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***“THINK-PIECE” ON THE CURRENT AND EMERGING MARINE-RELATED  
ACTIVITIES OF APEC***

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## ACRONYMS/ABBREVIATIONS

ACORN	Australian-Canadian Ocean Research Network
AFF	ASEAN Fisheries Federation
APEC	Asia Pacific Economic Cooperation
APEC	Asia Pacific Economic Cooperation
APFC	Asia-Pacific Fishery Commission
ASEAN	Association of Southeast Asian Nations
CCOP	Coordinating Committee for Coastal and Offshore Geoscience Programmes in East and Southeast Asia
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
COCATRAM	Central American Commission of Maritime Transport
CPCEMR	Circum-Pacific Council on Energy and Mineral Resources
CPPS	Comision Permanente del Pacifico Sur (Permanent South Pacific Commission)
EC	Economic Committee
ECOTECH	Economic and Technical
EEZ	Exclusive Economic Zone
ESC	SOM Sub-Committee on ECOTECH
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
EVSL	Early Voluntary Sector Liberalization
EWG	Energy Working Group
FAO	Food and Agriculture Organisation of the United Nations
FFA	Forum Fisheries Agency
FWG	Fisheries Working Group
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities
HRDWG	Human Resources Development Working Group
ICAO	International Civil Aviation Organisation
ICG/ITSU	International Coordination Group for the Tsunami Warning System in the Pacific
ICOM	Integrated Coastal and Ocean Management
IOC	Intergovernmental Oceanographic Commission
IMO	International Maritime Organisation
IMTA	Intermodal Transport Association
IOM	Integrated Ocean Management
IOM	Integrated Ocean Management
IPHC	International Pacific Halibut Commission
ISO	International Standards Organisation
ISTWG	Industrial Science and Technology Working Group
IT	Information Technology
ITIC	International Tsunami Information Centre
LBS	Land-Based Sources of Pollution (marine pollution from land- based activities)

LME	Large Marine Ecosystem
MRCWG	Marine Resources Conservation Working Group
NACA	Network of Aquaculture Centres in Asia-Pacific
NAFO	Northwest Atlantic Fisheries Organisation
OAA	Osaka Action Agenda
Osaka Action Agenda	The Osaka Action Agenda: Implementation of the Bogor Decalaration
OTEC	Ocean Thermal Energy Conversion
PAFTAD	Pacific Trade and Development Conference
PATA	Pacific Asia Travel Association
PBEC	Pacific Basin Economic Council
PECC	Pacific Economic Cooperation Council
PECC	Pacific Economic Cooperation Council
PICES	North Pacific Marine Science Organisation
R&D	Research and Development
S&T	Science and Technology
SEAFDEC	Southeast Asian Fisheries Development Centre
SEAPOL	Southeast Asian Programme in Ocean Law, Policy and Management
SEPHC	South East Pacific Hydrographic Commission
SME	Small-to-Medium Size Enterprise
SOM	Senior Officials' Meeting
SOPAC	South Pacific Applied Geoscience Commission
TELWG	Telecommunications and Information Working Group
TILF	Trade and Investment Liberalization and Facilitation
TPFCC	Trans-Pacific Fisheries Consultative Committee
TPTWG	Transportation Working Group
TWG	Tourism Working Group
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
WCU/IUCN	World Conservation Union
WG	Working Group
WWF	World Wildlife Fund International
WPRFMC	Western Pacific Regional Fishery Management Council

## 1. INTRODUCTION

This paper was prepared in March 2002 to provide “material” for preparation of papers by APEC Working Groups and for discussion in the plenary and break-out sessions of the APEC Integrated Ocean Management Forum Two Workshop, convened in Canberra, Australia, between 3-7 June 2002. The cut-off date for this paper was 31 March and consequently developments in and outside of APEC after this date are not covered.

The paper (1) summarises in executive format current and emerging APEC marine activities, (2) identifies law, policy and management gaps in APEC marine programming, and (3) suggests cross-APEC project ideas in marine affairs. The paper contains two annexes on (A) non-APEC Asia-Pacific regional marine organisations and (B) sample of topical/emerging issues in marine affairs.

### 1.1 On APEC

It is useful to recall why APEC was established and its general purposes today to gain a better understanding of the current marine issues actually addressed in APEC bodies. This will help explain the particular priorities and perspectives within relevant bodies, and the challenge thus posed to the development of an integrated approach to coasts and oceans.

APEC was established in 1989 in recognition of the growing interdependence of economic activities and trade in Asia-Pacific Rim countries. APEC members are in effect “member economies” and they concert to promote open trade and practical economic cooperation. In the year 2000, the APEC share of global trade was 46.76%. Thus the epicentre of APEC’s gravitation pull has been trade and economic prosperity in the region. APEC is also concerned with sustainability of that prosperity, including the promotion of cleaner production and environment protection. The commitment in *The Osaka Action Agenda: Implementing the Bogor Declaration* is “to achieve the long-term goal of free and open trade and investment no later than the year 2010 in the case of industrialized economies and the year 2020 in the case of developing economies.” The principles invoked to guide this process are: comprehensiveness; consistency; comparability; non-discrimination; transparency; standstill (non-protectionism); simultaneous start, continuous process and differentiated timetables; flexibility; and cooperation.

To enable the achievement of its trade objectives and in the process build a sense of community among trading partners, APEC has operated on the basis of consensus. The participation in APEC activities has tended to consist primarily of government officials and private sector/industry representation, with a smaller representation of academia and civil society (non-governmental organisations). APEC activities have frequently focussed on capacity-building, networking and information exchange across most thematic concerns.

Decision-making within each level of the APEC hierarchy is guided by common policy adoption, common priority-setting and consensus-building. There is regular rotation of chairing responsibilities in each body.

With this background, and excepting past ICM and current IOM initiatives, “marine” activities in

APEC have tended to be predominantly sectoral, and perhaps “sectoral” more in an economic than in an ocean user sense. For instance, fisheries-related activities have been frequently seafood and trade-related rather than management, co-management and multiple-user related. Discussions on conservation have tended to be limited to issues such as destructive fishing methods. Similarly in maritime transport, the numerous activities involved are dominantly sectoral and not necessarily relating transportation to other navigation uses of the ocean. In general, there have been very few activities that are primarily concerned with multi/inter-sectoral “relationships” which is at the heart of the integrated approach.

Integrated coastal and ocean management initiatives would need to take into consideration the larger trade, economy and sustainability framework of APEC.

## 1.2 On ICOM

Integrated coastal and ocean management is capable of different definitions depending on geographical extent, problems/issues addressed and nature of activities involved. Integration suggests comprehensiveness, and yet coherency and consistency by virtue of the unifying character of the marine environment. For the purpose of this paper, ICOM is understood as including: (a) a wide geographical meaning that would include flexible geographical areas within which activities that impact on the marine environment occur, and at a minimum includes the area of interface between land and sea which may vary in breadth from one place to another (commonly referred to as the coastal zone); (b) problems and issues arising in a marine environmental context, such as pollution, overfishing, disaster response and mitigation, multiple use conflicts, science for management, etc., and their regulatory frameworks; and, (c) all marine sectors, uses and users (e.g., maritime transport, fisheries, ocean industry, coastal communities, etc.) including their interactions and impacts, and land-based activities that have an impact on the marine environment.

In an operational sense, IOM includes the policy, planning, management and enforcement/compliance decision-making and related processes that address coastal and marine problems, issues, uses and users. The purposes may be environmental (protection, conservation), developmental (economic, socio-economic) or other. There is no limit to the diversity of activities in the marine environment, especially since technological, commercial and social forces continuously provide new opportunities.

## 2. CURRENT AND EMERGING MARINE-RELATED POLICY AND PROGRAMME DIRECTIONS IN APEC

The current APEC fora with **actual and direct** marine activities are in practice only three: (1) Marine Resources Conservation Working Group (MRCWG); (2) Fisheries Working Group (FWG); and (3) Marine Transportation Working Group (TPTWG). The functions of all three are necessarily marine by definition. The lead WG for each activity identified is put in brackets. The Economic Committee (EC) and ECOTECH Sub-Committee of the SOM (ESC) are primarily policy bodies and may, at the most, facilitate the adoption of policy framework and supervise the work of Working Groups (WGs). The other WGs surveyed have activities that could be relevant or have the potential of developing relevant marine activities (Energy Working

Group, EWG; Tourism Working Group, TWG; Industrial Science and Technology Working Group, ISTWG; Telecommunications and Information Working Group, TELWG; and Human Resources Development Working Group, HRDWG).

## **2.1 Framework concerns**

### ***Policy-setting***

- Policy frameworks, strategies and action plans (EC and ESC).

### ***Ocean governance***

- Inventory of current and emerging oceans governance arrangements in the Asia-Pacific region (MRC)
- Oceans governance forum (MRC)

### ***Integrated management***

- Member economies' profiles of integrated coastal and ocean management initiatives (MRC).
- Mechanisms for integrated coastal management (MRC).
- Integrated oceans management (MRC).

## **2.2 Sectoral and issue concerns**

### ***Alien/exotic species***

- Development of a management framework for APEC economies for use in the control and prevention of introduced marine pests (MRC).
- Capacity and awareness building on import risk analysis for aquatic animals (FWG).

### ***Aquaculture***

- Farming reefs (FWG).
- Collaborative grouper aquaculture research and development network (FWG).
- Grouper virus transmission and vaccine.
- Women in aquaculture.



### ***Fisheries management***

- Coastal resource management (FWG).
- Conservation and management of sharks (FWG).
- Conservation and management of marine turtles (FWG).
- Destructive fishing methods in coral reef environments (FWG).

### ***Marine pollution***

- Regional Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (MRC).
- Partnerships for marine pollution from land-based activities (LBS): convening of a meeting to include donors, assistance beneficiaries and private sector for domestic LBS plans of action (MRC).
- Management of red tide and harmful algal blooms (MRC).
- Application of monitoring and mitigation technologies of harmful algal bloom (MRC).

### ***Marine science***

- Modern approaches to linking exposure to toxic compounds and biological effects (MRC).
- Ocean model and information system (MRC).

### ***Marine transportation (ports, shipping, maritime trade)***

- Exchange of information and improvement of the Pacific Region's response capabilities to spills of oil and hazardous materials (MRC).
- An interactive web-based *Port Database*.
- Establishment of a Virtual Centre for Transportation Research, Development and Education website (TPT).
- Completion of a compendium of success stories on the increased participation of women in the transportation sector (TPT).
- Ascertainment of existing standards of training facilities, instructors, examiners and curriculum for seafarers throughout the APEC region's existing maritime training institutions and training equipment in each member economy in order to improve the quality of seafarers in the region (TPT).
- Intermodalism and Satellite-based Technologies (TPT).
- Transportation Security Initiative that provides for a mechanism for increased cooperation and communication on transportation security within the APEC region (TPT).
- Safer Shipping in the Asia Pacific Region, to form the basis for future work in the Maritime Safety Experts' Group (TPT).
- Non-tariff measures in the transport sector to facilitate trade (TPT).
- Electronic commerce, particularly paperless trading (TPT).

- Examples and case studies of the benefits of regulatory and other institutional changes directed to maritime trade liberalisation and facilitation to demonstrate how this can be achieved and the benefits that will flow from trade liberalisation and facilitation (TPT).
- Consideration of measures to promote the mutual recognition of transport professional qualifications (TPT).
- APEC accreditation of seafarer manning agencies (TPT).
- Development of a regional action plan for global navigation satellite systems implementation, in consultation with relevant international bodies such as the ICAO and IMO (TPT).
- Identification of needed intermodal skills and development of required training programmes (TPT).

### ***Offshore hydrocarbons and mining***

- Assessment and integrity of existing offshore oil and gas infrastructure (MRC).

### ***Seafood market and safety***

- Early Voluntary Sectoral Liberalization (EVSL) initiative outcomes to date: (1) a study into the nature and extent of subsidies in the fisheries sector in APEC member countries; (2) a study to reduce impediments to early voluntary sectoral liberalization in the fisheries sector; (3) options for policy model evolution harmonious with EVSL.
- Analytical methods, standards and reference materials for seafood product safety and certification (MRC).
- Management of marine algal toxins in seafood products (FWG and MRC).
- APEC seafood information system (market and industry information service) (FWG).
- Capacity and awareness building on import risk analysis for aquatic animals (FWG).
- Live reef food fish trade (FWG).
- Subsidies in the fisheries sector (FWG).

## **2.3 Capacity-building concerns**

### ***Education, training and networking***

- Marine environmental training and education programme (MRC).
- Law and policy knowledge base in support of integrated coastal and ocean management decision-making in APEC marine programming (MRC).
- Coordinated development of APEC's marine related networks to facilitate information exchange for decision-making, joint research and monitoring (e.g.s of networks: OMISAR, Sustainable Development Training and Information Network and EduNet Integrated Coastal Management Network)(MRC).

## ***Other***

- Marketing of marine technology (ISTWG).

### **3. “GAPS” IN CURRENT AND EMERGING MARINE-RELATED ACTIVITIES IN APEC**

The preceding section provided a comprehensive view of the range of current marine-related activities in APEC. As noted, the majority of current activities are primarily sectoral, problem or issue-specific. In this section “gaps” is used with reference to integrated or multi-sectoral/issue opportunities for cooperative activities. The emphasis is on “gaps” of a law, policy, management and capacity-building nature.

Overall, despite the tremendous range of activity in APEC, what seems to be missing is activities that actually cut-across APEC programming or which serve as a framework for the existing diversity of activity. The advantage of “big picture” activities is the sense of purpose they would reinforce in APEC programming for coasts and oceans.

#### **3.1 Law**

##### ***UN Convention on the Law of the Sea implementation***

Perhaps one of the most obvious gaps in current APEC marine programming is the little attention being paid to the implementation of the *UN Convention on the Law of the Sea*, a holistic instrument on ocean regulation. This instrument now has more than 130 member states, many of which are APEC member economies. This is the most important international instrument governing marine affairs and calls for regional cooperation on most of the issues it addresses. Oceans play an important role in APEC member economies, and the *UN Convention* is as much about development and use as it is about management, protection and conservation.

##### ***International environmental law implementation***

With the exception of fisheries and to some extent marine transportation, there is little attention paid to the relevant hard and soft international environmental law that impacts on the coastal and marine environment. Some attention has been paid to the *Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA)*, *FAO Code of Conduct for Responsible Fisheries*, *Convention on the Standards for Training and Certification of Watchkeepers*, 1996 (STCW) and the *Convention on the Prevention of Pollution From Ships*, 1973/78 (MARPOL 73/78).

With reference to the *GPA*, the Hawaii Declaration proposed “identification and review of the impediments to ratification of existing international and regional instruments concerning marine degradation in each economy and difficulties encountered in their implementation” (Declaration, APEC Oceans Conference: Realizing the Opportunities for APEC Economies, Hawaii, October 14-16, 1998). This is probably needed in relation to other instruments of international environmental law as well. There is room for more attention to the record of implementation of

relevant global instruments at the regional level. Particularly significant instruments that merit attention include the *Agenda 21 (Chapter 17)*, *UN Agreement for the Implementation of the Provisions of the UN Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Straddling Stocks Agreement)*, *Framework Convention on Climate Change*, including the *Kyoto Protocol*, *Convention on Biological Diversity*, *Convention on the International Trade in Endangered Species (CITES)*, *Convention on Wetlands of International Importance (Ramsar Convention)*, etc., and possibly also of important regional instruments in APEC sub-regions, such as the UNEP Regional Seas Programmes to the extent that member economies are involved.

### **3.2 Policy**

There is great diversity in governance practices and the few truly integrated national ocean and coastal policies, and the presence or absence of these in turn have the potential of affecting the implementation of APEC principles in the marine sectors. Given the importance of coasts and oceans in the APEC region, and the practice of policy dialogues, common policy concepts and joint activities among member economies (*Osaka Action Agenda*, Part II, Section B), there is significantly more that could be done with regard to integrated coastal and ocean policies. There is scope for such work in terms of policy recommendations and the “conduct [of] policy dialogue to share scientific and technical information, to identify and assess environmental issues, and to develop practical, action-oriented approaches to maintaining the quality of the marine environment” (*Osaka Action Agenda*, Part II, Marine Resources Conservation). To date, most of the actions and projects have tended to be sectoral or issue specific and not necessarily as part of an integrated policy approach. The *Action Plan for Sustainability of the Marine Environment* is a good step in the direction of integration, but there is still great potential for an APEC-wide cross-cutting programme.

### **3.3 Management**

#### ***ICM, ICOM***

There has been some APEC activity on integrated coastal management. ICM or ICOM is an area of activity with great potential for growth and cooperation. The *Action Plan for Sustainability of the Marine Environment* identified this area as an objective and tool for the achievement of strategy objectives. There is also considerable APEC interest in cooperation on the *GPA*, which identifies ICM as a major implementation tool. ICOM provides an opportunity for a funnelling of all relevant hard and soft instruments of international environmental law into a comprehensive strategy for coasts and oceans. There is an opportunity to show case successful examples of ICOM as demonstration sites. There is also an opportunity to develop criteria, indicators and a process for evaluation of successful experiences to enable meaningful comparison and possibly also standard-setting.

#### ***Ecosystem-based management***

Ecosystem-based management, whether on a local or large scale, is again another area which has a great potential for regional cooperation in coasts and oceans and which APEC could invest in.

Marine protected areas are a related opportunity. Again, there is the additional possibility of showcasing successful APEC MPAs.

### ***Precaution***

Another opportunity relates to the implementation of the principle of precaution. This principle has received attention in some APEC fisheries activities. However, precaution has become a valuable legal and management concept in many areas of environmental management. There is much that could be learned through a comparative survey of practices in various member economies and in the diverse fields it is being applied in (e.g., fisheries, aquaculture, toxics, forestry, etc.).

### ***Co-management***

There is currently little attention to community-based co-management as a form of legitimate and viable local area integrated management for various resource systems (e.g., fisheries, agriculture, watersheds/estuaries, forestry, etc.) and as a way of generating local economies. There are successful examples in several APEC countries that could be similarly useful show-cases.

### ***Places of refuge***

A new issue area with a transportation, humanitarian and socio-environmental security dimension is places of refuge for ships in distress (e.g., stricken tankers). This has become a problem in terms of reluctance of many states to permit such ships in their waters because of the risk they pose to their marine environments and local economies. This problem is currently being addressed by the IMO, but it offers an opportunity for regional cooperation as part of ICOM.

## **3.4 Capacity-building**

### ***“Ocean” universities of member economies***

There has been significant attention given to technical capacity-building in the various APEC bodies, but basically no attention has been paid to “big picture” concerns and the types of new professionals that ICOM, or for that matter the principles of sustainable development demand. The regional universities with expertise in these fields have seen little or no involvement. APEC has very significant “ocean universities” or universities with significant strengths in marine affairs that are under-utilized and yet can easily play one of the most far reaching roles for coasts and oceans in the region.

### ***Regional marine affairs institutes***

Several APEC member economies now have national marine affairs institutes that serve as advisory and/or coordinating bodies in coasts and oceans at the national level (e.g., China, Malaysia, Philippines, Vietnam, etc.). Representatives from these institutes have participated in

recent MRCWG meetings but their participation in APEC activities has been minimal. APEC support for these national institutes and assistance to new ones that could be established would build national capacity in support of APEC marine programming objectives.

#### 4. IDEAS FOR CROSS-APEC PILOT PROJECTS

As seen earlier, APEC bodies already have an extensive array of activities. What is advanced below is a cross-cutting **Ocean Governance Programme** with cross-cutting projects that serve to build on existing activities and networks, and further build critical mass and momentum.

- *What?*
  - < Principled ocean governance programme focussing on policy, law, management and capacity-building.
  
- *Why?*
  - < To demonstrate the value of Ocean Governance and ICOM within the Asia-Pacific Region.
  - < Facilitate regional cooperation in marine affairs.
  - < Further facilitate regional implementation of global instruments in marine affairs.
  - < Create a cross-APEC epistemic community in marine affairs and thereby increase the pool of expertise in integrated approaches to coasts and oceans.
  - < Provide for concerted APEC input into global marine processes.
  - < Strengthen the cooperative ethic and foster an “oceans” environment.
  - < Enhance the multiplier effect of knowledge and capacity-building in marine affairs.
  
- *How?*
  - < Operate within existing stated APEC policies and link commitments in the various strategies, utilizing an overarching coordinated approach.
  - < Convening of a biennial regional oceans forum (involving APEC bodies and other relevant actors) for practitioners, academics, researchers, and NGO personnel in the region.
  - < Utilization of comparative approaches and demonstration sites or examples in the APEC region.
  - < Different WGs and other APEC bodies could lead one or more projects.
  - < Cooperation with/through existing global and regional initiatives.
  - < Cooperation with competent international organisations.
  - < Greater inclusion of industry and private sector.
  - < Greater inclusion of civil society organisations.
  - < Building of capacity in regional marine affairs education and training.
  - < Strengthening national marine affairs institutes (especially those that perform knowledge-building, training and coordination functions in APEC countries).

- < Building of a regional marine affairs information system that links relevant databases.
- < Networking existing networks in the region (e.g., ACORN, SEAPOL, etc.).
- *Project ideas:*
  - < Ocean governance trends in APEC member economies.
  - < Convene a biennial regional oceans forum.
  - < Implementation of/compliance with international law of sea and international environmental law instruments.
  - < Establish a network of APEC expertise to assist with capacity-building to facilitate compliance (panels of experts).
  - < Identification of “success” stories of ICOM in the region.
  - < Precaution as principle and approach, and its applications.
  - < Ecosystem-based management and its applications.
  - < Selection of co-management, community-based resource management and indigenous peoples’ resource stewardship success stories.
  - < Mobilization of interested regional universities to build capacity for integrated coastal and ocean management and thereby increase the recruitment pool of marine affairs professionals in the region, perhaps under the auspices of the Association of Asia-Pacific Rim Universities (APRU).
  - < Development of voluntary guidelines for marine affairs professionals as a form of standard-setting and greater professionalization of the marine affairs field.

## ANNEX “A”

### NON-APEC ASIA-PACIFIC REGIONAL MARINE ORGANISATIONS

This Annex lists non-APEC regional intergovernmental and non-governmental organisations with marine programming and UNEP Regional Seas Programmes in the Asian-Pacific Rim. It does not include other global organisations with regional activities. The FAO, IMO, IOC, WWF and WCU/IUCN, among other organisations, maintain regional programmes in the Asia-Pacific marine regions.

ASEAN Fisheries Federation (AFF)  
Asia-Pacific Fishery Commission (APFIC)  
Association of Southeast Asian Nations (ASEAN)  
Central American Commission of Maritime Transport (COCATRAM)  
Circum-Pacific Council on Energy and Mineral Resources (CPCEMR)  
Comision Permanente del Pacifico Sur (CPPS)(Permanent South Pacific Commission)  
Commission for the Conservation of Southern Bluefin Tuna (CCSBT)  
Coordinating Committee for Coastal and Offshore Geoscience Programmes in East and Southeast Asia (CCOP)  
Forum Fisheries Agency (FFA)  
International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) –  
International Tsunami Information Centre (ITIC)  
International Pacific Halibut Commission (IPHC)  
Network of Aquaculture Centres in Asia-Pacific (NACA)  
North Pacific Marine Science Organisation (PICES)  
Pacific Basin Economic Council (PBEC)  
Pacific Economic Cooperation Council (PECC)  
Pacific Islands Forum  
Pacific Trade and Development Conference (PAFTAD)  
South China Sea Workshop Process  
Southeast Asian Fisheries Development Centre (SEAFDEC)  
Southeast Asian Programme in Ocean Law, Policy and Management (SEAPOL)  
South East Pacific Hydrographic Commission (SEPHC)  
South Pacific Applied Geoscience Commission (SOPAC)  
South Pacific Ports Association  
Trans-Pacific Fisheries Consultative Committee (TPFCC)  
UNEP Regional Seas Programmes:  
    *East Central Pacific Region*  
    *East Asian Seas*  
    *Northeast Pacific Action Plan*  
    *Northwest Pacific*  
    *South Pacific Action Plan*  
    *Southeast Pacific Action Plan*  
United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)  
Western Pacific Regional Fishery Management Council (WPRFMC)



## ANNEX “B”

### SAMPLE OF TOPICAL/EMERGING ISSUES IN MARINE AFFAIRS

The following is a sample of issues of current interest in coasts and oceans. The choice of issues is designed to give readers a sense of the diversity of challenges facing coastal and ocean managers.

#### **Aquaculture**

Aquaculture, or mariculture for the purposes of this paper, is the fastest food production sector in the world.<sup>1</sup> In inshore waters it frequently elbows other ocean uses (e.g., fishing, recreational uses, aesthetic values, etc.) and can be the cause of significant pollution (e.g., fecal). In many cases, pond culture in sensitive environments (e.g., mangrove areas) various problems have arisen including deforestation, contamination of water, coastal erosion and disease. Mariculture has also started to move offshore, especially with large sub-sea cages in deep waters (e.g., deep sea cages off Hawaii). Related activities to mariculture are efforts to re-stock depleted living resources (e.g., salmon) and sea ranching (e.g., tuna).

#### **Bioprospecting**

Bioprospecting is capable of diverse definitions, but one of the more commonly used refers to the “search for valuable chemical compounds and genetic material from plants, animals and microorganisms.”<sup>2</sup> The potential commercial benefits for a whole new range of products for nutrition, pharmaceutical, new materials and other purposes is significant. This is also a controversial ocean use, for although the *Convention on Biological Diversity* permits bilateral bioprospecting agreements, there is a danger that inefficient or no monitoring may lead to biopiracy to the disadvantage of source communities, especially those in developing countries.<sup>3</sup>

#### **Climate change and sea level rise<sup>4</sup>**

There is significant scientific basis to indicate that many parts of the Asia-Pacific region may be adversely affected by climate change and sea level rise and that human activities (emissions of greenhouses gases and aerosols) will continue to affect atmospheric composition throughout the 21<sup>st</sup> century. In this century sea surface temperatures are expected to increase and thermal

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<sup>1</sup> FAO, “Aquaculture - new Opportunities and a Cause for Hope,” <http://www.fao.org/focus/e/fisheries/aqua.htm> (Accessed 29 March 2002).

<sup>2</sup> “Bioprospecting: Discoveries Changing the Future,” Standing Committee on Primary Industries and Regional Services, Parliament of Australia, <http://www.aph.gov.au/house/committee/primind/bioinq/report/contents.htm> (Accessed 28 March 2002).

<sup>3</sup> See The Latin American Alliance, Bioprospecting, Biopiracy and Indigenous People, <http://www.latinsynergy.org/bioprospecting.htm> (Accessed 29 March 2002).

<sup>4</sup> Sourced from: Intergovernmental Panel on Climate Change, Third Assessment Report: Climate Change 2001, <http://www.ipcc.ch/> (Accessed 29 March 2002).

expansion and loss of mass from glaciers and icecaps is expected to result in a sea level rise of between .13 and .94 metres. This is expected to have a range of impacts on physical and biological processes, climate patterns, coastal ecosystems and other marine ecosystems (e.g., coral reefs and mangroves), water resources, marine economies and human activities (e.g., agriculture and food security), human health (e.g., threats of natural hazards, infectious diseases), and patterns of natural hazards. Adaptive capacities in the Asia-Pacific region vary from mostly high (North America, Australia and New Zealand) to low (Asia, Latin America and island states).

### **Coastal and ocean economics (valuation)**

The value of goods and services in coastal and ocean development is not well understood and documented. Part of the difficulty is separating coastal and ocean activities from the larger economy of which they are an intrinsic part. There have been attempts at quantifying values and some of the figures put forward are startling. A general estimate of the overall global ecological value of ocean goods and services is \$23 trillion (about six times the estimated value for the terrestrial environment).<sup>5</sup> Approximately 98% of global trade is seaborne. In the United States, over 180 million Americans visit the coast, one out of every six jobs is marine-related, one-third of the GNP is produced in ocean and coastal areas and about half of all new pharmaceutical products to treat cancer are derived from marine species.<sup>6</sup> More recently in Newfoundland and Labrador, a recent study illustrates the economic value of marine, coastal and ocean resources of this Canadian province. Some 26.5% of the provincial GDP is ocean-related and 23% of total employment between 1997-1999. The private sector in the offshore oil industry and the fishery accounted for 69% of that employment.<sup>7</sup>

### **Co-management<sup>8</sup>**

Co-management, including variations such as community-based resource management, has become an integral part of the emerging integrated coastal and ocean management paradigm and is considered a principle of sustainable development. It refers to resource management in local areas which is either based in the community itself, or which is shared with local or other authorities. Although there is no one definition or approach, co-management in relation to different types of resource systems is widespread around the world. The Asia-Pacific with its

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<sup>5</sup> Oceans and Seas: Harnessing the Marine Environment for Sustainable Development (Oceans Briefing Paper, Earth Summit 2002), <http://www.earthsummit2002.org/es/issues/oceans/oceans.pdf> (Accessed 25 March 2002).

<sup>6</sup> Adm. Roger T. Rufe, "Ocean and Coastal Policy: Emerging Challenges," in B. Cicin-Sain and E. Rivera-Arriaga, *North American and European Perspectives on Ocean Policy and Coastal Law*, Proceedings of the International Conference on Coastal and Ocean Space Utilization, Cancun, 1-4 November 2000 (Delaware: Centre for the Study of Marine Policy, 2000), at 43.

<sup>7</sup> Estimating the Value of the Marine, Coastal and Oceans Resources of Newfoundland and Labrador, <http://www.economics.gov.nf.ca> (Accessed 25 March 2002).

<sup>8</sup> Sourced from: Fisheries Co-Management: A World-Wide Collaborative Research Project, [www.co-management.org](http://www.co-management.org) (Accessed 27 March 2002); International Institute for Sustainable Development, <http://iisd1.iisd.ca/ic/info/Co-Management.htm> (Accessed 28 March 2002).

extensive practices throughout the region, and especially in Southeast Asia and the South Pacific, has provided inspiration and leadership for similar arrangements in other parts of the world.

In general, co-management addresses issues of decision-making, accountability and stewardship at the local level, and tends to complement integrated coastal and ocean management both on local and larger scales. Co-management presupposes decentralization of decision-making to community structures (non-government and industry), mostly in some shared capacity. It encourages consensus-based participation in the management of resources by the community concerned and avoids adversarial approaches to conflict management. Over time, co-management has combined both western scientific knowledge and traditional ecological knowledge in a given community. In some instances, it has encouraged the protection or development of property rights.

### **Extended continental shelf**

Under the *UN Convention on the Law of the Sea*, 1982 (Article 76), broad margin states are entitled to claim an extended continental shelf up to the full extent of the continental margin if its continental shelf as legally defined extends beyond 200 nautical miles. In effect, such states can claim sovereign rights over the seabed and subsoil in accordance with a complex scientific formula, which could give them up to 350 nautical miles from the baselines of the territorial sea or 100 nautical miles from the 2,500 metre isobath. Several states in the Asia-Pacific region are in a position to benefit from this position. Despite the work of the UN Commission on the Limits of the Continental Shelf in establishing of guidelines for the advancement of such claims before it, ambiguity in the scientific language may permit claims far more extensive than originally intended by the *UN Convention*. The current Russian claim before the UN Commission raises issues of this nature, and could have an impact on claims in the Pacific.<sup>9</sup>

### **ICOM<sup>10</sup>**

Whereas in the 1970s and 1980s the dominant discourse in coasts and oceans focussed on law and policy (national ocean policy, UN Convention on the Law of the Sea), in most of the 1990s and into the new millennium the emphasis has been on coastal and ocean development with a focus on governance and integration (including principles of sustainable development). There is no one approach which serves as common ground, and indeed the literature and practice does not even share the same language (integrated coastal zone management, integrated coastal area management, integrated coastal management, ocean management, integrated ocean management, marine management, etc.). The approaches taken in practice vary in spatial extent from those that focus limited on the coast (shoreline management), to those that include watersheds/ecosystems and maritime zones (including the EEZ).

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<sup>9</sup> The guidelines for extended continental shelf claims may be accessed on Commission on the Limits of the Continental Shelf, [http://www.un.org/Depts/los/cles/cles\\_new/cles\\_home.htm](http://www.un.org/Depts/los/cles/cles_new/cles_home.htm) (Date accessed 29 March 2002).

<sup>10</sup> For an authoritative comprehensive treatise on the subject, see B. Cicin Sain and R. W. Knecht, *Integrated Coastal and Ocean Management* (Washington: Island Press, 1998).

ICOM (used in a generic sense to include all the above approaches) has now become the dominant paradigm for the planning of coastal and marine area development and management in most coastal states around the world.<sup>11</sup> The various approaches underscore the need to take into account relationships between human uses and their impact on ecosystems, and vice versa, as well as planning to avoid or minimise conflicts. The applications may be at different geographical and ecosystemic scales, but in essence integration is the unifying theme.

In the Asia Pacific Region, most regional coastal and island states have programmes or projects exploring integrated management on a specific problem, site, community or at provincial or national level. In other regions (e.g., Mediterranean, Gulf of Maine), there is a trend towards cooperative approaches to integrated coastal management.<sup>12</sup>

### **Large Marine Ecosystem (LME) approach to integrated management and regional cooperation<sup>13</sup>**

There is a global campaign underway led by the World Conservation Union (IUCN), several UN agencies and the US National Oceanographic and Atmospheric Administration (NOAA) to promote large marine ecosystems management for sustainable utilization and management of ecosystem goods (e.g., living and non-living resources) and services (e.g., hydrological cycle) in coastal areas and maritime zones within national jurisdiction. Large ecosystem management is becoming a new paradigm for large scale and long-term management of coastal and ocean ecosystem goods and services. The initiative has five major modules concerning productivity, fish and fisheries, pollution and ecosystem health, socio-economics and governance. There are at least 23 large marine ecosystems in the APEC region, accounting for more than one-third of the world's LMEs identified in the campaign (California Current, Gulf of California, Insular Pacific-Hawaiian, Pacific Central-American Coastal, Humboldt Current, Gulf of Thailand, South China Sea, Sulu-Celebes Sea, Indonesian Sea, North Australian Shelf, Northeast Australian Shelf, East-Central Australian Shelf, Southeast Australian Shelf, Southwest Australian Shelf, West-Central Australian Shelf, Northwest Australian Shelf, New Zealand Shelf, East China Sea, Yellow Sea, Kuroshio Current, Sea of Japan, Oyashio Current and Sea of Okhotsk).

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<sup>11</sup> Numerous important international policy instruments now advocate or support ICOM, e.g.: Chapter 17, Agenda 21: The Programme of Action from Rio (New York, UN Office for Public Information, 1992); Noordwijk Guidelines, in Report of the World Coast Conference, Preparing to Meet the Coastal Challenges of the 21<sup>st</sup> Century (The Hague: Ministry of Transport et al., 1993); Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, 1995.

<sup>12</sup> For a survey of national experiences, see *International Review of Integrated Coastal Zone Management, Vol. 2: National Models*, Prepared by Meltzer Research and Consulting for the Department of Fisheries and Oceans, Canada, 1996.

<sup>13</sup> Sourced from: Large Marine Ecosystems of the World, <http://www.edc.uri.edu/lme/intro.htm> (Accessed 24 March 2002).

## **Marine biotechnology<sup>14</sup>**

Marine biotechnology is the application of molecular biology and molecular genetics to marine organisms. It has far-reaching potential and implications for aquaculture, re-stocking of wild, pharmaceuticals and many other applications.

## **Marine management education**

Over the last decade, there has been a discernible increase in new undergraduate and graduate programmes in marine affairs in many parts of the world, including APEC.<sup>15</sup> These types of programmes are not new, and in some cases (e.g., US), they have been offered by some universities since the 1970s. However, there are now many universities that offer masters degrees in marine affairs, marine policy or integrated coastal management. In the APEC Region the member economies with these types of programmes include Australia (University of Technology, Sydney, University of Wollongong), Canada (e.g., Dalhousie University, University of Quebec at Rimouski), Indonesia (University of Hasanudin, South Sulawesi), Philippines (University of the Philippines, Visayas), Thailand (Asian Institute of Technology, Bangkok, as a regional university), US (Universities of Delaware, Oregon State, Rhode Island, Washington, etc.), Vietnam (National University, Hanoi) and Fiji (University of the South Pacific as a regional university).

## **Marine Protected Areas<sup>16</sup>**

Like ICOM, there is no one generally accepted definition and approach for marine protected areas (MPAs). A leading definition is provided by the World Conservation Union as “any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.”<sup>17</sup> Although the concept of conservation behind MPAs is not, it is only in the last two decades that they have become major tools for coasts and oceans. They vary significantly in size, extent of protection, some or no human use, and general regulation. In general, the trend is to designate zones for protection which are respectful of ecosystemic concerns and related human use. Perhaps the most famous MPA in the Asia-Pacific region is the Great Barrier Reef administered by a dedicated Authority, but MPAs as a tool are

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<sup>14</sup> For current reading on this subject see *Marine Biotechnology: An International Journal on the Molecular and Cellular Biology of Marine Life and its Technological Applications* (eds., J. Grant Burgess, Thomas Chen, and Shigetoh Miyachi), published by Springer, ISSN 1436-2228. See also David H. Attaway, A report on Marine Biotechnology in the National Sea Grant Program (National Sea Grant Office, NOAA, 1996), <http://www.nsgo.seagrant.org/research/biotech/report/index.html> (Accessed 29 March 2002).

<sup>15</sup> See Aldo Chircop, “Teaching Integrated Coastal Zone Management: Lessons from the Learning Arena.” 43 *Ocean and Coastal Management* 343-359 (2000).

<sup>16</sup> On protected area generally, see IUCN/WCU World Commission on Protected Areas, <http://wcpa.iucn.org/> (Accessed 29 March 2002).

<sup>17</sup> G. Kelleher, *Guidelines for Marine Protected Areas* (Gland, Switzerland and Cambridge, UK: IUCN/World Conservation Union, 1999).

expanding throughout the region and some initiatives have embraced an eco-region approach.<sup>18</sup>

### **Marine tourism**

Tourism is the largest marine industry in the world. In coastal and marine areas, tourism impacts the marine environment in terms of spatial utilization for hotel and residential purposes, impact on coastal infrastructure (roads, energy production, etc.), production of wastes (sewage, garbage, etc.), water uses, whale/wildlife watching, inshore water uses for water sports, diving and cruise ships. New technologies have now expanded the frontiers of marine tourism to floating hotels and tourist submarines. As a major foreign currency earner, tourism is capable of elbowing other coastal and ocean uses where space is limited. It also leaves a pronounced ecological footprint.

### **Ocean energy<sup>19</sup>**

Energy from the oceans is foreseen as a potential economic activity falling within the sovereign rights of the coastal state within the EEZ in the UN Convention on the Law of the Sea [Article 56 (1)]. As the search for alternative sources of energy continues under various incentives (e.g., tax deductions in the US), there are important technological developments that are gradually leading to commercial viability on a large industrial scale.

Perhaps the most promising is wind farms, which have not moved from an experimental scale to a large scale. One major development under way is the recent agreement signed between Canada and MBB to build a 700 megawatt wind farm off the Queen Charlotte Islands in British Columbia. If the farm receives a satisfactory EIA and support from indigenous people (Haida Nation), other local users, and the governments involved, the farm would occupy some 81 square kilometres of shallow waters (maximum 20 metres depth). This new use will have a significant spatial relationship with established ocean uses in the area, such as fishing and navigation. Although wind farms are not new per se, this will probably be the largest ocean-based farm.

Ocean Energy Thermal Conversion (OTEC) was considered as promising in the 1970s and 1980s with successful experimentation in Hawaii. Potential uses explored at the time included aquaculture, agriculture (e.g., farming of strawberries, especially soil temperature conditioning and irrigation), and air conditioning. Applications are site specific (ocean depths within close proximity of the shore).<sup>20</sup> Others forms of energy from the oceans include wave energy and tidal energy, both of which are subject to demonstration sites in different parts of the world.

### **Offshore installations and structures**

Traditionally, offshore installations and structures have been primarily associated with offshore development and marine scientific research, whether on the surface or sub-sea. Today there are

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<sup>18</sup> See WWF Asia-Pacific Programme, <http://www.panda.org/asiapacific/ecohigh1.htm> (Accessed 29 March 2002).

<sup>19</sup> Sourced from: California Energy Commission, <http://www.energy.ca.gov/development/oceanenergy/> (Accessed 25 March 2002).

<sup>20</sup> Ocean Thermal Energy Conversion, [http://www.hawaii.gov/dbedt/ert/otec\\_hi.html](http://www.hawaii.gov/dbedt/ert/otec_hi.html) (Accessed 25 March 2002).

new or emerging types installations and structures used for tourism (e.g., floating hotels), aquaculture (underwater cages) and energy production (marine-based wind farms). These structures raise questions as to multiple use management and conflict avoidance, relationship to navigation safety and application of exclusive safety zones, normally extending to a radius of 500 metres. In the oil and gas industry, which accounts for many of the world's offshore installations and structures, there is a problem of decommissioning as such structures age or the life of a field nears an end.<sup>21</sup> ESCAP (Mineral Resources Section) has studied the problem in the Asia-Pacific region.<sup>22</sup>

### **People smuggling/illegal immigration**

In the APEC region as in several other parts of the world, illegal immigration from the sea has become a serious problem. Ship loads of illegal migrants, who may have paid significant sums for passage on board unsafe vessels, have attempted to land in various countries. It is suspected that organized crime might be behind some of this traffic. The Bali Ministerial Conference on People Smuggling, Trafficking in Persons and Related Transnational Crime, convened in Indonesia in February 2002 resulted in a commitment to regional cooperation to combat this growing transnational problem.<sup>23</sup>

### **Piracy**

Piracy has seen a resurgence in many parts of the world in the last two decades. According to the International Maritime Bureau, which retains an office in Kuala Lumpur, Southeast Asian waters have experienced a significant rise in piracy, frequently resulting in injury and loss of life, in addition to property losses.<sup>24</sup> There have been instances where piratical attacks may have posed risks to the marine environment (e.g., ship's crew are locked up while the vessel is under way). The attacks have targeted not only small recreational boating but also commercial shipping.

### **Places of refuge**

There have been numerous recent developments in the field of marine transportation, including

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<sup>21</sup> The IMO has developed Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone to address requirements under the Convention on the Prevention of Pollution from the Dumping of Wastes and Other Matter, 1972, as amended (London Convention) and the UN Convention on the Law of the Sea, <http://www.londonconvention.org/Removal.htm> (Accessed 27 March 2002). For various reports on the subject, visit Platform Decommissioning, <http://www.ogp.org.uk/publications/platform.html> (Accessed 30 March 2002).

<sup>22</sup> ESCAP publications on the subject are listed on the following page:  
<http://www.un.org/Depts/escap/enrm/mrs/mrsosfsh.htm> (Accessed 29 March 2002).

<sup>23</sup> Co-Chairs' Statement (Foreign Ministers of Indonesia and Australia), Bali Ministerial Conference on People Smuggling, Trafficking in Persons and Related Transnational Crime,  
[http://www.mofa.go.jp/policy/i\\_crime/people/conf0202.html](http://www.mofa.go.jp/policy/i_crime/people/conf0202.html) (Accessed 28 March 2002).

<sup>24</sup> See International Chamber of Commerce, Commercial Crime Services,  
[http://www.iccwbo.org/ccs/imb\\_piracy/weekly\\_piracy\\_report.asp](http://www.iccwbo.org/ccs/imb_piracy/weekly_piracy_report.asp) weekly piracy reports.

the coming into force of the ISM Code and the new STCW Convention, Many of these developments have already been addressed by the TPTWG. A newer ocean management problem important for marine transportation and which is still being considered by the International Maritime Organisation concerns places of refuge.<sup>25</sup> At issue here is the traditional right of refuge (which had humanitarian and property considerations) and the more recent practice which takes into consideration humanitarian and environmental concerns. There have been several incidents of ships in distress not being allowed to enter safe waters within national jurisdiction to undertake repairs. In some cases, the consequences have been a catastrophic spill (e.g., the *Erika*, in the Bay of Biscay in December 1999), serious obstacles to salvage services while posing a risk to the marine environment (e.g., the *Castor* in the Mediterranean in December 1999-January 2000) or even forced scuttling. Forced scuttling raises new problems for dumping at sea.

### **Pollution from land-based activities**

Unrestrained coastal development is leading to, among other, loss of habitats, marine pollution and loss of ecosystem services. Pollution from land-based activities continues to account for more than 80% of all marine pollution, including in the APEC region. Several regions have developed regional action plans and many states now also have national programmes of action patterned on the *GPA*. Other than two generic provisions in the UN Convention on the Law of the Sea, 1982, there is no global convention addressing this serious threat to the marine environment. The *Montreal Guidelines* before it and the *GPA* since 1995 are the closest in terms of setting global standards for combatting this problem. A review of the *GPA* in November 2001 opted for multi-stakeholders platforms based on the work of the Regional Seas Programmes.

### **Seabed mining**

The ocean seabed and subsoil are sources of major mineral resources including nodules and crusts (platinum, cobalt, nickel, manganese and copper), placers (tin, titanium, chromium, gold and silver) and thermal vents (copper, zinc and lead). Although commercial and technological challenges for development of such resources at abyssal depths remain, there is now significant development of certain minerals in deep waters within national jurisdiction. Last year an important international conference took a hard look at recent commercial developments that include the exploitation of sulphide deposits from hydrothermal vents off Papua New Guinea (Going to Extremes: Seabed Mining and Biotechnology, The 31st Underwater Mining Institute Conference, Hawaii, 2001). Resources associated with hydrothermal vents also hold promise for biotechnology. Also recently, there is recognition that methane hydrates trapped in marine sediments may constitute a major source of methane, both in terms of a new source of energy and as an immense carbon reservoir that could increase greenhouse gases.<sup>26</sup> There is not yet a practical and environmentally safe way to produce methane from this resource, and it is likely

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<sup>25</sup> On this subject see A. Chircop, "Ships in Distress, Environmental Threats to Coastal States, and Places of Refuge: New Directions for an *Ancient Regime*?" 33 *Ocean Development and International Law* 207-225 (2002).

<sup>26</sup> William Dillon, "Gas (Methane) Hydrates: A New Frontier," US Geological Survey (Marine and Coastal Geology Programme), <http://marine.usgs.gov/fact-sheets/gas-hydrates/title.html> (Accessed 30 March 2002).



that a large release could cause significant hazards.<sup>27</sup>

### **Submarine cables**

Submarine cables an ocean management subject is an old one and saw international regulation already in the late 19<sup>th</sup> century. The advent of fibreoptic cables has facilitated the revolution in computerization, informatics, telecommunications and electronic commerce. They are firm competitors of satellite based telecommunications, but in the process have necessitated a fast-growing global network in submarine cables.<sup>28</sup> In turn, there are new conflicts emerging between local communities and the path of cable in inshore waters and landing points, as well as fishing activities in the paths of submarine cables. Although cables may be buried in the subsoil, there is the possibility of conflicts with other uses (e.g., anchoring) that raise liability issues.

### **Unsustainable fisheries<sup>29</sup>**

Most of the world's commercial fisheries are subject to over-fishing, excess capacity, habitat damage, by-catch wastage (some 29 million tons) and other problems. At least 70% are now fully or over-exploited. There is poor regulation, distorting subsidies, poor species/habitat/ecosystem knowledge and export market domination. The threats from declining fisheries include dislocation of fishing communities, human-induced ecosystemic change with all its unknown repercussions, loss of food security, declining local economies and lower revenues. Fishing inefficiency is also tied to inefficiency in aquaculture: to raise one kilogram of farmed fish, it takes the equivalent of two-to-five kilos of wild fish caught for feed production.

There is a trend towards transferable rights-based fisheries management and fisheries co-management as a response to the need to develop a sense of stewardship for fishery resources. There is a special problem for high seas fisheries where Hardin's tragedy of the commons is particularly at play. The *UN Straddling Stocks Agreement* came into force in December 2001 and it remains to be seen how the monitoring and compliance mechanisms will work. The current experience in the Northwest Atlantic leaves much to be desired, despite the technical resources of NAFO members.

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<sup>27</sup> James E. Mielke, "RS 20050: Methane Hydrates: Energy Prospect or Natural Hazard," CRS Report for Congress, 14 February 2000, <http://cnie.org/NLE/CRSreports/energy/eng-46.cfm> (Accessed 31 March 2002).

<sup>28</sup> For the location of submarine cables in the Asia-Pacific region and globally, see *An Atlas of Cyberspaces*, <http://www.cybergeography.org/atlas/cables.html> (Accessed 31 March 2002).

<sup>29</sup> Sourced from: *Oceans and Seas: Harnessing the Marine Environment for Sustainable Development* (Oceans Briefing Paper, Earth Summit 2002), <http://www.earthsummit2002.org/es/issues/oceans/oceans.pdf> (Accessed 25 March 2002).