and Coastal Management Long Beach California, USA July 8-12. American Society of Civil Engineers, New York. pp. 676-680.

Craik, W. 1992. The Great Barrier Reef Marine Park: its establishment, development and current status. *Marine Pollution Bulletin* 25(5-8), pp. 122-133.

Crawford, B.R. 1991. Education and Training in Coastal Area Management: A Survey of the United States Experience. *Proceedings of the Workshop on Coastal Area Management Education in the ASEAN Region,* October 8-11, 1991, Singapore. pp. 92.

Cunningham, M.G. 1988. The Implementation of Policy: Coastal Zone Management. *Symposium on Coastal Water Resources,* Wilmington, NC, USA (Eds. Lyke, W.L. and Hoban, T.J.). pp. 575-586.

Curtis, M. 1997. *Who's at Fault in the Fish War?* Times Colonist, Victoria, BC. June 2, 1997.

Dahuri, R. 1995. Indonesia - Chapter 21. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 277-289.

Davidson, S. 1995. New Zealand Coastal Policy Statement. *International Journal of Marine and Coastal Law*. 10 (3), pp. 431-448.

Department of Conservation. 1994. *New Zealand Coastal Policy Statement, 1994*. Wellington, New Zealand: Department of Conservation.

Department of Ecology. 1995a. *Washington State Coastal Zone Management Program*. Prepared by the Shorelands and Coastal Zone Management Program. Publication 94-63

Department of Ecology. 1995b. *Managing Our Shores: Ten Years of Local Coastal Zone Management Projects in Washington State 1984-1994*. Ecology Publication 95-105.

Department of Fisheries and Oceans. 1997. *An Approach to the Establishment and Management of Marine Protected Areas under the Oceans Act*. Ottawa: Department of Fisheries and Oceans.

Department of Fisheries and Oceans. 1998. *Toward Canada's Oceans Strategy : Discussion Paper*. Advance Copy. Ottawa.

Division of Coastal Protection, Department of Environment and Heritage. 1991. *Green Paper - Coastal Protection Strategy, Proposals for Managing Queensland's Coast*. Special Purpose Cabinet Committee, Queensland Government.

Donnelly, K. 1994. Community-based Planning for the Coastal Zone. *Coastal Zone Canada '94, Cooperation in the Coastal Zone,* Halifax, NS, Canada (Eds. Wells, P.G. and Ricketts, P.J.). pp. 508-513.

Dorcey, A. H. J., 1986. *Bargaining in the Governance of the Pacific Coastal Resources: Research and Reform*. Westwater Research Centre. Vancouver: University of British Columbia.

Eaton, P. B., Gray, A. G., Johnson, P. W. and Hundert, E. 1994. *State of the Environment in the Atlantic Region*. Dartmouth, N.S.: Environment Canada.

Ecuador. 1992. *Executive Decree 3399.* Decreto de Constitucion y Reglamentos del Programa de Manejo de Recursos Costeros (PMRC).

Ehler, C.N. and Basta, D.J. 1993. Integrated Management of Coastal Areas and Marine Sanctuaries: A New Paradigm. *Oceanus.* 36 (3), pp. 6-13.

Ellsworth, J. P. 1994. Closing the Gap Between Community Expectations and Service Delivery: Canada's Atlantic Coastal Actions Program. *Coastal Zone Canada '94, Cooperation in the Coastal Zone,* Halifax, NS, Canada (Eds. Wells, P.G. and Ricketts, P.J.). pp. 687-695.

Environment Canada. 1991. *The State of Canada's Environment*. Ottawa: Minister of Supply and Services.

Environment Canada. 1993. *Coastal Zone Management: A Framework for Action*. Draft Policy Document. Unpublished Manuscript. Ottawa: Environment Canada.

Environment Canada. 1994. Coastal Zone Management in Canada. *Reviewing CEPA: The Issues #4.*. Ottawa: Environment Canada.

Epler, B. and Olsen, S. 1993. *A Profile of Ecuador's Coastal Region.* Technical Report Series: TR2047. The University of Rhode Island Coastal Resource Center, Narragansett, RI.

Ferrer, E.M. 1989. People's Participation in Coastal Area Management. *ASEAN/US Policy Workshop on Coastal Area Management,* Johore Bahru (Malaysia), 25-27 Oct 1988. (Eds. Chua, T.E. and Pauly, D.) ICLARM Conference Proceedings. No. 2, pp. 117-127.

Fisheries and Agriculture Organization (FAO). 1996. Precautionary Approach to Fisheries. Part 2: Scientific Papers. Prepared for the Technical Consultation on the Precautionary Approach to Capture Fisheries. Lysekil, Sweden, June 6-13, 1995. Fisheries Technical Paper 350, part 2. Rome: FAO.

Fisheries Resource Conservation Council (FRCC). 1997. *A Groundfish Conservation Framework for Atlantic Canada*. Report to the Minister of Fisheries and Oceans. FRCC.97.R.3, July, 1997.

Food and Agricultural Organization (FAO). 1995. *A Code of Conduct for Responsible Fisheries.* Rome: FAO.

France. 1986. *Loi no. 86-2 du janvier 1986 relative a l'amenagement, la protection et la mise en valeur du littoral.* J.O., 4 Jan 1986, p.200.

Fraser Scokeye Public Review Board. 1995. *Fraser River Sockeye 1994: Problems and Discrepencies.* Report of the Fraser River Sockeye Public Review Board.

Fukuya, M., Nishi, Y., and Sato, A. 1989. Laws and Regulations for Coastal Management in Japan. *Coastal Zone '89,* Proceedings of the Sixth Symposium on Coastal and Ocean Management. Charleston, USA. July, 1989. American Society of Civil Engineers, New York, pp. 46-57.

Gaigher, C.M. 1989. Land-use Planning and Coastal Conservation in South Africa. *Coastal Zone '89,* Proceedings of the Sixth Symposium on Coastal and Ocean Management, Charleston, SC, USA. July 11-14, 1989. American Society of Civil Engineers, pp. 3228-3240.

Galasso, G.A. 1994. The Use of Coordinating Mechanisms in the Management of National Marine Sanctuaries. *Coastal Zone Canada '94, Cooperation in the Coastal Zone,* Halifax, NS, Canada (Eds. Wells, P.G. and Ricketts, P.J.). pp. 1734-1748.

Gamble, D.B. and Day, J.C. 1989. Coastal Zone Management in Boundary Bay, B.C. and Cherry Point, WA. *Coastal Zone '89,* Proceedings of the Sixth Symposium on Coastal and Ocean Management, Charleston, SC, USA. July 11-14, 1989. American Society of Civil Engineers, New York, pp. 4166-4180.

Godschalk, D.R. 1992. Implementing Coastal Zone Management: 1972-1990. *Coastal Management*. 20 (2), pp. 93-117.

Goldin, P. and Sann, A. 1993. South East Tasmania Case Study, Australia. *Coastal Zone Management: Selected Case Studies.* OECD, Paris, France, pp. 199-226.

Gomez, E.D. 1995. Coastal Zone Management and Ecosystem Protection: Prospects for Cooperation in Southeast Asia Southeast Asian Programme in Ocean Law, Policy, and Management. *Seapol Singapore Conference on Sustainable Development of Coastal and Ocean Areas in Southeast Asia: Post-Rio Perspectives* (Eds. Koh, K.L. Beckman, R.C., and Chia L.S.). pp. 191-206.

Good, J.W. 1994. Shore Protection Policy and Practices in Oregon: An Evaluation of Implementation Success. *Coastal Management.* 22, pp. 325-52.

Great Barrier Reef Marine Park Authority (GBRMPA). 1994. *A 25 Year Strategic Plan for the Great Barrier Reef World Heritage Area: Keeping it great.*

Great Barrier Reef Marine Park Authority. 1996. *Annual Report 1995-1996.* GBRMPA.

Grenell, P. 1988. The Once and Future Experience of the California Coastal Conservancy. *Coastal Management.* 16, pp. 13-20.

Grenell, P. 1991. A New Framework for Integrated Coastal Zone Management. *The California Coastal Zone Experience* (Eds. Domurat, G. and Wakeman, T.). American Society of Civil Engineers, New York, pp. 32-45.

Gubbay, S. 1990. *A Future for the Coast? Proposals for a U.K. Coastal Management Plan*. A Report to the World Wildlife Fund for Nature from the Marine Conservation Society.

Gulf of Maine. 1998. Home Page. <http://www.gulfofmaine.org/>

Hanson, A.J. 1988. Coastal and Ocean Resource Management: The Vietnam Case. *Ocean Yearbook 7.* (Ed. Mann-Borgese, E.), University of Chicago Press, Chicago, pp. 241-262.

Hartman, B.M. and Raclin, L.L. 1994. The Coastal Zone Management Act: Unexpected Impacts on Environmental Permitting. *Journal Environmental Permitting.* 3 (3), pp. 377-386.

Haward, M. 1995. Integrated Coastal Zone Management in Australia. *Maritime Studies.* May-June, pp. 11.

Haward, M, and Davis, B. W. 1994. Current Developments in Australian Coastal Zone Management. Coastal *Zone Canada '94: Cooperation in the Coastal Zone*. ed. P G. Wells and P. J. Ricketts. Halifax: Coastal Zone Canada Association. pp. 19-29.

Henwood, B. 1996. Parks Canada. Personal Communication.

Herz, R. and Mascarenhas, A.S. 1993. Political and Planning Actions on the Brazilian Coastal Management Program. *Coastal Zone '93*, Proceedings of the Eighth Symposium on Coastal and Ocean Management, New Orleans, Louisiana, July 19-23, 1993. American Society of Civil Engineers, New York, pp. 1084-1091.

Hildebrand, L. P. 1984. Oceanographic Setting. *Health of the Northwest Atlantic*. R. C. Wilson and R.F Addison (eds.). Ottawa: Environment Canada and Department of Fisheries and Oceans.

Hildreth, R.C. 1992. Australian Coastal Management: Some North American Perspectives on Recent Queensland and Other Initiatives. *Coastal Management*. 20 (3), pp. 255-269.

Hildreth, R.G. and Johnson, R.W. 1985. CZM in California, Oregon, and Washington. *Natural Resources Journal.* 25 (1), pp. 103-166.

Hiller, M.A. 1991. The National Estuary Program and Public Involvement. *International Conference on the Environmental Management of Enclosed Coastal Seas '90*, Kobe, Japan, 3-6 August (Eds. Goda, T., *et al.*). pp. 645-648.

Holmes, N. and Saenger, P. 1995. Australia - Chapter 22. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 291-308.

Hout, E. 1990. Ocean Policy Development in the State of Oregon. *Coastal Management*. 18 (3), pp. 255-267.

Huh, H.T. and Lee, J. 1995. Republic of Korea - Chapter 11. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 167-176.

Ibrekk, H.O. and Kryvi, H. and Elvestad, S. 1993. A Nationwide Assessment of the Suitability of the Norwegian Coastal Zone and Rivers for Aquaculture (LENKA). *Coastal Management*. 21 (1), pp. 53-73.

Ijlstra, T. 1991. The Organization of the North Sea Policy in the Netherlands. *Chancery Water Law*. 2 (4), pp. 127-132.

Imperial, M.T., Robadue, D., and Hennessey, T.M. 1992. An Evolutionary Perspective on the Development and Assessment of the National Estuary Program. *Coastal Management*. 20, pp. 311-341.

Imperial, M.T. and Hennessey, T.M. 1993. The National Estuary Program: A Preliminary Evaluation of the Management Conference Process. *Coastal Zone '93.* Proceedings of the Eighth Symposium on Coastal and Ocean Management, New Orleans, Louisiana, July 19-23. American Society of Civil Engineers, New York, pp. 1133-1147.

India. 1991. *Coastal Regulation Zone Notification*. Gazette Notification S. O. No. 114 of 20 February, 1991.

Ingram, S.J. and Chapman, D.M. 1993. DUNECARE: Healing the Coast. *Coastal Zone '93*, Proceedings of the Eighth Symposium on Coastal and Ocean Management, New Orleans, Louisiana, July 19-23, 1993. American Society of Civil Engineers, New York, pp. 2739-2752.

Inland Waters, Coastal and Ocean Information Network (ICOIN). 1998. <http://www.discribe.ca/icoin/homepage.htm>

InterCoast Network. 1992. *Integrated Coastal Area Management Programs, Pilot Programs and Feasibility Studies.* Coastal Resources Center, University of Rhode Island, 16, pp. 8-12.

Intergovernmental Panel on Climate Change (IPCC). 1994. *Preparing To Meet the Coastal Challenges of the 21st Century*. Conference Report of the World Coast Conference 1993, Noordwijk, The Netherlands, 1-5 November, 1993.

International Center for Living Aquatic Resources Management (ICLARM). 1990. *Baguio Resolution on Coastal Resources Management*: *Policy Conference on Managing ASEAN's Coastal Resources for Sustainable Development.* The International Center for Living Aquatic Resources Management on behalf of the ASEAN/United States Coastal Resources Management Project.

Italy. 1992. *Law Regarding Provisions for the Defence of the Sea.* Gazzetta Ufficiale della Republica Italiana, Serie General n. 62, 14. Marzo 1992.

Itosu, C. 1995. Japan-Chapter 10. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 155-166.

Jacobson, M.A. 1995. The United Nations Regional Seas Programme: How does it measure up? *Coastal Management*. 23 (1), pp. 19-39.

Juhasz, F. 1991. An International Comparison of Sustainable Coastal Zone Management Policies. *Marine Pollution Bulletin*. 23, pp. 595-602.

Kalaw, M.T. 1991. The Role and Involvement of Non-governmental Organizations in the Sustainable Development of Coastal Resources. *ASEAN/US Policy Workshop on Coastal Area Management in Southeast Asia Conference* (Eds. Chua, T.E. and Pauly, D.). Johore Bahru, Malaysia, Oct 25-27, 1988. ICLARM Conference Proceedings No. 30., pp. 103-106.

Kangasniemi, B. 1994. *Transboundary Issues: Activities of BC/Washington Puget Sound/Georgia Basin Work Group.* 1994 Seminar on Environmental Quality and Research. Technical Report WQWM-93-11, pp. 12-14. Fraser River Estuary Management Program.

Kelleher, G., Bleakley, C., and Wells, S. 1995. *A Global Representative System of Marine Protected Areas., Volume* 1. Washington: The World Bank.

Kiravanich, P. and Buqnpapong, S. 1989. Coastal Area Management Planning: Thailand's Experience. *ASEAN/US Policy Workshop on Coastal Area Management in Southeast Asia Conference* Johore Bahru, Malaysia, Oct 25-27, 1988 (Eds. Chua, T.E. and Pauly, D.). ICLARM Conference Proceedings No. 30., pp. 215-230.

Knecht, R. W. and Archer, J. 1993. *Integration in the US Coastal Zone Management Program*. Ocean and Coastal Management, 21, pp. 183-199.

Koekebakker, P. and Peet. G. 1987. Coastal Zone Planning and Management in the Netherlands. *Coastal Management*. 15 (2), pp. 121-133.

Kriwoken, L.K., Haward, M., VanderZwaag, D., and Davis, B. (eds.) *Ocean Law and Policy in the Post-UNCED Era: Australia and Canadian Perspectives*. Kluwer Law Institute.

Kryvi, H., Ibrekk, H.O. and Elvestad, S. 1991. LENKA. *Marine Pollution Bulletin*. 23, pp. 785-788.

Lee, K. and Lawrence, J. *Environmental Law*. 16, pp. 423-459.

Leschine, T.M. 1990. Setting the Agenda for Estuarine Water Quality Management: Lessons from Puget Sound. *Ocean and Shoreline Management*. 13. pp. 295-313.

Lind, K.A. and Hershman, M.J. 1993. Grays Harbour, Washington Estuary Management Plan. *The Management of Coastal Lagoons and Enclosed Bays* . (Eds. Sorensen, J. *et al.).* American Society of Civil Engineers, New York, pp. 191-204.

Linden, O. and Lundin, C. G. 1996. *Proceedings of the National Workshop on Integrated Coastal Zone Management in Tanzania*. 8-12 May, 1995. The World Bank.

Lu, K. 1990. Marine and Coastal Management in China: A Planning Approach. *Coastal Management*. 18 (4), pp. 365-384.

Malan, D.E. 1994. Coastal Zone Management in South Africa: The Chief Directorate Environmental Management's Role. *Coastal Zone Canada '94, Cooperation in the Coastal Zone*, Halifax, NS, Canada, 1994. (Eds. Wells, P.G. and Ricketts, P.J.), pp. 85-98.

Maragos, J.E. 1995. Hawaii - Chapter 27. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 371-381.

Mauritius. 1991. *Environment Protection Act*. Act N.34 of 1991, State of the Environment in Mauritius.

McBride, L. 1998. Executive Director, Georgia Strait Alliance. Personal Communication.

McCreary, S.T. and Tietke, C. 1993. A First Look Back at the San Francisco Estuary Project. *The Management of Coastal Lagoons and Enclosed Bays* (Eds. Sorensen, J. *et al*.) American Society of Civil Engineers, New York, pp. 205-220.

McCullough, D. 1998. Program Coordinator, Coastal Resource Mapping. Department of Fisheries and Oceans. Personal Communication, March 13, 1998.

McFee, M and Wolfe, L. 1993. *Issues and Options for Coastal Management in British Columbia: a Discussion Paper.* Prepared for the Coastal Zone Issues / Planning Study Steering Committee. British Columbia Ministry of Agriculture, Fisheries and Food.

McNeill, S.E. 1994. The selection and design of marine protected areas: Australia as a case study. *Biodiversity and Conservation* 3(7), pp. 586-605.

Medler, J.F and Mushkatel, A. 1992. Environmental Policy, New Federalism and New Privatism: Policy Conflicts in the Coastal Zone. *Policy Studies Review*. 11 (1), pp. 100-110.

Meltzer, E. 1995. *Overview of Marine Conservation Issues in Atlantic Canada.* Mimeo prepared for the Canadian Arctic Resource Committee. Excerpts in Beckman, L. 1996. *Seas the Day: Toward a National Marine Conservation Strategy for Canada.* National Marine Conservation Strategy Programme (Canadian Arctic Resources Committee and Canadian Nature Federation).

Meltzer, E. 1996. *International Review of Integrated Coastal Zone Management*. Volume 1 and 2. Unpublished consultants report prepared for the Department of Fisheries and Oceans.

Meltzer, E. 1997. *Evaluation of Tanga Coastal Zone Conservation and Development Programme.* Report prepared for Irish Aid and EARO / IUCN, May, 1997.

Mexico. 1986. *Ley Federal del Mar*. Diario Oficial de la Federación. Ley Federal del Mar. 8 de enero de 1986.

Moore, T. and Nelson, A.C. 1993. Case Study of the Effectiveness of Coastal Growth Management in a Growth Management State. *Coastal Management*. 21, pp. 197-208.

Munoz, J.C. 1994. Planning for the Ecologically Sustainable Harvest of Marine Resources: A Philippine Experience. The Coastal Environment Program: The Philippine Situation. *Coastal Zone Canada '94, Cooperation in the Coastal Zone,* Halifax, NS, Canada, 1994. (Eds. Wells, P.G. and Ricketts, P.J.). pp. 320-329.

National Oceanic and Atmospheric Administration (NOAA). 1992. *Biennial Report to the Congress on Coastal Zone Management, Vol. I and II,* September, 1992. Office of Ocean and Coastal Resource Management, Silver Spring, Md.

Nayak, B.U. 1992. Planning and Management of the Coastal Zone in India - A Perspective. *Coastal Management*. 20 (4), pp. 365-376.

Nedham, B., Boreri, K. and Sorensen, J. 1995. Worldwide Database of Integrated Coastal Programs. *Coastal Zone '95*, Extended Abstracts for the Ninth Conference, Tampa, Florida, July 16-21, 1995. American Society of Civil Engineers, New York, pp. 110-111.

New Zealand. 1971. *Marine Reserves Act*. Act N. 15 of 1971, (reprinted 1988) R. S. N.Z. vol. 22.

New Zealand. 1991. *Resource Management Act*. Act N. 34 of 1991, R.S., N.Z., Vol. 32.

Nitz, K.K. 1989. Citizen Participation in Managing Hawaii's Coastal Zone. *Coastal Zone '89,* Proceedings of the Sixth Symposium on Coastal and Ocean Management, Charleston, SC, USA. July 11-14. American Society of Civil Engineers, New York, pp. 925-939.

Norse, E. A. 1993. *Global Marine Biological Diversity*. Center for Marine Conservation. Washington, DC: Island Press.

Nova Scotia. 1989. *Municipalities Act*. R.S.N.S. 1989, c.295.

Nova Scotia Department of the Environment and Nova Scotia Department of Fisheries. 1994. *Coastal 2000: A Consultation Paper*. Nova Scotia.

Okemwa, E. and Wakwabi, E. 1995. Integrated Coastal Zone Management of Kenya. *Workshop and Policy Conference on Integrated Coastal Zone Management in Eastern Africa Including the Island States*. Linden, O., ed. pp. 183-203. Coastal Management Center. Metro Manila, Philippines.

Olsen, S., Sadacharan, D., Samarakoon, J.I., White, A.T., Wickremeratne, H.J.M., and Wijeratne, M.S. (Eds.). 1992. *Coast 2000. Recommendations for a Resource Management Strategy for Sri Lanka's Coastal Region*. 2 Vols. Department of Coastal Conservation, Colombo and Coastal Resources Center, University of Rhode Island.

Olsen, S., Tobey, J., and Kerr, M. 1996. *A Common Framework for Learning from ICM Experience*. Prepared for the International Workshop on Integrated Coastal Management in Tropical Developing Countries: Lessons Learned from Successes and Failures. Xiame, People's Republic of China. 24-28 May, 1996.

Organization for Economic Co-operation and Development (OECD). 1993. *Coastal Zone Management: Integrated Policies*. Paris, France: OECD.

Owen, S. 1988. *Aquaculture and the Administration of Coastal Resources in British Columbia*. Ombudsman Public Report No. 15. British Columbia.

Owens, D.W. 1992. National Goals, State Flexibility, and Accountability in Coastal Zone Management. *Coastal Management*. 20 (2), pp. 143-165.

Premaratne A. 1991. Difficulties of Coastal Resource Management in Developing Countries: Sri Lankan Experiences. *Coastal Zone '91*, Proceedings of the Seventh Symposium on Ocean and Coastal Management, Long Beach California, USA July 8-12, 1991. American Society of Civil Engineers, New York, pp. 3026-3041.

Robadue, D.D. (Ed.) 1995. *Eight Years in Ecuador: The Road to Integrated Coastal Management*. Coastal Resources Center, University of Rhode Island and Global Environment Center, U.S. Agency for International Development.

Robadue, D.D. 1990. Development and Conservation Planning in Ecuador's Coastal Zone. *Maritimes*. 34 (1), pp. 4-6.

Robadue, D.D. and Arriaga, L. 1993. Policies and Programs Toward Sustainable Coastal Development in Ecuador's Special Area Management Zones - Creating Vision, Consensus, and Capacity. *Coastal Zone '93*. Proceedings of the Eighth Symposium on Coastal and Ocean Management, New Orleans, Louisiana, July 19-23, 1993. American Society of Civil Engineers, New York, pp. 2668-2682.

Roberts, S. Y. and Ricketts, P. J. 1990. Developing Integrated Information Systems for Marine and Coastal Environments: Lessons learned from the FMG Project. *GIS for the 1990s: Proceedings*. National Conference, March 5-8, 1990, Ottawa, Canada. pp. 157-166.

Rose, J.G., Grissom, T.A., and Carlock, J.M. 1995. Local Government Role in Shoreline Management. *Second Annual Marine and Estuarine Shallow Water Science and Management Conference*, Atlantic City, NJ (USA), April 3-7.

Ross, R. 1972. *Te Tiriti o Waitangi: Texts and Translations*. 6 NZ J. History 129.

Scura, L.F., Chua T.E., Pido, M.D., and Paw, J.N. 1992. Lessons for Integrated Coastal Zone Management: the ASEAN Experience. *Integrative Framework and Methods for Coastal Area Management*. ICLARM Conference Proceedings No. 37, pp. 1-70.

Sherin, A. G. and Edwardson, K. A. 1996. A Coastal Information System for the Atlantic Provinces of Canada. *MTS Journal*. 30(4), pp. 5-14.

Sirinanda, K.U. 1995. Chapter 20 - Brunei Darussalum. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 265-276.

Sloan, N.A. and Sugandhy, A. 1994. An Overview of Indonesian Coastal Environmental Management. *Coastal Management*. 22 (3), pp. 215-233.

Smith, H.D. 1991. The Present and Future of Coastal Zone Management in the UK. *Land Use Policy*. 8, pp. 125-32.

Sorensen, J. and Hershman, M. 1990. Ocean Policy Development in the State of Washington. *Coastal Management*. 18 (3), pp. 297-311.

Sorensen, J. 1990. An Assessment of Costa Rica's Coastal Management Program. *Coastal Management*. 18 (1), pp. 37-63.

Sorensen, J. 1993. The international proliferation of integrated coastal zone management efforts. *Ocean and Coastal Management*. 21 (1), pp. 45-81.

Sorensen, J. 1996. University of Massachusetts, Boston. Personal Communication.

Sorensen, J. 1997. National and International Efforts at Integrated Coastal Management: Definitions, Achievements, Lessons. *Coastal Management*. 25(1), pp. 3-41

Sowman, M.R. 1993. The Status of Coastal Zone Management in South Africa. *Coastal Management*. 21 (3), pp. 163-184.

Sri Lanka. 1981. *Coast Conservation Act*. Act No. 57 of 1981. Amended by *Coast Conservation (Amendment) Act*. Act No. 64 of 1988.

Standing Committee on Environment, Recreation and the Arts, Commonwealth of Australia. 1991. *The Injured Coastline: Protection of the Coastal Environment*. April 1991. Commonwealth of Australia, Canberra.

Stewart, J.E., Penning-Rowsell, E.C., and Thornton, S. 1993. The LENKA Project and Coastal Zone Management in Norway. *Coastal Zone Management: Selected Case Studies.* Organization for Economic Cooperation and Development, Paris, France. pp. 257-281.

Sudara, S. 1995. Thailand - Chapter 17. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 235-242.

Taberner, J. 1993. *Legislative Options for National Coastal Zone Management*. Report commissioned by the Coastal Zone Inquiry of the Resource Assessment Commission.

Tabucanon, M.S. 1991. State of Coastal Resource Management Strategy in Thailand. *Marine Pollution Bulletin*. 23, pp. 579-586.

Thomson, R. E. 1981. *Oceanography of the British Columbia Coast*. Canadian Special Publication of Fisheries and Aquatic Sciences 56. Ottawa: Department of Fisheries and Oceans.

Tobin, R.J. 1991. Legal and Institutional Environment for the Management of Coastal Resources in Brunei Darussalam. *ASEAN/US CRMP Workshop on Coastal Resources Management in Brunei Darussalam*, Bandar Seri Begawan (Brunei Darussalam), 30 April to 1 May 1991. (Eds. Matdanan, S.G., Sharifuddin, H.J.H., DeSilva, M.W.R.N. and Chua, T.E.), ICLARM Conference Proceedings No. 34, pp. 189-206.

Tobin, R.J. 1992. Legal and Organizational Considerations in the Management of Coastal Areas. *Proceedings of the Regional Workshop on Coastal Zone Planning and Management in ASEAN: Lessons Learned*. Bandar Seri Begawan, Brunei Darussalam 28-30 April 1992. (Eds. Chua, T.E. and Scura, L.F.). ICLARM Conference Proceedings No. 37, pp. 97-105.

Truscott, S. J. and Dunn, M. 1994. The Evolution of Coastal and Marine areas Management Policy in Pacific Canada. *Coastal Zone Canada '94, 'Cooperation in the Coastal Zone':*. R. G. Wells and P. J. Ricketts, eds. Vol. 1, pp. 47-62. Coastal Zone Canada Association, Bedford Instituted of Oceanography, Dartmouth, Nova Scotia.

Turks and Caicos. 1970. *Coast Protection Ordnance.* Act 1 of 1970. 3rd June 1970, pp. 1571-1572.

Underwood, P., Waterman, M. and Keeley, D. 1991. Building a Regional Consensus for Ecosystem Management - A Gulf of Maine Experience. *Coastal Zone '91, Proceedings of the Seventh Symposium on Ocean and Coastal Management Long Beach California*, USA July 8-12. American Society of Civil Engineers, New York. pp. 865-872.

United Kingdom. 1995. *Coast Protection Act*. 12, 13, & 14 Geo 6 c.74, in Halsbury's (4th ed.), Vol. 49 Water (1992), 95.

United Nations. 1982. *United Nations Convention on the Law of the Sea*. A / CONF 62 / 122, 21 ILM 1261.

United Nations. 1992. *Convention on Biological Diversity*. 31 I.L.M. 818.

United Nations. 1995. *United Nations Convention on Straddling and Migratory Fish Stocks*, New York, 1995.

United Nations Conference on Environment and Development (UNCED). 1992. *Agenda 21: Programme of Action for Sustainable Development*. A / CONF. 151 / 26 / Rev.1, Vol.1.

United Nations Environment Program (UNEP). 1995. *Global Programme of Action for the Protection of the Marine Environment from Land-based Activities*. Reykjavik, May 19, 1995, UNEP/ICL/IG/1/2/Rev. 1.

United States. 1972. *Coastal Zone Management Act*. 16 U.S.C. Sect. 1451-1464 , PL 92-583.

United States. 1973. *Endangered Species Act*. U.S.C. 16, 1531 et. seq., P.L. 93-205.

United States. 1990. *Coastal Zone Managment Act Reauthorization Act*. 16 U.S.C. Sect. 1451-1464, PL 101-508, 104 Stat. 1388.

United States. 1990b. *Alternative Dispute Resolution Act*. 5 U.S.C. Sect. 571 et seq., PL 101-552.

Valencia, M.J. and VanderZwaag, D. 1989. Maritime claims and management rights of indigenous peoples: rising tides in the Pacific and Northern Waters. *Ocean and Shoreline Management*. 12 (2), pp. 125-167.

Vietnam-Canada Ocean and Coastal Cooperation Program. 1995. *Co-Management of Living Coastal Resources in ASEAN: Theory, Practice and Implications for Vietnam*. Report from the Training Course 'Principles and Practices of Co-management', May 15-17, 1995.

Wakeman T. and Domurat, G. 1991. The California Coastal Zone Experience. *The California Coastal Zone Experience* (Eds. Domurat, G. and Wakeman, T.). American Society of Civil Engineers, New York, pp. 1-5.

Waldichuk, M. 1988. The Nature and Extent of Marine Contamination Caused by Land-Based Sources in Canada. *Canadian Conference on Marine Environmental Quality: Proceedings*. P. G. Wells and J. Gratwick, (eds.). Halifax: International Institute for Transportation and Ocean Policy Studies.

Walls, K. 1995. New Zealand - Chapter 23. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 307-317.

Walters, C. 1995. *Fish on the Line: The Future of Pacific Fisheries*. Report to the David Suzuki Foundation.

Wang, Y. 1995. China - Chapter 12. *Coastal Management in the Asia-Pacific Region: Issues and Approaches* (Eds. Hotta, K. and Dutton, I.M.). Japan International Marine Science and Technology Federation, Tokyo, pp. 177-186.

Weisbord, M. R. 1992. *Discovering Common Ground*. San Francisco, California: Berret-Koehler Publishers, Inc.

Weisbord, M. R. and Janoff, S. 1995. *Future Search: An Action Guide to Finding Common Ground in Organizations & Communities*. San Francisco: Berret-Koehler Publishers.

Wells, R. G. and Ricketts, P. J. 1996. *Coastal Zone Canada '94, 'Cooperation in the Coastal Zone': Conference Summary*. Vol. 6. Coastal Zone Canada Association, Bedford Institute of Oceanography, Dartmouth, Nova Scotia.

Wells, R. G. and Rolston, S. J. 1991. *Health of Our Oceans: A Status Report on Canadian Marine Environmental Quality*. Ottawa: Environment Canada.

Westcott, G. 1989. The Planning and Management of the Coast of the State of Victoria, Australia. *Coastal Zone '89*, Proceedings of the Sixth Symposium on Coastal and Ocean Management. Charleston, SC, USA,. July 11-14, 1989. pp. 1-15.

White, A.T. and Lopez, N. 1991. Coastal Resources Management Planning and Implementation for the Fishery Sector Program of the Philippines. *Coastal Zone '91*, Proceedings of the Seventh Symposium on Ocean and Coastal Management Long Beach California, USA July 8-12, 1991. American Society of Civil Engineers, New York. pp. 762-775.

Wolfe, L. 1998. Quadr Planning, British Columbia. Personal Communication.

Wolfenden, J. Cram, F. and Kirkwood. B. 1994. Marine reserves in New Zealand: a survey of community reactions. *Ocean & Coastal Management* 25(1), pp. 31-51.

Wood-Thomas, B.C. 1994. Land-based Marine Pollution and Coastal Zone Management - Role of State and Local Government in the USA. *Marine Policy*. 18 (2), pp. 165-174.

Zhijie, F and Côté, R. P. 1990. Coastal Zone of PR China: Management Approaches and Institutions. *Marine Policy*. 14 (4), pp. 305-315.

APPENDIX I
CZM EXPERTS CONTACTED

Australia

- Jacqueline Alder, Coastal Management, DEH
- K. R. Brown, Institute for Coastal Resource Management
- Ian Dutton, Southern Cross University
- Marcus Haward, U. of Tasmania, Dept. of Political Science
- Richard Kenchington, Great Barrier Reef Marine Park Authority
- Ilse Kiessling, U. Of Tasmania, Inst. of Antarctica and Southern Ocean Studies

Barbados

- Leonard Nurse, Coastal Conservation Feasibilty Study, Project Manager

Brunei

- Chua Thia-Eng, IMO, Program Manager

California

- Jack Liebster, California Coastal Commission
- Garbiella Goldfarb, California Coastal Commission

Costa Rica

- Anthony Charles, Saint Mary's University
- Jorge Campos Monteros, National Coastal and Marine Commission

Ecuador

- Don Robadue, U. of Rhode Island Program Manager for Ecuador
- Brian Crawford, U. of Rhode Island Program Manager for Ecuador

France

- Alastair Couper, U. of Wales at Cardiff, Dept. of Maritime Studies
- Omer Chouinard, Université de Moncton
- Roland Paskoff, Université Lumière Lyon 2
- Hance Smith, U. of Wales at Cardiff, Dept. of Maritime Studies

Indonesia

- Brian Crawford, U. of Rhode Island
- Ian Dutton, Southern Cross University
- Chua Thia-Eng, IMO, Program Manager

Japan

- Kenji Hotta, Nihon University
- Harvey Shapiro, Department of Environmental Planning
- Chua Thia-Eng, IMO, Program Manager

Malaysia

- Brian Needham, U. of Rhode Island
- Kim -Looi Ch'ng, National Coastal Resource Management Policy, National Coordinator
- Edward Miles, U. of Washington, School of Marine Affairs
- Raja M. D. Noordin, SEAFDEC / MFRDMD
- Chua Thia-Eng, IMO, Program Manager

Massachusetts

- Anne Smrcina, Coastal Management Division, Department of Environmental Affairs

Netherlands

- Alastair Couper, U. of Wales at Cardiff, Dept. of Maritime Studies
- Winifred Broadbelt, Chief Directorate of Public Works and Water Management, Senior Legal Adviser, the Netherlands
- Gerard Peet, Consultant, the Netherlands
- Christian Laustrup, Danish Coastal Authority, Deputy Director
- Hance Smith, U. of Wales at Cardiff, Dept. of Maritime Studies
- Leo de Vrees, Coordinator CZM Centre, The Hague

New Zealand

- David Gregory, Canterbury Regional Council
- Hamish Rennie, Department of Conservation, The Coastal Section

Norway

- Alastair Couper, U. of Wales at Cardiff, Dept. of Maritime Studies
- Marios Helga, Director of Fisheries
- Christian Laustrup, Danish Coastal Authority, Deputy Director
- Hance Smith, U. of Wales at Cardiff, Dept. of Maritime Studies
- James Stewart, Department of Fisheries and Oceans, Bedford Institute of Oceanography

Oregon

- Richard Hildreth, Ocean and Coastal Law Center, University of Oregon

Philippines

- John Wilson, AID, Washington
- Chua Thia-Eng, IMO, Program Manager

South Africa

- D.E. Malan, Environmental Directorate

Sri Lanka

- B. S. Kahawita, Coast Conservation Development
- Alan White, Sri Lanka USAID Project, Sri Lanka
- Brian Crawford, Coastal Resources Center, University of Rhode Island

- Nissanka Perera, Coastal Conservation Department

Thailand

- Somsak Boromthanarat, Coastal Resources Institute, Director
- Debashis Puzari, Asian Institute of Technology
- Suraphol Sudara, Chulalongkorn University, Dept. of Marine Science
- Chua Thia-Eng, IMO, Program Manager

United Kingdom

- Alastair Couper, U. of Wales at Cardiff, Dept. of Maritime Studies
- Christian Laustrup, Danish Coastal Authority, Deputy Director
- Hance Smith, U. of Wales at Cardiff, Dept. of Maritime Studies
- Simon Edwards, U. of Portsmouth, Dept. of Geography

United States

- Marc Hershman, U. of Washington
- Jens Sorenson, U. of Mass., Harbour and Coastal Centre
- Steven Stichter, N.C. Division of Coastal Management
- Lori Sutter, N.C. Division of Coastal Management

Vietnam

- Aldo Chircop, Dalhousie University, Marine Affairs Program
- Ian Dutton, Southern Cross University
- Chua Thia-Eng, IMO, Program Manager
- Vince Verlane, Consultant, Canada

Washington

- Douglas Canning, Shorelands and Water Resources Program

APPENDIX II
INTERNET SITES

The following internet sites provide information on coastal zone management initiatives worldwide.

General CZM Sites

Centre for Tropical Coastal Management, Research in Tropical Coastal Management, University of Newcastle
http://www.ncl.ac.uk/~nmscmweb/mscm/resea

Coastal Advocate
http://www.cyboard.com/pol/coastal.html

Centre for Marine Studies, University of Cape Town
http://emma.sea.uct.ac.za/cms/index.html

Coastal Resources Center, University of Rhode Island
http://brooktrout.gso.uri.edu

Coastal Resources Center, University of Rhode Island: ICZM Country Files
http://brooktrout.gso.uri.edu/ICZM_Country_Files_Region.html

Coastal Zone Management Source Page
http://www.wantree.com.au/~kays

Coast Wise Europe
http://hrovx6.hro.nl/www/hrocis/fac/fka/avb/cwe/cwe.htm

COASTWATCH Magazine
http://www2.ncsu.edu/unity/project/www/ncsu/CIL/sea_grant/coastwatch/index.html

European Commission's Marine Environment Unit
http://me-www.jrc.it/home.html

Food and Agriculture Organization
http://www.fao.org

International Federation of Institutes for Advanced Study Coastal Resources Management Program
http://www.ifias.ca/IFIAS/Docs/CRMdocs

International Organizations on Internet
http://undcp.or.at/unlinks.html

Fletcher School of Diplomacy, Tufts University, Marine and Coastal Multilateral Conventions
http://www.tufts.edu/fletcher/multilaterals.html

International Organizations involved in Marine-related activities
http://kaos.erin.gov.au/sea/sea.html

Marine Law Institute, University of Maine

http://www.law.usm.maine.edu/mli/

National Sea Grant College Program
http://www.mdsg.umd.edu/NSGO/index.html

Ocean Voice International
http://www.conveyor.com/oceanvoice.html

Small Islands Information Network, University of Prince Edward Island
http://www.upei.ca/~siin/coastal.htm

United Nations Environment Programme Geneva Executive Center Switzerland
http://www.unep.ch/

World Conservation and Monitoring Centre: Marine and Coastal Data and Links
http://www.weme.org.uk/data/database/me_html

Australia

Environmental Resources and Information Network (ERIN) Homepage, Department of Environment, Sport, and Territories
http://www.erin.gov.au

Australia's National Strategy for Coastal Zone Management
http://www.erin.gov.au/portfolio/esd/nsesd/coasts

Great Barrier Reef Marine Park Authority
http://www.erin.gov.au/portfolio/gbrmpa/gbrmpa.html

Integrated Environmental Management Best Practice Case Studies in Local Government
http://www.erin.gov.au/portfolio/dest/dest/contents.html

Living on the Coast - Summary
http://www.erin.gov.au/sea/coastal_policy/cst_con

Marine and Coasts Introduction
http://www.erin.gov.au/sea/sea.html

Marine Information Sources
http://www.erin.gov.au/other_servers/category/Marine.html

Ocean Rescue 2000
http://kaos.erin.gov.au/sea/conservn/or2000.

Our Sea, Our Future: Major Findings of the State of the Marine Environment Report for Australia

http://kaos.erin.gov.au/sea/somer/chapter6.html

Portfolio Marine And Coastal Environment Strategy - An Overview
http://www.erin.gov.au/sea/marine

The Australian Coastal Zone and Global Change: Research Needs
http://www.erin.gov.au/sea/coastal_zone/contents

Turning the Tide: Integrated local area management for Australia's coastal zone
http://www.erin.gov.au/sea/Turning_Tide/tide1

Australia Coastal Resources: Complete Documentation from the Resource Assessment Commission's Coastal Zone Inquiry
http://www.vicnet.net.au:80/vicnet/informit/coast

Centre for Coastal Management/Conservation Technology Staff Listing
http://www.scu.edu.au/ressci/staff/index.html

Victoria Coastal and Bay Management Council
http://www.dce.vic.gov.au/nps/coast/coast.html

Baltic Sea

Baltic Sea Resources Homepage
http://biomac.io-warnemuende.de/baltic

California

California Coastal Commission Home Page
http://ceres.ca.gov/coastalcomm/web/index

California Coastal Management Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/california.html

USGS San Francisco Bay Program: Lessons Learned
http://h2o.usgs.gov/public/wid/html/sfb.html

Caribbean

Island Resources Foundation
http://www.irf.org/irhome.html

C aribbean Coastal Studies (CCS)

http://www.millersv.edu/~boostdam/CCS.html

Delaware

Delaware Zone Management Coastal Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/delaware.html

Florida

The Florida Coastal Management Program Home Page
http://www.dos.state.fl.us/fgils/agencies/fcmp.html

Quarterly Newsletter: Coastal Currents, The Florida Coastal Management Program
http://freenet3.scri.fsu.edu:81/doc/fcmp.publicat.txt

Florida Coastal Management Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/florida.html

Georgia

The Georgia Conservancy Issues Page Georgia Coastal Management Program
http://www.america.net/~reefball/gc.html

Gulf Of Maine

Gulf of Maine Council
http://hed.bio.dfo.ca/~gomhab/hp-gomc.html

Ireland

CZM Progress in 1993/1994: Selected Sites in Ireland
http://www2.tcd.ie/Environmental_Sciences/biomar/progress.html

Korea

Marine Policy Center, Korea Ocean Research and Development Institute
http://sari.kordi.re.kr/general/policy.html

Maryland

Maryland Coastal Zone Management Program: NOAA Assessment
http://www.nos.noaa.gov/ocrm/cpd/maryland.html

Massachusetts

The Center for Coastal Studies
http://www.provincetown.com/coastalstudies/index.html

Michigan

Michigan Coastal Zone Management Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/michigan.html

Michigan Coastal Zone Management Program
http://www.deq.state.mi.us/lwm/czm.html

National Esturary Program

National Esturary Program homepage
http://www.epa.gov/nep

National Ocean And Atmospheric Administration (NOAA)

Center for Coastal Ecosystem Health, South Carolina
http://www.noaa.gov/coastal_ecosystems_health.html
http://ccch.noaa.gov

Coastal America
http://kingfish.ssp.nmfs.gov/coastamer/coastamer.html

Coastal Management Services (CMS)
http://www.csc.noaa.gov/text/bull2.html

National Ocean Service (NOS) Home Page
http://www.noaa.gov/nos

NOAA Assessment of selected State Programs
http://wave.nos.noaa.gov/ocrm/cpd/cpd_states.html#name

NOAA Oceans Page

http://www.esdim.noaa.gov/ocean_page.html

NOAA NOS Fact Sheets
http://www.nos.noaa.gov/facts/ocrm

NOAA Coastal Services Center WWW Home Page
http://cceh.noaa.gov/

Office of Ocean and Coastal Resource Management Welcome Page
http://www.nos.noaa.gov/ocrm

Office of Ocean Resources Conservation and Assessment (ORCA)
http://seaserver.nos.noaa.gov/organization/orca.html

ORCA's Coastal Assessment Framework (CAF)
http://seaserver.nos.noaa.gov/projects/caf/caf.html

Netherlands

NetCoast: Netherlands Coastal Zone Management Center
http://www.minvenw.nl/projects/netcoast/info/info.htm

New Zealand

The Resource Management Act
http://www.govt.nz/ps/min/com/tpg/rma.html

Resource Management Act/Regional Councils And The Resource Management Act
http://www.boprc.govt.nz/www/resman1.html

North Carolina

Department of Energy, Health and Resources, Division of Coastal Management
http://cgia.cgia.state.nc.us/agency.dir/dcm.html

North Carolina Coastal Federation Homepage
http://www.eastnc.coastnet.com/nccf/homepage.htm

Pennsylvania

Pennsylvania Coastal Zone Management Program.
http://www.dep.state.pa.us/dep/subject/advcoun/czac/96czmapp.html

Rhode Island

Rhode Island Coastal Zone Management Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/rhode_is.html

South Carolina

Baruch Institute for Marine Biology and Coastal Research, University of South Carolina
http://inlet.geol.scarolina.edu

South Carolina Coastal Zone Management Program: NOAA Assessment
http://wave.nos.noaa.gov/ocrm/cpd/scarolin

Viet Nam

UNEP: Coastal Zone Management
http://www.serve.net/vietnam/pages/viet1161.htm

Virginia

Virginia Coastal Resources Management, Virginia Department of Environmental Quality
http://www.deq.state.va.us/envprog/coastal.html

Washington

Washington Coastal Mangement Program
http://www.wa.gov/ecology

Wisconsin

Wisconsin Coastal Zone Management Program
http://www.doa.state.wi.us/deir/coastal.htm

United Kingdom

Dundee Centre for Coastal Zones Research, University of Dundee, Scotland
http://www.dundee.ac.uk/dcczr