

Comparison of Approaches to Management of Large Marine Areas



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ABOUT FAUNA & FLORA INTERNATIONAL (FFI)

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ABOUT CONSERVATION INTERNATIONAL (CI)

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CI's Mission

Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity.

CI's Vision

We imagine a healthy prosperous world in which societies are forever committed to caring for and valuing nature, our global biodiversity, for the long-term benefit of people and all life on Earth.

Conservation International is committed to helping societies adopt a more sustainable approach to development – one that considers and values nature at every turn.

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PREFACE

The ocean makes up the Earth's primary life support system, comprises 70 percent of our planet's surface and is essential to human well-being and prosperity. Ocean ecosystems are threatened by unsustainable fishing, global change, habitat destruction, invasive species, and pollution - the combined effects of which are far more destructive than individual threats on their own.

Effectively addressing these threats requires comprehensive ocean management at large scales. Several models exist for achieving such large scale marine management, each of which tackles a broad range of issues with its own suite of inputs, objectives and methodologies. Often, more than one of these frameworks are applied to the same or similar geographies by different institutions.

Over the past five years CI, together with a multitude of partners, has developed the Seascapes model to manage large, multiple-use marine areas in which government authorities, private organizations, and other stakeholders cooperate to conserve the diversity and abundance of marine life and to promote human well-being. The definition of the Seascapes approach and the identification of the essential elements of a functioning Seascape were built from the ground up, informed by the extensive field experience of numerous marine management practitioners.

In order to learn more about the different approaches to managing large-scale marine areas, their comparative merits, and the synergies and overlaps between them, CI commissioned this independent analysis of several widely applied models. Although the report was commissioned by CI, the views expressed in this report are those of the authors; they were charged with providing a critical examination of all the assessed approaches, including the Seascapes approach.

This analysis provides a comprehensive understanding of the strengths and weaknesses of each approach. This will help us – and, we hope, other readers – to identify ways to work together to achieve even greater results through synergistic efforts. We are delighted to publish this report and intend to use its recommendations to further strengthen our work and expand our partnerships. Together, we will secure a new future for the world's oceans.



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EXECUTIVE SUMMARY

Large marine areas, based partly or wholly on biogeographic and ecological criteria, are widely held to be the preferred way to define areas for Ecosystem Based Management (EBM). We took five commonly used approaches to defining and intervening in Large Areas for Marine Management (LAMMs) and compared their success in developing countries in four aspects: achieving marine conservation outcomes; generating donor funding and private investment; being widely applied, and becoming sustainable in financial, institutional, social and political terms. In reviewing outcomes we used Olsen (2003)'s framework of 1st Order (enabling conditions such as legal instruments, policies, plans, social context, capacities), 2nd Order (changes in behaviour, enforcement, changing catch levels, treatment of waste), and 3rd Order (results in terms of biodiversity, species populations, water quality, income, social benefits) outcomes. To keep the study manageable, we restricted our study to the coastal and marine environment, and did not compare the approaches in terms of how they address connectivity between marine and terrestrial environments, including watershed management.

The purpose of our study was to generate, through literature review, case studies and interviews with people knowledgeable about the programmes, observations and ideas that might be useful for conservation practitioners.

We first characterised the five approaches: Marine Ecoregions, Seascapes¹, Large Marine Ecosystems, Regional Seas Programmes and Integrated Coastal Management. Major differences in nature and purpose of the five approaches highlighted the fact that we were not comparing like with like, nevertheless we considered that the comparison could still generate useful conclusions.

In the case of Marine Ecoregions it was apparent that the main use of the biogeographic classification, which has evolved a great deal over the years, is in identifying conservation targets, representative of the Earth's habitats and ecosystems. WWF and TNC use Marine Ecoregions for this purpose but their chosen programme geographies are usually a larger cluster of Ecoregions and their approaches to strategy development and implementation thereafter vary between institutions and between locations, with Ecoregions being of only marginal relevance. Both institutions are moving towards a holistic, multi-level approach to marine conservation, with planning methodologies strongly influenced by the local context. WWF's strategies start with a Biodiversity Vision exercise but combine interventions at multiple levels, from local sites up to global programmes, such as influencing fisheries markets. In adopting EBM, TNC has piloted multi-objective planning and the use of the ecoregional assessment to develop a decision-support tool rather than produce a blueprint for conservation. The resulting marine programmes of WWF and TNC have attracted substantial funding from diverse sources and have achieved an array of outcomes, though the 3rd Order outcomes generally involve either specific sites or large, migratory species and are the result of thematic interventions, rather than the EBM approach. Strengths of the Ecoregional programmes are that they work with national and local partners and that the NGOs concerned are committed to the kind of long-term, e.g. 15-20 year, intervention usually needed to achieve sustainability. On the other hand, the continuing dominant role of the NGO in setting the agenda, albeit through a consultative process, and in deciding the use of funds may impede the emergence of sustainable governance.

Conservation International launched the Seascapes programme only recently (2004) and the concept has been defined and refined through the experiences of the pilot programmes. Consequently, the statement that the geographic area of a Seascape is determined on a combination of biological and strategic criteria is more applicable to new Seascapes in the pipeline than to the existing ones. In fact, in the Coral Triangle there is no significant difference between the two Seascapes and

¹ We have used "Seascapes", with capital S, as the approach adopted by Conservation International, as distinct from the term "seascapes", used loosely by Wildlife Conservation Society, World Wildlife Fund and others to describe clusters of sites, usually within an Ecoregion.

the multi-Ecoregion geographies within which WWF and TNC work. The Seascape programmes emphasise the development of sustainable, multi-level governance, which could prove to be a powerful approach, although the technical capacity of CI and partners in this discipline needs to be strengthened to achieve this goal in practice. The Seascapes have attracted considerable funding, mainly from the Walton Family Foundation, and have benefited greatly from the flexibility of the funding from this source and the ability to maintain communication and collaboration between the three pilot Seascapes. The delivery of outcomes in the first four years of the programme has been remarkable and is a result of the nature of the funding and the mobilization of numerous national and local partner organisations. As with Ecoregions, the 3rd Order outcomes tend to be site- or species-specific. The Papuan Bird's Head Seascape is notable for its potential as a model for EBM that integrates conservation and development objectives. The new phase of this programme appears on paper to be reverting to a narrower focus on MPAs, though CI staff say that that is not the intention. It is too early to comment on duration of CI support or prospects for long-term sustainability, but the emphasis on governance can help a lot in this regard. As with the Ecoregions, issues of programme decision-making and control of finances affect local ownership and need to be addressed.

The Large Marine Ecosystem approach has a solid ecological basis, relevance to development through its emphasis on ecosystem productivity, access to major GEF funding and is very widely applied. The LME methodology organizes information in five modules: biological productivity, fish and fisheries, pollution and health, socioeconomics, and governance. Most LME/GEF projects invest predominantly in applied research, feasibility assessments, plans and management recommendations, and in training. They have generated a wealth of useful scientific information. There seems to have been relatively little GEF funding to enable these 1st Order results to lead on to 2nd Order results, such as improved practices, new management actions and protection of priority sites. While appropriate in wealthier countries with strong governance, the focus on information may lessen the impact of LME/GEF projects in developing countries, which have scarce funds and tend to face serious constraints on marine governance. The imbalance is compounded by weaknesses in the LME approach to governance issues. The very large geographic scale and association with GEF's International Waters programme lead LME programmes to concentrate on the national and regional levels of governance.

While there have been successes in institutionalising transboundary cooperation, impact on the ground may be constrained by deficiencies in the rest of the multi-level, multi-sectoral governance system in each country, which LME projects rarely analyse or strengthen adequately. The treatment of the governance component of the five-module LME information system reflects both low priority and failure to recognize governance as an over-arching theme. The association with GEF brings major funding but also brings constraints in terms of project cycles, duration of programme, and separation of international from in-country interventions. Overall, the LME approach is a powerful generator of information and financial resources and promotes transboundary cooperation but we suggest that, in a developing country context, GEF and LME proponents should redirect emphasis and resources from natural sciences to effective, sustainable governance. A new LME/GEF project in the Caribbean is bringing creative new thinking to this challenge, including a framework for analysis of governance and ideas about networking as a substitute for building large-scale governance structures. This project could generate valuable lessons not only for LMEs but also for other LAMM programmes.

Regional Seas Programmes, which have the widest global coverage, with more than 140 participating countries, are inter-governmental coordinating bodies that facilitate and coordinate activities related to marine environmental issues, usually on the basis of a regional convention and associated protocols and/or regional action plans. In most cases, pollution of various kinds has been the issue initially drawing the governments together to adopt a common policy and strategy. Biodiversity is also a theme of the Regional Seas Programmes but, with notable exceptions such as the Caribbean, tends to be given lower priority and less investment by governments. The outcomes achieved are predominantly 1st Order, because the programmes operate at the policy level with individual governments being responsible for implementation. Nevertheless, several Regional Seas

Programmes participate actively in implementation of donor-financed projects that deliver 2nd Order outcomes. Most Regional Seas Programmes are well established and have an increasingly significant role in coastal and marine resource management and conservation in their respective regions. Modest annual subventions by member countries cover most of the core costs, though not activities, and demonstrate that the countries do perceive the Regional Seas programmes to have a useful function, worth sustaining, albeit not a priority for substantial investment. In general, Regional Seas Programmes can play a valuable role in LAMMs, provided that they collaborate not only with governments but also with other initiatives capable of delivering 2nd and 3rd Order outcomes.

Integrated Coastal Management is generally applied in smaller areas, insufficient for EBM, though there have been attempts to scale up to national level. Its strength lies in the integration of environmental and development objectives and the participation and empowerment of the full array of local authorities and stakeholders. Where there is political commitment and capital available, as in our two case studies in South-East Asia, sustainable 3rd Order outcomes can be attained in short times. More typically, though, the process is longer, requiring several iterations before achieving sustainable, measurable benefits, and is vulnerable to breaking down because of interruptions in donor support. It has been suggested that ICM has been largely superseded by EBM. However, we consider that the other approaches studied here have much to learn from the ICM process, as they strive to overcome some of the barriers to EBM in developing countries, such as: ineffective governance, sometimes undermined by corruption; local stakeholders lacking rights over resources, power in decision-making and the means to develop alternative livelihoods; rapid social and political change preventing sustained commitment to EBM; scarcity of strong civil society organisations to champion and support EBM. Concern about these constraints was reinforced by the final element of our study: a rather cursory comparison of LAMMs in developed and developing countries, with the former much better able to deliver 3rd Order outcomes, thanks to better governance, greater capacity throughout society, less direct dependence on marine resources for survival, and more funds to invest in solutions to environmental problems.

In conclusion, Regional Seas Programmes have a specific function, that is only one element in ecosystem governance, and Integrated Coastal Management is a process rarely applied at large scale. Large Marine Ecosystems, Marine Ecoregions and to some extent Seascape are all ecosystem-based in their geography and are reasonable starting units, around which to build a programme of marine conservation or restoration and sustainable use. Many factors make comparisons between these three approaches difficult. Several interviewees insisted that success depends less on characteristics intrinsic to each approach and more on factors related to context and to the practices of the implementing agencies, for example opportunity for iteration and adaptation, mobilisation of partners, capacity to work at multiple levels, sustained investment, availability of capital to finance agreed solutions, local leadership, the skill and determination of field staff, relevance to development priorities, and alignment of multilateral, national government and NGO agendas. All three approaches have attained important results, yet we are concerned that the aim of effective governance across sectors and at all levels, from local to regional, is poorly articulated and inadequately addressed, especially in the case of the Large Marine Ecosystems. EBM demands sustained attention to the challenges of marine resource governance at the level of coastal communities, just as much as it demands maintenance of large-scale ecological processes. There are encouraging signs that conservation practitioners are progressing in this direction, irrespective of which methodological flag they are flying.

CASE STUDIES ASSESSED IN THIS REPORT

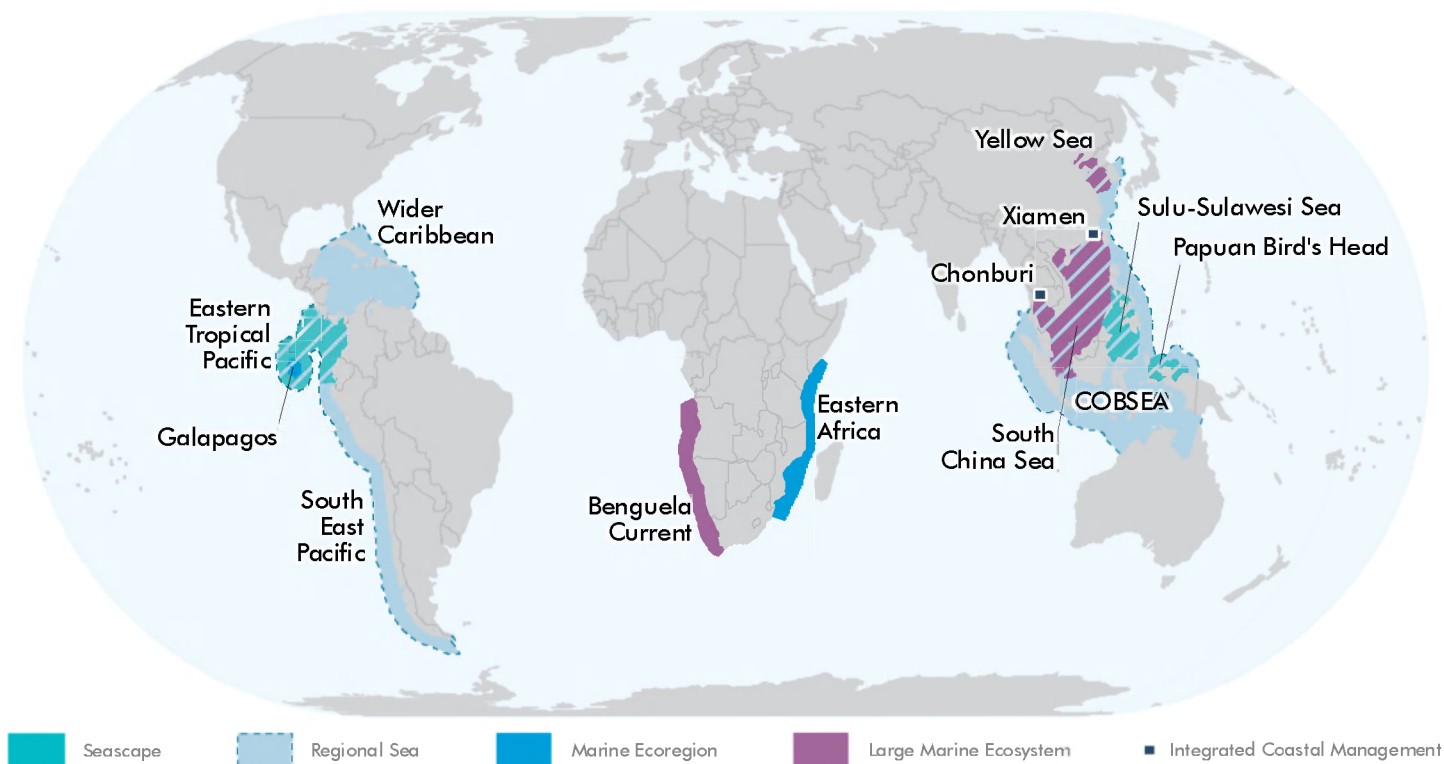


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1. INTRODUCTION



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1.1 BACKGROUND: LANDSCAPE CONSERVATION AND ECOSYSTEM-BASED MANAGEMENT

As the evidence of degradation of marine ecosystems accumulates, there is no shortage of commitments by the world community to pursue an alternative, sustainable pathway to development. Instruments include the UN Convention on the Law of the Sea (UNCLOS), the Convention on Biological Diversity (CBD), the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities, and the UN Framework Convention on Climate Change (UNFCCC), the UN Fish Stocks Agreement (FSA), UN Regional Seas agreements, and the FAO Code of Conduct for Responsible Fishery Practices with its action plans (Duda and Sherman, 2002).

It is widely recognized that any strategy to achieve conservation and sustainability on a grand scale must incorporate planning and action at a landscape (or marine equivalent) scale, exemplified by ecosystem-based conservation. Conservation strategies that are formulated at an ecosystem scale can potentially address the fundamental goals, originally articulated by Noss (1992) and then adopted widely as the foundation of biodiversity conservation efforts around the world:

- Represent all distinct natural communities within conservation landscapes and protected areas networks;
- Maintain ecological and evolutionary processes that create and sustain biodiversity;
- Maintain viable populations of species;
- Conserve blocks of natural habitat that are large enough to be resilient to large-scale stochastic and deterministic disturbances as well as to long-term changes;
- Prevent the introduction of invasive species and eradicate or control established invasive species.

Coastal and ocean management should aspire to these conservation goals, whilst sustaining the exploitation of renewable resources, restoring degraded areas and monitoring the performance of these efforts.

Trying to put this big idea into practice immediately raises the question of how to identify and delineate this large ecosystem. Biogeographical analysis is surely part of the process. Biogeographical classifications are essential for developing ecologically representative systems of protected areas, as required by various international conventions (Spalding et al., 2007). Two of the worldwide classification systems most commonly used today were summarized by Miklos Udvardy in 1975. He described a Biological Realm implying features of geography and fauna and flora at continent or sub-continent level. His lower level was Biogeographical Province at an ecosystem or biotic subdivision of the Biogeographical Realm. Ray (1975) developed a similar classification for marine and coastal areas for IUCN.

Biogeographical units can be used with information on currents, geology, topography and other biophysical criteria to identify the scales and specific areas within which marine ecological processes operate and hence need to be maintained. Managing the marine environment in order to maintain small- and large-scale ecological processes is a particular challenge, demanding approaches that go beyond the more familiar management of single or multiple sites. This study compares five such approaches to marine management over large areas. Before embarking on the comparison, it is worth commenting briefly on the concept of Ecosystem Based Management (EBM).

Various ecosystem approaches to address the problems of increasing human populations and demand on coastal areas have been developed by managers. Scientists have been advocating an

ecosystem-level approach to land management since the early 1950s (Leopold, 1949, Grumbine 1994). Conviction of the need for EBM has grown over the years, but there is continued confusion about what constitutes “true” EBM and how to translate it into management actions in ocean waters.

Holistic approaches treat species, other natural commodities, and humans as components of larger ecosystems, and seek to integrate ecological, social, economic and institutional components. However, some definitions focused mainly on the ecological aspects. For example, Christiansen et al. (1996) define ecosystem management as management driven by explicit goals, executed by policies, protocols and practices and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure and function. He points out that ecosystem processes operate over a wide range of spatial scales and their behaviour at any different location is greatly affected by surrounding systems, so there is no single appropriate scale for management. Over time scales of decades or centuries, landscapes are changing due to catastrophic or intermediate disturbances leading to mosaics of successional patches of different ages. These patches are critical to ecosystem structure and function.

According to Browman and Stergiou (2005), the political and socio-economic implications of EBM have not been adequately addressed. They sought contributions from colleagues from non-government (NGOs) and government organisations, research institutes and universities that have been engaged in the interaction of politics with science. The resulting Theme Section in Marine Ecology Progress Series Volume 300 describes the “structural, technical, administrative, operational, socio-economic and scientific complexities associated with implementation of a holistic EBM”.

FAO has developed an ecosystem approach to fisheries, which “strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within meaningful ecological boundaries” (Reykjavik FAO Expert Consultation cited in Garcia et al, 2003).

A characterization that seems to capture in a simple way most of the salient features of EBM appears on a multi-institutional website on EBM (www.marineebm.org), quoting the COMPASS scientific consensus that EBM:

- *“emphasizes the protection of ecosystem structure, functioning and key processes;*
- *is place-based in focusing on a specific ecosystem and the range of activities affecting it;*
- *explicitly accounts for the interconnectedness among systems, such as between air, land and sea;*
- *and integrates ecological, social, economic and institutional perspectives, recognizing their strong interdependences.”*

While this may be the scientific consensus, Arkema et al (2006) reported that scientists characterize EBM differently from agencies planning to manage coastal and marine ecosystems. They distilled 18 different scientific definitions of EBM into a common set of distinguishing features. The authors then analyzed recent management plans at seven ocean and coastal sites in USA and one in Australia (Great Barrier Reef) and found that the objectives being pursued were only loosely tied to the important features of EBM and tend to miss critical ecological and human factors emphasized in the academic literature. They suggest that one explanation for the scarcity of specific ecological criteria in management plans has been our limited understanding of complex ecosystems, including their temporal variability, but argue that this could change with the advances in ecological science and modelling. They also point out a tendency for management plans to have quite narrow ecological and socio- economic objectives (e.g. about a single resource or a single economic activity) without addressing the relationships between them. Given the limited knowledge of how ecosystems function, vary over time and respond to human intervention, Arkema et al (2006) stress the importance of stakeholder participation in monitoring and adaptive management, not just in initial planning.

The challenges of implementing EBM in developed countries are dwarfed by those facing developing countries. The obstacles to good coastal governance were summarised by Hale & Olsen (2003) and more recently the journal Coastal Management a double issue about the feasibility of EBM in tropical regions (Coastal Management, 2009). The additional challenges facing developing countries as they try to close the gap between theory and practice of the EBM concept are:

- Access rights, laws and institutional structures in some countries are outdated and do not reflect social and political realities, so that governance structures have inherent conflicts;
- Whether governance structures are appropriate or not, there are chronic weaknesses in their application, especially in relation to natural resources; ineffective enforcement is a widespread problem;
- Commitment to meet short-term social and economic needs can conflict with EBM emphasis on sustainability and long-term benefits;
- Frequent changes in political leadership make it difficult to secure the sustained policy commitment over decades that EBM requires; individual and institutional champions of EBM can counter-balance this problem but they are few and civil society organisations in many countries are weak;
- Countries have insufficient marine management capacity in terms of skilled personnel and budget.

These problems do not mean that EBM cannot work in developing countries, but they do highlight the needs to adapt EBM to the social and institutional context of the countries involved and to consider the whole marine governance set-up, not just the large-scale elements.

1.2 LARGE AREAS FOR MARINE MANAGEMENT

Various kinds of Large Areas for Marine Management (LAMM) have been defined, in order to assist with management of coastal and ocean areas, facilitating the application of the principles outlined above. They are delineated on ecological criteria or on political and strategic criteria or on a combination of the two. Amongst the different kinds of LAMM defined globally, five are the subject of this study:

| | |
|-------------------------------|-----|
| Seascapes | SSC |
| Marine ecoregions | MER |
| Large Marine Ecosystems | LME |
| Regional Seas | RS |
| Integrated Coastal Management | ICM |

The study asks how successful each approach has been in four aspects:

- In being applied widely around the world;
- In achieving marine conservation outcomes;
- In generating donor funding and private sector investment;
- In becoming sustainable in financial, institutional, social and political terms.

The study is divided into three parts. The first part is a general characterisation of the five different LAMM approaches and the compilation and analysis of data on how widely they have been applied. The second part addresses the other three questions—outcomes, funding and sustainability—for LAMMs involving developing countries. It does this through a number of tightly focused, mini case studies. The third part is a comparison with the application and success or failure of LAMMs in developed countries. This is a much less thorough study, based on readily available, published information and expert opinion.

2. GENERAL CHARACTERISATION OF LAMMs AND THEIR EVOLUTION



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2.1 DATA SOURCES AND INTERVIEWS

Data sources including websites, journal articles, book chapters and reports are contained in the References (Section 9). Websites are also included in the text as the primary reference. The interviewees were chosen as people involved in the LAMM programmes or with independent knowledge of them; they are listed in Annex 2.

2.2 CHARACTERISATION AND EVOLUTION

2.2.1 SEASCAPES, AS DEFINED BY CONSERVATION INTERNATIONAL

The term "seascape" has been used for at least 15 years by Roff and others working with WWF (Pers. Comm. John Roff), and extensively by Wildlife Conservation Society. The term was then appropriated by CI for their three big initiatives, which marked its large-scale involvement into marine issues. CI developed its own specific definition of Seascape, which should not be confused with earlier references by WWF, WCS and others. In this report we have referred to these with a lower case, i.e. "seascapes"

CI started developing the Seascape concept in 2003 and the term was acknowledged by UNESCO, the UN Foundation and subsequently the Walton Family Foundation in applications for funding. The initial use of the term by CI was quite loose, in that it was applied to three quite disparate areas of ocean, in terms of size (180,000 to 2,000,000 sq km) and political complexity (a sub-region of one country to four countries plus some High Seas). The definition was constructed later, once the three programmes were well under way, with practitioners of all three Seascapes coming readily to agreement on the main characteristics, including the idea that it is a geographic space, identified on the basis of both ecological and strategic criteria, in which an initiative is taking place. A Seascape is not a mapping unit that exists in the absence of any programme. By 2005 CI had developed the following definition:

"Seascapes are large, multiple-use marine areas, defined scientifically and strategically, in which government authorities, private organisations, and other stakeholders cooperate to conserve the diversity and abundance of marine life and to promote human well-being. Seascapes typically have high biological diversity, ecological and economic connectivity, and aesthetic and cultural value. Seascapes may include government-authorized protected areas for addressing special management needs and provide an opportunity for government agencies to coordinate their efforts voluntarily to secure more effective regional management programs. Seascapes define places where conservation goals and human well-being can be secured through partnerships between governments, local communities, and non-government and private organisations."

Subsequent meetings of those involved in the Seascapes programme stressed the development of good governance at multiple scales from local to national to Seascape-wide as the central long-term aim of each Seascape initiative.

CI has identified nine essential elements, on which the consolidation of a Seascape depends and towards which it works. The list continues to evolve but here is the latest version provided by CI (V. Farmer, pers.comm.):

- i. Enabling legal framework: an enabling framework of laws, conventions, regulations and policies that facilitates marine conservation, including marine managed area establishment, and appropriate governance structures for managing the marine ecosystem and its species and economic development plans that are consistent with sustainable resources use from the site to Seascape scales.

ii. Ecosystem-based management: management of marine ecosystem and species at larger scales, including national marine territories/Exclusive Economic Zones and Seascope-wide scale, requires effective planning, implementation, monitoring and evaluation, and use of multi-disciplinary scientific information.

iii. Adequate institutions and capacity: an adequate institutional framework and capacity, including personnel, infrastructure and equipment, to make the governance structures work effectively and efficiently. This covers both authorities and participating stakeholders such as local communities, the commercial sector, NGOs and other civil society groups, and the building of alliances amongst them. It also covers coordination across sectors and between Seascope nations.

iv. Private sector engagement: major economic activities are compatible with conservation and, wherever possible, have their viability and profitability linked with the sustainable management of the ecosystem, so that the processes of conservation and development are increasingly convergent within the Seascope.

v. Social and political support: marine conservation is socially and politically viable, because it is perceived as an integral part of sustainable development and enjoys broad support at all scales from local marine managed area stakeholders up to national leaders. This includes broad ownership of conservation programs, from site to Seascope level, and institutionalized participation in their governance.

vi. Critical habitats, ecological processes and environmental quality maintenance and restoration: marine management efforts restore and/or maintain critical habitats so that ecological processes and ecosystem services are sustained.

vii. Threatened species recovery: marine conservation efforts reverse declining population trends for threatened marine species and there is no increase in threatened species in the Seascope.

viii. Human well-being benefits: marine and coastal management improve the social (including legal and political), economic and cultural well-being of human communities dependent on marine and coastal resources and ecosystems consistent with the delivery of the Millennium Development Goals.

ix. Sustainable financing and market mechanisms: marine conservation programs in the Seascope are financially sustainable, meaning funding portfolios are stable, diverse, and large enough to implement all priority activities. This includes sustainable financing of Seascope-wide coordination, cooperation and ecological monitoring.

It is notable that the scope of these nine elements is consistent with the holistic concept of EBM. A draft CI framework for monitoring, entitled "How do we know we make progress in Seascapes?" (Tröng, in prep), is organized around these nine essential elements and stresses that many of them need to be monitored at multiple levels: Seascope, country, provincial, municipal and site.

2.2.2 ECOREGIONS, AS DEFINED BY WWF AND TNC

A. ECOREGIONS AS BIOGEOGRAPHIC UNITS

Biodiversity is not spread evenly across the Earth but follows complex patterns determined by climate, geology and the evolutionary history of the planet. The biome system classifies the world into ecosystem types, i.e. forests, grasslands, etc., based on climate and vegetation. The Earth's land surface can be divided into eight biogeographical realms (formerly called kingdoms) that represent the major terrestrial communities of animals and plants, and are a synthesis of previous systems of floristic provinces and faunal regions. Each biogeographical realm contains multiple biomes, and biomes occur across several biogeographical realms. A system of biogeographical

provinces was developed to identify specific geographic areas in each biogeographical realm that were of a consistent biome type, and shared distinct plant and animal communities. In turn the biogeographical province was divided into Ecoregions. The Ecoregion concept has been developed and applied primarily by WWF and TNC.

An Ecoregion is a large area, often covering thousands of square kilometres and crossing national borders. Each Ecoregion has a characteristic set of species, habitats, and environmental conditions (known as an ecosystem). The boundaries of an Ecoregion are not fixed and sharp, but rather encompass an area within which important ecological and evolutionary processes most strongly interact. Choosing global Ecoregions as units on which to base conservation efforts recognizes the fact that unique manifestations of Nature are found in all oceans and seas and they risk being lost forever if they are not conserved.

WWF initially defined an Ecoregion as a "large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions". (Dinerstein et al. 1995, TNC 1997). The WWF system represents a further refinement of the system of biomes (which the WWF calls "major habitat types"), biogeographical realms, and biogeographical provinces.

Using others' definitions, Olson and Dinerstein (2002) produced an updated definition of Ecoregions as "a relatively large area of land or water containing a characteristic set of natural communities that share a large majority of their species, ecological dynamics, and environmental conditions (Dinerstein et al., 1995; Groves et al., 2000). They function effectively as coarse-scale conservation units because they encompass similar biological communities, and their extent roughly coincides with the area over which key ecological processes interact most strongly".

WWF initially identified 867 terrestrial ecoregions in 2001 (Olson et al., 2001), across the Earth's land surface, as well as freshwater and marine ecoregions. The goal of this classification system is to ensure that the full range of ecosystems will be represented in regional conservation and development strategies. Of these ecoregions, the WWF selected the Global 200 as the ecoregions most crucial to the conservation of global biodiversity. The Global 200 list actually contains 238 ecoregions, made up of 142 terrestrial (of which eight are mangrove ecoregions), 53 freshwater, and 43 marine ecoregions.

Some ecoregions were selected over other ecoregions of the same major habitat type (biome) or ecozone. Selection of the Global 200 relied on extensive studies of 19 terrestrial, freshwater, and marine major habitat types. Selection of the ecoregions was based on analyses of species richness, species endemism, unique higher taxa, unusual ecological or evolutionary phenomena, and global rarity of the major habitat type. The WWF assigns a conservation status to each ecoregion in the Global 200: critical or endangered; vulnerable; and relatively stable or intact. Over half of the ecoregions in the Global 200 are rated endangered (Olson and Dinerstein, 2002).

WWF's Global 200 is a first attempt to identify a set of ecoregions whose conservation would achieve the goal of saving a broad diversity of the Earth's ecosystems. These ecoregions include those with exceptional levels of biodiversity, such as high species richness or endemism, or those with unusual ecological or evolutionary phenomena.

Relative to most terrestrial and freshwater ecoregions, marine ecological and biogeographic units are more spatially and temporally dynamic (Sherman et al., 1990) and therefore more challenging to delineate. Marine ecoregions delineated by the Global 200 are derived from a synthesis of global and regional spatial plans, review of the available literature and consultations with experts. Kelleher et al. (1995), Sherman et al. (1990), Longhurst (1998), and Bailey (1998) served as the primary sources for the Global 200. The marine part of the Global 200 does not cover deep water ecosystems, i.e., pelagic, abyssal, or deeper areas below 6000 m, nor is its biogeographic units as finely resolved as the maps used in the freshwater or terrestrial analyses. As in land-based analyses, the delineation of marine ecoregions is intended to highlight general regions within which characteristic animals, plants, ecological

interactions, and biophysical processes occur.

The scheme used to designate and classify marine ecoregions is analogous to the classification system used by WWF for terrestrial ecoregions. There are nine major habitat types identified—polar, temperate shelves and seas, temperate upwelling, tropical upwelling, tropical coral, pelagic (trades and westerlies), abyssal, and hadal (ocean trench)—which correspond to the terrestrial biomes. The 12 major biogeographic realms, analogous to the seven terrestrial ecozones, represent large regions of the ocean basins: North Temperate Atlantic, Eastern Tropical Atlantic, Western Tropical Atlantic, South Temperate Atlantic, North Temperate Indo-Pacific, Central Indo-Pacific, Eastern Indo-Pacific, Western Indo-Pacific, South Temperate Indo-Pacific, Southern Ocean, Antarctic, Arctic, and Mediterranean.

The classification of marine ecoregions was not developed to the same level of detail and comprehensiveness as that of the terrestrial ecoregions. However, in a recent publication, Spalding et al. (2007) redefine Ecoregions as part of a three divisional hierarchical system, known as Marine Ecosystems of the World (MEOW), based on taxonomic configurations, influenced by evolutionary history, patterns of dispersal and isolation. The critical units in their hierarchy are Realm, Province and Ecoregion. In their definition there are 232 marine ecoregions within 62 provinces in 12 realms. The outer boundary for their ecoregions is the 200 m isobath which is a widely used proxy for the shelf edge. The ecoregions are mapped and listed in Spalding et al. (2007), who provide the following definition of Marine Ecoregions: “Areas of relatively homogeneous species composition, clearly distinct from adjacent systems. The species composition is likely to be determined by the predominance of a small number of ecosystems and/or a distinct suite of oceanographic or topographic features. The dominant biogeographic forcing agents defining the ecoregions vary from location to location but may include isolation, upwelling, nutrient inputs, freshwater influx, temperature regimes, ice regimes, exposure, sediments, currents, and bathymetric or coastal complexity”.

Spalding et al's (2007) MEOW is a nested, global system of broadly consistent scales and incorporating the full spectrum of habitats found across shelves. The authors have minimized further divergence from previous systems, developing a nested hierarchy that used already widely adopted systems and fitted closely with broader-scale systems or alongside regional systems. Thus, the Marine Ecoregion as a unit of biogeographical classification and global prioritisation has evolved from a minor appendage to a predominantly terrestrial system to a situation where it covers the world's coastal-marine areas comprehensively, is underpinned by a much refined analysis, and provides a basis for assessment of global progress on marine conservation.

B. ECOREGIONS AS AN APPROACH TO CONSERVATION

Isolated islands of protected areas cannot alone provide effective conservation of marine habitats. Neither can isolated instances of well-managed fisheries or ecotourism developments. A key aim of WWF's work is therefore the conservation of entire Ecoregions. WWF maintains that "although conservation action typically takes place at the country level, patterns of biodiversity and ecological processes, e.g. migration, do not conform to political boundaries", which is why ecoregion-based conservation strategies are deemed essential.

Within each focal Marine Ecoregion, WWF promotes a large-scale approach to conservation activities and tries to harmonize the work of governments and other non-governmental organisations (NGOs). WWF also helps bring governments together to cooperate on managing their shared marine resources. There is a WWF institutional manual for ecoregion planning, but this seems to be applied in a loose and flexible way, depending largely on the context of the specific Ecoregion. Three central aspects of the WWF ecoregion approach are:

- The initial development of a long-term Biodiversity Vision for the Marine Ecoregion, based mainly on expert opinion;
- The establishment of well-managed, representative networks of MPAs;
- The sustainable management of fisheries and other marine resources through ecosystem-based management.

http://www.panda.org/what_we_do/how_we_work/conservation/marine/holistic_approach/

TNC also uses Ecoregions but in different ways. Its "Conservation by Design" approach (<http://www.nature.org/aboutus/howwework/cbd/>) combines global habitat assessments and ecoregional assessments to define conservation priorities. TNC then plans conservation action to develop projects to achieve the conservation targets. Compared to WWF, TNC makes less use of expert opinion and puts more emphasis on compiling large amounts of information in databases, as tools to support decision-making. Both organisations seek to build coalitions of governmental and non-governmental organisations, loosely organised through Memoranda of Understanding, to achieve shared conservation objectives.

A decade ago TNC applied its institutional methodologies with little flexibility. Ecoregional assessment and planning involved five basic steps:

- Identifying conservation targets.
- Gathering information.
- Setting goals for each of the conservation targets.
- Assessing viability of each occurrence of each conservation target.
- Assembling portfolios (or an efficient network of conservation areas).

However, in recent years TNC has been shifting towards an approach that is less dominated by the natural sciences and more holistic, flexible and concerned with issues of governance and inter-sectoral coordination. In the marine realm in particular TNC is one of the promoters and users of EBM tools (www.marineebm.org). That website gives case studies, showing that TNC is going a step further and pursuing multi-objective assessment, planning and management. TNC's Global Marine Initiative brochure (http://www.nature.org/initiatives/marine/files/setting_priorities_fact_sheet.pdf) similarly stresses that strategies should address multiple needs: "Marine conservation and management

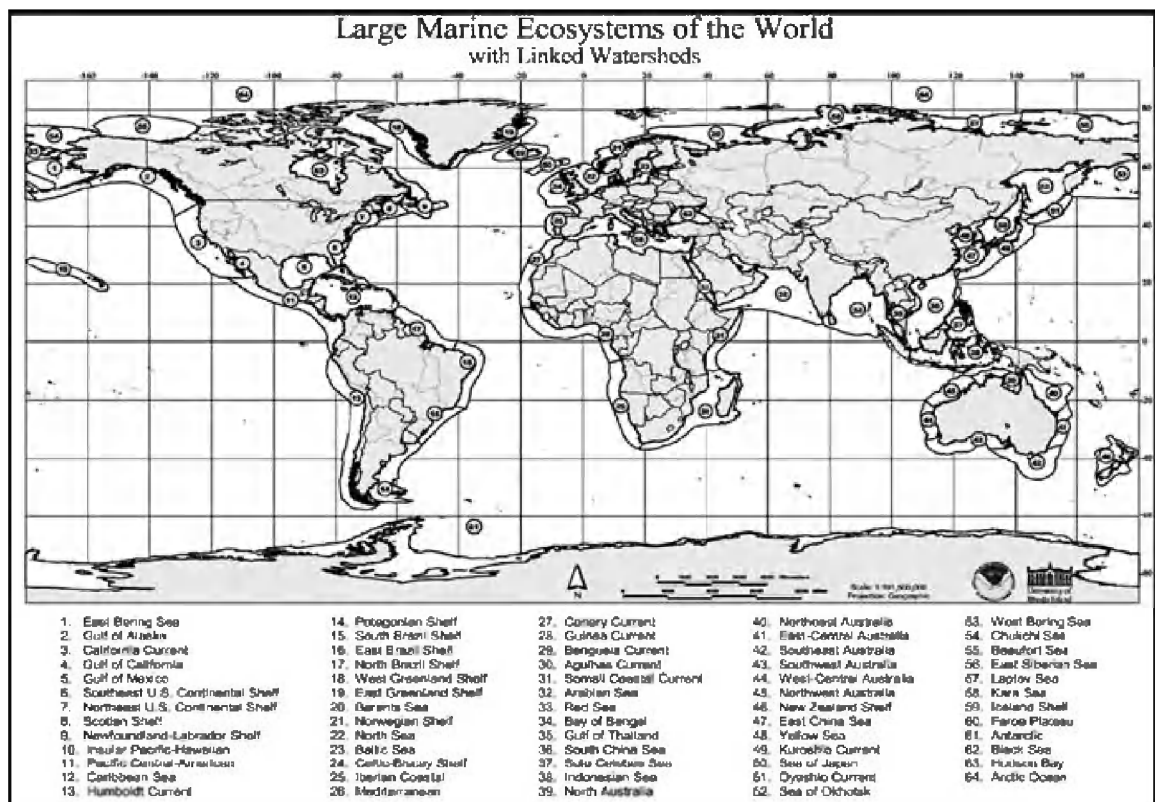
involves many stakeholders, organisations and agencies often working independently and at different scales. The Conservancy's approach to regional marine planning aims to unify these independent efforts through flexible, adaptive approaches. By jointly meeting the needs of many partners, we develop region-wide visions that support an ecosystem-based management approach." Thus, we see a subtle but significant shift from addressing other stakeholders' needs as a means to achieve biodiversity objectives to pursuing a suite of objectives, one of which is biodiversity conservation.

2.2.3 LARGE MARINE ECOSYSTEMS, AS DEFINED BY NOAA

A similar, but generally larger scale, system to the "ecoregions" for identifying areas of the oceans for management purposes is that of Large Marine Ecosystems, developed by Sherman and others for the US National Oceanic and Atmospheric Administration (NOAA) (Sherman, 1994). Relative to Ecoregions and Seascapes, the motivating force behind the LME approach is less about biodiversity and more about sustaining productivity, especially fisheries. At stake globally in LME's are renewable goods and services valued at over \$12 trillion per year (Costanza et al., 1997).

Large Marine Ecosystems generally exceed 200,000 km² in extent. There are 64 in total and they encircle nearly every continent and some large islands and island chains (Fig. 1). Each LME has distinct bathymetry (depth), hydrography (tides, currents, and physical conditions of ocean waters), and biological productivity whose plant and animal populations are inextricably linked to one another in the food chain. The website <http://www.lme.noaa.gov/> gives access to summaries of the five categories of information on each LME.

Fig. 1 Large Marine Ecosystems. (From www.edc.uri.edu/lme/maps.htm)



Five information modules—biological productivity, fish and fisheries, pollution and health, socioeconomics, and governance—accompany each LME. They are intended to help scientists and managers understand and integrate the elements of monitoring, assessing and managing LMEs.

- The productivity module describes the availability of nutrients and primary productivity;
- the fish and fisheries module covers the status and changes in fish populations and their biomass;
- the pollution and health module covers the types and degree of pressure from pollutants like sediments and excessive nutrients;
- the socioeconomic module covers the size and scope of activities of surrounding human populations and the various ways that humans exploit or manage the resources; and,
- the governance module covers the laws, regulations and the various entities responsible for managing the resources and enforcing laws.

It is generally acknowledged that the socio-economic and governance modules, especially the latter, have been less thoroughly developed than the three natural science modules. This is very obvious when reviewing the module contents or NOAA's own review document (Sherman et al, 2007), where there is a wealth of detail about fish fecundity, stomach contents, pathology etc. but governance profiles rarely go beyond a summary of the government institutions involved.

Over the 20+ years since the LME's were first mapped, the five information modules have remained but the LME approach has evolved from being primarily oriented towards the needs of NOAA, as a tool to prioritise research actions, to being an information tool used to guide investment by a variety of international agencies. GEF, World Bank and the UN Regional Seas Programme all use LME's as the basis for their marine projects. LME's were also used by Global International Waters Assessment (GIWA). GIWA assessed the ecological status of the water areas and the causes of environmental problems of 66 subregions in international waters—international waters comprising marine, coastal and freshwater areas, surface waters and groundwater—in nine mega-regions. Focus was on the key issues and problems facing the aquatic environment in these international waters. The use of the LME concept by GEF is explained in the quote from K. Sherman below.

“After the September 2002 World Summit on Sustainable Development (WSSD): Toward the Future, a new imperative is emerging that calls for a radical shift in how marine ecosystems are to be managed. North-South collaboration must result in changes in the economic sectors that create the stress on our valuable marine ecosystems. If the spiralling degradation of coastal and marine ecosystems is to be reversed so that these ecosystems continue to provide both livelihood benefits to coastal communities and foreign exchange to governments, a more ecosystem-based approach needs to be implemented.

In recognition of the interest expressed by coastal countries to halt and reverse the deteriorating condition of coastal areas, IUCN and NOAA have joined in an action programme to assist developing countries in planning and implementing an ecosystem-based strategy that is focused on LMEs as the principal assessment and management units for coastal ocean resources.

In a complementary exercise, the IOC of UNESCO and its partners (WMO, UNEP, and ICSU) are working through the Living Marine Resources and Coastal Modules of the Global Ocean Observing System to develop ecosystem monitoring and forecasting methods that can be applied by coastal nations to marine ecosystems of coastal seas.

The Global Environment Facility (GEF) has strategies for:

- *reversing the decline of their marine ecosystems,*
- *restoring the depleted biomass of food fish for sustaining growing populations of coastal communities, and*
- *conserving the integrity of highly fluctuating ecosystems to ensure continued benefits for future generations.*

Since the early 1990s, developing coastal nations have approached the GEF and its implementing agencies (the UN Development Programme, UN Environment Programme, and World Bank) and executing agencies like the UN Industrial Development Organisation, for assistance in GEF's international waters focal area to restore and protect global coastal and marine ecosystems. The GEF Operational Strategy provides guidance on addressing these issues within the framework of sustainable development. GEF recommends the use of LMEs and their contributing freshwater basins as the geographic area for integrating changes in sectoral economic activities. This place-based assistance with initial interventions through participative, multi-country processes of setting priorities and adopting commitment to action, makes possible the transition to ecosystem-based management of these transboundary systems that encompass two or more coastal nations.

One of the two principal processes used by the GEF to engage the science community in each of the participating countries for establishing ecosystem-based priorities for transboundary issues is the Transboundary Diagnostic Analysis (TDA). The other process, known as the Strategic Action Programme (SAP), enables cooperating nations to jointly determine what policy/legal/institutional reforms and investments they need to make to address the TDA priorities. Once such country-driven commitments to action are established, the GEF may also fund incremental costs of implementing the action programme or SAP to accelerate adoption of management regimes based on the concept of adaptive management for the ecosystem as a whole rather than the management of specific sector by sector issues in isolation." www.edc.uri.edu/lme/intro.htm (Sherman, 1994).

2.2.4 REGIONAL SEAS, AS DEFINED BY UNEP

Most of this text is taken from the UNEP Regional Seas website: <http://www.unep.org/regionalseas/programmes/default.asp>

A. HISTORY AND DESCRIPTION OF REGIONAL SEAS

The Regional Seas Programme (RSP) aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environments, by engaging neighbouring countries in comprehensive and specific actions to protect their shared marine environment.

The global RSP was launched in 1974 (Fig. 2) and has more than 140 countries participating (Annex 3). It was revised and strengthened by the UNEP Governing Council in the mid 1990s and 2003, and its objectives have evolved from contributing to the relevant targets of Agenda 21 to contributing to the WSSD Plan of Implementation and the Millennium Development Goals. Similarly, individual RSP's have changed course over time in response to directives from the Conference of the Parties and to inter-governmental decisions. Nevertheless, the core theme remains: regional cooperation to reverse degradation of the shared coastal-marine environment.

As distinct from LMEs, Seascapes and Marine Ecoregions, the Regional Seas management areas are delineated solely by member countries' borders. Some countries within a Regional Seas area may be excluded from the programme due to their lack of interest, e.g., Brunei and Myanmar from

the East Asian Seas Regional Seas Programme known as the Coordinating Body of the Seas of East Asia (COBSEA). Some member countries do not have Regional Seas activities in their countries, yet are members of the Programme, e.g. Australia and Korea in COBSEA. China is a member of two Regional Seas Programmes and, by informal agreement, has tropical coasts under COBSEA and temperate coasts under the North Western Pacific Action Plan (NOWPAP) activities (Kirkman, 2006). The UNEP Regional Seas Programme covers 18 regions of the world and more than 140 countries, making it one of the most globally comprehensive initiatives for the protection of marine and coastal environments (Annex 3).

B. HOW REGIONAL SEAS PROGRAMMES ARE IMPLEMENTED

Of the 18 Regional Seas across the world, 13 are under UNEP auspices. In most regions the international cooperation is underpinned by a regional convention. A major role of UNEP is to assist the RS programmes to fulfill their responsibilities under the regional convention, plus relevant global conventions and Multilateral Environmental Agreements (MEAs), for which the RS can in many cases provide a useful forum for coordinated implementation.

Fig. 2 Global distribution of regional seas (UNEP, 2005a)



Globally, the Regional Seas Programme has many partners for implementing MEAs and global programmes and initiatives. These partners in 2005 were: The Global Plan of Action (GPA) for the Protection of the Marine Environment from Land-based Activities, International Coral Reef Initiative (ICRI), WWF, International Maritime Organisation, Global Environment Facility, Intergovernmental Oceanographic Commission (IOC) of UNESCO, UN Food and Agriculture Organisation (FAO), International Atomic Energy Agency (IAEA), IUCN and the Small Islands Development States' (SIDS) Programme of Action.

Most of the Regional Seas Programmes function through action plans, which are adopted by member governments in order to establish a comprehensive strategy and framework for protecting the environment and promoting sustainable development. An action plan outlines the strategy and substance of the programme, based on the region's particular marine environmental challenges and its socio-economic and political situation. The scope of each RSP depends on the region's needs and institutional set-up. A striking example is the South Pacific Regional Environment Programme,

SPREP, which expanded to encompass terrestrial and marine environmental conservation. It is the RS programme for Melanesia, Micronesia and Polynesia and, having started life as just a programme of the South Pacific Commission, has become fully autonomous and functions under its own terms and conditions.

Fourteen of the Regional Seas Programmes have adopted legally-binding conventions that express the commitment and political will of governments to tackle their common environmental issues through joint coordinated activities. Most conventions have added protocols, legal agreements addressing specific issues such as protected areas or land-based pollution (UNEP, 2005a).

REGIONAL COORDINATING UNITS

The Regional Seas programmes work through Secretariats or Regional Coordinating Units (RCUs), Regional Activity Centers (RACs) and, with the support of several partner agencies, Regional Activity Networks (RANs). The RCU has the overall and practical responsibility for the implementation of the decisions of member countries (or contracting parties) regarding the operation of the action plan, which are outlined during biannual Inter-Governmental Meetings. The RCU is responsible for the follow-up and implementation of legal documents, the programme of work and of strategies and policies adopted by the member countries. The RCU also carries out the diplomatic, political and public relations functions of the action plan. Finally, the RCU cooperates with governments, other UN and non-UN agencies, private sector and NGOs, and facilitates the capacity building of its own regional activity centers and of member governments (UNEP, 2005a).

REGIONAL ACTIVITY CENTERS

The RACs serve all member states by carrying out activities related to the action plan as agreed and guided by the Conference of the Parties or intergovernmental decisions. The RACs play key roles in the implementation of various components and activities of the action plan at regional, sub-regional, national and sometimes local levels. The RACs are an integral part of the action plan and report directly to the RCU. They are usually financially supported by the contracting parties and by the host country through the financial mechanisms of the action plan (<http://www.unep.org/regionalseas/>), though in at least one case (the Caribbean) the policy aims to have the RAC become financially self-sufficient, not dependent on government contributions.

2.2.5 INTEGRATED COASTAL MANAGEMENT²

Olsen (2003) traces the origins of Integrated Coastal Management (ICM) back to the 1969 Stratton Commission in the USA, whose work led to the Coastal Zone Management Act of 1972. The Act offered incentives for States to restructure policies and authorities in order to achieve more effective, better coordinated coastal planning and decision-making, which responded to the national interest. Interestingly, there were two kinds of incentive, one financial and the other in terms of empowerment: federal agencies would respect the State's approved coastal zone management plan. The Act also stressed the importance of process, requiring consultation across many sectors. Thus, some of the enduring characteristics of what later became ICM were set.

Pre-colonial, centralized, community based, and collaborative coastal management have evolved to what today is called integrated coastal management. Centralized management began during colonial times when any attempt at management was orchestrated from the top of government. Community based coastal management, in response to the failures of more centralized approaches, began in the Philippines through several projects, the experience of which spread to other countries in Southeast

² In this document we are using Integrated Coastal Management as synonymous with Integrated Coastal Zone Management

Asia and to Ecuador in the 1980s (Christie and White, 1997).

The term Integrated Coastal Management itself was coined in 1992 during the Earth Summit in Rio de Janeiro. The approach set out in Chapter 17 of Agenda 21 emphasized the inter-sectoral coordination aspect but omitted the incentives that made the USA initiative successful (Olsen, 2003) and also ignored some of the basic governance and financial issues that make ICM a much more challenging, long-term task in developing countries than in a country like the USA.

There are many variations on the ICM theme, but a widely used definition is that of the UN Joint Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) (1996): “a continuous and dynamic process, which unites government and the community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources”.

A web publication by Sombat Yumuang (200?) expands on this definition in a way that explains the main features of ICM: (http://www.gisthai.org/resource/article/systematic_geo_eng.html)

“Integrated coastal zone management (ICZM) is a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning (in its broadest sense), decision making, management and monitoring of implementation. ICM uses the informed participation and cooperation of all stakeholders to assess the societal goals in a given coastal area, and to take actions towards meeting these objectives. ICM seeks, over the long-term, to balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics. ‘Integrated’ in ICM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space.”

The following table from Olsen (2003) emphasizes the cyclical nature of ICM and spells out the steps in the cycle.

THE ICM LEARNING CYCLE AND THE ACTIONS ASSOCIATED WITH EACH STEP
(FROM OLSEN, 2003)

| STEP | STEP INDICATORS |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1: Issue Identification and Assessment | <ul style="list-style-type: none"> • Principal environmental, social and institutional issues and their implications assessed • Major stakeholders and their interests identified • Issues upon which the ICM initiative will focus its selected efforts • Goals of the ICM initiative defined • Stakeholders actively involved in the assessment and goal-setting process |
| Step 2: Preparation of the Plan | <ul style="list-style-type: none"> • Scientific research on selected management questions conducted • Boundaries of the areas to be managed defined • Baseline conditions documented • Action plan and the institutional framework by which it will be implemented defined • Institutional capacity for implementation being developed • Second Order behavioral change strategies at pilot scales tested • Stakeholders actively involved in planning and pilot project activities |
| Step 3: Formal Adoption and Funding | <ul style="list-style-type: none"> • Policies/plan formally endorsed and authorities necessary for their implementation provided • Funding required for program implementation obtained |
| Step 4: Implementation | <ul style="list-style-type: none"> • Behaviors of strategic partners monitored, strategies adjusted and interpreted • Societal/ecosystem trends monitored • Investments in necessary physical infrastructure made • Progress and attainment of Third Order outcomes documented • Participation of major stakeholder groups sustained • Constituencies, funding and authorities sustained • Program learning and adaptations documented |
| Step 5: Self Assessment and External Evaluation | <ul style="list-style-type: none"> • Program outcomes documented • Management issues reassessed • Priorities and policies adjusted to reflect experience and changing social/environmental conditions • External evaluations conducted at junctures in the program's evolution • New issues or areas for inclusion in the program identified |

Defining features that emerge from these descriptions of ICM are:

- It is a **cyclical process**, which aims to build increasingly effective, equitable, resilient and sustainable **governance**, through successive cycles of intervention and learning (Hale & Olsen, 2003). One consequence of this is that ICM is more explicit than typical donor-funded projects about the need to sustain the programme over long periods—usually 15–20 years or more in a developing country context.
- The **conservation and development goals** to be attained through this good governance are defined and refined by the **stakeholders** and **relevant authorities**. They may use an array of information, including data about ecological processes and global biodiversity priorities, but the goals they set will depend on their values and on national policies (the balance between the two reflecting the current state of participatory governance).
- Similarly, the **geographic boundaries** of the ICM programme are defined and refined by the **stakeholders** and **relevant authorities**, not pre-determined by biogeographic considerations. Rather, it is an area where the interests of various stakeholders overlap and where there is a perceived need to manage the area in a way that integrates these multiple interests, whilst ensuring sustainability.

2.3 INITIAL OBSERVATIONS ABOUT THE FIVE LAMM APPROACHES

2.3.1 SUMMARY OF THE CHARACTERISTICS OF THE FIVE APPROACHES

TABLE 1. CHARACTERISATION OF LARGE AREAS FOR MARINE MANAGEMENT

| LAMM | Key supporting donors | Proponents and users | When started | Objectives | Operating mechanisms |
|-----------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seascapes | Walton Family Foundation, GBMF, United Nations Foundation, | CI UNESCO (supported ETPS). Recently adopted by governments of Coral Triangle Initiative (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, Timor Leste) | 2003 | Conservation, human well-being, | CI-led, multi-organisation cooperative efforts, in close collaboration with governments. Methodologies being forged from experiences of 3 pilot Seascapes. Recent adoption by governments in the Coral Triangle Initiative for coral reefs, fisheries and food security as one of five outcomes |

TABLE 1 CONTINUED

| LAMM | Key supporting donors | Proponents and users | When started | Objectives | Operating mechanisms |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seascapes (continued) | | | | | ('Priority Seascapes') may require a different operating mechanism. |
| Marine Ecoregions | WWF and TNC, and through them many bilateral agencies and private foundations e.g. AusAID, CIDA, DANIDA, DFID, FINNIDA, AFD, BMZ, KfW, GTZ, DGIS, LNV, NZAID, NORAD, SIDA, SDC/DEZA/DDC, SECO, EU, USAID, GEF, Govt of Japan, MacArthur Foundation World Bank, ADB. | WWF, TNC | 1998 Olsen & Dinerstein 1998 Spalding, 2007 | Conservation, reduction of extinction rate, manage fisheries | WWF- or TNC-led multi-organisation cooperative efforts, in close collaboration with governments. Sophisticated methods for biogeographic analysis. WWF/TNC have set methodologies for conservation planning and implementation but becoming more flexible, and multi-objective (TNC). Has been formalized through multilateral agreements (eg Sulu-Sulawesi marine ecoregion, Bismarck-Solomon Seas marine ecoregion). |
| Large Marine Ecosystems | USAID, GEF, ADB | NOAA, USAID, UNEP, UNDP, GIWA | Mid-80s. GEF in 1995 | Transboundary management issues, conservation of fisheries | Projects designed by government agencies with donors. Methodologies fixed by NOAA (5 modules of information) and GEF (including TDA, SAP and standard GEF procedures). |

TABLE 1 CONTINUED

| LAMM | Key supporting donors | Proponents and users | When started | Objectives | Operating mechanisms |
|------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regional Seas | Member countries and bilateral and multilateral donor agencies, notably SIDA, GEF, DANIDA, | UNEP | 1974 | Reduce degradation of marine & coastal environments | Usually underpinned by an international convention. Inter-governmental bodies decide plans, develop biannual work programmes, and monitor implementation by individual governments. Some allow participation by NGOs as observers and field collaborators. |
| Integrated Coastal Zone Management | USAID, Netherlands & UK government, many donor agencies. | URI, PEMSEA, many others including WWF, Regional Seas, TNC, Bangladesh | 1972 in USA then 1992 globally in Rio | Integrate use, development and environmental protection in the coastal zones, and achieve sustainable coastal development. | A cyclical process to develop good governance, with authorities and stakeholders setting aims, geographic scope, strategy etc. Strongly participatory. Guiding principles for process but no fixed methodology for analysis, planning etc. URI use method of 1st, 2nd, 3rd and 4th Order results for categorizing outcomes and hence tracking progress from enabling framework to concrete conservation and development benefits. |

2.3.2 DIFFERENCES IN PURPOSE AND NATURE OF THE FIVE APPROACHES

From Table 1, it is evident that the five LAMM methodologies share a general aim of facilitating conservation and sustainable use of the world's coastal-marine ecosystems, but differ in the contribution that they seek to make to that aim.

The Marine Ecoregion approach starts with a system of biogeographic classification. To make a contribution to the general aim of ecosystem sustainability, these geographic units must be used as the basis for planning and implementing management measures, through WWF or TNC's ecoregional planning processes (or any other processes involving the authorities, economic users and other stakeholders involved in that geography). Both WWF and TNC have institutional planning methodologies, which in both cases have been dominated by natural sciences but are evolving towards a more holistic approach.

A Seascape is an area within which a conservation initiative is operating. Though it has not happened yet, the geography could potentially change over time (for example, it has been suggested that Peru could be invited to join the ETPS initiative). In the absence of a conservation programme—whether CI's or some post-project permanent management—a Seascape (unlike an Ecoregion) has no real significance as a unit. A Seascape should be reasonably inclusive in ecological terms—indeed, it could adopt a MER or LME as its basis—but should also make sense in “strategic” terms. The latter could include considerations of existing governance structures, jurisdiction of authorities, areas used for management of fishing, areas of cultural similarity, areas within which coordination mechanisms already exist, areas within which it would be feasible to apply effective management measures, availability of funds to pursue large-scale marine management, possibility of adding value to existing efforts etc. There is no prescribed Seascape planning methodology as such, but there is a growing body of common thinking and practice between the three pilot Seascapes, as well as a draft set of criteria for measuring success and a draft process for launching a new Seascape.

LMEs are a combination of a geographic area defined on ecological criteria (similar to a MER but bigger) and five standard sets of information, intended to facilitate monitoring and science-based management of that area. By nature, scale and association with GEF, NOAA and RS, LME programmes tend to operate at the level of governments and research institutes, rather than the whole governance structure from local to regional. The combination of the LME's five pre-determined information modules and GEF's set procedures for project development make the LME the most prescriptive approach in relation to methodologies for planning.

Governance—specifically inter-governmental coordination and decision-making about shared resources—is the core function of the Regional Seas. The RS programme seeks to forge links between existing levels of governance, principally between nations, and establish the higher, multi-country level of governance (respecting sovereignty as appropriate). Thus, its contribution to the general purpose of ecosystem sustainability is confined not only to a specific geography but also to a specific component of governance; it depends on the rest of the governance structure for its effectiveness. RS are defined geographically by a combination of national boundaries and political and strategic considerations. Ecological considerations were weak or absent, but have in some cases been incorporated through linking RS with LME programmes, as these are (i) suitably large and (ii) favoured by proponents and supporters of RS, including GEF, The World Bank, the Asian Development Bank and UNEP.

ICM is essentially a set of principles guiding a participatory process for integrating environmental, economic, social, cultural and recreational objectives, within limits set by the ecosystem itself, but not necessarily covering a single ecosystem. Its geographical scope is whatever the authorities and stakeholders say it is. It is therefore not really a LAMM so much as a methodology for conservation and development that can be applied in any LAMM programme.

ICM varies considerably in size from country-wide, as practised in Bangladesh and suggested for Thailand (www.gisthai.org), to municipality size, e.g. Chonburi and Xiamen described in Section 4.

2.3.3 IMPLICATIONS FOR THE ANALYSIS

In summary, Ecoregions and LMEs are biogeographical units with planning methodologies and tools attached; Seascapes are areas shaped by ecological and strategic factors within which partners

cooperate for conservation; Regional Seas are agglomerations of national waters with an inter-governmental governance mechanism; and ICM can be seen as a governance process, which can be applied to part or all of the other LAMMs. They contribute in different ways to a common aim. In comparing the five LAMM approaches, in terms of application, funding, outcomes and sustainability, we should be aware that we are comparing apples and oranges. The comparison can be enlightening and generate recommendations about particularly effective features of one or other approach and about potential synergies between approaches, but cannot conclude that one is simply better than the other.

Given the different nature—and, in some aspects, complementary roles—of the five LAMM approaches, it is not surprising that their application has in many cases overlapped. In some places the outcomes, funding and sustainability achieved may be fruits not of individual programs but of two or more complementary, interacting approaches. An additional question to ask, then, is whether the application of multiple approaches in the same area, or overlapping areas, is synergistic or merely inefficiency caused by institutions adhering to their own methodologies instead of building on what is already in place.

3. APPLICATION OF THE LAMM APPROACHES



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3.1 INVENTORY

3.1.1 SEASCAPES

Seascapes have three marine locations, Papuan Bird's Head, Sulu-Sulawesi Sea and Eastern Tropical Pacific. The areas are 180,000 km², 900,000 km² and 2 million km², respectively. Bird's Head and Sulu-Sulawesi have coral reefs as a major habitat type whereas the ETPS has limited coral reef but much rocky reef, mangrove, estuarine and sandy beach habitats. Much of ETPS is deep sea. All Seascapes have fisheries associated with them, including benthic coral and rocky reef fish and pelagics. Other important animals are turtles, whales, dolphins, shark and, in the ETPS, sealions. Papuan Bird's Head Seascope is within Indonesia. The Sulu-Sulawesi Sea Seascope is shared between Indonesia, Malaysia and Philippines. The ETPS includes four countries: Costa Rica, Panama, Ecuador and Colombia. This, seven countries in total are participating in the three Seascope Initiatives. CI plans to establish up to four more Seascope programmes, subject to availability of funds. In line with the Seascope definition, the areas are being identified on the basis of biodiversity importance, ecological considerations (ocean currents and other large-scale ecological processes, migratory species, etc) and strategic considerations (administrative boundaries; existing coordination mechanisms; existing large-scale programs; organisation of large-scale economic activities such as fishing etc).

Hitherto, the establishment of a Seascope programme has depended on a decision by CI to invest in that area. In some ways the term "Seascope" has been perceived as a CI brand name for this kind of large-scale marine programme and for this perception to change there will need to be Seascope programmes that either are led by another NGO or continue to function sustainably under regional leadership after CI has withdrawn. There are indications that this may now be happening in South-East Asia. The Philippines government has recently declared the "South China Sea Seascope" as part of its contribution to the Coral Triangle Initiative and the government of Indonesia is considering the declaration of the "Anambas-Natuna Seascope". The practical significance and durability of these declarations remains to be seen.

It should be noted that CI has other marine field programs that may be fairly large-scale but do not constitute "Seascope" initiatives, because they do not have all the characteristics or "essential elements". For example, CI has worked for many years in Abrolhos, Brazil, but considered the programme there to be a coordinated portfolio of projects rather than a Seascope Initiative.

3.1.2 MARINE ECOREGIONS

Marine Ecoregions have been mapped for coastal-marine ecosystems worldwide. Both WWF and TNC have used this global ecoregion mapping, and larger-scale habitat mapping, to define a set of priority places for conservation, representative of the whole suite of habitats and ecosystems on Earth. In the case of WWF, it produced a "Global 200" list of priority Ecoregions, of which 19 were marine. All of these have been the subject of interventions by WWF—some major, some minor—and we list 13 of them in the table in Annex 4. WWF is currently revising its website and the new version takes a modified approach, highlighting 35 "critical regions", including about 12 which are wholly or partially marine http://www.panda.org/what_we_do/where_we_work/. It is apparent that each "critical region" comprises several ecoregions, and there is a further link to the list of the 238 "most important ecoregions", of which 43 are marine http://www.panda.org/about_our_earth/ecoregions/ecoregion_list/.

TNC has completed 10 Marine Ecoregional Assessments and has 15 more in progress, all in Asia Pacific, the Caribbean and the western coast of the Americas (<http://www.nature.org/initiatives/marine/strategies/assessments.html>).

The general idea of an ecoregion as a large ecological unit has been used by many organisations, with a variety of definitions and purposes. However, as far as we know, the use of the WWF/TNC Ecoregion maps and assessments for conservation planning is limited to these two organisations and their partners, as are their respective institutional planning methodologies. There is not yet any indication that another organisation or funding agency might decide to take on the establishment of a Marine Ecoregion program, without funding from TNC or WWF. In identifying potential Seascapes, CI would take into consideration the location of Marine Ecoregions, but this would be just one layer of information, to be combined with others related to the strategic factors mentioned above, in order to come up with the geographic area of interest for the Seascope initiative (S.Troëng, pers. comm.).

Thus, we can say that the MER approach has been applied widely across the globe, but always stimulated or mediated in some way by investment by WWF or TNC or both.

3.1.3 LARGE MARINE ECOSYSTEMS

Large Marine Ecosystems are each generally [HYPERLINK "http://www.panda.org/about_wwf/content/nav_content.cfm?uNC=53586361&uXNavID=1509"](http://www.panda.org/about_wwf/content/nav_content.cfm?uNC=53586361&uXNavID=1509) greater than 200,000 km² in area. There are 64 LMEs globally and they cover all marine habitats. (Figure 1). As with Marine Ecoregion mapping, LME mapping covers coastal-marine ecosystems worldwide. Initially, as with Marine Ecoregions and Seascapes, the application of the LME concept to conservation planning and implementation was driven by the investment decisions of the institutional parents of the concept, in this case NOAA and USAID, and the LME concept became important for NOAA's international outreach and capacity-building efforts. However, the LME concept has in addition been adopted by certain governments, international organisations and scientists in ways that have expanded greatly its application around the world, as demonstrated by the examples below:

- The President's 2005 U.S. Ocean Action Plan recommends LMEs as the unit for marine resource management worldwide. Sherman et al (2007) cite USOAP (2004) as follows: "The US will promote, within the United Nations Environment Program's regional seas programs and by international fisheries bodies, the use of the Large Marine Ecosystems (LME) concept as a tool for enabling ecosystem-based management to provide a collaborative approach to management of resources within ecologically bounded transnational areas. This will be done in an international context and consistent with customary international law as reflected in 1982 UN Convention on the Law of the Sea."
- The Global Environment Facility (GEF), an independent financial organisation that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities, has adopted LMEs as the basis for its "International Waters" programme, and has funded projects in 10 LMEs and 75 countries. These projects are intended to continue over time, with national institutions replacing the support provided by donors.
- UNEP adopted the LME as the basic unit for its Regional Seas ecosystem-based activities.
- Twelve peer-reviewed scientific journal papers have been published containing descriptions and case studies of LMEs.

One factor persuading GEF, UNEP and others to adopt the LME concept was the fact that USAID, a regular co-financer of GEF projects, was already using the LME concept in many parts of the world. The fact that the LME approach involves both a mapping unit and an information database, organised systematically into five modules (biological productivity, fish and fisheries, pollution and health, socioeconomics, and governance), may also have appealed to an organisation like GEF, seeking consistent information and methodologies for its global programme.

Consequently, the geographic scope of LME programmes and the investment in them have been impressive. Sherman et al (2007) state that, "Since 1995, 16 LME projects have been planned and implemented internationally within a framework provided by NOAA's LME Program, to which NOAA has contributed scientific and technical assistance. These LME projects are focused on ecosystem-based strategies to recover depleted fisheries, reduce coastal pollution, and restore damaged habitats in Africa, Asia, Latin America, and Eastern Europe. Involved in this activity are an estimated 7,000 participants and partners, five UN environmental agencies, and two NGOs, with grants and investment funds totaling \$1.8 billion."

The 16 LME programmes are:

| | |
|-----------------|-------------|
| Agulhas Current | 9 countries |
| Baltic Sea | 9 countries |
| Bay of Bengal | 8 countries |
| Black Sea | 6 countries |
| Canary Current | 7 countries |

| | |
|-------------------|--------------|
| Caribbean Sea | 23 countries |
| Guinea Current | 16 countries |
| Gulf of Mexico | 3 countries |
| Gulf of Thailand | 6 countries |
| Humboldt Current | 2 countries |
| Indonesian Sea | 3 countries |
| Mediterranean Sea | 19 countries |
| Somali Current | 9 countries |
| South China Sea | 7 countries |
| Yellow Sea | 2 countries |

3.1.4 REGIONAL SEAS

Regional Seas boundaries are determined by political agreement between member countries of each Regional Seas Programme. They may have many different ecosystems within a Programme and management is not so much ecosystem-based as a regionally based coordination of government and non-government organisations' activities for sustainable development and conservation of coastal and marine resources (Figure 2).

Thirty-five years on from its launch in 1974, there are 18 regional programmes established across the world (<http://www.unep.org/regionalseas/programmes/default.asp>), covering nearly all of the world's marine ecosystems, including open-ocean.

They are:

[Antarctic, Arctic, Baltic, Black Sea, Caspian, Eastern Africa, East Asian Seas, Mediterranean, North-East Atlantic, North-East Pacific, North-West Pacific, Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific, Western Africa and the Wider Caribbean]

All oceans have some Regional Seas Programmes in them and more than 140 countries take part (Annex 3). Thus, the geographic scope of application of Regional Seas far exceeds that of the other approaches. It is worth noting, however, which these inter-governmental Regional Seas programmes are used by development agencies, banks and NGOs as the basis for their support to some conservation planning and implementation. Usually these initiatives are of regional significance but implementation takes place at country level.

3.1.5 INTEGRATED COASTAL MANAGEMENT

In considering the extent of application of ICM, one consideration is that ICM has tended to stick closer to the coast than have the other LAMMs. In many cases, the adoption of ICM has been driven by on-shore coastal issues, such as tourism, pollution of estuaries and nearshore waters, and competing demands for coastal land. Fisheries, especially offshore fisheries, have often been minor components or even excluded altogether. Having said that, there are also cases where the whole Exclusive Economic Zone (EEZ) is included. According to Mimura (2008), in international ICM programmes in the Asia-Pacific region, the boundary can extend to the edge between coastal sea and ocean, covering all the areas of the territorial seas and EEZ. Each government has responsibility for managing its waters, but international cooperation is needed to address transboundary issues.

Hale and Olsen (2003) state that there has been a proliferation of ICM projects and programmes since the Rio Summit in 1992 and they cite Sorensen (2000)'s estimate of 345 ICM efforts in 95 coastal nations and semi-sovereign states, of which 70 are developing nations. Most of these have been small-scale projects, which is to be expected, since the geographical coverage of an ICM programme is driven not by ecosystem boundaries but by the area over which there is a perceived need for inter-sectoral integration e.g. a port, a municipality, an MPA, an island or the coast of a whole country. Few of these ICM projects have progressed beyond planning to full implementation on any significant scale, though there are important exceptions, especially in Asia (see below). In any case, the sheer quantity of places where authorities and stakeholders have seen ICM as a good way to solve their development problems is impressive.

ICM has also received increasing global attention as a policy tool that leads to a comprehensive framework to address multiple management issues in coastal areas. Major international organisations such as the World Bank, The World Conservation Union (IUCN), the United Nations Environment Programme

(UNEP) and Organisation for Economic Cooperation and Development (OECD) have published guidelines on its use, and various Regional Seas programmes, e.g. in Eastern Africa, have also promoted it and sought to build relevant capacity.

One of the most successful and sustained ICM programmes has been the Coastal Resources Management Programme (CRMP) of University of Rhode Island (URI), funded mainly by USAID (Olsen ed., 2003). It started in 1985 and in its ten-year first phase concentrated on three countries: Ecuador, Thailand and Sri Lanka, covering between 50 and 250 km of coastline in each case. In Phase 2 the project expanded to take in a large area in Indonesia (300,000 sq km), smaller areas in Mexico and Tanzania, and a very small site in Kenya.

Some governments have developed policy frameworks around ICM. The Chinese Government developed a framework for ICM called the Chinese Ocean Agenda 21, released in 1992, and the National Sea Area Use Management Law was enacted in 2001. This is the basis for China's coastal zone management. Korea has implemented ICM and coastal resource use and strengthened this with legislation, such as the enactment and amendment of the Coastal Management Act, the Marine Pollution Prevention Act and the Wetland Conservation Act in 1999 (PEMSEA, 2003). Japan is seeking a way to develop a comprehensive framework for ICM but has amended the Coastal Act (1999) enacted the Fishery Basic Law and amended various other coastal and marine laws to develop policy towards ICM (Mimura, 2008).

Of great importance to East Asian Seas is Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), an organisation that uses ICM as its framework and process, and we are using two of its projects as examples of the successful use of ICM.

PEMSEA's geographic coverage includes the six subregional seas of the East Asian region: the Yellow Sea, East China Sea, South China Sea, Sulu Sea, Celebes Sea and Indonesian Seas. They are semi-enclosed with a total sea area of 7 million km², a coastline of 234,000 km and a total watershed area of about 8.6 million km². These seas are regionally and globally ecologically and economically important. PEMSEA's definition of the Seas of East Asia is different from that of the UNEP Regional Seas Programme for SE Asia. Only the South China Sea, Sulu-Sulawesi, Indonesian Seas, the Gulf of Thailand, part of the Andaman Sea in the Indian Ocean are in the Regional Seas Programme.

The PEMSEA "Seas of East Asia" sustain 30 percent of the world's coral reefs and mangroves; produce about 40 percent of the world's fish catch and 84 percent of world aquaculture; and represent one of the world's centers for tropical marine biodiversity. However, the Seas of East Asia are under serious threat from human activities. Integrated coastal management (ICM) has proven to be an effective tool for national and local governments, providing a comprehensive and holistic approach to solving the many conflicting uses of coastal and marine resources. ICM is a process that encourages all stakeholders to plan, develop and implement a management programme designed to achieve the sustainable development of coastal and marine resources, as well as adjacent watersheds.

Eight demonstration sites were established, covering a total of 917 km of coastline and 15,118 km² of land and sea areas (Fig. 3). The inherent flexibility of ICM enables it to be re-created and adopted by local communities, as well as larger administrative regions, to fit the complexity and urgency of issues being addressed. Learning from the experience of the demonstration sites, 18 other local government units in the region began to replicate the ICM programs. A total of 1,674 km of coastline and 27,508 km² of land and sea area have now been covered by ICM, benefiting over 11 million inhabitants.

PEMSEA Partners are targeting to cover 20% of the regional coastline through replication of ICM practices by 2015.

Figure 3 PEMSEA Sites for ICM



3.2 COMPARISON OF APPLICATION

Comparing the above information on the application of the five LAMM approaches, we can see that in terms of area of ocean covered the RS approach is by far the most widely applied. This indicates that governments perceive RS as being an appropriate mechanism for achieving inter-governmental cooperation, in a way that will serve their national interests and help them to meet their obligations under international conventions.

The extent of application of the LME approach is also very large, covering substantial areas of the globe and a wide variety of habitats, temperate and tropical. This is mainly because it has been adopted by GEF, the RS Programme and other major international players.

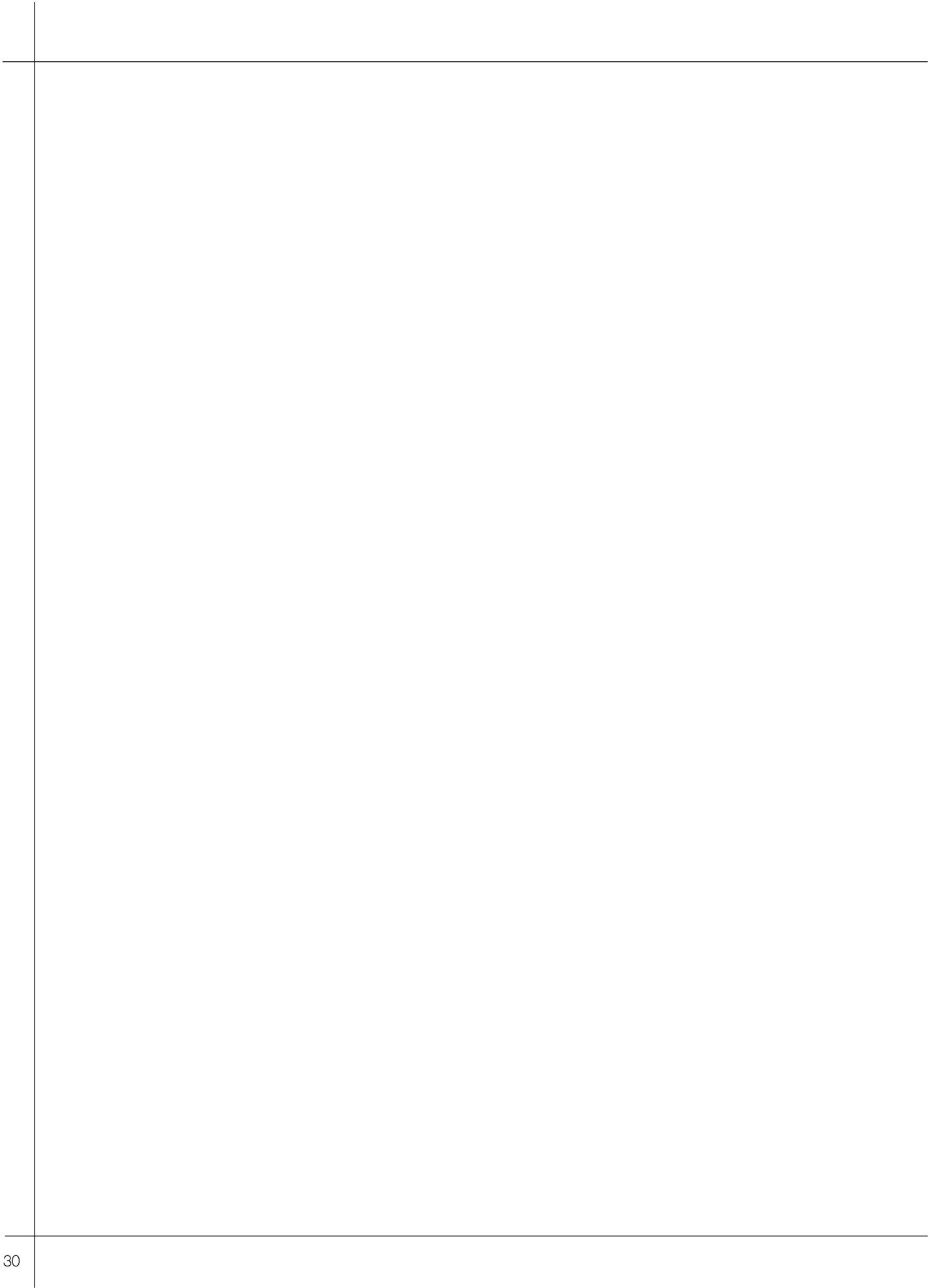
The extent of application of Marine Ecoregion and Seascape approaches has been determined largely by the investment decisions of their respective "proprietors" i.e. WWF and TNC for Ecoregions and CI for

Seascapes. There has been little uptake outside of these organisations and their funded partners, but then WWF, TNC and CI might argue that their primary intention is that their own investments in priority Ecoregions and Seascapes should attract additional actors and financing. In other words, the aim is to maximize impact in the priority regions rather than to maximize the geographical scope of application. Nevertheless, CI does also aim to inspire others to launch their own Seascope programmes, without CI funding, and can point to evidence that in the Coral Triangle this is starting to happen (S.Troëng, pers.comm.).

WWF and TNC have invested heavily in the biogeographic mapping as a basis for their investment decisions, with conservation of representative areas of Earth's habitats and ecosystems as their main goal. In its terrestrial work, CI's decisions have been driven by species considerations i.e. Hotspots and Wilderness Areas (though this appears set to change to a focus on ecosystem services). The selection of the three pilot Seascapes appears to be broadly consistent with this philosophy but was not based on any particular analysis. A more consistent process, with defined criteria related to biodiversity, threats, ecosystem services and human well-being considerations, is likely to be used for selecting the proposed next Seascapes (S.Troëng, pers.comm.). With their much longer histories, WWF and TNC's Marine Ecoregion programmes have been established over much wider areas than CI's Seascapes.

In comparison with LME and RS programmes, the Ecoregion programmes cover smaller areas. However, they do so in greater depth, with interventions at multiple scales from site through sub-national and national up to regional scales. By contrast, the RS programmes operate predominantly at the national and regional levels, and so do many LME programmes, since the GEF projects that support them are planned with national governments. We will consider this issue further in Section 5.

The ICM approach far exceeds the others in terms of the number and diversity of situations in which it has been taken up. It is clear that many authorities and stakeholders feel that the governance-oriented process approach of ICM responds to their needs, and this in itself is important. In some places, especially in the Asia-Pacific region, this uptake of ICM has been translated into management action across large areas of coastal seas. In other places, ICM has been less successful in passing from planning workshop to field practice. We are not able to analyse how many square kilometres of coast and sea have been influenced by ICM programmes. Its comparative impact on development may be increased by the fact that ICM is most demanded and used in areas with high population density and/or competing interests in high value coastal resources. In any case, the success of ICM is reflected more in the breadth and diversity of uptake than the number of square kilometres or species.



4. LIST OF CASE STUDIES



4.1 SELECTION OF CASE STUDIES

The case studies were selected from many examples that we examined. We chose them on being representative of the efforts for marine and coastal conservation and sustainable resource use from developing countries. For Seascapes there were only three examples but for the others we attempted to use a global spread of examples. The examples we chose needed to be on-going and as diverse as possible. For Marine Ecoregions, WWF and TNC are the proponents and they have projects from Africa, Asia and South America. The LMEs are used by GEF and multilateral agencies for funding purposes and by some Regional Seas Programmes. To choose the LME case studies we used examples for which information was readily available from developing countries and that had multi-country and single-country applications. We chose two LME/GEF projects, both well known to one of us (HK), which have distinct approaches, despite being geographically close to each other. We later added a third LME (Benguela Current), that involves a different continent and institutional approach. It was included as a case study at the suggestion of Dr Ken Sherman (US Department of Commerce, NOAA, National Marine Fisheries Service Office of Marine Ecosystem Studies, Narragansett, Rhode Island), who considered it to be a notably successful GEF LME project. Regional Seas Programmes were chosen to be geographically distant from each other and with different choices for their Action Plans. Two had been set up on the basis of a formal convention while the third was more loosely tied by an Action Plan. The latter (Coordinating Body of the Seas of East Asia – COBSEA) was well known to one of us (HK), as he had been coordinator for five years. The South-East Pacific RS was chosen as an example of a RS Programme coordinated by a long established inter-governmental commission, while the Caribbean RS Programme, with its numerous nations, reflects special challenges and innovative responses. The choice for ICM was difficult. We contacted two countries that advocated ICM but were unable to get a response from email and website requests. One organisation that uses ICM as its basic unit for management is the GEF/UNDP/IMO Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), which has many projects in south-east Asia and east Asia. PEMSEA was funded by GEF through a UNDP initiative but in this case the LME approach was not used. The two ICM projects we chose were in different countries under different regimes, although with quite similar problems.

To get some form of qualitative assessment of the success of the different case studies in achieving results, we have distinguished between three different kinds of conservation outcomes using the system of Olsen (2003) to organize the information. He used First Order results, i.e. context (policies, plans, social context), Second Order results, i.e. management action (controlling human activities, changing catch levels, protecting areas, etc) and Third Order results, i.e. impact (changes in biodiversity, populations, size distribution, fishing yields, income).

4.2 LIST OF CASE STUDIES IN DEVELOPING COUNTRIES

This section describes briefly the location and actors involved in each case study. The case studies themselves are in Annex 5.

4.2.1 SEASCAPES

Sulu Sulawesi Seascape (SSS): This case study describes the Seascope Initiative involving Indonesia, Philippines and Malaysia, that was led by CI but now has WWF as a full partner. It lies within the Coral Triangle and the Seascope Initiative built upon earlier work by WWF's Sulu Sulawesi Marine Ecoregion programme and associated inter-governmental agreements and bodies. The relationships between these initiatives are described in the case study. A central feature of the SSS programme has been support to the establishment and management of a network of MPAs in four "conservation corridors".

Papuan Bird's Head Seascope (PBHS): This Seascope falls wholly within Indonesian waters and lies at the heart of the Coral Triangle. The Seascope Initiative has a governance/management component, that is informed by a multi-disciplinary research component. It was initially led by CI but WWF and TNC are full partners in Phase 2. New MPA's declared in 2006/8 by the Raja Ampat and Kaiman Regency (sub-national) Governments are a focus of much attention, as are sustainable fishing and tourism, but the Initiative has been more holistic in scope, with the research component ranging from traditional tenure systems and practices to ecosystem service valuation and genetic connectivity.

Eastern Tropical Pacific Seascape (ETPS): This case study describes the CI-led Seascape initiative covering the seas of Ecuador, Colombia, Panama and Costa Rica. It includes information about approaches taken by RS in the overlapping South-East Pacific region (Chile-Panama) and by WWF in the Galapagos MER, which lies within the ETPS. We also have case studies of each of these two. The inspiration for the ETPS Initiative derived from the apparent ecological connectivity between prominent, biologically rich islands in the region: Galapagos, Malpelo, Cocos, Coiba. The programme includes these sites and associated migratory species but also works at national and regional levels, and on cross-cutting themes. Its measures of success reflect these multiple levels.

4.2.2 MARINE ECOREGIONS

Eastern Africa Marine Ecoregion (EAME): The case study describes the WWF Marine Ecoregion programme, which operates in Kenya, Tanzania and Mozambique. This is a subset of the Eastern Africa MER, originally defined as extending from Somalia to South Africa. The programme invests in site and species conservation and in national and regional outcomes, such as sectoral policy development and training. The case study also includes information about (i) UNEP's RS programme, in approximately the same region, (ii) the LME/GEF programme, which covers two LME's (Agulhas and Somalia Current) and (iii) ICM projects in the region. Only Seascapes are absent - but CI has plans for a Western Indian Ocean Seascape in the pipeline.

Galapagos Marine Ecoregion (GMER): This archipelago has been used by WWF for its objectives for many years. It is a distinctive case study for several reasons: the unique species and ecological characteristics of the Galapagos Islands, the existence of a "Special Law" and sub-national governance structure just for the Archipelago, and the scale of tourism as an activity and source of income for management. Since upgrading its programme in Galapagos to MER status, WWF has invested especially in zoning, fisheries, marine surveillance and institutional capacity. The Galapagos Archipelago also lies within the CI ETPS initiative and the South East Pacific RS Programme.

4.2.3 LARGE MARINE ECOSYSTEMS

Yellow Sea Large Marine Ecosystem: The LME/GEF Project, "Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem", involves China, Korea and Japan. It is implemented by UNDP, but a distinctive characteristic is the coordination mechanism known as the Yellow Sea Partnership, comprising the UNDP project and 12 other organisations, including NGOs and international bodies. There is close and fruitful collaboration between the project and WWF, for whom the Yellow Sea is a high priority Marine Ecoregion. The LME/GEF project is tackling problems of reduced fish catch, changes in biodiversity, red tide outbreaks and coastal habitat degradation, amongst others.

South China Sea and Gulf of Thailand: The LME/GEF, "Project Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand", involves seven countries: Cambodia, China, Indonesia, Malaysia, Philippines, Thailand and Viet Nam. The implementing agency is UNEP, which contracts national institutions to implement the activities. Priority areas of concern were: loss and degradation of coastal habitats; over-exploitation of fisheries; land-based pollution; and inadequate regional coordination. The project was about establishing the knowledge base, political commitment, coordination mechanisms and capacities to address these transboundary problems. With 7 countries involved, project design and start-up was a long process. The project has a distinctive, highly ordered structure to direct implementation, with each government nominating two members of a steering committee.

Benguela Current Large Marine Ecosystem: The Benguela Current LME/GEF project, implemented by UNDP, involves Namibia, Angola and South Africa. The project's top priority is to reverse the decline of commercial fish stocks, but it has also identified other ecological problems, such as deterioration of water quality, harmful algal blooms and industrial pollution risks. A specific goal achieved by the project was the establishment of a new body, the Benguela Current Commission, to facilitate collaboration by the three countries on resolving transboundary issues. The Guinea Current LME is pursuing a similar institutional arrangement and we have included some information about that project (also at the suggestion of Dr. Sherman), but decided not to make it a full case study.

4.2.4 REGIONAL SEAS PROGRAMMME

Coordinating Body of the Seas of East Asia (COBSEA): Despite not being based on a formal international convention, COBSEA has been operating for over twenty years, with a mandate to coordinate all activities that conserve, restore or sustainably manage the seas of East Asia. Participating countries are Australia, Cambodia, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand and Viet Nam. The scope of COBSEA's work was described in the "Action Plan for the protection and development of the marine and coastal areas of the East Asian Region", approved in 1981. COBSEA has been supported by UNEP and various donors, as well as the countries themselves. Its geographic area contains a number of other LAMM projects, with varying degrees of cooperation.

Wider Caribbean Regional Seas Programme: The RS Programme here is the Caribbean Environment Programme (CEP), which is governed by the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (known as the Cartagena Convention) of 1983. Focal areas include combating pollution from terrestrial and marine sources, conserving wildlife and establishing specially protected areas. The RS Programme covers most of the Caribbean, so involves many small nations with limited institutional capacities. It is notable for its collaboration with NGOs and with other initiatives in the region, including TNC's Caribbean Marine Ecoregion assessment and a new Caribbean LME/GEF project. The latter is taking an innovative approach to LME governance. The Caribbean area also has the Meso-American MER nested within it, but we have not included this in our study.

South-east Pacific Regional Seas Programme: This RS programme is based on the "Convention for the Protection of the Marine Environment and Coastal Areas of the South East Pacific" of 1981 and the associated "South East Pacific Action Plan". The objectives are to curb pollution of marine and coastal areas and achieve sound management of natural resources. Focal areas include pollution monitoring, integrated coastal management, protected areas, biodiversity and capacity building. The participating countries are Chile, Peru, Ecuador, Colombia and Panama. The secretariat for the convention is the Permanent Commission for the South-east Pacific (PCSP), which had already existed for 30 years as a body dealing with fisheries legal, policy and management issues, before the RS Programme started. The RS area includes the Galapagos MER and overlaps with the Eastern Tropical Pacific Seascape (see case studies above).

4.2.5 INTEGRATED COASTAL MANAGEMENT

Xiamen: This ICM project is part of the 12-country PEMSEA programme but operates wholly within the Chinese part of the South China Sea. It has been in operation for 15 years, tackling pollution (sewage, oil, industrial), inappropriate coastal land use, over-exploitation of fisheries and other problems. It is notable for the sustained, high-level political commitment to solving these problems and consequent huge investment, principally in environmental infrastructure and waste management, leveraged by the GEF/UNDP/IMO funding.

Chonburi: This ICM Project is part of PEMSEA but operates in a single province (Chonburi, Thailand), located in the Gulf of Thailand. It is younger than the Xiamen project, having commenced in 2001. The project has established a mechanism whereby coastal municipalities (26 of them so far) collaborate to solve common problems through the application of ICM principles. The shared problems include pollution, decline of fisheries, coastal erosion and degradation of seagrass and mangrove habitat. Solutions have involved significant commitments by the participating municipalities, in terms of funds and control of development. A feature of the project is the strong local leadership by the mayor of one municipality, Sriracha, who was himself inspired by the success of the Xiamen project.

5. COMPARISONS BETWEEN THE FIVE APPROACHES



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This section compares the five approaches in relation to six questions. These questions expand upon those originally included in the terms of reference, in order to provide a more complete picture of the conservation process, from deciding where and how to intervene through to sustaining the outcomes achieved. They are:

- **Biogeography:** Is the geographical definition optimal from the point of view of encompassing ecosystems to be conserved?
- **Scale of intervention:** What is the scale of intervention?
- **Strategy Development:** Does the approach facilitate development of an effective strategy, informed by relevant, multi-disciplinary science and owned by authorities and key players?
- **Governance systems:** Does the approach facilitate the development of effective, sustainable governance structures at multiple, inter-connected levels?
- **Investment and Financial sustainability:** Has the approach attracted funding for marine conservation and does it help attain financial sustainability at various levels (site, national, regional)?
- **Outcomes:** Does the approach achieve 1st, 2nd and 3rd Order (Olsen, 2003) conservation outcomes?

5.1 BIOGEOGRAPHY AND ECOLOGY

Is the geographical definition optimal from the point of view of encompassing ecosystems to be conserved?

As discussed in Section 2.4, the five approaches differ in the extent to which they seek to encompass ecosystems and biological communities. The LME and Marine Ecoregions approaches are based on wholly technical, rather than strategic or political criteria. In the case of LME's the criteria are bathymetry, hydrography, productivity and trophic relationships and the areas are very large. The Marine Ecoregions approach uses biogeographic criteria and aims at a finer scale mapping. Its proponents, WWF and TNC, have invested much effort in refining the analysis, culminating in the Marine Ecosystems of the World (MEOW), with its hierarchy of Realms, Provinces and Ecoregions (Spalding et al., 2007). The Regional Seas have been defined primarily by political boundaries and relationships, together with a recognition of common problems and challenges. These may or may not be ecologically connected; for example, many RS address issues of land-based marine pollution, which are common across the region rather than ecologically connected. Integrated Coastal Management areas are defined by common interests between stakeholders, rather than ecological factors. Lastly, the Seascape geographies are based on an unspecified combination of ecological and strategic considerations.

Our observations in relation to the biogeographic and ecological validity of the LAMMs defined under the five approaches are:

- LME's and MER's (especially in the latest iteration of MEOW) have a solid underpinning in current knowledge of marine biogeography and ecology. Both acknowledge that there is no hard ecological boundary. To verify empirically their validity as ecological units would require effective Ecosystem Based Management, with monitoring of large-scale processes. To be pragmatic, it is sufficient to say that LME's and MER's have solid foundations in scientific knowledge of the oceans and may be modified as we learn more.
- The MEOW system is intended mainly to guide TNC and WWF in their quest to protect representative areas of all major habitats on the planet and, within that broad categorisation, to protect priority sites and ecological functions of selected Ecoregions. In fact, the programmes of both organisations target areas that are generally a cluster of Ecoregions,

which may or may not correspond to a province in the MEOW system, e.g. WWF's 35 "Critical Places".

- Of the three Seascapes, Sulu Sulawesi has its origins in the Ecoregion concept, while Papuan Bird's Head has been supported by research to understand ecological processes; strategies have been adapted accordingly. On the other hand the geography of the Eastern Tropical Pacific Seascape seems to have emerged more opportunistically, starting from the enthusiasm of certain ministers for the idea of a Galapagos-Cocos Corridor and eventually expanding to a much bigger area. Research on migratory species has confirmed that there is important ecological connectivity within the Seascape. Its northern and southern limits seem quite arbitrary in ecological terms, but they may be inevitable given the apparent connectivity along the coasts of North America and South America.
- Many ICM projects focus on areas that are much smaller than an Ecoregion and may make little sense in terms of ecosystem boundaries. In such cases the ICM project would have to consider potential external ecological influences as risks, which the project may or may not try to manage. Thus, of the five LAMM approaches, ICM is the one which might in some cases be undermined by the limited viability, in ecological terms, of its target area for conservation, but we have no evidence for this from the few case studies that we have considered.
- At the institutional level, there is a great deal of cross-referencing between LME's, MER's, RS, ICM and to some extent SSC, with each recognizing the usefulness of the others. In field programmes the degree of interaction varies from negligible to the merging of two or more approaches, e.g. in the Coral Triangle, the East African coast and the Caribbean.

A distinction, in theory at least, between Ecoregions and Seascapes is that Marine Ecoregions are based solely on biogeographic and ecological criteria while Seascapes balance these with strategic criteria. In practice, that distinction is not evident in the three pilot Seascapes, which were launched when the Seascape concept was still being worked out. Within the Coral Triangle CI, TNC and WWF seem to have converged on a common view of the geography and the conservation targets within it. There is no obvious tie-in with component Ecoregions, nor any obvious application by CI of additional strategic criteria. Indeed, in a report to the Walton Family Foundation (March 2009) CI justifies its recommendation that Halmahera be considered as a separate entity from PBHS and SSS exclusively on the grounds that it is biogeographically intermediate and serves as a biological corridor. We understand (S.Troëng, pers.comm.) that CI did also assess the strategic pros and cons of considering Halmahera to be part of PBHS, part of SSS or autonomous, nevertheless it is apparent that ecological criteria predominated in the decision.

In the case of the ETPS, political opportunism was certainly a factor, along with ecological considerations, in the initial definition of its geographic scope. However, there was no systematic analysis of strategic pros and cons of this geography and the subsequent evaporation of the Ecuadorian government's enthusiasm was a reminder that transient political enthusiasm does not necessarily translate into enduring strategic advantage.

Notwithstanding these observations about the initial three Seascapes, CI's proposals for the next cohort of Seascapes are to be based on explicit consideration of both biological and strategic criteria, and a process of dialogue and negotiation with governments before boundaries are drawn (S.Troëng, pers.comm.). Given the natural fuzziness of marine ecosystem boundaries, it seems to us unlikely that any shortcomings of these new Seascapes as ecosystem conservation targets, resulting from the compromises made for strategic purposes, will be detectable in practice. Biogeographic precision is surely much less important than effectiveness of conservation efforts.

5.2 SCALE OF INTERVENTION

What is the scale of intervention?

In reviewing the application of each approach, it is evident that the scale of intervention is not limited to—in some cases is only loosely connected to—the target area drawn on the map. This is not a problem, just

a reflection of what these LAMMs do and do not signify.

As already mentioned, MER mapping enables TNC and WWF to define their conservation targets, but their programmes are a strategic combination of site, national, regional and global interventions, in which the Ecoregion level may play a small or large part. For example, WWF's Galapagos MER programme has a strong component at the ecoregional scale, supported by a fisheries programme operating over a larger region (collaboration with IATTC, so eastern Pacific) and at the global level (fisheries markets). On the other hand, WWF's East Africa MER programme operates mainly at the scale of sites and small clusters of sites (referred to as "seascapes"), with regional cooperation being as much through the Regional Seas Programme, which extends all the way to Seychelles, as through any ecoregional structures or fora. In the Caribbean, TNC has invested in a Decision Support System at the scale of the Insular Caribbean (a cluster of MER's) but the use of that System is mainly at the national level and TNC field programmes are mainly at national and site levels.

The Seascope programmes are explicit in their organisation of interventions at site, national and Seascope-wide scales. In this they are closer to the governance framework approach, discussed in the next section on Strategy Development. They have strong networking between Seascopes, thanks to CI's management of the global programme including annual Seascope workshops. Links to CI's global scale interventions—for example global marine policy, fisheries markets, marine management area science etc—exist but have been patchy, due to an internal organisational based on separate departments for geographic and thematic work.

ICM programmes are designed around concepts of governance and multi-stakeholder participation, so would be expected to operate at all the levels necessary to decide and achieve the intended changes in environmental management. From what we have been able to review, it appears that many ICM programmes are small-scale and focus on interventions at the local level, treating higher levels of governance as part of the external context to be lived with, rather than changed by intervention. Others do seek to intervene at the levels of national policy and institutions, as in the case of Tanzania.

PEMSEA is of particular note as a regional portfolio of ICM projects; the combination of site-specific projects with regional networking, rather than hierarchical governance, has proven to be a powerful mechanism. We are not aware of collaboration between ICM proponents and those working on global issues that affect many ICM projects, such as fisheries markets or climate change, but it may exist.

The LME programmes have intervened primarily at national and regional levels, though this is sometimes accompanied by site-level intervention, such as the demonstration sites of the South China Sea Project. The concentration on the international scale is not inherent in the LME approach but rather derives from the fact that LMEs are associated with bilateral (USAID) and multilateral (GEF, ADB and World Bank) financing, which (i) is specifically intended to address transboundary issues and (ii) is mostly channelled through governments and inter-governmental bodies. The question remains whether the research results and recommendations about transboundary issues will result in improved management in practice; there is a risk that recommended solutions derived from a transboundary analysis may prove difficult to apply in practice, due to failure to analyse and address weaknesses of governance at the national and local levels. This concern may be one reason why the South China Sea LME project has invested heavily in setting up institutional mechanisms for implementation at all levels; their effectiveness will be seen in the coming years. The Yellow Sea LME project is encouraging partnerships with NGOs and international organisations to facilitate implementation. Amongst the many studies implemented by the Benguela Current LME project, with its array of civil society partnerships, are analyses of problems facing regionally important fisheries at all scales from local upwards. This could provide the basis for a multi-scale response in the second phase of the project. The Caribbean LME project goes further, starting with selected resource species, then analysing their governance at all levels of the hierarchy and across all sectors and stakeholders. Thus, interventions can be designed to strengthen the whole governance system for that resource, and the programme can build from good governance of specific components towards good governance of the whole ecosystem. On the other hand, in the Agulhas/Somali Current (East Africa) LME project it is unclear how the 1st order results of some regional actions, such as oceanographic research, will lead on to 2nd and 3rd order results, given the governance challenges at local and national levels. Overall, it appears that LME projects have tended to prioritise research and intervention at the large, transboundary scale, but are increasingly complementing this with attention to issues operating at a smaller scale.

The scale of intervention of RS programmes is primarily at regional level and channelled through governments, because this is precisely what the RS programmes set out to do. As a coordinator, a RS

secretariat's ability to catalyse interventions at other scales, for the purposes of biodiversity conservation, depends on various factors:

- The priority that the member governments attach to that theme;
- The effectiveness of national governance systems in translating policy into practice;
- The capacity of national focal points to mobilize their colleagues and partners;
- The ability of the RS programme to raise funds;
- The extent to which the RS programme reaches out to other actors, especially NGOs and the private sector.

The first three factors listed here are largely beyond the RS secretariat's control. Where they are weak, they can be partially compensated through alliances i.e. the last factor in the list. On this point the case studies vary. Governments can be reluctant to open up the inter-governmental RS space to wider participation, fearing undue non-governmental influence over regional policies. For example, in South-East Asia (COBSEA) and South-East Pacific (PCSP) collaboration with NGOs and the private sector is still quite limited. But, where RS Secretariats do collaborate more, as in the Caribbean and East Africa/Western Indian Ocean, this has been mutually beneficial. RS programmes benefit from the financial, technical and field capacity of the NGOs and their partners, potentially leading to better regional plans and increased likelihood of their implementation (hence 2nd and 3rd Order results). The NGOs benefit from the official, inter-governmental adoption of policies and plans conducive to their conservation and development programmes (assuming that dialogue leads to such alignment).

Overall, the Marine Ecoregions and Seascape approaches demonstrate the greatest ability to organise a coordinated set of interventions at all scales from local to global. This is due to the internal capacity of the NGOs using these approaches, combined with their systems for mobilizing local NGO capacity and practice of collaborating with national and local governments. Through its scale and association with GEF, the LME approach has tended to concentrate on interventions at the regional and national levels, but this may be changing. The RS Programmes are designed to operate at regional and national levels, though some use partnerships to catalyse local interventions. The ICM approach, on the other hand, tends to concentrate on interventions at the local level, and sometimes at the national level, but rarely regional or global.

5.3 STRATEGY DEVELOPMENT

Does the approach facilitate development of an effective strategy, informed by relevant, multi-disciplinary science and owned by authorities and key stakeholders?

The ICM approach revolves around the process of developing and implementing a strategy with authorities and stakeholders, using multi-disciplinary information. It has proven effective in many parts of the world and has been strengthened by accumulated experience of its applications. A couple of case studies cannot adequately reflect the diversity of ICM projects, but the PEMSEA examples presented here illustrate how it can work well. As mentioned above, a potential weakness of ICM projects, which are focused on local issues and actors, may be in the national, regional and global components of their strategy. In the PEMSEA case studies, that was not an issue, because national policy, far from being a problem, was a very positive external influence on the local process. For Chonburi, the central government was committed to ICM and ensured that capital investment was available where needed, e.g. for infrastructure.

With regard to Marine Ecoregions, both WWF and TNC have institutional processes for ecoregional assessment and strategy development, but both show flexibility in how they develop their strategies for intervention. In the case of WWF, the process always begins with the development of a 50-year Biodiversity Vision through expert workshops. Thus, the biologists set the long-term goals, for subsequent discussion and analysis with regard to socio-economic and governance aspects. In some cases WWF has been successful in generating buy-in to this Biodiversity Vision, right up to the level of national governments, e.g. in Sulu Sulawesi the tri-national agreement refers to the Vision and the strategy for achieving it. In other cases, such as Galapagos, there has not been much buy-in. In general, a vision

developed with all stakeholder groups, as in the ICM process, is more assured of buy-in than one developed by experts and then sold to other stakeholders. However broad or narrow the ownership of the Biodiversity Vision, it has value in providing a baseline and benchmark for assessing progress in biodiversity conservation. For the subsequent process of developing a conservation strategy for the Ecoregion, or cluster of Ecoregions, WWF has an institutional manual but is very flexible according to the characteristics of each programme, existing plans, local capacities, ongoing interventions, funding opportunities etc. Hence there is much variation between the planning processes in the case study Ecoregions (Galapagos, East Africa, Sulu Sulawesi). This pragmatic approach, in the hands of skilled staff, has generally led to appropriate strategies, which have been adapted and improved over time.

In the case of TNC the institutional planning methodology of “Conservation by Design” is laid out in detail and has in the past been applied quite strictly, at least in some cases. Like WWF’s process, it gives biologists the dominant role in defining conservation targets. However, there appears to be a significant shift under way in TNC’s approach to strategy development for MER’s. In the case study of the Caribbean, we see that the Ecoregional assessment produced not an Ecoregion conservation blueprint but a GIS-based tool for planners, which is mainly used for conservation planning by national governments, supported by TNC. Furthermore, TNC is an architect of the web-based toolkit for Ecosystem Based Management (www.marineebm.org), which describes a holistic approach to planning. It includes planning for multiple objectives, rather than giving a pre-eminent value to biodiversity and treating the rest as context for the strategy to achieve pre-determined biodiversity targets. By making this shift to incorporate the multiple objectives of different sectors of society, TNC is moving into the ICM camp. We do not in this report have an example of this new approach, but the website has case studies, such as the combination of offshore oil exploration and environmental conservation in Venezuelan waters.

CI’s Seascapes programme similarly marks a trend away from a strategy design process dominated by natural sciences and towards a more holistic approach, though here the trend is towards a focus on governance rather than multiple objectives, as is evident from both the draft monitoring framework (Troëng, in prep.) and the list of essential elements of a Seascape (Section 2.2.1), which comprise a mixture of governance/institutional capacities, ecosystem management and stakeholder participation and benefit. In the terrestrial realm CI has long been emphatic about applying the Key Biodiversity Area (KBA) methodology as the overriding determinant of priorities, and to some extent strategies, as spelt out in its conservation planning handbook. However, the establishment of the Seascapes programme ran ahead of the analysis of how to apply the KBA methodology to marine conservation, so that strategy development for the first three Seascapes was driven more by the ideas of the CI field teams, working with national partners and, in the case of the two Coral Triangle Seascapes, building on the results and experience of prior ecosystem planning in the region. In the ETPS, the approach taken was to start with a strong emphasis on core sites and work up towards national and Seascape-wide interventions. In the Coral Triangle, the Sulu Sulawesi Seascape programme built on Marine Ecoregion work of WWF, TNC and others. Papuan Bird’s Head Seascape has arguably done the most technically rigorous strategy development and their Packard-financed research programme provides a solid foundation for pursuing EBM, including protecting ecosystem functioning, accounting for inter-connectedness among systems, and integrating ecological, social, economic and institutional perspectives, recognizing their strong interdependences (see Section 1.1). With this multi-disciplinary scientific base, a governance structure of manageable complexity, and local authorities keen to exercise their rights and responsibilities in respect of natural resources, the conditions are favourable for a fully integrated EBM approach at PBHS.

In the four years of the Seascapes programme to date, there has been increasing input to planning from other partners (government, NGO and, to a lesser extent, commercial private sector) and convergence amongst the three programmes towards a common approach. This organic, field-driven development of the programme has been highly beneficial to all three Seascapes and was made possible by the large-scale, flexible Walton Family Foundation funding, sufficient to cover major investment in each Seascape plus coordination and networking between them. This evolution of strategy contrasts with the LME approach, which has both the benefits and constraints of being linked to GEF investment.

A concern in relation to the strategies developed by NGO-led LAMMs, i.e. Seascapes and MERs, is that they may concentrate too much on MPAs as the principal management tool for EBM. Certainly MPAs feature strongly in the results achieved in the case studies. Unquestionably MPAs are essential components of EBM but they can become too dominant in the EBM strategy, due to the biodiversity priorities of the NGO and the preference of many donors for results that they can readily measure in hectares and species. Christie et al (2009) give three reasons for expanding the toolkit beyond MPAs and applying other tools, especially for fisheries management: “(i) balancing EBM goals in a manner to engage and enable equitable results for a wide array of constituencies and institutions, (ii) problems of free

ridership and overfishing near MPAs and subsequent conflict in MPA implementation, and (iii) ensuring that MPAs are not viewed as a panacea.”

In relation to strategy development, the benefits of GEF investment include assured large-scale funding and government buy-in and participation. These benefits are evident in the Benguela Current, Yellow Sea and South China Sea case studies, with large amounts of government staff time invested in each. The constraints may include:

- Fixed time frames and bureaucratic procedures, which make it difficult for strategy to be developed alongside pilot-scale implementation and to be adapted over time (thus, differing from Seascapes, Ecoregions and ICM projects).
- Lengthy design and approval procedures that can make strategies obsolete and/or weaken government and stakeholder commitment and enthusiasm.
- Increased dependence on consultants, which can work well but risks lack of continuity or vulnerability to individual biases (vs. Ecoregions or Seascapes, which enjoy continuous guidance and support but may be unduly subject to the NGO's agenda).
- A tendency to under-value the role of civil society in strategy development.
- A tendency to focus on international elements of governance, with insufficient attention to governance constraints within each country.

Our case studies confirm the first two of these constraints. We did not see evidence one way or the other regarding the third constraint, while the wide participation in the Benguela Current LME project argues against the fourth constraint being generally applicable. However, notwithstanding the individual fisheries studies mentioned in Section 5.2, the BCLME case appears to confirm the fifth constraint, with the strategy being strong on building up the inter-governmental commission but weaker on the task of reforming top-down marine governance within each country to be more in tune with the modern socio-political contexts of South Africa, Namibia and Angola respectively. Without such reform the project's impacts may be limited by weak in-country governance.

Another issue in relation to LMEs is the extent to which the five information modules that characterise the approach are or should be used to determine strategy. The modules are “for measuring the changing states of LMEs, and for taking remedial actions toward the recovery and sustainability of degraded goods and services” (www.lme.noaa.gov). As Mahon et al (2009) argue convincingly (see the Caribbean case study), the modules may serve a monitoring purpose well (although socio-economic and governance modules are often weak) but they are not a basis for the second purpose, i.e. for working out the strategy and remedial actions necessary to restore the ecosystem.

Looking at what has happened in practice, the methodology applied in LMEs is the GEF/LME methodology of Transboundary Diagnostic Analysis, followed by Strategic Action Plan development, which generates the strategy for each LME. The use of the modules must therefore be incorporated into this methodology. The Yellow Sea LME project did use the five modules to guide the planning (Duda & Sherman, 2002) and is using them for monitoring and decision-making. It is not clear to us how the five modules were used in developing the South China Sea or Benguela Current projects. The TDA/SAP process seems to have taken the cases of the Benguela Current, Yellow Sea, South China Sea, Agulhas Current (East Africa) and Caribbean in quite different strategic directions. Presumably, this variation reflects their respective needs and contexts but it could also be in part a product of the skills and preoccupations of the consultants involved (or in the case of Benguela, the pre-existing BENEFIT programme)—we cannot say. For example, Eastern Africa and the Caribbean share issues of capacity limitations and marine-dependent livelihoods, so it would be interesting to have Mahon and Fanning review the East Africa LME project strategies through their governance lens (Mahon et al., 2009; Fanning et al., 2007).

We concur with the proposal of Fanning et al (2007) that the LME/GEF approach could be strengthened by starting with an analysis of strengths and weaknesses in the overall governance system, using a multi-level, multi-sectoral governance framework, with horizontal and vertical linkages, as a tool for this purpose. The governance strengthening priorities should then determine the information requirements, which may be additional to, or even instead of, the standard content of the five modules. This is the reverse of

Duda & Sherman's view (2002) that the other four modules support the diagnosis and planning process, while the governance module "is associated with periodic updating of the SAP". They summarise the TDA process as "analyzing factual, scientific information on transboundary concerns, their root causes, and setting priorities for action on transboundary concerns". A prior understanding of the processes by which decisions are being taken and implemented, and the relationships between the many actors involved, would not only facilitate diagnosis of root causes and priorities for action, but also decisions about "national and regional policy, legal and institutional reforms and investments needed to address the priorities", which is the next step, the SAP.

Most of the Regional Seas Programmes are based on inter-governmental conventions (COBSEA is not) and coordination mechanisms for their implementation. Within this framework, the participating governments decide the priority areas for action, the specific objectives and the strategies for achieving them, and it is up to them to adapt and update the strategies. Looking at the case studies, it seems that RS Programmes have played an important role in formulating regional strategies in relation to common pollution issues, including oil spill prevention and response, hazardous wastes and land-based sources of pollution, e.g. Caribbean, South-East Pacific, Eastern Africa. They have also had a role in some migratory species strategies, e.g. whales and turtles, but less of a role in other biodiversity conservation strategies, with the exception of the SPAW programme in the Caribbean, where the links between biodiversity, tourism and fisheries are evident. This pattern suggests that the contribution of RS Programmes to strategy formulation is strongest where the countries consider the theme to be a priority, perceive a need to address it regionally as well as nationally, and have identified a source of funding for governmental action. Thus, RS Programmes may be better suited to consolidating and institutionalising pre-existing initiatives than to developing an initiative from scratch. In the absence of these prior conditions, RS Programmes can still coordinate ongoing actions and promote piecemeal activities in line with their mission. The RS Programmes should certainly be assets for LME/GEF projects, with their focus on transboundary issues. The case studies show strong involvement of the RS Programme cooperation in certain cases, e.g. the land-based pollution LME/GEF project in Eastern Africa. In other cases, e.g. South China Sea LME/GEF, there was little involvement at the start (despite COBSEA helping to secure the GEF funds) but cooperation has since increased. This is in line with a global cooperation agreement made five years ago, committing LME projects to provide information to the RS Programmes. In some cases the cooperation remains minimal e.g. South-East Pacific programme, where there is a geographic mis-match between RS and LME boundaries.

As a governmental mechanism, RS Programmes would be expected to have certain strengths in relation to strategy formulation, i.e. capacity to call actors together, assurance of government buy-in and policy support for the agreed strategy, against which may be set weaknesses i.e. a tendency to adopt strategies centred on government action rather than mobilizing multiple actors, and a preoccupation with equitable sharing of resources, positions and responsibilities between countries. Our look at the case studies was not sufficiently in-depth to comment on this.

5.4 GOVERNANCE SYSTEMS

Does the approach facilitate the development of effective, sustainable governance systems at multiple, inter-connected levels?

In part, the answers to this question mirror the answers about strategy development, since effective governance is at the heart of what the strategies are designed to achieve. However, there are some additional factors and variations to emphasise. One basic factor is the extent to which the LAMM approach includes thorough characterisation of the governance system it is aiming to develop. In the absence of such a goal, necessary changes may never take place and/or capacity building may omit important elements of the system. A second factor is sustained commitment. Many ICM publications stress the iterative nature of the process of developing effective governance (see Section 2.2.5) and the fact that it can take 15–20 years or more to develop, especially in situations of social and political instability or generalised shortage of technical and administrative capacity. Christie et al (2009) list the need for sustained commitment as one of the overarching conclusions of their assessment of the feasibility of tropical marine EBM. A third factor is the extent to which the LAMM approach facilitates development of governance systems which are inherently resilient to social and political change, i.e. systems which achieve socio-economic development, have a broad constituency of popular support, and can draw on capacities across various institutions and sectors of society.

For Regional Seas the starting point is the establishment of a governance structure at the regional

level, in most cases linked to a regional convention. The inter-governmental body is linked to national governments, usually through a designated focal point. For effective governance, the focal point must be linked adequately to other sectors of national governments, to lower levels of government and to civil society organisations and stakeholders, and each player in this system should have the capacity to fulfil its role in governance. The patchy implementation of regionally agreed policies, e.g. as criticised by Sheehy (2004) in the Caribbean or Kirkman (2006) in East Asia, indicates that this is seldom the case. An additional limitation is that inter-governmental bodies can be wary of NGO and private sector participation in their affairs, especially where there is political sensitivity about marine border disputes, e.g. South China Sea (see Section 5.2).

On the other hand, within their own terms of providing a mechanism for inter-governmental coordination and cooperation, the RS Programmes have proved durable. Furthermore, member country support has tended to increase, rather than decline, over time, e.g. in the Caribbean, East Africa/Western Indian Ocean and South-East Pacific. The basis in regional conventions and protocols is surely a factor in this longevity and it may be no coincidence that the programme with the most tenuous existence is the one of those lacking such a foundation: COBSEA. Continuing support by UNEP to RS programmes is considered a mixed blessing. On the one hand, UNEP can bring valuable technical resources and access to bilateral and multilateral donors. On the other hand, there can be, as in the case of the Caribbean, tension between the pull of the countries towards regional priorities and the pull of UNEP towards its global priorities. In the South-East Pacific, by contrast, the countries have full autonomy in setting their RS agenda and value that independence (F.Felix, pers. comm.). In general, there may be opportunities to reinforce areas of common interest and to increase the extent to which regional priorities inform UNEP's global agenda. One suggestion arising from the Caribbean case study is to explore how work under UNEP's strategic objective on Environmental Governance can be used to strengthen the governance aspect of the RS Programmes.

As discussed in Section 5.3, the LME approach includes a governance information module, but this has been weak and the relationship between governance and science in the LME/GEF process may need to be rethought, as suggested by Mahon (2009). Perhaps recognizing that the governance aspect needs strengthening, one of the leading ICM institutions, University of Rhode Island, was commissioned to produce "A Handbook on Governance and Socio-Economics of Large Marine Ecosystems" (Olsen et al, 2006). What may be lacking in the LME/GEF project process are (i) the sustained investment to be able to go through two or more cycles of governance development (e.g. the South China Sea project has apparently ended), and (ii) the broad constituency of support and stakeholder participation in governance, which can bring resilience to the governance system.

Though the analyses of governance may be insufficient, the LME/GEF SAP process does set objectives for institutional and policy reform at the national and regional levels, and some projects have set up new bodies and mechanisms for inter-governmental and inter-sectoral coordination. The Benguela Current LME is notable for the effectiveness shown in implementation of the GEF project, which funded numerous partner organisations to implement over 100 activities, principally studies and training. In this it was helped by the decision to incorporate in the project a pre-existing regional collaboration programme (BENEFIT). The Benguela Current Commission (BCC) has been established to coordinate implementation of the policies, plans and recommendations that have been produced. The Guinea Current LME is pursuing a similar model, as will other LMEs. Notwithstanding the early success of BCC and the fact that geographic boundaries are not identical, one could ask whether the LME/GEF projects should invest in strengthening existing RS secretariats and building links between relevant institutions, rather than creating new inter-governmental commissions. For example, the Agulhas Current ASCLME project could invest more in strengthening the RS secretariat of the Eastern Africa/Western Indian Ocean as a permanent coordination body, rather than establish a new one.

The effectiveness of the LME commissions in achieving their ecosystem productivity and sustainability objectives will depend on the extent to which the transboundary and national levels of governance are connected to sub-national and local levels in governance systems that functions effectively as a whole. In the case of the BCLME, the project's studies have confirmed the need to strengthen the marine governance system at all levels but, in the absence of a full, multi-level analysis of governance, have produced only general proposals about how to do so e.g. to increase stakeholder participation. This limitation is compounded by the fact that, in contrast to biological and fish stock indicators, the indicators of social, economic and governance performance are poorly defined and not routinely measured (Cochrane et al, 2009).

The Caribbean LME stands out as charting a new course for LME/GEF projects, as it is addressing

governance in a comprehensive manner. The aim is to build effective, sustainable governance systems—not just national and inter-governmental coordination mechanisms—initially for specific components of the marine ecosystem, such as coral reef fish, lobster and large pelagics. By ensuring these governance systems are coherent and inter-connected, the project can work towards full ecosystem management. Furthermore, the project will work to adapt and strengthen the existing array of international bodies and cooperation mechanisms, rather than create a new one. This incremental approach to building integrated, multi-level governance is one of the four overarching recommendations of Christie et al (2009) regarding EBM, based in part on the CLME initiative. An important observation by Fanning et al. (2007) is that effective regional governance does not necessarily imply a hierarchical system in which a regional body sets the policy framework, within which national and sub-national governance operates. For example, in the Caribbean, where each island's people depend heavily on their coastal and marine resources for their livelihoods, effective governance may be achieved through networking between individual islands, each with its own locally designed governance system for ensuring conservation and sustainable use of its slice of the ecosystem. The regional body could then be a facilitator of exchanges between islands, an advisor and a capacity builder, rather than a policy maker. This approach may offer a means by which to resolve the inherent tension between ecological considerations such as food-webs, which tend to guide EBM designers to larger scales, and governance feasibility considerations, including the principle of subsidiarity, which tend to favour smaller scales. This tension is discussed by Christie et al (2009).

For ICM the reform and strengthening of the governance structure can emerge as a result of the multi-stakeholder process, as long as the participating governments are open to this. In the two case studies, the political commitment was firm from the start; in Xiamen it stemmed from the Chinese Central Government and in Chonburi from the municipality of Sri Racha. For most ICM projects, it will take longer to reach that degree of conviction, and hence to build a fully sustainable governance system. Buy-in should grow, as awareness is raised, capacities built, and tangible socio-economic benefits delivered in line with the objectives defined in the ICM process. Again, the Xiamen and Chonburi projects have delivered major benefits in a relatively short time, but most ICM projects will need more time and sustained investment. ICM can run into problems of unfulfilled expectations if time or funding are insufficient. Nevertheless, for the purposes of building a sustainable governance system, the ICM approach does have the merit that the objectives and agenda belong, right from the start, to the stakeholders and authorities involved, as illustrated by the Mayor's comment in the Chonburi case study—that ICM encourages rather than prohibits development.

For the MER and Seascope programmes, success in developing effective governance structures depends, in the first place, on the extent to which their planning processes address governance as a central issue. The three NGOs—WWF, TNC and CI—can all point to progress in this regard but might also acknowledge that their processes have in the past been dominated by natural sciences and that their expertise in governance issues has been weak. Current documentation about the Seascope approach emphasizes multi-level governance as essential to Seascope development, and the PBHS case study stands out as having undertaken research to understand current governance and design a new institutional framework (though it is of concern that the results of this work are not explicit in the list of PBHS Phase 2 outcomes). TNC's move towards multi-objective planning is also significant, as are WWF's increasingly comprehensive strategies for its "critical places". Nevertheless, it is fair to say that all three organizations are in a transition phase and have yet to reach a stage where their strategies incorporate thorough planning, monitoring and adaptive development of governance systems.

A related challenge for the Seascapes and Ecoregion approaches is to ensure that authorities and stakeholders really "own" the strategies and hence are committed to developing and sustaining the structures to make them work. The Sulu Sulawesi case seems to be an example where a multi-partner NGO programme is working harmoniously with governmental and inter-governmental bodies, so that ultimately a comprehensive governance system could evolve. Even so, NGOs have their own objectives and agendas—even maps of what science says the countries should conserve—and this creates a different dynamic from the ICM approach of facilitating a process whereby authorities and stakeholders set the objectives. This tension between the NGO's global agenda and the appropriate role of the NGO in relation to governments and stakeholders in-country is familiar from terrestrial programmes. TNC's Caribbean Decision Support System and multi-objective planning, WWF's work with governments in Sulu Sulawesi and the way CI's Seascope programmes were set up, all suggest that the marine programmes are moving towards increased ownership by governments and stakeholders. In developing new Seascope or MER programmes, it would be advisable to conduct a thorough analysis of existing regional geographies, institutions and coordination mechanisms, with a view to supporting and strengthening structures and programmes that already exist and have a degree of ownership by both authorities and stakeholders, rather than devising and promoting a new geography, requiring new coordination

mechanisms and institutions. One caution, though, is not to be too closely wedded to narrowly governmental structures, that might hamper the flexibility and dynamism brought by the participation of diverse civil society organisations.

One sensitive governance issue is decision-making about the use of funds. Accountability to donors, and perhaps other fears about decision-making, makes NGOs retain ultimate budgetary decision-making power, even where they go to great lengths to ensure wide participation of authorities and stakeholders in planning, monitoring and evaluation. This raises the question of how the programmes will transition to a sustainable governance system that may involve but is not dependent upon the NGOs. Any long-term vision of the governance of a Seascape or Marine Ecoregion will surely involve a body that takes decisions about the use of funds to sustain LAMM-wide functions, such as coordination, monitoring, evaluation, communications, networking etc. Will that body evolve from the participatory fora of the project itself or from a pre-existing institution, or will it be some other body to be created? Sooner or later this needs to be thought through. As with any delegation of authority, one can only go so far in preparation—a large part of the learning and capacity building happens only when the authority has been transferred. Furthermore, handing over financial decision-making authority can have a motivating, galvanising effect on the bodies concerned. If done incrementally, the risks can be minimized. We are not aware from our case studies of Seascapes or Ecoregions where this has been done.

An important advantage of the Marine Ecoregions and Seascapes is that the fund-raising capacity of the NGOs should enable them to sustain the programmes over the 15–20 year time scales generally necessary to establish sustainable, integrated governance systems. Of course, this also depends on the NGO's own priority setting. In this regard, our case studies confirm the tendency to maintain long-term support, e.g. WWF in East Africa and, albeit with ups and downs, Galapagos, and TNC in the Caribbean. There are some grounds for concern about the duration of CI support to Seascapes, given the heavy dependence on one donor (WFF) and CI's reported intention to expand to new Seascapes (originally 10 new ones but now reduced to 4, S.Troëng pers. comm.).

Another advantage of the NGO-led approaches is that, unburdened by the role of “authority” or the constraints of government procedures, they may have greater capacity than government-led approaches, such as RS, to reach out to civil society organisations and the private sector. This is an important part of developing a resilient governance system. The ETPS Initiative has been strikingly effective in mobilizing partners—local, national and regional—and some 60% of the Seascape's funds are being channelled to them. This is especially important for a Seascape in which there have been doubts about the commitment of one government (Ecuador) to the inter-governmental accord of 2004. In this and other Seascapes, it would be good to accompany the sub-granting with a larger, more systematic investment in organisational capacity building, at least for those organisations considered potentially important for effective governance in the long-term.

Overall, one can conclude that all five LAMM approaches have strengths and weaknesses as means to build effective, sustainable governance. Ecoregions and Seascapes try to bridge the multiple levels of governance, whereas RS and LMEs focus on transboundary components of governance, while ICM tends to work at local and sometimes national levels. For Ecoregions, Seascapes and LMEs a more explicit, thorough treatment of governance as a central objective would help to overcome current constraints. In this regard the Caribbean LME project may generate valuable lessons, because its goal is defined in terms of good governance, it is using a multi-level, multi-sector framework to analyse governance and specify objectives, and it is taking an incremental approach that can deliver tangible, interim results.

The Ecoregions, Seascapes and LMEs might also consider the comments of Christie et al (2009) in their assessment of the feasibility of tropical marine EBM: “In fact, starting the boundary designation from a natural science perspective is questionable from a program feasibility perspective unless governance institutions are to be redesigned along ecological principles – an unlikely outcome. A more pragmatic approach, as manifested by these case studies, is the definition of an area of EBM program implementation that functions at sufficient temporal and spatial scales to incorporate the relevant ecological interactions among species and habitats of interest, while not exceeding institutional capacity”. Following this advice would allow funds to be redirected from the development of new transboundary institutions to the reform and strengthening of existing institutions, relationships, networks and processes, in order to improve governance of the ecosystem at all scales.

5.5 INVESTMENT AND FINANCIAL SUSTAINABILITY

Has the approach attracted funding for marine conservation, and does it help attain financial sustainability at various levels (site, national, regional)?

In this section we will be looking at the quantities and kinds of investment associated with each LAMM, and at financial sustainability, in terms of both the financing of conservation activities and the financial viability of new practices established under the programme.

The funding associated with the different approaches varies in terms of quantity and source. The largest sums are associated with LMEs for the simple reason that GEF has adopted the LMEs as the organising basis for its International Waters portfolio. Other bilateral and multilateral donors have contributed co-financing, as have the beneficiary governments, so that Sherman et al. (2007) estimate that total investment will reach \$3bn by 2010.

In seeking financial sustainability, the LME/GEF projects also have an important asset in GEF's capacity to capitalise trust funds and leverage matching capital from other sources. We do not have examples in our case studies, but GEF generally includes a component on mechanisms for financial sustainability.

However, the strongest argument for financial sustainability of LME programmes should be the increased returns from improved sustainable fisheries. Restoration of fisheries productivity is a fundamental aim of the LME's and 95% of the world's fisheries occur in the 64 LME's (though this may under-estimate unrecorded artisanal fishing). Where restored productivity is achieved, the benefits should ensure the financial sustainability of the programme, provided that financing mechanisms are put in place (this can be problematic with a fishing sector that is accustomed to receiving subsidies rather than to paying for the management of the ecosystem it exploits). Sustainable fisheries is an aim of the LME programme in several case studies—Yellow Sea, South China Sea, Benguela Current, Agulhas/Somali Current (East Africa) and the Caribbean— but none is sufficiently far advanced to be generating this kind of economic return. We do not know if other LME programmes have successfully closed the circle and achieved enhanced economic returns that in turn finance ecosystem management. Compared to LME advocates, proponents of other LAMM approaches have had to look for funding across a wider range of sources, though in some cases, such as the East Africa/Western Indian Ocean, a RS programme receives GEF funding that is under the LME flag.

All RS programmes strive to raise donor funding, mainly from bilateral and multilateral sources. The case studies in this report have attracted funding from UN agencies, such as FAO and the Inter-governmental Oceanographic Commission, development agencies, such as CIDA, SIDA, DANIDA, USAID and AusAID, and smaller amounts from foundations. They have also helped to raise funds for other projects, e.g. COBSEA's role in securing the \$32m GEF grant for South China Sea LME. The total amounts passing through the books of the RS Programmes tends to be modest, e.g. US\$1–2m per year, compared to the big GEF/LME projects.

Governments also commit to financing the core costs of the RS secretariat, thereby ensuring the sustainability, at a basic level, of the inter-governmental coordination mechanism. The extent to which they do so depends on how committed they are to the RS objectives, how convinced they are of the value of the coordinating body and, of course, the state of their economy. Our case studies suggest that, in many cases (South-East Pacific RS, East Africa/Western Indian Ocean RS, Caribbean RS), payment of dues is modest, e.g. \$10–40K per country per year, but consistent and from almost all participating countries (more from the wealthier ones). This income is sufficient to cover a large proportion of fixed costs and ensure the existence of the RS Programme, though not to fund any activities. The PCSP has the added advantage of a second stream of core funding from governments, for its non-RS responsibilities, which doubles income and hence enhances sustainability. In a few cases, such as COBSEA, government contributions are insufficient and tend to come late; the crunch for COBSEA will come when core support from SIDA comes to an end.

Marine Ecoregions and Seascapes have attracted funding, typically \$1–3 million per programme per year, from a wide range of sources: multi- and bi-lateral sources, such as USAID, foundations such as Packard and the Walton Family Foundation, individual donors and other private sources. CI, TNC and WWF have substantial fund-raising capacity, so designation as an institutional priority assures the Ecoregion or Seascape of significant funding. Raising these funds involves a major marketing exercise, in which branding can be as important as the underlying concepts. WWF made use of the Ecoregion concept in its

Global 200 campaign, but in other cases may adopt a more appealing name, e.g. Coral Triangle, or just rely on an already famous name e.g. Galapagos. Having concentrated mainly on terrestrial conservation, CI needed a striking concept to launch its new, large-scale marine programme, so “Seascope” became an important part of the marketing terminology long before CI’s field staff had worked out what the concept could mean in practice. Having gained financial support, CI went on to develop the substance behind the term and is now in a position to promote the concept with governments and other partners.

By far the largest and most important investment in Seascapes is that of the Walton Family Foundation, which provided CI with \$18 million for the first three-year phase of the programme (2005–8) followed by a further \$21.3 million for the next three years, together with \$2.5 million in complementary grants to other organisations. The WFF grants presented CI with a unique opportunity for large-scale marine conservation, not only for the amount—large but not so much more than some GEF grants to LME’s—but also because of its particular characteristics, notably:

- It supports three pilot Seascapes and allocates funds for coordination and networking between them, thereby allowing the Seascope approach to be forged from practical experience rather than based on a theoretical model.
- The initial design of each Seascope initiative was field driven, thus responsive to local contexts.
- The donor was willing to take an adaptive approach, approving an initial project then maintaining regular dialogue with CI to agree modifications—and even supplementary grants—as the programmes encountered obstacles or progressed more rapidly than expected.
- The non-prescriptive approach and early release of funds enabled CI to build practical collaboration with local and national partners through sub-granting, thereby drawing them into the programme. This contrasts with situations in which local partners tolerate lengthy pre-project processes and high transaction costs in the hope of eventually receiving funds.

These characteristics have enabled the WFF-funded Seascapes to mobilize many partners, achieve important results, and develop the Seascope concept.

All Ecoregion and Seascope programmes have components aimed at achieving financial sustainability, and most consider financial needs at site, national and regional levels. Achieving financial sustainability is not easy, but a wide array of mechanisms has been implemented. Seascope programmes have set up park entry fees (Raja Ampat, Coiba), increased ship grounding fees (Tubbatha), auctioned species names (Raja Ampat) and established trust funds (Malpelo). For the Caribbean Ecoregions TNC has launched the Caribbean Challenge, which will eventually put over \$40m into trust funds and should leverage additional GEF capital, too. Success depends on many factors: creativity and skill of the NGO, flow of tourists and other economic users, availability of potential funders, availability of swappable debt, reputation of the region for transparency and accountability, capacity of the governments to contribute financially etc. None of these factors is inherent to a particular LAMM approach, but the NGOs behind Seascapes and Marine Ecoregions have more skill than most in this area. Nevertheless, the total sustainable income for conservation falls far short of what is ultimately needed and there is a need for further innovation in this field, perhaps in the area of payment for marine ecosystem services.

Ecoregion and Seascope programmes include components aimed at enabling community members from occupations that have degraded the marine environment to profitable activities in other arenas, for example from selling turtle eggs to raising pigs in PBHS, from near shore to offshore fishing in Galapagos MER, from fishing to ecotourism services, or from blast fishing to use of non-destructive gear. Such changes, if truly viable in economic terms, can provide inherent resilience to the conservation programme. Our case studies include numerous livelihood initiatives of this kind and the impression is that they are making a significant contribution to sustainability without making a truly compelling case for an alternative, more sustainable path to development. An example in this regard is the PBHS situation, where one of the challenges identified by the project is the continued ambivalence of local authorities over the choice between biodiversity-friendly sustainable development and extractive, high-impact alternatives.

In ICM the integration of conservation and development objectives stresses the aim of an alternative model of development, which is both economically and ecologically advantageous. This model should have a

reduced need for a financing mechanism for biodiversity conservation. Modest investment is required for the integration and negotiation process, and many bilateral donors and foundations have contributed in this way, notably USAID's financing of the Coastal Resources Management Programme. Investment required for implementation of the agreed solutions varies immensely. Sometimes, the ICM plans call for heavy investment in infrastructure, such as wastewater treatment plants and waste or recycling facilities, which can be an insuperable obstacle for some places, e.g. in the case of some Caribbean islands. The ICM process can help to secure funding for these investments, by giving them strategic justification and a broad constituency of support within and outside government. In the Xiamen ICM Project, investment in environmental structure and waste management was US\$212 million and US\$1 million was spent on preservation zones. These funds were found within the central and local government. This was major capital investment but, as the case study shows, the economic returns more than justified it. The Chonburi case also proved its economic viability and hence potential sustainability. Of course, not every ICM case will be so economically favourable, especially in the short term. Particularly in rural areas, economic benefits may be lower, restoration times may be longer and/or the capital cost (or opportunity cost) of the transition to a new development model may be unaffordable.

In conclusion, the LME approach works for GEF International Waters, perhaps because it is large-scale and has a governmental, transboundary emphasis, and this alone has led to huge investments in LME projects designed by the TDA/SAP methodology. The RS, SSC, MER and ICM approaches have all had to work harder to find donors to support them. Each has had reasonable success, with RS appealing to some bilateral donors, ICM attractive to development donors, and SSC and MER drawing in a wide range of funds through their respective NGO proponents.

In terms of sustainability, the ICM case studies show the potential for generating economic returns on a scale that should facilitate sustainability. The LME approach, with its emphasis on recovery of fisheries, should similarly have inherent sustainability, but our few case studies do not provide evidence for this. The RES approach is assured of income from member countries, to cover some core costs. The MER and SSC approaches tend to generate a demand for long-term income for biodiversity conservation, e.g. to run new MPAs, and a number of creative ways of securing that income, but there is still a big gap between need and availability of revenue.

A final comment is that our study reinforces the perception that beneficiaries of marine ecosystem goods and services contribute little in return. Cruise ships in the Caribbean, coastal property owners whose beaches are nourished and protected by reefs, towns sheltered by mangroves, users and polluters of harbour areas, the fishing sector almost everywhere—so many people taking the benefits and giving back little or nothing. Globally, sustainability depends on correcting that inequity and making the beneficiaries of ecosystem services pay for their conservation.

5.6 CONSERVATION OUTCOMES

As mentioned in Section 4.1 above, we have categorised the conservation outcomes achieved by the different LAMM programmes, using the system of Olsen (2003) to organize the information. He defines First Order results, i.e. context (policies, plans, social context), Second Order results, i.e. management action (control, changing catch levels, protecting areas, etc) and Third Order results, i.e. impact (changes in biodiversity, populations, size, yields, income).

The table below is an illustrative list, not an exhaustive one. In the interviews we did ask particularly for evidence of 3rd Order outcomes, so where none is recorded it is probable that there were none. On the other hand, 1st and 2nd Order outcomes were abundant, and the lists are more useful as an illustration of the kinds of outcomes each programme has achieved than the number of them. For various reasons, the programmes vary in the amounts of detail we obtained.

TABLE 6. CONSERVATION OUTCOMES OF THE CASE STUDIES DISCUSSED IN ANNEX 5.

SEASCAPES

| Name | 1st Order | 2nd Order | 3rd Order |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sulu-Sulawesi Sea | <p>Inter-governmental partnerships in the Tri-National Committee include sub-committees on turtles, MPAs, fisheries and species, and are supported by other regionally active organizations.</p> <p>Environmental governance and MPA management plans produced.</p> <p>Biological and oceanographic surveys showing the connectivity of the corridors completed.</p> <p>Information on turtle foraging and migration obtained and used for a SSS tri-national turtle conservation plan.</p> <p>Increased awareness about sea turtle conservation and commitment to the tri-national turtle plan.</p> <p>Ecotourism activities promoted.</p> <p>Stakeholders' environmental awareness increased through videos, website and information kits.</p> <p>Priority areas for new MPA's identified.</p> <p>654 Verde Passage stakeholders trained in conservation, enforcement and governance.</p> <p>SSS incorporated into plans for the Coral Triangle Initiative.</p> <p>Local wardens trained in conservation management and paralegal work.</p> | <p>Enforcement in the Verde Passage has improved.</p> <p>Since 2005, there have been 67 arrests and 47 cases have been filed in Batangas province.</p> <p>In Cagayan Ridge enforcement operations in the municipality include sea-borne patrols resulted in 74 arrests of illegal fishers with 19 motor boats and confiscation of fishing gear used by illegal fishermen. A total of P 37,000 in fines was collected for violations committed by illegal fishers.</p> <p>A locally appropriate "Fish ruler" tool was deployed to discourage catching of under-sized fish.</p> | <p>In Cagayancillo, fish catch has increased from 4kg/hr to 8-10kg/hr in fair weather and house hold incomes (almost exclusively from fishing) have risen from 2,800 pesos to 4,200 pesos.</p> |

| Name | 1st Order | 2nd Order | 3rd Order |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Papuan Bird's Head Seascape (BHS) | <p>Helped promote gazettement of Raja Ampat network of 6 MPA's, covering 900,000 ha, and a new 600,000 ha multiple-use area in Kaiman.</p> <p>Management planning done for 4 focal MPAs in the newly gazetted Raja Ampat MPA network.</p> <p>Acquired a speedboat for each MPA</p> <p>Establish temporary headquarters in each MPA.</p> <p>At Raja Ampat, the corridor has been largely scientifically characterized, through multi-disciplinary studies covering ecology, socio-economics and governance.</p> <p>Baseline reef health monitoring of all reef area within each of the MPAs.</p> <p>Partner CCIF completed an MPA network financing study.</p> <p>Local and regency decision-makers more aware of alternative development paths, more sustainable than short-term extraction.</p> <p>Community better informed about environmental issues through Raja Ampat tabloid newspaper (3,000 copies/month), 6 community radio stations, students participating in Kalabia course (>1500 in FY08).</p> | <p>Management plan implementation under way for 4 focal MPAs within the newly gazetted Raja Ampat MPA network.</p> <p>The Raja Ampat Tourism Entrance Fee system raised more than US\$120K: over \$52.5K distributed directly to all 88 villages via the Posyandu system for pregnant and nursing mothers.</p> <p>Microfinance projects led by CI, e.g. a rattan furniture production initiative and an organic piggery.</p> <p>Community patrols and monitoring started.</p> <p>Raja Ampat joint patrol system ran five 10-day joint patrols with many arrests</p> <p>New floating ranger station for the Kawe MPA undergoing refit and soon to be operational.</p> | <p>Increasing numbers of turtle nestings, and poaching eliminated.</p> <p>Microfinance projects income linked to elimination of turtle poaching.</p> |

| Name | 1st Order | 2nd Order | 3rd Order |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Eastern Tropical Pacific | <p>PCSP has updated regionally agreed strategies for marine mammal and sea turtle conservation and MPA network establishment.</p> <p>All 4 ETPS countries have improved national legislation relating to MPA creation and management.</p> <p>A policy for implementing VMS for all vessels in Galapagos Marine Reserve has been signed into law by the Ecuadorian Navy.</p> <p>A \$5M trust fund was established to underwrite most of Malpelo's core management costs.</p> <p>Costa Rica has adopted a new marine strategy, which benefitted from extensive stakeholder consultation and incorporates biodiversity conservation objectives, and has completed a technical analysis of potential MPA sites in its EEZ.</p> | <p>All 4 ETPS countries have created new MPAs, including a massive expansion of the Malpelo Flora and Fauna Sanctuary to become the 9th largest No Take area in the world.</p> <p>Patrolling effort in Malpelo, Coiba and Cocos has increased and observed infractions per/unit patrolling time have decreased.</p> <p>Landmark prosecutions have been achieved at both Malpelo and Cocos.</p> <p>Vessel Monitoring Systems (VMS) using satellite are being deployed in Ecuadorian waters, including Galapagos.</p> <p>Ongoing</p> | <p>The Tempisque area of Costa Rica has seen some of the highest levels of olive Ridley nesting in years.</p> <p>Catch levels in Costa Rica's Tarcoles community fishing reserve are stable and producing profits for CoopeTarcoles members.</p> <p>18 microentrepreneurs in the Coiba buffer zone have increased income levels based on small businesses linked to the sustainable use of marine resources.</p> <p>Coral reef recovery in most ETPS sites, including the Galápagos northern islands, Coiba and other Panamanian coastal sites.</p> <p>Whale shark sightings in the northern Galápagos islands are continually increasing per unit effort.</p> |

ECOREGIONS

| Name | 1st Order | 2nd Order | 3rd Order |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| East African Marine Ecoregion | <p>Root causes of biodiversity loss determined.</p> <p>Multi-stakeholder committees, focal point institutions and an Ecoregion Strategy Framework established covering 25-years.</p> <p>Approval of the Quirimbas general management plan by the government of Mozambique.</p> <p>WWF initiated a policy analysis process for Tanzania towards the development of a national oil and gas strategy.</p> <p>Fisheries policy in Kenya produced.</p> <p>Dugong status report from WWF has generated positive responses from around the world.</p> <p>The Zambezi delta has been declared a Ramsar site.</p> <p>The establishment of Primeiras and Segundas National Park in Mozambique and the Rufiji-Mafia-Kilwa seascape programme.</p> | <p>Implementation of management activities in several sites supported by WWF, including Mafia Island, Rufiji-Mafia-Kilwa seascape, and Primeiras and Segundas NP.</p> <p>A 0% poaching rate of marine turtles within the Mafia Island Marine Park.</p> | <p>There are probably 3rd Order outcomes at site level, but we have no information.</p> <p>Mafia turtle hatchling nos. probably increased</p> |
| Galapagos Marine Ecoregion | <p>Biodiversity Vision for 2050 produced.</p> <p>WWF ecoregional strategy produced,</p> <p>VMS for smaller boats is planned.</p> <p>Increased marine patrol capacity through refurbishment of vessel.</p> <p>Marine Reserve financial requirements analysed and potential additional funding mechanism identified.</p> <p>Fishers and others given training relevant to ecotourism business development.</p> | <p>Physical demarcation of the No Take Zones in Galapagos Marine Reserve.</p> <p>VMS to control boats over 20 tonnes, & software for "virtual" demarcation alert in boats.</p> <p>Development of alternative fishing methods, including (i) deployment of Fish Aggregating Devices away from sensitive areas, and (ii) having tourists accompany fishermen and join in activities.</p> | <p>FAD's and fishing with tourists are generating economic returns for fishermen</p> |

LARGE MARINE ECOSYSTEMS

| Name | 1st Order | 2nd Order | 3rd Order |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| UNEP/GEF Yellow Sea LME | TDA and SAP produced. Studies undertaken of pollution, red tides, the status of fisheries, etc. Increased cooperation, especially between China and ROK. Collaboration established with NOWPAP programme, which has been tackling related issues across the North-west Pacific. | Over-exploitation of fisheries tackled by implementation of new fisheries policies. Red tides tackled by reducing non-point sources. Increased control and management of development on coast. | Ongoing. Not yet clear as to whether fisheries are improved, less pollution flow into sea and algal blooms reduced. |

| Name | 1st Order | 2nd Order | 3rd Order |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| UNEP/GEF South China Sea LME | <p>The TDA followed by the SAP produced.</p> <p>Regional networking fostered and Project Steering Committee established.</p> <p>Convening of all regional meetings at the demonstration sites.</p> <p>Convening of 3 regional scientific conferences (total 450 participants) and 3 Mayors' Roundtables.</p> <p>39 sectoral National Action Plans developed and available for viewing on Google Earth.</p> <p>Review of regional seas governance mechanisms including instruments and institutional arrangements, and an evaluation of their applicability to the South China Sea.</p> <p>Regional overview of pollution hotspots.</p> <p>Technical agreement on water quality standards at regional level.</p> <p>Development of economic values for coastal habitat goods and services and their use in determining regionally applicable Total Economic Values.</p> <p>Development of mechanisms for implementing the SAP under the umbrella of COBSEA.</p> <p>Establishment and operation of a regional network for information and experience exchange</p> <p>Establishment of mechanisms for local coordination of planning and management of the environment and natural resources.</p> <p>Capacity building for long term management of coastal resources and environment.</p> <p>Provision of scientific information and data, and its use in planning for long term, multi-sectoral coordination and management for multiple use of resources.</p> <p>Increased knowledge and awareness of sustainable management practices.</p> | <p>Application of agreed water quality standards in prioritising action on pollution hotspots.</p> <p>Implementation of the National Action Plans in support of the SAP targets.</p> <p>Implementation of 2 pilot activities addressing sewage pollution.</p> <p>The fisheries <i>refugia</i> concept applied in two countries.</p> <p>Support provided for development of alternative livelihoods by local communities.</p> <p>Transboundary cooperation on environmental management initiated between Kampot – Phu Quoc and Trat – Peam Krasop.</p> <p>Rehabilitation of mangroves and corals.</p> | <p>Probable improvements in coral and mangrove habitat but no data for this yet.</p> |

| Name | 1st Order | 2nd Order | 3rd Order |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| UNDP/GEF Benguela Current LME | <p>Creation of the Benguela Current Commission. Formal Interim Agreement in 2006. The precursor of the fully fledged Benguela Current Commission in 2010</p> <p>Establish a cost effective Environmental Early Warning System for the Benguela region to warn of extreme environmental events.</p> <p>Information, feasibility assessments, plans, recommendations and institutional capacities produced through about 100 sub-projects. They are designed to address transboundary environmental problems and contribute to the integrated and sustainable management of the BCLME including projects to test the cumulative impact of offshore marine diamond mining on the ecosystem and projects to assess and map the biodiversity of the estuarine, coastal, nearshore and offshore environments of the BCLME, and identifying suitable sites for aquaculture.</p> | <p>Implementation of management measures, based on the recommendations and plans produced by the 100+ sub-projects. We do not know what proportion of the 1st Order results have led to management action in the field; the UNDP/GEF project's support has been concentrated on studies and training (1st Order) rather than management action.</p> | |

REGIONAL SEAS

| Name | 1st Order | 2nd Order | 3rd Order |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------|
| COBSEA | <p>Ongoing White Paper on future directions of COBSEA ratified in 2008. Agreement to have a coordinating body by member nations. Agreement on some initiatives, e.g UNEP/GEF SCS Project Ongoing collection of data and metadata, and use for reporting on State of Environment.</p> <p>Funds raised (\$32m) for South China Sea LME project and other projects in the region.</p> <p>SIDA funding obtained to rejuvenate COBSEA</p> | <p>Enhanced coordination of management actions and interventions in the Seas of East Asia.</p> | No |

| Name | 1st Order | 2nd Order | 3rd Order |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Wider Caribbean | <p>CEP provides only regular forum for discussion and coordination of environmental issues, which includes all States bordering Caribbean.</p> <p><u>Assessment and Management of Environment Pollution (AMEP).</u></p> <p>Ratification of and accession to the LBS and Oil Spills Protocols.</p> <p>National Programmes of Action for Land-based sources of pollution under preparation or prepared.</p> <p>Assessment and estimation methodologies prepared for land-based pollution.</p> <p>Pollutant loads and water quality assessments prepared.</p> <p>Oil spill, integrated watershed and sewage and wastewater management plans prepared.</p> <p>Enhanced coordination, collaboration, cooperation, and communication amongst with regional and international organizations on pollution issues.</p> <p><u>Specially Protected Areas and Wildlife (SPAW)</u></p> <p>Strategic Recovery Plans and Action Plans for various taxa, including sea turtles, manatees and other marine mammals.</p> <p>Adoption of guidelines for the implementation of the SPAW Protocol, including guidelines for creation and strengthening of MPA's.</p> <p>Promotion of sustainable tourism.</p> <p>Small grant facility established for sustainable artisanal fishing.</p> <p><u>Communication, Education, Training and Awareness (CETA).</u></p> <p>Educational materials about the value, relevance and importance of marine and coastal resources made available to Caribbean States for public and schools education.</p> <p>Capacities built through Caribbean MPA Managers Network e.g. 1999-2007, six Training of Trainers events organized in different parts of the Caribbean with a total attendance of 75 people from 28 countries, 90% of the respondents of an evaluation had organized training events. 978 people were trained by them (alone or jointly with other trainers) in 44 events held in 15 different countries.</p> | <p>Implementation by most countries of the LBS and Oil Spills Protocols.</p> <p>Implementation by most countries of National Programmes of Action for Land-based sources of pollution and for oil spill prevention.</p> <p>Demonstration projects implemented e.g. water supply and sanitation in Jamaica.</p> | <p>Increasing populations of sea turtles in the Caribbean.</p> <p>Reduction in oil pollution.</p> <p>Reduction in solid waste pollution.</p> |

| Name | 1st Order | 2nd Order | 3rd Order |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| South-East Pacific | <p>Regional Action Plan for marine and coastal environmental management adopted by all five countries.</p> <p>Strengthened national legislation on pollution and coastal environmental management.</p> <p>National personnel trained in coastal environmental management.</p> <p>Coordinated regional action plan on marine mammal conservation.</p> <p>National action plans adopted on sea turtle conservation, supported by a regional scientific committee.</p> <p>Agreement on processes for establishing MPA's.</p> <p>MPA managers' network established and operating, with periodic conferences.</p> <p>GIWA regional assessments produced with UNEP, GEF and KALMAR for Eastern Equatorial Pacific and Humboldt Current.</p> <p>In addition, PCSP has achieved a whole suite of outcomes that are relevant to, but not managed by, the RS programme. They include scientific understanding and prediction of the El Niño phenomenon, oceanographic information through joint research cruises, a regional alliance for ocean monitoring, regional collaboration on fisheries data analysis and planning, economic analysis of options for improved management of industrial fisheries (certification, impact of free trade agreements, individual transferable quotas etc).</p> | <p>Elements of the Regional Action Plans implemented, as funds are raised.</p> <p>Elements of the National Action Plans implemented, as funds are raised.</p> <p>Implementation (nor directly under RS) of port controls to combat illegal, undeclared and unregulated industrial fishing.</p> | |

INTEGRATED COASTAL ZONE MANAGEMENT

| Name | 1st Order | 2nd Order | 3rd Order |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Xiamen PEMSEA 2005 | <p>Mechanisms established for participation in ICM by governments, funding agencies, private sector, local communities, scientific and educational institutions and citizens. Xiamen Marine Management Coordinating Committee (MMCC) formed in 1995, with multi-sectoral structure, and serves a coordination and review function. Integrated Task Team for Xiamen Demonstration Project (ITTXDP) prepared Strategic Management Plan for Marine Pollution Prevention in 1996. ITTXDP developed Strategic Environmental Management Plan and adopted by Executive Committee of Xiamen composed of representatives from 22 local government agencies. Work plan prepared, jointly funded by PEMSEA(\$US 1.3) & municipal government 1995–2001 (\$US 8.2) Scientific and technical support services established and projects designed. Marine Experts Group set up in 1996. Integrated Information Management Systems used to store & manage data. Pollution management guide produced. Technical report on solid waste produced and action plan adopted. Legal framework for integrated coastal-marine management established, including regulations on sea area use. In 1994–1997 13 laws on land-based pollution and environmental protection were passed. Functional zoning established. Sea-use scheme revised in 2003 on new developments and emerging needs. Marine industry planning guidelines prepared. Development of Environmental Management System based on ISO 14001 for Xiamen Ocean fisheries Bureau. ICM incorporated into Xiamen socio-economic development plan and into economic development guidelines. Public awareness increased through newspaper column, educational material and public consultations, International Training Centre for Sustainable Coastal Development designated as a PEMSEA ICM Training Centre. Personnel trained in ICM, water quality monitoring, ecological assessment etc. Private sector encouraged to finance environmental facilities. Development of a management framework for the Jiulongjiang River, to address transboundary issues between Xiamen and nearby municipalities.</p> | <p>Sea use zoning plan implemented. Fishing pressure on over-exploited stocks reduced. Reduction of conflicts between different resource users. Provision of nature-based recreational amenities. Demonstration projects implemented. Infrastructure built to reduce pollution. Regulations on discharge of oil, metals and urban effluent applied. Regulations on quarrying and construction applied. Protection measures for endangered species and habitats implemented. Implementation of the majority of the plans and guidelines listed under 1st Order outcomes.</p> | <p>Decreased pollution & red-tide occurrence. Increased fishing productivity from \$US 78m in 1994 to \$US 123m in 2001. Decrease in illegal fishing. Increased economic value for tourism and other investment. Improved efficiency in sea use. Increased sewage treatment from 29.3% in 1994 to 54.7% in 2001. Industrial wastewater meeting the standard rose from 32.6% in 1991 to 96.8% in 2001. Ten coastal communities in China wish to become parallel ICM sites. No results for them yet.</p> |

| Name | 1st Order | 2nd Order | 3rd Order |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chonburi PEMSEA 2005 | <p>Currently 26 municipalities have signed the ICM agreement. Use of grease traps promoted to all local governments. Municipalities are preparing a state of the coasts report that covers governance aspects and specific action programs. Plan to address coastal erosion problem being prepared, in line with national strategy on coastal erosion. Analysis and discussion of environmental concerns, including waste management, resource depletion and impacts of sea-based transfer of cassava flour and other dusty commodities. Increased awareness of people on these environmental concerns. Increased knowledge and confidence of local officials and personnel on coastal management.</p> | <p>Replication of garbage banks in municipalities and schools; community members and students bring recyclable wastes to garbage banks every week. Local governments increased expenditure on marine management. 200 restaurants have installed grease traps. Changes in practices of general public in relation to waste management, resource protection and conservation action. Field actions to restore seagrass and mangrove areas of Sriracha Bay. Increased participation of local stakeholders in coastal management activities. Infrastructure: replacement of bridge</p> | <p>Improvement in tidiness, less garbage in streets. Seagrass and mangrove status in Sriracha Bay probably improved (no data). 2–4 times increase in crab catch from 2005–2008. 50–100 turtles released annually since 2002. Recognition by other municipalities of success of ICM in Chonburi, as evidenced by study tours from elsewhere, as well as official awards for good governance.</p> |

In many interviews we were advised that the effectiveness of a programme in achieving outcomes depends not on the particular LAMM approach within which the programme is framed but on other factors: time and opportunity for iteration and adaptation, stakeholder participation and relevance to their development aspirations, mobilization of partner organizations, capacity to work at multiple levels of the governance hierarchy, sustained investment in the process, availability of capital to finance agreed solutions, leadership of the process of change, and the skill and determination of the field staff. The documentation of outcomes largely confirms this. Nevertheless, the LAMM approaches do vary in relation to these characteristics and so there are discernible patterns in the results. Even this limited interpretation is complicated by the facts that in many regions—and in most of our case studies—there is more than one LAMM programme operating in any given area. The following are some observations regarding 3rd Order and 2nd Order outcomes.

**Few of the case studies have attained Third Order results and most of those recorded are either site- or species-specific.*

Third Order results reflecting ecological processes at the LAMM scale are difficult to demonstrate, either because of short time scale or inadequate monitoring or both. Many of the case studies, e.g. the Seascapes and the three LME's, have operated for only a short time (<10 years). Most 3rd Order outcomes are site-specific and have been generated by Seascapes, Ecoregions or ICM projects, reflecting the fact that these LAMM programmes have the strongest capacity to operate at site level and to mobilize local government and non-government organisations. The speed of 3rd Order outcome achievement in ETPS is surely down to the effective mobilization of national and local partners—mostly NGO but also government—with the commitment, connections and capacity to deliver.

Third Order outcomes, which are of larger geographic scale, tend to be either in relation to water quality or migratory species. Pollution reduction seems to be a powerful theme for bringing countries together, generating a large-scale result from multiple site-specific interventions. Increases in populations of migratory species, especially sea turtles, are readily identifiable outcomes that depend

on management over a large area, but the areas do not generally coincide with any LAMM and the outcome may be more a product of thematic projects rather than an integral part of a broader LAMM approach. An exception may be the work on various shark species and Leatherback turtles in the Eastern Tropical Pacific, where the studies are designed as an integral part of the Seascape programme and implemented through regional networks of researchers.

It would have been informative if we had found examples of 3rd Order outcomes involving migratory, commercially important fish, but we did not come across any in our case studies. Restoring fisheries productivity is a central aim of the LME programmes, but it is too early to expect such outcomes for Yellow Sea, South China Sea and Benguela Current, and we do not have information from other LMEs. If there are such outcomes in other LMEs, then it will be interesting to see how the programmes have overcome some of the governance problems, including working with or round the Regional Fisheries Management Organisations, some of which are notoriously ineffectual.

The most impressive 3rd Order results were those of the ICM projects. This may in part reflect the quality inherent in the ICM approach of pursuing objectives that are priorities for local authorities and stakeholders. The demise of the white dolphin highlights a risk in cases where biodiversity per se is not a local priority. Dolphins apart, the success of the two ICM cases also reflects the fact that the national government was strongly supportive of ICM in both areas and the government was willing to invest substantial sums in the solutions identified. This may be more characteristic of developed countries (see Section 6). In developing countries there are plenty of counter-examples, where local buy-in to ICM solutions has not led to action, for lack of funds and/or lack of national government support.

The rapid spread of the Xiamen and Chonburi examples to other municipalities reminds us of Fanning's comment in relation to the Caribbean about networking as an alternative to hierarchical regional governance (Fanning et al., 2007). Depending on the context, large-scale outcomes can be achieved by large-scale management or by replicating local outcomes. The Chonburi programme also highlights the value of individual and institutional leadership, the importance of which for EBM development is stressed by Christie et al (2009). In this case a particular mayor and municipality provided the driving force.

Notwithstanding the rapid successes of the two ICM case studies, it is probable that the LAMMs most likely to deliver a whole suite of 3rd Order outcomes, including large-scale ones, are those that can sustain interventions over at least 15–20 years and intervene at multiple levels from local to regional or global. On this basis the NGO-led approaches of Ecoregions and Seascapes have clear advantages, but our cases do not provide evidence one way or the other.

There are difficulties of attributing 3rd Order outcomes to project activities. Most will be the product of a series of actions by authorities and stakeholders, supported by various project interventions, some of which may be associated with a particular LAMM or LAMMs.

Perhaps all the methodologies struggle to deliver verifiable, large-scale, 3rd Order outcomes, because the concern about large-scale ecological processes is more based on theory than measurable in practice, with the exception of large, migratory species. Gene flow, larval dispersal and settlement, nutrient cycling and the like would be difficult to monitor and, in most cases, not worth it given the cost relative to the total cost of management. The exception to this is actual areas of restored habitat or successfully transplanted coral.

**Second Order outcomes have been attained by all the LAMM approaches, albeit less so by the Regional Seas programmes, which are inherently focused on 1st Order outcomes.*

Second Order outcomes are easier to determine and to attain. For example, establishing patrols to protect MPAs and reducing destructive practices by local users are verifiable 2nd Order outcomes, but to demonstrate increase in biodiversity or increased fish stock takes longer and is more difficult to demonstrate. In some LAMMs 2nd Order outcomes have been achieved at a multi-national scale, e.g. in the Coral Triangle Initiative, whereas in others achievements have been at the local or national

level. Though less so than in the case of 3rd Order outcomes, there can be difficulties in attributing results, especially where different LAMMs are super-imposed.

That Regional Seas have many 1st Order outcomes but few 2nd Order outcomes is to be expected. They are outlined by political borders and are inter-governmental coordinating bodies, so their typical outcomes are political, multilateral agreements, conventions or protocols, or they help countries to develop a national action plan to conserve marine environments and use marine resources sustainably. Nevertheless, some of the RS programmes, such as the Caribbean case, participate actively in the generation of a range of 2nd Order outcomes too, in collaboration with national organisations and NGO partners.

LME programmes are very large-scale and, by association with GEF International Waters, focused mainly on the transboundary scale of governance. One might expect them to have predominantly 1st Order outcomes, with 2nd Order outcomes varying according to the commitment and capacity of each country. In fact the Yellow Sea LME case study, and on a pilot scale the South China Sea case study too, shows that while the GEF projects do indeed have predominantly 1st Order outcomes, a number of 2nd order outcomes have followed due to governments implementing the recommended actions. The Benguela Current LME project has focused GEF funding on studies and capacity building, generating many 1st Order outcomes. We do not know how many of these may have already led on to 2nd Order outcomes achieved by the institutions and stakeholders involved, but the objective of the second phase of GEF funding is to achieve 3rd order results (e.g. restoring depleted fisheries) by supporting SAP implementation.

There is a huge amount of published literature about LMEs, but it is beyond the scope of this study to review it all in detail. The report by Sherman et al. (2007) is about current and planned activities, partnerships, investments and the use of the LME approach as a monitoring system, rather than about the results of LME/GEF interventions so far, except for a few 1st Order examples. The latest review (Sherman & Hempel, 2009) contains a wealth of scientific information, but again the review is mainly about monitoring LME status rather than evaluating the results of interventions. Overall our observation is that most LME/GEF programmes invest predominantly in research, monitoring and training – i.e. 1st Order results – and look to countries take the recommended management actions (2nd Order) using their own resources. While appropriate to countries with strong governance structures, this would not seem to be the optimal approach for most developing countries, where there are many national and sub-national constraints on good governance. In such cases implementation of recommended management actions is likely to be partial or ineffective, unless provided with financial and technical support over at least the first five or ten years. It is likely that 2nd and 3rd Order results in LME/GEF programmes will come more readily, where they collaborate not only with national governments but also with Ecoregion, Seascape or ICM programmes working at multiple levels of the governance system.

Across all kinds of LAMM, it would be expected that the time needed to reach 2nd Order outcomes would be less in areas where the necessary governance structures are already in place. The case studies bear this out, with 2nd Order outcomes achieved rapidly in, for example, Galapagos, where the Marine Reserve is the Ecoregion, and in Raja Ampat in PBHS, where the whole area falls under one Regency. By contrast, South China Sea LME had to spend three years designing the GEF project and a further five years planning and developing inter-institutional structures and fora, with 2nd Order outcomes limited to partial implementation at a few demonstration sites. This strengthens the argument of Christie et al (2009) for working through existing institutional structures rather than developing new ones.

6. COMPARISONS WITH LAMMs IN DEVELOPED COUNTRIES



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6.1 EXAMPLES OF LAMMs IN DEVELOPED COUNTRIES

We looked briefly at three cases of LAMMs in developed countries: Australia, the USA and the Mediterranean Regional Seas Programme. The cases are described in Annex 6.

Australia and ICM

This study describes briefly how the regionalisation of the Australian coast started in 1985 using physical criteria, but transitioned in the 1990's to use of ecological criteria. This led eventually to the establishment of a national system of MPAs (Thakaway and Cresswell, 1995), which receive support from WWF, TNC and others. The study goes on to describe Australia's adoption in 2003 of ICM as a framework for cooperation across sectors and across administrative borders, in order to achieve conservation and ecologically sustainable development of the coast. It also summarises the institutional arrangements for implementing the resulting action plans. The overall picture is of a country that has used biological research and ICM to make substantial progress in managing its coastal zone.

USA and LMEs

These brief notes summarise how NOAA introduced the concept of LMEs to the US, initially for fisheries management purposes but later for broader ecosystem services too.

It was officially adopted by the government and used for planning and management. US waters are divided into the following LMEs: the Northeast U.S. Continental Shelf, Southeast U.S. Continental Shelf, Gulf of Alaska, Gulf of Mexico, Eastern Bering Sea, Gulf of Alaska and California Current. The notes also mention the work of WWF and TNC in the USA, which does not seem to be organised along ecoregional lines.

Mediterranean Regional Seas Programme

This study describes the world's first Regional Seas Programme, called the Mediterranean Action Plan (MAP), based on the Barcelona Convention of 1975. Its membership has now extended to 21 countries – developed and developing - that border the Mediterranean Sea. As a near-enclosed sea with high diversity—biological and social—and huge problems of pollution, over-exploitation and ecological degradation, the Mediterranean sorely needs effective regional management. Whether for this reason, for the mix of participating countries or for sheer longevity, the MAP seems relatively well able to deliver on the actions to which the countries agree. Nevertheless, processes have been very slow and there has been growing frustration at the inadequate implementation of many non-binding guidelines, so it was a breakthrough when in January 2008 the parties adopted a legally binding, regional protocol for integrated coastal zone management. It will be interesting to track how this protocol is implemented in those member countries with relatively weak governance. The RS Programme also has protocols on Specially Protected Areas and on Biodiversity.

6.2 COMPARISON BETWEEN DEVELOPED AND DEVELOPING COUNTRIES

This study has concentrated on the application of the five LAMM approaches in developing countries. All are used also in developed countries and the results are often quite different, with more rapid movement towards 2nd and 3rd Order outcomes. The University of Rhode Island team has commented concisely on this issue and we concur with their perspective on it, which we will draw on here.

In their review of Chesapeake Bay (USA), the Great Barrier Reef (Australia) and Wadden Sea (Europe), Olsen & Nickerson (2003) highlight the remarkable harvest of 3rd Order results, such as the reversal of habitat loss and rebounding of striped bass populations in Chesapeake Bay, curbing the impacts of mining and oil and other human activities in the Great Barrier Reef, and wetland restoration in the Wadden Sea. They point out that there are major impediments to achieving comparable outcomes in low income countries, some to do with dependence on donor funding, which is usually too short-term, but most to do with the challenging governance context in the countries concerned. Hale & Olsen (2003) elaborate on the governance challenge, as follows:

"Since ICM is a governance process, and one that was initially developed in the U.S., differences in governance context and capacity are important to understand. The U.S. is a wealthy nation, with a relatively high degree of social stability with multiple institutionalized mechanisms to balance individual and societal rights. The U.S. has multiple levels of government, and while they often have different objectives and different capabilities, they provide a relatively stable structure for coastal management. There are also well-developed organizations within civil society that can represent stakeholder interests, from environmental advocacy groups, to business associations, to fishermen's associations, to labor unions. There are democratic traditions, checks and balances among the branches of government, and a free press. A "social contract" exists between people and their government. In many donor-assisted nations, these structures and traditions are lacking. The impact is that programs attempting to advance ICM in such nations must devote considerable time and attention to creating the context, or enabling conditions, that allow an ICM governance initiative to succeed. This means it is likely to take longer to reach sustainable outcomes— even First Order outcomes—in USAID-assisted countries than it did in the U.S."

Hale & Olsen (2003) describe other constraints of developing countries, relative to the USA, including limited capacity to implement agreed ICM plans, lack of continuity in funding for the ICM programmes, the fact that ICM in poor areas may be dealing with the means of survival of local people with few if any alternatives, and the disempowerment of key stakeholder groups. Olsen (2003) in the same volume said:

"Experience is teaching that tailoring the principles and the practices to the socio-cultural and biophysical conditions of a specific place lies at the heart of success. We are also learning that some variables are more important than others. At least three are emerging as particularly important: (1) the strength and resilience of the existing governance fabric; (2) the speed at which change is occurring; and (3) the prospects for sustained financial support for promising initiatives."

The most important of these variables is the baseline of conditions in governance capacity, authority and institutional structures, and the beliefs that frame the goals of governance. In the North, where nations are wealthy and politically stable, the rules by which the planning and decision making unfold have been formalized and are widely accepted. With few exceptions, here society lives "within the law." In low-income, low-consumption "developing countries" the context is usually very different. Typically, a substantial proportion of the population lives in poverty and is struggling to extract food and marketable products from its immediate environment. Not infrequently, the majority of the society operates outside the law. Government may have little control over the activities that are changing the society and degrading coastal ecosystems. Not infrequently, corruption is rife and governments are willing partners in behavior that is destructive to the nation's natural assets, the people, or both. In the North, controls over land use through zoning, the designation of areas off-limits to development, and rules over where new activities may take place and how they are conducted are all present and generally accepted as "the rules of the game." They provide a framework within which a coastal management programme can seek out a role and make a contribution to the common good. In the South, development and change are often occurring in a context of near anarchy under conditions that have been dubbed as "a cowboy economy" In the South, the first challenge is to assemble the institutional capacity, the collective will and the resources that are the preconditions to a viable programme."

Olsen goes on to describe the greater challenges faced by the South than the North in relation to rapid, unplanned urban growth, with its impacts on both environment and society, and to financing the ICM from a budget that is often insufficient to address the basic needs of society. This leads to a dependence on donors, with their different interests, different selection criteria, different administrative procedures and, most damagingly, their short-term funding cycles.

In assessing tropical marine EBM feasibility, Christie et al (2009) highlight the challenges of economic integration, globalisation and the colonial and neo-colonial legacy of “impoverished societies, weak states, large disparities between the few wealthy and the majority poor, corrupt governments, and export-oriented natural resource-based economies”. The conditions, which are “not conducive to large-scale, expensive, and science-dependent ocean governance”, do not preclude EBM but do demand context-specific strategies. They also point out that to be successful EBM requires sustained commitment from all parties, but that in the tropics this is “challenging because these regions tend to be politically unstable, impoverished and dependent”. This adds to the importance of delivering tangible, positive outcomes, that will keep all constituencies on board.

To these well articulated summaries of the greater challenges faced by developing than developed countries in applying LMM approaches, we will add a few observations.

One is that the successful ICM case studies (Xiamen, Chonburi), which delivered major 3rd Order outcomes in a short time, have quite a different governance context from a “typical” developing country LMM. Thus, they can perhaps be seen as the exception that proves the rule.

Another observation is that developed countries’ culture of looking to science, particularly natural rather than social sciences, to provide all the answers to resource management problems, can cause problems. First, it can distort negotiation processes, effectively disempowering stakeholders with lower capacities to understand and use western scientific information and devaluing their knowledge. This leads on to “solutions” which seem scientifically “correct” but are socially unworkable and/or ignore relevant local knowledge. Thus, care must be taken to ensure that scientific information is a tool that really is available to all, in some form, and is not perceived as a weapon that gives one group power over another. Second, enthusiasm for science can lead to a disproportionate investment of donor funds in (natural) scientific research compared to the funds available to establish and maintain a functioning governance system. TNC staff member, David Cleary (2006) caused a stir when he suggested that conservation organizations were spending too much of their limited funds on science, rather than conservation. He was reflecting the concerns of many practitioners. Of the LMM approaches that we have looked at, all invest in science to some extent, and as far as we can see the research is all very relevant. The one LMM approach that stands out as being accompanied by heavy investment in science, and sees science as the “driver” of improved governance, is the LME approach. If some of the funds spent on gathering the impressive data sets quantifying the problems of the LMEs (Sherman & Hempel, 2009) had instead been invested in strengthening coastal-marine governance at multiple levels, could more progress have been made towards restoring the ecosystems? Finding the optimal balance can generate debate!

The very brief comparison of LMMs in developing and developed countries reinforces the conclusion (Section 5.4) that understanding the governance context is an essential starting point for a LMM programme. Indeed, in many developing country LMMs reforming and strengthening governance within each country may be a prerequisite for transboundary cooperation to have real impact.

7. CONCLUSION



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Though there is no consensus on what Ecosystem Based Management means precisely (see Section 1.1), there is consensus that EBM in some form should provide the framework for efforts to conserve and restore coastal and marine habitats and their biodiversity. Putting all our observations together, what can we say about the extent to which these LAMM approaches bring us closer to EBM in developing countries? Let us use the characteristics cited in Section 1.1, namely that EBM:

- emphasizes the protection of ecosystem structure, functioning and key processes;
- is place-based in focusing on a specific ecosystem and the range of activities affecting it;
- explicitly accounts for the interconnectedness among systems, such as between air, land and sea; and
- integrates ecological, social, economic and institutional perspectives, recognizing their strong interdependences.

Large Marine Ecosystems, Marine Ecoregions and to some extent Seascapes are all ecosystem-based in their geography and it appears to us that they are reasonable starting units around which to build a programme of marine environmental conservation, restoration or maintenance. Each area is fundamentally different in its geography, oceanography, politics, socio-economic character and climate. Furthermore, the methods by which each LAMM programme carries out its operations depend on available funding, what the problem is, the attitudes and leadership shown by key stakeholders, and the skill, commitment and leadership of senior managers. These factors make comparisons between approaches difficult, but we have been able to identify some distinguishing characteristics and patterns.

Beneath their public communications, which can be quite simplistic and preoccupied with branding, the proponents of Ecoregions and Seascapes, namely TNC, WWF and CI, have a lot in common in the way they seek a holistic, long-term, multi-level, partnership-based strategy to achieve conservation of biodiversity in their respective priority areas. Each is shifting towards an approach in which marine conservation and development objectives are addressed in a coherent, integrated strategy. All have a track record of sticking with their priority places long-term, albeit with ups and downs in funding. As one interviewee commented, to be successful a programme needs a champion, dedicated to the long-term goal and willing to stick at it through thick and thin over many years. NGOs, be they global, national or local or some coalition of all three, can often serve as such a champion. There is nothing to suggest that the choice between Ecoregions or Seascapes as the framework makes a significant difference, compared to the other qualities influencing success or failure, that were discussed in Section 5.6.

Amongst the case studies we looked at, the Papuan Bird's Head Seascape stands out as the one with the highest potential to develop a model of EBM. Authorities and stakeholders have growing interest in a holistic approach to conservation and development based on their natural resources; valuable, multi-disciplinary information is available; there are traditional rights to build on; and the governance hierarchy is relatively simple and free from the complications and slow processes that multi-country LAMMs have to deal with. With CI, WWF and TNC all now involved, it is to be hoped that they will continue to pursue the EBM approach of integrating ecological, social, economic and institutional perspectives, despite having restructured their plans around. MPAs are vital and there are valuable opportunities for establishing and improving them, but they are only part of the picture. Long-term success will depend on conservation being the route by which local stakeholders decide to pursue development, and that can best be brought about through a multi-objective LAMM intervention.

The LME approach has a solid ecological basis, relevance to development through its emphasis on the ecosystem's productivity, and access to major GEF funding. On the other hand, its larger geographic scale and association with GEF's International Waters programme lead it to concentrate on the national and regional levels of governance. Furthermore, the governance component of the LME approach has been weak and, in the five-module information system, is treated inadequately as one more, rather skimpy module, rather than an over-arching theme. Another impediment to LME programmes being more comprehensive and long-term in their approach to governance, is GEF's policy of having separate project funds for national and international conservation, insisting on the separation of "baseline" from "incremental" investment, and, like most multilateral donors, being reluctant to get engaged for the 15–20 year duration needed to transform governance. Another feature of many LME/GEF projects is that they invest predominantly in applied research, monitoring and training, with relatively little GEF funding to enable governments and stakeholders to implement the recommended actions. This preference for

investment in 1st Order results combined with the inadequate approach to governance may reduce the long-term impact of the LME/GEF approach in a developing country context. Overall, the LME approach is a powerful generator of information and financial resources and promotes transboundary cooperation but new thinking is needed on how to overcome the constraints to effective, sustainable coastal and marine governance in developing countries, identified by Hale & Olsen (2003) and Christie et al (2009).

As each part of this comparative study has shown, the Regional Seas Programmes are different, with a geography that is determined politically, rather than ecologically, and a more narrowly defined role. Their aims and ambitions are determined primarily by member country governments, though also influenced by the global objectives of UNEP, which may become more significant as UNEP seeks to implement its new Oceans and Coasts Strategy, currently under development. The RS Programmes facilitate inter-governmental decision-making and coordinated action, and aim to deliver 1st Order results: agreements, protocols, unified policies etc. Accountability for the implementation of these instruments to achieve 2nd and 3rd Order results rests with the member countries; the RS Programme Secretariat can only encourage and monitor. The regional conventions supporting the RS Programmes do not generally delegate decision-making authority to the RS Secretariat, let alone empower the secretariat to penalise countries that do not comply with the protocols to which they have signed. Nevertheless, the RS Programmes have produced significant results, especially in the area of pollution control, and are valued by the countries concerned, as reflected in the modest annual subventions from most members. To use the RS Programme as a component of a governance system for EBM is feasible but depends on the RS member countries taking the decision to go that route. Perhaps, 35 years on and with its mix of developed and developing countries, the Mediterranean Regional Seas Programme may emerge as a pioneer in this direction.

The ICM approach is different again and cannot really be considered a LAMM approach, as its geography is usually much smaller, if defined at all. In ecological terms its area is usually markedly incomplete, and hence incompatible with principles of EBM. Indeed, it has been said that ICM has been superseded by EBM. However, it could equally be said that the essential integrating principles that mark the ICM approach have pushed their way into the formerly biocentric strategies of conservation organisations. Given political will and resources for capital investment, if necessary, ICM has proven that it can be a powerful means of achieving sustainable 3rd Order outcomes, at least at the local level.

The above paragraphs summarise our perceptions of progress towards EBM. However, EBM is an approach to management and, as Olsen (2003) said, “the urgent need to redirect the forces of change in coastal ecosystems and promote stewardship of these critically important areas is most often a challenge of governance rather than of management”. As the brief comparison between LAMMs in developed and developing countries highlighted, a fundamental determinant of success or failure in reversing degradation of coastal and marine ecosystems is the governance context in the countries concerned. In many places conservation of the coastal ecosystem depends on turning round a situation in which coastal communities have few rights over marine resources, little or no say in decision-making, and no means, incentive or opportunity to change practices that may be harmful to the ecosystem but bring their daily bread. As stressed by the World Resources Institute, natural resources are the “wealth of the poor” (WRI, 2005) and governance systems should enable them to use and manage that wealth. There is a risk that in their enthusiasm for the large ecosystem part of EBM, conservationists may neglect the fact that at the other end of the scale, on the ground along each coastline, conservation is fundamentally an issue of rights and responsibilities, and the empowerment of local actors in the governance system.

From this point of view, ICM stands out, despite its patchy track record in terms of following through to deliver concrete development outcomes, as a relevant methodology, because it is an inherently empowering process. Other LAMM proponents have much to learn from the ICM experience, and the ICM proponents could become more proactive in bringing their skills and experience to bear on large-scale EBM. The international NGOs need to build their capacity and partnerships in the area of governance as an essential step in the shift towards a more holistic, multi-objective approach to coastal-marine conservation. Similarly, the LME/GEF proponents may want to consider that their natural-science-rich, large-scale approach may not work in developing countries, where the real drivers of ecosystem degradation are weaknesses in parts of the governance system that current LME programmes do not reach. No amount of natural science research is going to change local rights, responsibilities and power relations. Rather, we suggest that LME/GEF programmes in developing countries need to redirect effort and resources towards a comprehensive approach to strengthening governance. Mahon, Fanning and colleagues in the Caribbean have introduced some valuable new thinking in this regard (Fanning et al., 2007; Mahon et al., 2009). Increased partnering with other programmes that have complementary strengths, could also be a way to go, e.g. with networks of local ICM projects, or with Seascape or Ecoregion programmes with a governance focus.

In conclusion, our brief survey of a small sample of LAMM programmes and interviews with the practitioners involved have generated a variety of perceptions and stimulated ideas. The aim of this report is simply to document the ideas and what lies behind them, as food for thought for people working in this field. We hope that the document may prove useful and we reiterate our thanks to all who contributed their valuable time and knowledge.

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ANNEX 1. ACRONYMS

| | |
|---------|---------------------------------------------------------------------|
| ACIUCN | Australian Committee for IUCN |
| ASCLMEs | Agulhas and Somali Current Large Marine Ecosystems |
| ADB | Asian Development Bank |
| AFD | Agence Francais de Developpment |
| ALCOSTA | Alianza para la Sustentabilidad del Noroeste Costero Mexicano |
| ALGA | Australian Local Government Association |
| AMEP | Assessment and Management of Environment Pollution |
| ASCLME | Agulhas and Somali Current Large Marine Ecosystems Project |
| AusAID | Australian Agency for International Development |
| BCC | Benguela Current Commission |
| BCLME | Benguela Current Large Marine Ecosystem |
| BENEFIT | Benguela Environment Fisheries Interaction and Training |
| BHS | Bird's Head Seascape |
| BINU | Biodiversity Indicators for National Use |
| BMZ | Ministry for Economic Cooperation and Development (Germany) |
| CaMPAM | Caribbean Marine Protected Area Managers |
| CARICOM | Caribbean Community |
| CBC | Scripps Institute |
| CBD | Convention on Biological Diversity |
| CCIF | Conservation and Community Investment Forum |
| CDF | Charles Darwin Foundation |
| CDSS | Caribbean Decision Support System |
| CEP | Caribbean Environment Programme |
| CCAMLR | Convention on the Conservation of Antarctic Marine Living Resources |
| CDSS | Caribbean Decision Support System |
| CEO | Chief Executive Officer |
| CETA | Communication, Education, Training and Awareness |
| CI | Conservation International |
| CITES | Convention on International Trade in Endangered Species |
| CIDA | Canadian International Development Agency |
| CLME | Caribbean Large Marine Ecosystem |
| COBSEA | Coordinating body of the Seas of East Asia |
| CONCOM | Council of Nature Conservation Ministers |
| COP | Conference of the Parties |
| CORDIO | Coastal Oceans Research and Development in the Indian Ocean |
| CPPS | Permanent Commission for the South Pacific |
| CSGC | Californian Sea Grant College |
| CTA | Chief Technical Advisor |
| DANIDA | Danish International Development Assistance |
| DESD | United Nations Decade of Education for Sustainable Development |
| DGIS | Netherlands Directorate General for International Cooperation |
| DOE | Defying Oceans' End |
| EAF | Ecosystem Approach to Fisheries |
| EAWLS | East African Wild Life Society |
| EBM | Ecosystem Based Management |
| ECP | Ecoregion Conservation Plan |
| EEZ | Exclusive Economic Zone |
| ETPS | Eastern Tropical Pacific Seascape |
| EU | European Union |
| FADs | Fish Aggregating Devices |
| FAO | UN Food and Agriculture Organisation |
| FARI | Forum of Academic and Research Institutions |
| FIBA | Foundation Internationale du Banc d'Arguin |
| FMCN | Fondo Mexicano para la Conservacion de la Naturaleza |
| FSA | UN Fish Stock Agreement |
| GBMF | Gordon and Betty Moore Foundation |
| GEF | Global Environment Facility |
| GIS | Global Information System |

| | |
|-----------|---------------------------------------------------------------------------------------------------|
| GIWA | Global International Waters Assessment |
| GLISPA | Global Island Partnership |
| GMR | Galapagos Marine Region |
| GOOS | Global Ocean Observing System |
| GPA | The Global Plan of Action for the Protection of the Marine Environment from Land-based Activities |
| GTZ | Technical Cooperation (Germany) |
| GVB | Global Village of Beijing |
| HAB | Harmful Algal Blooms |
| HNS | Hazardous and Noxious Substances |
| IAEA | International Atomic Energy Agency |
| IATTC | Inter-American Tropical Tuna Commission |
| ICAG | Intergovernmental Coastal Advisory Group |
| ICARM | Integrated Coastal Zone and River Basin Management |
| ICRAN | International Coral Reef Action Network |
| ICRI | International Coral Reef Initiative |
| ICSU | International Council for Science |
| ICM | Integrated Coastal Management |
| ICZM | Integrated Coastal Zone Management |
| IMCRA | Interim Marine and Coastal Regionalisation for Australia |
| IMO | International Maritime Organisation |
| IOC | Intergovernmental Oceanographic Commission of UNESCO |
| IOCaribe | Caribbean and Adjacent Areas sub-commission of the Inter-governmental Oceanographic Commission |
| IODE | International Oceanographic Data and Information Exchange |
| IOSEA | Indian Ocean — South East Asian Marine Turtle MoU |
| IUCN | International Union for Conservation of Nature and Natural Resources |
| IWCAM | Integrating Watershed and Coastal Areas Management |
| IWLEARN | International Waters Learning and Exchange Resource |
| KEI | Korea Economic Institute |
| KfW | Financial Cooperation (Germany) |
| KML | Keyhole Mark-up Language |
| KORDI | Korea Ocean Research and Development Institute |
| LME | Large Marine Ecosystems |
| LMMA | Large Marine Management Areas |
| LNv | Netherlands Ministry of Agriculture, Nature and Food Quality |
| MAB | Man and the Biosphere |
| MALITA | Marine Litter Activity |
| MEA | Multilateral Environmental Agreement |
| MEOw | Marine Ecosystems of the World |
| MER | Marine Ecoregions |
| MRA | Mesoamerican Reef Alliance |
| MSC | Marine Stewardship Council |
| NEAR-GOOS | Northeast Asian Regional GOOS |
| NEPAD | New Partnership for Africa's Development |
| NOAA | National Oceanographic and Atmospheric Agency |
| NORAD | Norwegian Agency for Development Cooperation |
| NOWPAP | North Western Pacific Action Plan |
| NSMPA | National System of Marine Protected Areas |
| NZAID | NZ Agency for International Development |
| OSPAR | Convention for the Protection of the Marine Environment of the North-East Atlantic |
| PAME | Protection of the Arctic Marine Environment |
| PBHS | Papuan Bird's Head Seascape |
| PCSP | Permanent Commission of the South Pacific |
| PEMSEA | Partnerships in Environmental Management for the Seas of East Asia |
| POMRAC | NOWPAP Pollution Monitoring Regional Activity Center |
| PRCM | Programme Regional de Conservation de la Zone Cotiere et Marine |
| PSC | Project Steering Committee |
| RAC | Regional Activity Centers |
| RAP MALI | NOWPAP Regional Action Plan on Marine Litter |
| RCU | Regional Coordinating Units |
| ROK | Republic of Korea |

| | |
|--------------|----------------------------------------------------------------------------------------------------|
| ROPME | Regional Organisation for the Protection of the Marine Environment |
| RS | Regional Seas |
| SAP | Strategic Action Plan |
| SADC | South African Development Community |
| SAP BIO | Strategic Action Plan for the conservation of marine and coastal biodiversity in the Mediterranean |
| SDC/DEZA/DDC | Swiss Development Cooperation |
| SDS-SEA | Sustainable Development Strategy for the Seas of East Asia |
| SEAFDEC | Southeast Asia Fisheries Development Center |
| SECO | Swiss State Secretariat for Economic Affairs |
| SGP | Small Grant Projects |
| SIDS | Small Island Developing States |
| SIDA | Swedish International Development Cooperation Agency |
| SOMER | State of Marine Environment Reporting |
| SPA | Specially Protected Areas |
| SPAW | Specially Protected Areas and Wildlife |
| SPC | Secretariat of the South Pacific |
| SSME | Sulu Sulawesi Marine Ecoregion |
| SSS | Sulu-Sulawesi Seascape |
| SWIOFP | South Western Indian Ocean Fisheries Project |
| TDA | Transboundary Diagnostic Analysis |
| TNC | The Nature Conservancy |
| UBC | University of British Columbia |
| UNCLOS | UN Convention on the Law of the Sea |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Education, Science and Cultural Organisation |
| UNF | United Nations Foundation |
| UNFCCC | UN Framework Convention on Climate Change |
| UNOPS | United Nations Office for Project Services |
| URI | University of Rhode Island |
| USAID | US Agency for International Development |
| VMS | Vessel Monitoring System |
| WCPA | World Commission on Protected Areas |
| WCMC | UNEP World Conservation Monitoring Centre |
| WCS | Wildlife Conservation Society |
| WFF | Walton Family Foundation |
| WIDECAST | Wider Caribbean Sea Turtle Network |
| WIO | Western Indian Ocean |
| WIO-C | Consortium for the Conservation of Coastal and Marine Ecosystems in the WIO |
| WIOLab | Addressing Land-based Activities in the Western Indian Ocean |
| WIOMSA | Western Indian Ocean Marine Science Association |
| WNBR | World Network of Biosphere Reserves |
| WRI | World Resources Institute |
| WSSD | World Summit on Sustainable Development: Toward the Future |
| WWF | World Wildlife Fund |
| YSEPP | Yellow Sea Eco-Region Planning Programme |
| YSLME | Yellow Sea Large Marine Ecosystem |

ANNEX 2. INTERVIEWEES

Apart from those people whom we acknowledge above, we sent out some written questionnaires to various leaders in the case study projects. Some of these people answered by email while others were interviewed on the phone. We sincerely thank everyone who responded and hope that we have reproduced accurately what they conveyed.

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ANNEX 3. REGIONAL SEAS, THEIR PARTICIPATING COUNTRIES, CONVENTIONS AND ACTION PLANS.

| Programme | Member States | Convention |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Antarctic | Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, Finland, France, Germany, Greece, India, Italy, Japan, Korea, Republic, of Namibia, The Netherlands, New, Zealand, Norway, Peru, Poland, Russian Federation, South, Africa, Spain, Sweden, Ukraine, United Kingdom, United States of America, Uruguay, Vanuatu, European Community | CCAMLR |
| Arctic | Canada, Denmark, (Including Greenland & Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden | USAPAME |
| Baltic | Estonia, Finland, Denmark, Germany, Latvia, Lithuania, Poland, Russian Federation, Sweden, European Community | Helsinki |
| Black Sea | Russia, Georgia, Ukraine, Turkey, Bulgaria, Romania | Bucharest |
| Caspian | Azerbaijan, Iran, Kazakhstan, Russian Federation, Turkmenistan | Tehran |
| Eastern Africa (WIO) | Comoros, Kenya, Le Reunion, Mauritius, Madagascar, Seychelles, Somalia, Tanzania, Mozambique, South Africa | Nairobi and Abidjan |
| East Asian Seas COBSEA | Australia, Cambodia, China, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, Viet Nam | Action Plan |
| Mediterranean | Albania, Algeria, Bosnia/ Herzegovina, Croatia Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco Montenegro, Slovenia, Spain Syria, Tunisia, Turkey, European Community | Barcelona |
| North-East Atlantic | Belgium, Denmark, European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom | OSPAR |

| Programme | Member States | Convention |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| North-East Pacific | Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama | Antigua |
| North-West Pacific | China, Japan, Russia, South Korea | Action Plan |
| Pacific SPREP | Australia, Cook Islands, Fiji, France, Kiribati, Republic of Marshall Islands, Federal States of Micronesia (US), Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, USA, Vanuatu, Samoa, American Samoa, Northern Mariana Islands, French Polynesia, Guam, New Caledonia, Tokelau, Wallis and Futuna | Numea |
| Red Sea and Gulf of Aden | Egypt, Saudi Arabia, Yemen, Djibouti, Jordan, Somalia, Sudan, Yemen | Jeddah |
| ROPME | Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates | Kuwait |
| South Asian Seas | Bangladesh, India, Maldives, Pakistan, Sri Lanka | Action Plan |
| South-East Pacific | Chile, Colombia, Ecuador, Panama, Peru | Lima |
| Western Africa | Angola, Benin, Cameroon, Cape Verde, Congo, Democratic Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mauritania, Namibia, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Togo | Abidjan |
| Wider Caribbean | Antigua, Barbuda, Bahamas, Barbados, Belize, Columbia, Costa Rica, Cuba, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Christopher & Nevis, St Lucia, St Vincent & Grenadines, Suriname, Trinidad & Tobago, USA, Venezuela, France, Netherlands & UK Caribbean Territories | Cartagena |

ANNEX 4. LIST OF MARINE ECOREGIONS USED BY WWF

Polar Seas

Antarctic

(196*) Antarctic Peninsula & Weddell Sea–Antarctic Peninsula & Weddell Sea

Arctic

(197) Bering Sea - Canada, Russia, United States

(198) Barents-Kara Sea - Norway, Russia

Temperate Shelves and Seas

Mediterranean

(199) Mediterranean Sea - Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Gibraltar (United Kingdom), Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey, Yugoslavia

North Temperate Atlantic

(200) Northeast Atlantic Shelf Marine - Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Latvia, Lithuania, Netherlands, Norway, Poland, Russia, Sweden, United Kingdom

(201) Grand Banks - Canada, St. Pierre and Miquelon (France), United States

(202) Chesapeake Bay - United States

North Temperate Indo-Pacific

(203) Yellow Sea - China, North Korea, South Korea

(204) Okhotsk Sea - Japan, Russia

Southern Ocean

(205) Patagonian Southwest Atlantic - Argentina, Brazil, Chile, Uruguay

(206) Southern Australian Marine - Australia

(207) New Zealand Marine - New Zealand

Temperate Upwelling

North Temperate Indo-Pacific

(208) Californian Current - Canada, Mexico, United States

South Temperate Atlantic

(209) Benguela Current - Namibia, South Africa

South Temperate Indo-Pacific

(210) Humboldt Current - Chile, Ecuador, Peru

(211) Agulhas Current - Mozambique, South Africa

Tropical Upwelling

Central Indo-Pacific

(212) Western Australian Marine - Australia

Eastern Indo-Pacific

(213) Panama Bight - Colombia, Ecuador, Panama

(214) Gulf of California - Mexico

(215) Galápagos Marine - Ecuador

Eastern Tropical Atlantic

(216) Canary Current - Canary Islands (Spain), Gambia, Guinea-Bissau, Mauritania, Morocco, Senegal, Western Sahara (Morocco)

Tropical Coral

Central Indo-Pacific

(217) Nansei Shoto - Japan

(218) Sulu-Sulawesi Seas - Indonesia, Malaysia, Philippines

(219) Bismarck-Solomon Seas - Indonesia, Papua New Guinea, Solomon Islands

- (220) Banda-Flores Sea - Indonesia
(221) New Caledonia Barrier Reef - New Caledonia (France)
(222) Great Barrier Reef - Australia
(223) Lord Howe-Norfolk Islands Marine - Australia
(224) Palau Marine - Palau
(225) Andaman Sea - Andaman and Nicobar Islands (India), Indonesia, Malaysia, Myanmar, Thailand

Eastern Indo-Pacific

- (226) Tahitian Marine - Cook Islands (New Zealand), French Polynesia (France)
(227) Hawaiian Marine - Hawaii (United States)
(228) Rapa Nui - Chile
(229) Fiji Barrier Reef - Fiji

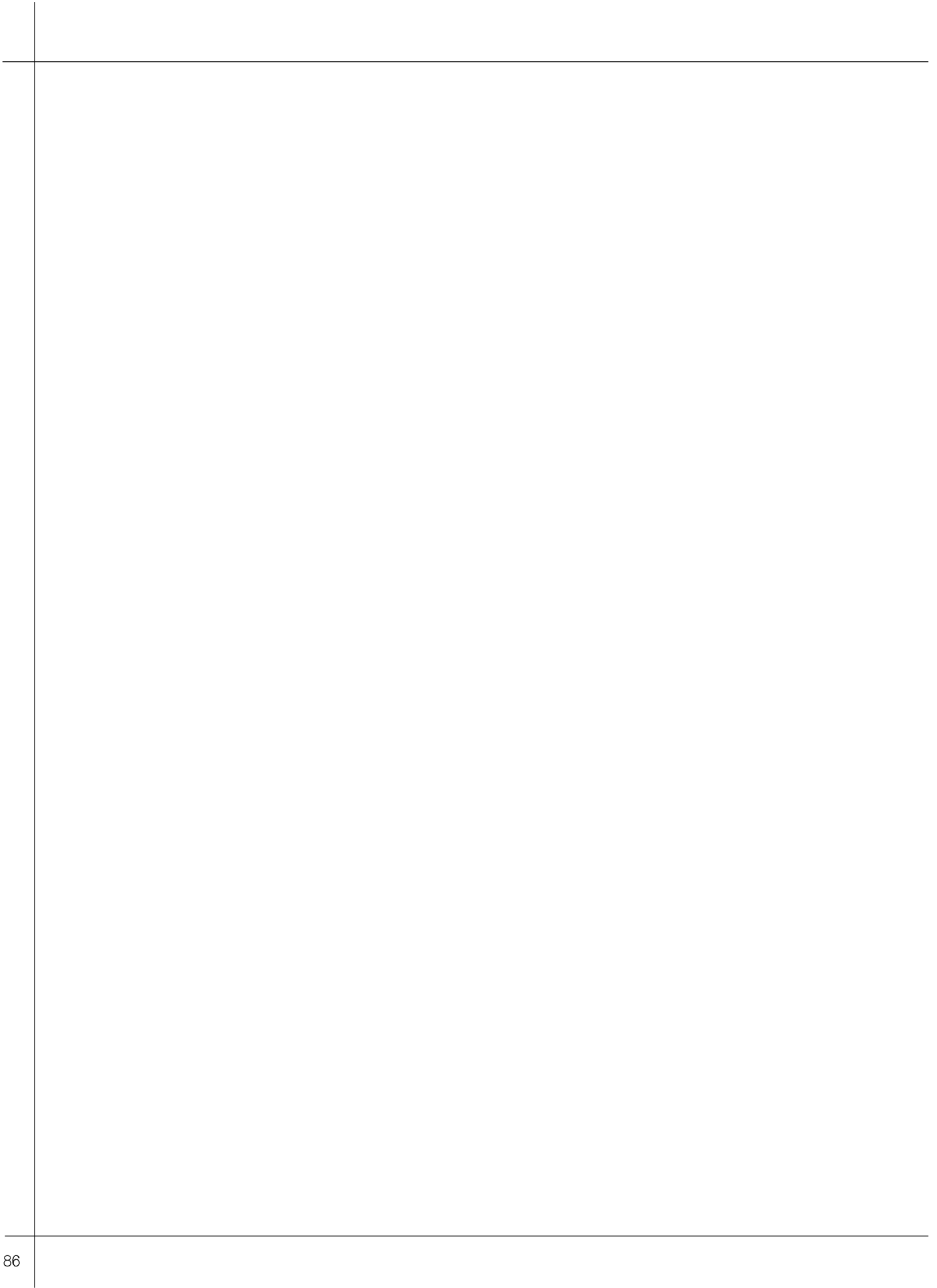
Western Indo-Pacific

- (230) Maldives, Chagos, Lakshadweep Atolls - Chagos Archipelago (United Kingdom), India, Maldives, Sri Lanka
(231) Red Sea - Djibouti, Egypt, Eritrea, Israel, Jordan, Saudi Arabia, Sudan, Yemen
(232) Arabian Sea - Djibouti, Iran, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, United Arab Emirates, Yemen
(233) East African Marine - Kenya, Mozambique, Somalia, Tanzania
(234) West Madagascar Marine - Comoros, Madagascar, Mayotte and Iles Glorieuses (France), Seychelles

Western Tropical Atlantic

- (235) Mesoamerican Reef - Belize, Guatemala, Honduras, Mexico
(236) Greater Antillean Marine- Bahamas, Cayman Islands (United Kingdom), Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico (United States), Turks and Caicos Islands (United Kingdom), United States
(237) Southern Caribbean Sea - Aruba (Netherlands), Columbia, Netherlands Antilles (Netherlands), Panama, Trinidad and Tobago, Venezuela
(238) Northeast Brazil Shelf Marine - Brazil

*Refers to global number for WWF Ecoregions of the World



ANNEX 5. CASE STUDIES IN DEVELOPING COUNTRIES

A5.1 SEASCAPES

A5.1.1 BACKGROUND INFORMATION ON THE CORAL TRIANGLE

Coral Triangle

Two of the three Seascapes fall within the Coral Triangle. Therefore, before describing them, we will first provide a summary of background information about the region.

CORAL TRIANGLE INITIATIVE

Around the year 2000 or so several conservation organisations began to focus on the need to promote conservation of a large marine area in South-East Asia, where so much marine biodiversity was concentrated. For example, WCPA, TNC and partners produced "The Regional Action Plan to Strengthen a Resilient Network of Effective Marine Protected Areas in Southeast Asia: 2002-2012". Soon the term Coral Triangle, which had been around for some years, came into wide usage, for both its convenience and its marketability.

The Coral Triangle, as currently defined, occupies 6 million km² and stretches out as far as Indonesia, the Philippines, Malaysia, Papua New Guinea, the Solomon Islands, East Timor and Brunei Darussalam. The triangle is a true nursery of the sea, being the home of 75% of all coral species and of more than 3,000 different fish species. The area is seriously threatened by a range of factors, such as overfishing, destructive fishing (for example by the use of dynamite and cyanide), global warming and pollution (Fisheries Center UBC, 2007).

In December 2003, Indonesia, Malaysia and the Philippines adopted the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). In 2004, the governments of Indonesia, Malaysia and the Philippines adopted the Ecoregion Conservation Plan (ECP), developed with WWF on the basis of the earlier Biodiversity Vision, and this was eventually ratified in 2006. Then in August 2007 President Susilo Yudhoyono of Indonesia wrote to other leaders in the region to propose a new Coral Triangle Initiative on coral reefs, fisheries and food security. The resulting Putrajaya Declaration became the region's common platform for achieving the goals and objectives of the World Summit on Sustainable Development Plan of Implementation and the United Nations Millennium Development Goals concerning sustainable coastal and ocean development. These countries committed to implement the priority targets of the SDS-SEA by: mobilizing resources, capacities and services; formulating and implementing national policies and action plans for sustainable coastal and ocean development in at least 70 percent of participating countries by 2015; and implement integrated coastal management (ICM) programs in at least 20 percent of the region's coasts by 2015 and promote regional partnerships in ICM capacity building (PEMSEA, 2007).

The big conservation NGOs have all been working for some years in the Coral Triangle and are increasing their efforts in the framework of the Coral Triangle Initiative.

CONSERVATION INTERNATIONAL

CI is working in two seascapes within the Coral Triangle: Sulu-Sulawesi Seascape and the Papuan Bird's Head Seascape (see below) and has identified Halmahera as a third area, biogeographically intermediate between North Sulawesi and Raja Ampat and acting as a true biological "corridor" between the Bird's Head and Sulu-Sulawesi Seascapes..

The main funder of CI's work here is the Walton Family Foundation, which since 2005 has given well over \$10 million for CI's Seascape work in the Coral Triangle, as well as smaller grants to WWF and TNC's Marine Ecoregion efforts there. The Packard Foundation has also been an important funder of early work in the Coral Triangle.

THE NATURE CONSERVANCY

The Nature Conservancy's Coral Triangle Center (www.coraltrianglecenter.org) is developing resilient networks of MPAs throughout the region using on-site conservation, technical support (i.e., science, training and communications) and policy. The Conservancy's work to design networks of MPAs is based on the latest scientific principles of resilience: protecting a representative range of habitat types; protecting coral communities that resist bleaching as refugia; understanding coral reef connectivity in order to create ecologically linked MPAs; and increasing the effectiveness of management to respond to direct threats, especially over-fishing and destructive fishing.

WORLD WILDLIFE FUND

WWF, on the other hand, developed its Action Plan based on the ECP focused on conserving priority areas in SSME. National organisations of WWF in Malaysia and the Philippines implement the Action Plan with partners. The SSME Coordination Unit complements country efforts by undertaking ecoregion level actions of transboundary nature and relevance www.wwf.org.ph/main.php. There are also the WWF projects funded by the Turing Foundation from the Netherlands providing nearly \$4 million over the next six years. This will be spread over six target themes: Sustainable finance for networks of MPAs; tuna nursery and bycatch; live fish trade; protecting endangered turtles; responding to climate change through reduction in tourism and travel footprints and other selected projects. These projects are not specifically placed in ecosystem-based management areas such as Marine Ecoregions.

In addition, the Global Environment Facility is making substantial investments in the Large Marine Ecosystems that cover the Coral Triangle i.e. the Sulu-Celebes Sea, the Indonesian Sea and the North East Australian LME.

TABLE 2. GEF FUNDING IN THE CORAL TRIANGLE

| Implementing Agency | Contribution \$million | | Title |
|---------------------|------------------------|------------|-----------------------------------------------------------------------------------------------|
| | GEF | Co-Finance | |
| UNDP/ADB | 1.3 | 1.4 | IWLEARN: Regional Cooperation and Knowledge Sharing to Support the Coral Triangle Initiative |
| UNDP | 3.3 | 3.5 | Arafura and Timor Seas Ecosystem Action Program |
| UNDP | 3.0 | 5.4 | Sulu-Celebes Sea Large Marine Ecosystem and Adjacent Area Sustainable Fisheries Management |
| UNDP | 1 | 2.3 | West Pacific-East Asia Oceanic Fisheries Management Project — UNDP (GEF: \$1M, Total: \$3.3M) |
| ADB | 11.9 | 76.5 | Coastal and Marine Resources Management in the Coral Triangle: Southeast Asia |

The biggest of these, the “Coastal and Marine Resources Management in the Coral Triangle: Southeast Asia” project has funding of \$11.9 million with co-financing of \$77 million and is due to begin in 2009. It covers two LMEs: The Indonesian Sea and the Sulu-Celebes Sea. Its objective is “To build on existing foundations to support the long-term conservation and sustainable management of coral reef ecosystems and other coastal and marine resources to ensure their resilience and to generate global and local benefits for current and future generations”. It will be run by the Asian Development Bank with other partners in participating government agencies (Malaysia, Indonesia and the Philippines); inter-governmental agencies; and non government organisations (NGOs). It is not yet clear how the GEF projects will fit into the CI Seascapes projects and the WWF and TNC Marine Ecoregion projects in the Coral Triangle.

A5.1.2 SULU-SULAWESI SEASCAPE AND OVERLAPPING INITIATIVES (MER, LME)

DESCRIPTION

The 900,000 sq km of Sulu-Sulawesi seas have been identified as a Marine Ecoregion (or cluster of Marine Ecoregions), a LME (Sulu-Celebes) and a Seascape. A recent edition of *Tropical Coasts* (2008) is devoted to the Sulu-Sulawesi case and has a wealth of information, which we only briefly summarise here.

The Sulu Sulawesi Seascape (SSS) covers four marine biodiversity conservation corridors: The Verde Island Passage Corridor identified as the “Center of the Center of Marine Biodiversity” (Carpenter and Springer, 2005); The Cagayan Ridge Corridor; the Balabac Strait Corridor and the Tri-National Sea Turtle Corridor. Nearly 40 million people live in association with the Seascape. Efforts currently focus on capacity and institution building and improved enforcement and governance. The declaration, establishment and management of MPAs are major aims of the SSS initiative.

CI started its SSS initiative in the same geographical area as WWF’s Sulu Sulawesi Marine Ecoregion program, launched in 1999. The WWF expert workshop to generate a long-term Biodiversity Vision for the region stimulated the three countries concerned—Indonesia, Philippines and Malaysia—to commit to collaborate on an Ecoregion Conservation Plan, first setting up informal structures for collaboration, then signing in 2004 and MoU, which was eventually ratified in 2006 (Miclait & Trono, 2008). The WWF Marine Ecoregion programme went on to achieve a number of outcomes in terms of conservation management and capacity building. In that sense, the SSS Initiative has benefitted from and built upon prior work under the Marine Ecoregion banner.

A few years after launching the Sulu Sulawesi MER program, WWF expanded the scope of its activities in the region, and started to use prominently the term “Coral Triangle”. This change of label may have been for donor marketing purposes, with perhaps some strategic advantages, rather than for ecological reasons. And even the geographic extent of the Coral Triangle has been modified over time, to incorporate New Guinea and the Solomon Islands. The MEOW mapping (Spalding et al, 2007) further subdivides the MER’s within the Coral Triangle. Thus, in this area the MER approach seems to have been applied with a great deal of flexibility, with project interventions being organised around various pragmatic considerations, such as funding, rather than a framework based on ecological considerations. Nevertheless, the programme has adhered to the central idea that conservation must be carried out at a large enough scale to accommodate trans-boundary ecological processes, and the Sulu Sulawesi area, as an almost enclosed sea, has retained a strong identity.

In 2004 Sulu Sulawesi was chosen by CI to be one of its three pilot Seascape programmes, thus adopting a pre-existing LME/MER-based geography and using international governance structures created by the governments, in part thanks to the prior MER program. The Initiative’s lead proponent, CI, has then gone on to pursue its own specific objectives and strategies for Sulu

Sulawesi, but coordinated with WWF and aligned with government and other actors.

Lastly, it is worth noting that the SSS falls within the area covered by COBSEA, but there has been little interaction between the two programmes. There is a separate case study on COBSEA.

INVESTMENT

Investment through CI and WWF has come from the Walton Family Foundation and other donors listed in Table 3. In its first three years (2005-2008) the SSS Initiative used just over \$5 million of Walton Family Foundation funding, plus smaller amounts from other sources.

To complement their funds from Walton Family Foundation, CI and WWF have also sought funding from oil and gas companies in the region. The CI project report at the end of Phase 1 indicates that it has raised US\$1 million from these sources.

Under the LME banner GEF/UNDP are just starting the \$3m preparatory phase of a sustainable fisheries management project.

The Seascope and other conservation programmes may have attracted Korean investments in new resorts and a new resort on Verde Island, but it is uncertain as to whether the investments were attracted by the Seascapes concept or by the area being the “center of the center” of fish biodiversity (Carpenter and Springer, 2005) or because the Philippines is a cheap, accessible tourist destination.

OUTCOMES

The SSS Initiative has contributed to significant achievements at Seascope, National and local (corridor or site) level. Most of them are 1st Order results, such as:

- Intergovernmental partnerships in the Tri-National Committee include sub-committees on turtles, MPAs, fisheries and species; these partnerships are operational and supported by other regionally active organisations.
- MPA management plans produced.
- MPA personnel trained in enforcement and other skills.
- Biological and oceanographic surveys showing the connectivity of the corridors.
- Promotion of ecotourism.
- Stakeholders better informed through videos, website and information kits.

There are also some 2nd Order results being reported by the end of Phase 1, principally in relation to evidence of more effective enforcement.

The intended Phase 2 outcomes from the Seascapes Project are:

- 100,000 ha managed by local government units and stakeholders and a 10,000 ha network of MPAs in the Verde Island Passage, an aggregate of over 1,000 ha and a contiguous 1,000 ha of No-Take-Zones;
- an MPA network of 97,000 ha of No-Take-Zones protecting at least 205 of critical habitats iCagayan Ridge with effective enforcement;

- at least 48,000 ha of managed No-Take-Zones that protect turtles and their habitats in the Sea Turtle Corridor and threats to turtles outside MPAs are reduced;
- good governance and effective management is in place in the Sulu-Sulawesi Seascape as a result of an effective communication campaign and the sharing and replication of best practices, effective tools and policy.

Currently, in Year 1 of Phase 2, it is difficult to say whether the outcomes will be achieved. CI project reports for the first semester indicate a high level of activity (“training 250 Bantay Dagat members and other stakeholders throughout the Seascape, the drafting of 14 MPA management plans, the selection of 16 new MPA sites, and the commitment to reestablish or expand 11 previously existing MPAs. The Seascape program engaged well over 1,000 stakeholders, garnering growing support for marine conservation at multiple levels of governance...”). If the outcomes are achieved, it is likely to be through the commitment of the provincial governments and their role as drivers of the initiative, supported by CI, filling in the gaps of institutional capacity, funds and technical expertise.

Meanwhile, WWF is continuing with its MER programme, supporting the Ecoregion Conservation Plan, which the three governments adopted. http://www.panda.org/who_we_are/wwf_offices/philippines/wwf_philippines_our_solutions/ecoregions_sulu_sulawesi/

Their approach has many similarities with that of the Seascape Initiative, but with different priority corridors (or equivalent) and greater emphasis on marine fisheries policy and management across the whole Sulu-Sulawesi area.

FINANCIAL SUSTAINABILITY

The financial sustainability of the SSS, based on reliable income streams, has not yet been secured. The SSS Initiative would like to have funds from Corporate Social Responsible organisations, economic instruments, fines, fees, etc directed to conservation. The Seascape approach has attracted project funds but has not yet served to increase long-term income for marine conservation in the area.

At the start of the Seascape Initiative, the SSS programme carried out perception mapping that informed the managers what the resources were, what they are used for, the fisheries status and issues, threats, threatened species and the state of enforcement capacity (equipment and personnel). This gave the SSS managers an idea of timing, the relative importance of the issues and who the key stakeholders were. It also reinforced the idea that the SSS is a priority area for conservation. This has led to provincial governments starting to allocate funds for coastal and marine conservation, although still far from the scale necessary to cover the ongoing costs of conservation when CI withdraws.

SUSTAINABILITY OF GOVERNANCE

The SSS Initiative is striving to build systems of participatory governance for the MPAs it is supporting. It adheres to the local government code and prioritises capacity building for local level stakeholders. The CI approach of doing much implementation through sub-grants to national and local partners is an essential component of building both capacity and ownership. The SSS Initiative works with municipal government units, in accordance with the local government code, and also with provincial governments in their role as provincial organizers. Designation and delineation of MPAs are informed by focus group discussions among stakeholders. CI project reports indicate that in Phase 1 the project put less effort into the national policy and legal level, which can be complicated, but this will feature more strongly in Phase 2. At the higher regional level, the prior existence of the tripartite MoU is an important, perhaps under-used advantage, which could form the basis for sustainable inter-governmental element to the overall governance hierarchy. There is a long way to go before these higher levels are fully functional and moving towards sustainability. For example, Sulu Sulawesi resources are being poached by outsiders, but authorities frequently release them because of

political pressure from elsewhere.

The governance system generally has access to and uses available information for decision-making but some data are not readily available. Plans being prepared will have monitoring systems to complete the cycle of adaptive management.

It will be a long time before it is known whether Seascope establishment contributed to sustainable development, and/or to building capacity for sustainable development, within its area of influence. It has resulted in additional transaction costs as stakeholder consultations take time. Generally, the development benefits and costs have not been distributed equitably between stakeholder groups. Local governments, fishers, bantay dagat (reefwatchers) contribute to conservation, while tourist resort builders benefit disproportionately from the efforts of conservation groups. Social sustainability will require a more equitable distribution of costs and benefits, including substantial flow of benefits to the current net contributors.

In general the Sulu-Sulawesi Seascope and the three different LAMM categories that exist here are perceived favourably by the public in their areas of influence. National and local decision-makers are aware and supportive of the three different LAMM categories but they do not understand the differences between them. The Sulu-Sulawesi Seascope has sufficient recognition with stakeholders, but it is not resilient to political changes in the Philippines. Probably Regional Seas is the most resilient in this respect, as it has broad political support.

CONCLUSIONS

“One vision, one plan, common resources, joint management” is the headline of the Miclat and Trono (2008) paper. This is shown to the extent that there is a tripartite agreement between the three governments, based on the Ecoregion Conservation Plan, and that this agreement is the umbrella for the work of WWF, CI and their respective partners, and presumably will be so for the GEF/UNDP LME project too. Whether the unity of visions and plans holds up throughout the governance hierarchy is less evident. It would be desirable that the investments of WWF, CI and others in capacity building be guided by a broad consensus about the kind of governance system to be constructed, with its multiple levels, multiple actors and complex web of interactions. To produce such a consensus (if it has not already been done) would require an in-depth analysis of the whole governance system and a process of discussion involving a range of local and national actors.

The use of the term Ecoregion was significant ten years ago, when the WWF process for generating a Biodiversity Vision formed the basis for what became an inter-governmental conservation plan. However, at this stage of implementation, there appears (to the outsider, at least) to be a lot of similarity in the CI Seascope and WWF Ecoregion approaches. The labels may reflect institutional branding more than distinctive methodological approaches. Indeed, when we look at the geographic scale of their respective interventions, CI is working primarily at a smaller scale (the “corridor”) whilst WWF’s “Ecoregion” is in terms of biogeographical classification a cluster of Ecoregions.

Whatever the labels, it appears that CI’s SSS Initiative is enjoying early success and making good progress towards significant biodiversity conservation targets. Factors in this success include:

- The sound approach to working with local partners and governments on MPA’s.
- The framework established by the prior work of WWF and partners to secure government commitment to the Ecoregion Conservation Plan, with associated inter-governmental structures.
- The decision to focus on a geographic scale (the marine biodiversity conservation corridors) that are intermediate between site and Seascope and manageable for CI and partners.

- The support of a large, unbureaucratic donor, who is open to an adaptive approach to the development of the programme and is open in principle to consider a sustained investment over 2-3 phases.

A5.1.3 PAPUAN BIRD'S HEAD SEASCAPE

DESCRIPTION

The Papuan Bird's Head Seascape (PBHS) lies at the centre of the "Coral Triangle," the region harbouring the world's highest marine biodiversity. The Seascape concept was put forward by CI in 2004, building on earlier research and conservation work by TNC especially in the Raja Ampat area, and the initiative was launched in the field 2005.

Recent surveys of the Seascape's three main coral reef regions (Raja Ampat, Teluk Cenderawasih, and the Fak Fak-Kaimana coastline), covering a combined area of more than 180,000 sq km, have recorded over 1,300 species of coral reef fishes and 600 scleractinian corals (approximately 75 percent of the world's total). In addition, Raja Ampat's strong ocean currents sweep coral larvae across the Indian and Pacific Oceans to replenish other reef ecosystems. Raja Ampat's coral diversity, resilience to threats, and ability to replenish reefs make it a global priority for marine protection. Cenderawasih Bay is the largest marine national park in Indonesia and Jamursba Medi has the most important Pacific Leatherback turtle nesting beaches in the world.

Economic development ranges from fisheries to marine tourism, oil and gas, mining, and forestry. Consequently, local governments and stakeholders, such as the newly-formed Raja Ampat and Kaimana Regencies, require strong support in developing effective, sustainable coastal and marine resource management that conserves biodiversity while benefiting local communities. Through the Bird's Head Seascape initiative, CI aims to develop conservation in a manner that protects biodiversity, sustains fisheries, and maintains tourism potential, thereby generating considerable sustained benefits for local communities and for the entire Seascape. CI and its partners believe strongly that achieving this objective requires establishing a multiple-use network of ecologically-connected MPAs, which is supported by and embedded in local and national legislation, and that is co-managed by local communities and local government agencies (CI, 2006).

The PBHS initiative has two inter-related components, a research-oriented component financed mainly by the Packard Foundation, and a governance- and management-oriented component financed mainly by the Walton Family Foundation.

The research-oriented component has moved well beyond the initial biodiversity inventories and is designed to support Ecosystem-Based Management (CI et al. in prep).

CI, TNC, WWF and a range of research partners have studied ecological, governance and socio-economic aspects of the Seascape, with particular focus hitherto on Raja Ampat but intentions to expand to the full Seascape in Phase 2 (2008 onwards). Research topics are:

Ecosystem science:

- Genetic connectivity analysis
- Turtle migration
- Oceanography
- Fish reproduction (spawning aggregation sites etc)
- Biomass assessments of coral reef fish functional groups
- Marine resource utilization studies
- Historical ecology of Raja Ampat
- Governance

- Knowledge, attitudes and practices
- Traditional coastal and marine tenure systems
- Institutional mapping of decision-makers and influence-wielders
- Design of an institutional framework for collaborative EBM
- Socio-economic impact assessment
- Valuation of ecosystem services
- Raja Ampat development option studies
- Seascape synthesis
- Spatially specific Seascape-wide ecosystem modelling

The research aims to feed into the governance- and management-oriented component of the programme, so that the overall intended outcomes of the PBHS Initiative were stated as follows:

- By 2007, the Raja Ampat Conservation Corridor in the Bird's Head Seascape is sufficiently well characterized scientifically to support development of an ecosystem-based management plan for the corridor and to formally define marine conservation outcomes.
- By 2008, an enabling environment is established in the Raja Ampat regency for effective conservation and collaborative management of its marine and coastal resources, and the regency government has chosen an environmentally sustainable economic development trajectory, which its citizens are actively benefiting from.
- By 2012, the 4.5-million-hectare Raja Ampat Conservation Corridor is established and functioning effectively, encompassing biodiverse insular, coastal, and nearshore habitat. This includes improved management of the six national protected areas in this region, improved ecosystem connectivity through corridor linkage (primarily marine habitat) between the major and minor islands, and additional protected area designation.
- By 2011, a large-scale multiple use marine and coastal protected area is established and functioning effectively in the Kaimana corridor in the southern Bird's Head, encompassing at a minimum the top conservation priority sites of Triton Bay and its surrounding watershed and endemic lakes, the Venu Island turtle rookery and Tanjung Kumawa fringing reefs.

During Phase 1 of the programme (2005-2008) CI coordinated with independent TNC and WWF programmes. During Phase 2, now under way, TNC and WWF are full partners in implementation of the Seascape Initiative, and joint objectives have been agreed, as will be discussed below.

INVESTMENT

Phase 2 of the Papuan Bird's Head Seascape initiative is being carried out in partnership by CI, TNC and WWF. Funding comes mainly from the Walton Family Foundation, with additional amounts from the Packard Foundation and other donors. There is also now a flow of revenue for conservation from the MPA entry fees paid by tourists.

The substantial funding from the Walton Family Foundation was the key to the PBHS initiative. It seems that the larger-scale vision of the Seascape had convinced this donor, and Packard Foundation too, of the merits of correspondingly large-scale investment, rather than piecemeal funding of individual sites or clusters of sites (Ketut Sarjana Putra Marine Director, CI, pers. comm.).

One novel conservation financing effort was the gala Blue Auction in 2007. Sponsored by the Monaco-Asia Society and Conservation International, and under the high patronage of HSH Prince Albert II of Monaco, the charity auction was conducted by Christies International. It involved the auctioning of species naming rights and had never been attempted on such a grand scale, or with a marine conservation focus. The naming rights to ten new fish species discovered in the Bird's Head, along with two non-species lots were auctioned and together raised a total of \$2,045,000.

The revenue from the ten species lots (totalling \$1,595,000) will be used exclusively for three priority conservation programs in the Bird's Head Seascape. The remaining revenue generated from the two non-species lots were dedicated to conservation programs run by the Monaco-based NGOs Act for Nature and the Prince Albert II Foundation.

CONSERVATION OUTCOMES

The research component of the PBHS Initiative has generated valuable 1st Order results in the form of multi-disciplinary information that can be used to guide EBM.

The governance- and management-oriented component of the Initiative has generated an array of results, including many 2nd Order results (see Table 6). The headline news was the Raja Ampat Regency Government's declaration in December 2006 of six new MPA's, covering 900,000 ha. This was followed in 2008 by Kaiman declaring all of the waters under its jurisdiction (597,000 ha) to be a multiple-use MPA.

These are spectacular 1st Order results, to which the Seascape Initiative has contributed. There are enough paper parks around as warnings that such legal declarations are only as valuable as the commitment to implement them, so it is significant that CI also report progress in implementing management at four focal MPA's, with baseline reef survey completed, community patrols started and participatory zoning plans drafted.

Although these are early days for the programme, some 3rd Order results are emerging, notably an increase in successful sea turtle nesting, due to a reduction in poaching following awareness work and micro-finance support for alternatives.

In relation to the outcome about establishing an enabling environment, there has been important progress. Education, mass communication and the explanation of research results have increased the awareness of local stakeholders and authorities about the value of, and management options for, their natural resources. As a result, the local authorities are thinking more broadly and holistically about their development options. However, there is some way to go on this. The CI report (CI, 2006) comments that CI and TNC "continue to push for principles of EBM to be included in all legislation and policies on coastal and fisheries management in Raja Ampat.....[]..... but a formal 'EBM plan' for Raja Ampat is not currently viewed as a useful deliverable by the local government". That is not necessarily a problem but the report also highlights continuing challenges, most of which relate to the issue of the development vision for Raja Ampat, e.g. growing threats from nickel mining, sedimentation and other impacts of poorly planned infrastructure, lack of control of fishing licenses, slow prosecution of infractions and a new fish processing plant that will impact reefs and whales. The report suggests that the aim of improving watershed management is proving difficult and is slipping down the list of priorities for intervention, despite the potential impact of siltation on coral reefs.

In light of this, it is surprising that the revised five-year (2013) outcomes for Phase 2 of the PBHS, agreed between CI, WWF and TNC, all seem to focus on MPAs. Notwithstanding assurances by CI to the contrary (M. Erdmann, pers. comm.), there seems to be a shift away from the holistic approach of Phase 1. Ten outcomes focus on the establishment and effective functioning of 10 focal MPA's, which together include enough No-Take Zones to protect 20–30% of the PBHS coral reefs from all forms of exploitation. Outcome 11 identifies five more areas for more MPA's and Outcome 12 is about forging the MPA's into a true network. Outcome 13 focuses on the creation of a seascape-level enabling environment for marine conservation and sustainable EBM of marine resources in the PBHS and finally Outcome 14 is about reducing fishing pressure on threatened species. Thus, just one of the 14 outcomes retains a more holistic approach and even that focuses on natural resource management rather than the "sustainable economic development trajectory" of Phase 1. It is described as "largely unfunded or funded through co-financing" (CI, in prep.).

FINANCIAL SUSTAINABILITY

The Seascape management concept is well founded and has been accepted by communities and the donors alike. Financial sustainability of the MPA's has been on the CI radar from the start of the Initiative and the MPA entry fee system is already functioning successfully. Phase II of the programme will include efforts to expand the MPA financing mechanisms. With the acceptance of new fishing and management policies the recurrent funding needed for management may reduce. Alternative livelihood activities, such as making tourist souvenirs or environmentally sound aquaculture can also contribute to the overall financial viability of the programme.

Nevertheless, the programme is likely to require support from CI, TNC and WWF and their donors for many years to come, perhaps including a large trust fund component. This is because it will take a long time in this remote rural region for the economic benefits and associated financing mechanisms to generate sufficient funds to maintain an ongoing programme of biodiversity conservation and sustainable development. Given the global importance of the region's biodiversity, long-term support from global community would be fully justified.

SUSTAINABILITY OF GOVERNANCE

The partners in the PBHS—CI, TNC and others such as the Coral Reef Alliance (CORAL)—have worked closely with villagers, the Raja Ampat government and dive tourism operators on activities such as MPA designation, turtle conservation, the tourism user fee and the development of economic alternatives. They have also engaged extensively with local authorities on development planning issues. As discussed in the Outcomes section above, real progress has been made towards generating a commitment and increased capacity amongst local authorities and stakeholders towards sustainable development based on conservation and sustainable use of their marine resources. The Provincial Planning Bureau now has a vision for management of the MPA's as an inter-connected network, rather than individual sites (Ketut Sarjana Putra, CI, pers. comm.). Nevertheless, there is still a long way to go before a sustainable, resilient governance system for integrated management of the PHBS is in place. The conditions for developing such a governance system are generally favourable, so given time and a continuing focus on governance, it can be achieved. However, it is of concern that the revised statement of outcomes seems to be moving away from governance and integrated management and towards a narrower focus on MPA's.

CONCLUSIONS

The extraordinary natural assets of the area, the interest of local people in protecting and managing their natural resources, the attention of high-capacity NGOs and the availability of relatively large-scale, and the unbureaucratic funding from Walton Family Foundation and the Packard Foundation give this Seascape exceptional potential to achieve outstanding large-scale marine conservation results linked to sustainable development. The fact that the governance structures are relatively simple (single country) relative to the size of the Seascape (183,000 sq km) avoids some of the major challenges facing multi-country LAMMs, for which focus on inter-governmental coordination mechanisms takes attention away from the lower levels of the governance hierarchy, which are often more important.

The multi-disciplinary research component of the Initiative is impressive and offers the possibility for science to support the development of good governance, rather than seek to dictate what should happen, as is so often the case. The early achievements in MPA management and collaboration with local communities are equally impressive. The foundations are in place for a successful, long-term programme.

The future of the PBHS area and its people may be determined in large measure by the extent to which the local stakeholders and authorities are empowered to pursue their own model of development, through sustainable management of their natural resources rather than high-impact

exploitative activities. It involves issues of the rights of local individuals and groups, power relations between sectors and between national and local governments, tenure, organisational capacity, traditional and scientific knowledge, technical capacity and external economic forces. It is to be hoped that these critical issues will be given due importance, as CI states (V. Farmer, pers. comm.), despite the restructuring of the Seascope outcomes and plan around individual MPAs. If the conservation organisations were to revert to focusing narrowly on their biodiversity objectives, especially MPA's, then there would be a real risk of missing the opportunity, for which the foundations have been laid, to establish a great example of sustainable, empowered, participatory governance that pursues development and conservation objectives in an integrated manner.

A5.1.4 EASTERN TROPICAL PACIFIC SEASCAPE

DESCRIPTION

The development of the ETPS concept started with a number of high-level political meetings in 2001–2002, culminating in a high-profile launch at the Johannesburg World Summit on Sustainable Development by the 4 governments, CI, UNESCO and other partners. During 2002–2004 the intended geography of the Seascope expanded from being essentially an oceanic “corridor” connecting Galapagos, Malpelo, Cocos and Coiba (the latter being coastal) to an area including the four marine territories and Exclusive Economic Zones, with Gorgona (Colombia) and Las Baulas (Costa Rica) added as coastal priority sites. Thus, it covers a huge area (2m sq km), the majority of which is open ocean. It contains islands—Galapagos, Malpelo and Cocos - well known for their biological diversity, productivity and, in the case of Galapagos, endemism, supported by local upwelling. The coastal zones of the archipelagos and mainland include a large amount of rocky reefs, soft bottoms and some significant mangroves swamps, but only localised areas of coral reef (more abundant in warmer waters around Coiba and mainland Costa Rica).

The geography of the Eastern Tropical Pacific Seascope seems to have evolved opportunistically. The expansion from an oceanic Galapagos-Cocos Corridor to include coastal areas, and eventually the whole marine territory or EEZ and some High Seas off Ecuador, was driven by the wish to include Costa Rican nesting beaches of the Leatherback turtle, important near shore sites in Panama and Colombia, and connectivity between Ecuadorian mainland and Galapagos. Not everyone agreed with this “expansion”, as can be seen from the wording of the San José agreement's (see below) definition of the Marine Corridor. Research on turtle and shark migration, undertaken under the ETPS Initiative, has reinforced the fact that there is significant ecological connectivity. Nevertheless, the cut-offs at the Ecuadorian border to the south, in the Humboldt Current, and at the Costa Rican border to the north, remain arbitrary in ecological terms. They have some political justification, in that they correspond to national borders, but are also arbitrary in terms of governance structures, since no existing regional institution, such as the Permanent Commission of the South Pacific (PCSP) or the forum of Central American environment ministers, spans the ETPS countries. In retrospect, CI could have dedicated more effort in the early stages to working out with key authorities and stakeholders the geographic area to be covered and the existing regional institution(s) to be involved, and building a constituency of support for the concept at multiple levels.

During 2002–2004 a project was developed by CI and UNESCO's World Heritage Centre for funding by the United Nations Foundation. In 2004, responding in part to a sense that the governments needed to reassert their leading role in the initiative, Costa Rica called an inter-governmental meeting to sign the San José Declaration, committing them to cooperate in the “Corredor Marino de Conservación del Pacífico Este Tropical entre las Islas Coco-Galápagos-Malpelo-Coiba-Gorgona” and setting up a Secretariat for this purpose.

By mid-2005 CI had started implementation of the program, with support from both the UNESCO-UNF project and a large grant by the Walton Family Foundation. With an annual budget of over US\$2 million, over 50% of which was sub-granted to partner organisations, CI was able to stimulate a wide range of activity involving numerous local, national and international partners. The initial focus

was on priority sites, with activities at national and seascape-wide scales increasing over time. In 2008 CI and partners obtained a further 3 years funding from WFF, at a somewhat increased level, enabling an expansion of the scope of activities within the same 4-country geography. Scores of organisations—local, national and regional—have received funding through the ETPS Initiative to implement activities contributing to the overall plan for the Seascape, so there is a growing constituency and on-the-ground impact.

The San José Declaration in 2004 was a crucial moment in the process. It provided impetus for the Seascape initiative but also provoked long-lasting problems, which had their origin in the failure by the environmental sector (government and NGO) to include other major stakeholders, either in the early stages of developing the Seascape concept or in the negotiation of the agreement. At the time, several organisations questioned the need for a new inter-governmental body, before the scope for working with existing bodies, such as the South Pacific Permanent Commission, had been explored. More fundamentally, CI was concerned that this formal agreement was premature, since much work remained to be done to get major stakeholders, such as the navies and fishing sectors, on board with the Seascape concept. This fear proved to be well founded in the case of Ecuador, where the Declaration provoked a backlash from these excluded sectors. Though gradually weakening, the resistance by Ecuador's industrial fishing sector has continued ever since, despite much diplomatic effort and clarification of misconceptions—perhaps genuine at first—that the Seascape would be a massive marine park with no fishing or that it sought to over-ride national sovereignty. This summary of the Seascape's complex history is included here, because it has had consequences for attempts to institutionalise inter-governmental cooperation and for the approach taken by CI to catalysing regional collaboration in various fields, such as ecological monitoring, species research and conservation (turtles, sharks), tourism management etc. Indeed, the difficulties encountered had some influence in the way that CI has shaped its definition of seascapes in general, stressing that they are areas for voluntary cooperation (see Section 2.2.1 above).

Thus, the two programmes have moved forward in parallel but with a moderate degree of coordination between them. One is the inter-governmental Corridor program, coordinated by a Secretariat, and the other is the ETPS Initiative, led by CI, which supports some parts of the inter-governmental Corridor programme but also mobilizes numerous other organisations and stakeholder groups in the region. Undoubtedly, the cooperation between the two programmes could have been much tighter, if the Corridor programme had not been hampered by Ecuador's ambivalence about it. This study focuses on the CI-led ETPS Initiative.

Other approaches have been applied in LAMMs overlapping with the ETPS. One is the Galapagos Marine Ecoregion programme of WWF (see Section A5.2.2). A second is the South-East Pacific Regional Seas program, for which the Permanent Commission of the South Pacific (PCSP) is the secretariat (see Section A5.4.3). In addition, Integrated Coastal Management methodologies have been applied in various parts of the Seascape countries. In particular, Ecuador was one of the three pilot countries for the Coastal Resources Management Programme of URI, which started in 1985 (Olsen et al., 2003; Arriaga, 2000). The programme in Ecuador is still continuing. Rather than being fully integrated into the institutional structure, it remains a discreet entity, though it was in 2009 moved from the Presidency to the Ministry of Environment. There has been little collaboration between the ETPS Initiative and this "Programme for the Management of Coastal Resources", and in this case study we have not attempted to assess the application of ICM within the Seascape.

INVESTMENT

The ETPS Initiative has attracted substantial funding: US\$19m from WFF for the period 2005-2011 plus >\$5m to date through other CI sources, and has leveraged several million dollars of partner funds, including a US\$2.5 million matching contribution to a Trust Fund for Malpelo. The recent commitment by WFF to continue funding up to 2011, and potentially to 2014 subject to satisfactory progress, is hugely important in enabling CI and partners to plan jointly for the medium term, instead of thinking only of short-term projects.

The Initiative has coincided with significant government and debt-swap investment in MPA's, including a marine component of a big, new Costa Rican Trust Fund, and investment by the Ecuadorian government in MPA establishment. This positive trend has several contributory causes, so it is hard to gauge the influence of the ETPS Initiative. Nevertheless, in some cases the connection is evident, for example the co-financing of major investments in Malpelo by the Colombian Navy (>\$1m + recurrent costs) and the mixed government-private Fund for Environmental Action and Youth (\$2.5m).

CONSERVATION OUTCOMES

Whilst no important outcome, especially 3rd Order results, can be attributed to a single initiative, ETPS has played a demonstrable role in many 1st and 2nd Order outcomes and some emerging 3rd Order outcomes. Samples of these are:

1st Order (policies, plans, social context):

- PCSP has updated regionally agreed strategies for marine mammal and sea turtle conservation and MPA network establishment.
- All 4 ETPS countries have improved national legislation relating to MPA creation and management.
- The Ecuadorian Navy is implementing a policy making VMS mandatory for all vessels using the Galapagos Marine Reserve.
- A \$5M trust fund was established to underwrite most of Malpelo's core management costs for the coming 99 years.
- Costa Rica has adopted a new marine strategy, which benefitted from extensive stakeholder consultation and incorporates biodiversity conservation objectives, and has completed a technical analysis of potential MPA sites in its Exclusive Economic Zone.

2nd Order (behavioural changes and protection levels):

- All four ETPS countries have created new MPAs, including a massive expansion of the Malpelo Flora and Fauna Sanctuary to become the 9th largest No Take Area in the world.
- Patrolling effort in Malpelo, Coiba and Cocos has increased and observed infractions per/unit patrolling time have decreased. Landmark prosecutions have been achieved at both Malpelo and Cocos.
- Vessel Monitoring Systems (VMS) using satellite are being deployed in Ecuadorian waters, including Galapagos.

3rd Order (resource or conservation target trends):

- The Tempisque Conservation Area of Costa Rica has seen some of the highest numbers of olive ridley turtle nesting in years.
- Catch levels in Costa Rica's Tárcoles community fishing reserve are stable and producing profits for CoopeTárcoles members.
- 18 microentrepreneurs in the Coiba buffer zone have increased income levels based on small businesses directly linked to the sustainable management and use of marine resources.

- Coral reef recovery in most ETPS sites, including the Galápagos northern islands, Coiba and other Panamanian coastal sites is consistent.
- Whale shark sightings in the northern Galápagos islands are continually increasing per unit effort.

Key factors enabling these outcomes were identified by CI to be:

- Significant funding to mobilize a capable, committed partner network
- Investment in developing relations with authorities at all scales to generate the political will necessary to implement transformational measures
- Sound project management to ensure that subgrants received technical inputs and were kept focused on the agreed objectives within the agreed time frame and budgets.

Some of the outcomes are the product of joint efforts with other LAMM programmes. For example, the turtle and marine mammal strategies were led by PCSP and the introduction of VMS in Galapagos was a joint effort with WWF's Ecoregion program, amongst others.

FINANCIAL SUSTAINABILITY

At the site level income streams are continually improving at many MPAs and the Seascope initiative has contributed to the development of several of them, e.g. a funding mechanism involving tour operators, a trust fund for Malpelo trust fund, a park entry fee system for Coiba, and at Gorgona a tourism concession that covers some management costs with in-kind contributions.

At the national and regional scales sustainability continues to be a challenge. Funding for the implementation of national plans of action for species, habitats, MPA subsystems and inter-institutional coordination have not materialized.

Of related regional bodies, the Inter-governmental Secretariat of the "Marine Corridor" is also suffering from insufficient core and project funding, but the SPC (Regional Seas) has core funding from governments and the Inter-American Tropical Tuna Commission also has basic funding from its members.

SUSTAINABILITY OF GOVERNANCE

The ETPS Initiative started up with two CI projects, one financed by the United Nations Foundation and CI's Global Conservation Fund, and the other by the Walton Family Foundation (WFF). The planning for these projects was undertaken by CI in consultation with a limited number of authorities and partners. All activities must, of course, be consistent with national regulations and policies. Since the start-up CI has moved quickly to broaden the range of partners and increase their role in the planning and monitoring process. The planning process is quite decentralized to country programme and site level and is participatory and transparent. The sub-granting mechanism of implementation gives a further opportunity to negotiate and ensure that activities correspond to the priorities of both partners and the CI-led initiative. The planning of Phase 2 involved representatives from 30 organisations, including authorities responsible for environment, fisheries, tourism and naval affairs. Nevertheless, investment decisions on the ETPS initiative, following this consultation process, are ultimately internal to CI. In 2009–10 CI plans to implement a more participatory governance system, while retaining the final decision-making power.

It is not yet clear what structures—governmental, non-governmental and mixed—the ETPS Initiative will ultimately hand over to when the time comes for CI to exit or at least reduce by an order of magnitude its role and financial support. Arguably the greatest strength of the initiative is the number

and diversity of institutions it has mobilized around a common agenda. The question of how to organize and sustain that movement or “coalition” long-term will need to be addressed. Participation in the coalition by the commercial private sector, particularly tourism and fishing, has been slower to develop, though the Initiative does now have a component working with artisanal fishers, including a regional network of fishing cooperatives, and is collaborating with tour operators in certain sites. Direct participation by the industrial fishing sector has been held back by the frank opposition of the Ecuadorian industry to the Initiative.

At the level of inter-governmental coordination, the Secretariat of the Marine Corridor is the responsible body but, as already explained, it lacks legitimacy with the Ecuadorian government. This not only limits its effectiveness but also inhibits the collaboration between the ETPS Initiative and the Secretariat; CI and partners can still carry out a full programme with endorsement of individual governments, who have the ultimate authority, but it is the inter-governmental cooperation that is affected.

The ETPS Initiative also works to some extent with PCSP and IATTC, but there are limits in each case. PCSP can only work on programmes that also extend to Peru and Chile too and its role is one of coordinating strategies and policies, with all implementation being through the countries. The IATTC has a decision-making role on certain fisheries issues and a geographic remit that includes the ETPS countries, but its consensus-based internal governance mechanisms prevent it taking the kind of decisions necessary to achieve sustainability.

Overall, national level components of the ETPS are increasingly integrated with national government institutions, although the degree to which this integration occurs between countries is variable. There is extensive regional cooperation through informal networks but inter-governmental coordination is weak, due to the relationship between Ecuador and the Marine Corridor Secretariat. The growing constituency of participants, stakeholders and beneficiaries of the ETPS Initiative provides a platform for eventual sustainability, but it is not yet clear how that will be achieved.

CONCLUSIONS

Despite the hostility of the Ecuadorian fishing industry and the Ecuadorian Government’s consequent decision not to participate actively in the inter-governmental coordination mechanism set up for the Marine Corridor, the ETPS Initiative led by CI has flourished in terms of activities, results and range of participants. Most early results have been at site level, but national and regional results are beginning to materialise. The approach of mobilizing many partners through a sub-granting mechanism has been crucial, both in generating the results and in building a widely shared commitment to the general goals of the Seascope. This approach has been made possible by the availability of WFF funding, which is large enough to be significant even in such a large region, flexible enough to allow CI to manage the programme adaptively and respond to partner priorities and evolving priorities, and now secure enough to enable joint planning with the coalition of partners. Two challenges now are to increase the impact of the Initiative at the national and regional scales, and to work out how to build sustainable structures and institutional capacity for the period following this phase of major WFF funding.

A5.2 ECOREGIONS

A5.2.1 EAST AFRICAN MARINE ECOREGION (EAME) AND OVERLAPPING INITIATIVES (RS, LME, ICM)

DESCRIPTION OF THE ECOREGION

The Eastern African Marine Ecoregion (EAME) is an area of high biodiversity and endemism, providing livelihoods for millions of people who depend heavily on functioning systems of marine life. WWF defines the ecoregion as covering coastal and marine areas from southern Somalia to the Natal shores of South Africa, which is some 4,600 km of coastline. This area comprises several smaller ecoregions on the recent classification by Spalding et al. (2007). The country members of the Eastern African Marine Ecoregion are Kenya, Mozambique, Tanzania, South Africa and Somalia, but do not include the Western Indian Ocean islands (Madagascar, the Comores, Reunion, Mauritius and the Seychelles). These are in the West Madagascar Marine Ecoregion, though it is recognised that the two Ecoregions are linked.

WWF was already active in marine conservation at various sites in the region when it launched the ecoregional planning process in 2001 by convening an expert workshop to develop a 50-year Biodiversity Vision. This Vision and an accompanying 25-year strategy, with species, site and “seascape” targets (not to be confused with CI Seascapes), were completed in 2004 and WWF is now implementing the strategy with governments and partners in the region. The programme is focusing on three core countries—Kenya, Tanzania and Mozambique—and each of these have established multi-stakeholder committees and focal point institutions for the Ecoregion programme.

The WWF strategy focuses on specific areas within the Ecoregion, selected to include the full range of habitats and to maintain ecological function and diversity. This approach generated twenty-one priority areas for EAME based on the level of threat, the intactness of the biological features, the presence of feeding grounds, degree of representation and other criteria. Eight areas were ranked of global importance, seven of ecoregion importance and six of sub-region importance (Table 4).

Reasons for assigning global importance were:

- High levels of diversity giving a high degree of representation of the ecoregion’s species richness (e.g. Rufiji-Mafia complex; Mtwara-quirimbas; Zambezi Delta; Mida Creek-Malindi);
- High levels of endemism, e.g. Lamu Archipelago, Maputo Bay-Machangulo Complex;
- Importance for critical stages in the life cycle of threatened species, e.g. Zambezi Delta for breeding Humpback whales and Lamu Archipelago, Maputo Bay-Machangulo Complex and Bazaruto for turtles;
- Importance for maintaining ecosystem function, e.g. Mtwara-Quirimbas as a source area since it straddles the divergence of the South Equatorial Current, and the Zambezi and Rufiji Deltas as nursery grounds and nutrient input.

The priority sites include a variety of coastal and shallow water marine systems and physical features but, with the exception of Latham Island, do not extend into oceanic waters. There are two cross-border sites at Msambweni–Tanga (Kenya–Tanzania) and Mtwara–Quirimbas (Tanzania–Mozambique).

http://www.panda.org/about_wwf/what_we_do/marine/our_solutions/marine_programme/projects/index.cfm?uProjectID=TZ0862

TABLE 4. THE PRIORITY SITES FOR CONSERVATION WITHIN EAME

| Country | Site | Importance |
|------------|----------------------------------------------------------|------------|
| Kenya | Lamu Archipelago | Global |
| | Mida Creek–Malindi | Ecoregion |
| | Tana River Delta | Global |
| | Msambweni–Tanga (Kenya – Tanzania cross border site) | Ecoregion |
| Tanzania | Pemba Island | Ecoregion |
| | Unguja Island (E) | Ecoregion |
| | Bagamoyo (S) | Sub-region |
| | Latham Island (E) | Ecoregion |
| | Rufiji–Mafia Complex | Global |
| Mozambique | Mtwara–Quirimbas (Tanzania–Mozambique cross border site) | Global |
| | Nacal–Mossuril | Ecoregion |
| | Ilhas Primeiras & Segundas | Ecoregion |
| | Zambezi Delta system | Global |
| | Sofala Bay | Sub-region |
| | Bazaruto Archipelago | Global |
| | Inhambane Bay | Sub-region |
| | Inharrime Complex | Sub-region |
| | Maputo Bay–Machangulo Complex | Global |
| Somalia | Greater St. Lucia Wetlands | Global |
| | Shebela Delta (S) | Sub-region |
| | Bajuni | Sub-region |

WWF aims to complement the site conservation with action to improve the legal and policy framework, strengthen institutional capacity, support sustainable fisheries and other livelihoods, address trans-boundary threats, e.g. climate change, oil pollution, unsustainable industrial fisheries, and protect migratory species, e.g. turtles. The geographies of these transboundary threats and migratory species do not, of course, match the Ecoregion geography, which had a different basis. Thus, the programme is operating predominantly at local scale (site or relatively small seascape), complemented by action at a variety of other scales, including national and the three-country sub-group of the Ecoregion. The EAME is now designated a WWF “Network Initiative”, bringing increased support from cross-cutting global programmes, such as those related to fisheries. Thus, WWF’s conservation strategy operates at scales from site to global, with the Ecoregional scale not being particularly prominent. Rather, the Ecoregion’s relevance seems to be first as the framework for choosing priority areas for WWF intervention and then as the geography within which WWF is seeking to achieve its general objective i.e. to secure a healthy marine environment, with the marine resources protected, managed and used sustainably for the benefit of the coastal communities and the regional economies.

OTHER APPROACHES IN THE SAME REGION

Although this case study set out to be about a MER, the East African coast and Western Indian Ocean could equally well serve as a case study area for ICM, RS or LME. And CI has plans to establish a Seascape here too, so it will be a full house! It is therefore a good region to help understand how these approaches differ and how they relate to each other.

The RS programme is the longest established RS and includes the same countries as WWF's Ecoregion, plus Comoros, Madagascar, Mauritius, Seychelles and France (Reunión), as it extends across the Western Indian Ocean. It began with adoption in 1985 of the "Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region", along with the Convention itself and two protocols, one concerning marine pollution and the other concerning protected areas and wild fauna and flora. However, it was not until 1996 that the Convention and protocols entered into force, with all countries ratifying them by 1999 except South Africa, which ratified them in 2002 (<http://www.unep.org/NairobiConvention/about/BackgroundCOP5.asp>). In the first decade after the 1985 adoption of the Convention the initial hopes turned to disillusion, as inconsistent and inadequate funding, combined with weak political commitment in the face of other priorities, left the programme languishing. However, since 1998, with a reorganised secretariat, both funding and political commitment have increased and the programme has gained substantial credibility and relevance.

The Nairobi Convention web-page <http://www.unep.org/NairobiConvention/> characterizes its functions as follows:

- provides a mechanism for regional cooperation, coordination and collaborative actions;
- plays a coordinating role in the implementation of [...] projects;
- is a platform for dialogue between governments and civil society at the regional and national level;
- offers a legal framework and coordinates the efforts of the countries of the region to plan and develop programmes;
- provides a forum for inter-governmental discussions;
- is a partnership convention. It recognizes the success [...] depends on [...] effective partnerships [...] between government, NGOs and the private sector.

The emphasis on partnership with civil society is noteworthy for a Convention that, like most RS, has in the past been an almost entirely governmental mechanism. Whether the governments have come around to being as enthusiastic as the Secretariat about NGO participation is not clear.

UNEP's website about the Eastern Africa RS states that it has two major ecosystems, the Agulhas and Somalia Current LMEs. These two are the target of three GEF International Waters projects, co-financed by NORAD and other donors and governments. One (WIO-LAB, implemented by UNEP RS, 2004-9) addresses land-based threats, another (SWIOFP, implemented by WB and involving Nairobi Convention and South-West Indian Ocean Fisheries Commission; just started) deals with commercial fisheries and the third (ASCLME, implemented by UNDP, just started) is the "bridging" project, with the objectives of generating oceanographic and biological information, carrying out a TDA, producing a SAP and strengthening scientific and management expertise with a view to introducing ecosystem-based management.

Less prominent but most widespread in the region has been the application of ICM (Torell et al, 2003). The approach has been widely applied in most countries of the Western Indian Ocean, including Tanzania (mainland and Zanzibar), Kenya and Mozambique. The local examples are numerous but of particular interest is the fact that in 1998 Tanzania, in collaboration with the URI Coastal Resources Center, initiated a project to develop ICM policy and institutional framework and actions at the national level. In recent years the Eastern Africa RS Secretariat has been promoting the adoption of the ICM approach in all countries of the region.

Conservation International is considering the development of a Seascape Initiative in the Western Indian Ocean, perhaps centred on Madagascar. With four of the five methodologies already active here, an obvious question is how the new initiative will relate to the others, in terms of geography, programme governance and strategy.

INVESTMENT

Investment by WWF in the EAME is composed of multiple projects of varying sizes, many of them specific to one or more of the 21 sites listed above. The total investment has grown to substantial levels (up to \$5m per year) (Amani Ngusaru, Eastern African Marine Ecoregion Leader pers. comm.) and is set to continue.

The RS programme now has consistent, modest income from member governments (\$566K in the period 2004-7) and more substantial support over many years from SIDA (\$1.3m in 2004-7) and from other donors.

The levels of investment by GEF and co-financers (mainly NORAD) in the two LMEs are much higher: \$78m during the period 2004-12: WIO-LAB \$11m, SWIOFP \$36m and ASCLME \$31m. Although the amounts are impressive, it is likely that some of the costs are too, with three different implementing agencies and certain activities that can be costly, such as oceanographic research. Also, these projects cover the full extent of the two LME's, whereas almost all EAME investments are narrowly targeted within the Ecoregion.

GEF also has a number of single-country projects in the region, which related to coastal and marine management, and in November 2005 approved a \$60m contribution over 10 years to a "Strategic partnership for a sustainable fisheries investment fund in the Large Marine Ecosystems of Sub-Saharan Africa". The partnership was designed together with WWF and WB, and the GEF contribution requires a 3:1 match. It covers 5 LME's.

<http://www.iwlearn.net/iw-projects/iwproject.2009-08-07.1860648574/view>

Investment in ICM has spanned many sites and been sustained over many years, with support from SIDA, USAID and others. The accumulated total could perhaps be in the tens of millions of dollars (Amani Ngusaru Eastern African Marine Ecoregion Leader. pers. comm.) Thus it is clear that this area has been the target of heavy investment, aimed at achieving conservation and sustainable use of an ecosystem that is vital to hundreds of coastal communities.

CONSERVATION OUTCOMES

Some of the outcomes associated with the EAME Project are as follows:

- Documentation: vision, strategy and conservation plan documents are complete.
- The dugong status report.
- Declaration of the Zambezi delta as a Ramsar site.
- Establishment of Primeiras and Segundas National Park in Mozambique and the Rufiji-Mafia-Kilwa seascape programme (priority areas of the Ecoregion)
- Approval of the management plan for Quirimbas in Mozambique, the largest MPA in EAME.
- Policy analysis process for development of a national oil and gas strategy in Tanzania.
- Production of the final draft of the fisheries policy in Kenya has also been produced.
- Elimination of poaching of marine turtles within the Mafia Island Marine Park.

All these are 1st Order outcomes, except for the last one, which is 2nd order. We understand that there have been many more 2nd Order and some 3rd Order outcomes achieved, but these are at the level of the site-based projects, which are listed in WWF's website:
http://www.panda.org/what_we_do/where_we_work/east_african_coast/

After achieving little in the first 15 years, the RS programme has had increasing impact since about 2001, with SIDA-funded projects and then the GEF/NORAD-funded WIO-LaB project all being crucial in this regard (UNEP report for COP5: <http://www.unep.org/NairobiConvention/about/Political.asp>). Examples are:

- A regional TDA on land-based sources of marine pollution, and SAP based on it;
- Progress towards integration of coastal policies and management policies;
- Establishment of Nairobi Convention Clearing House Mechanism, as a forum for sharing current information about the region;
- Demonstration projects to build management and technological capacity for land-based activities.

With occasional exceptions, like the last in this list, the outcomes are 1st order, mainly in the areas of capacity building (e.g. for MPA management), the control of land-based threats to the coastal/marine environment, and the promotion of ICM throughout the RS, in line with the Seychelles Statement on Integrated Coastal Zone Management (1996).

The WIO-LaB project can be considered both RS and LME, so both can be said to have contributed to the results in terms of building policies, regulations and capacity for reducing land-based threats, especially pollution. The other two big GEF projects are still in their early stages, having taken a long time to develop, so it is too early to expect significant outcomes. The scale of the investments raises some questions about implementation capacity, and hence about institutional and financial sustainability.

Like WWF's EAME programme, the array of ICM activities consists mainly of projects at the level of site or a bit larger (what WWF might call a complex or seascape). Torell et al (2003) list seven such "local" projects within Tanzania alone, including some operating in the same places as EAME and there are many more elsewhere in the region. This study cannot investigate the outcomes achieved, but it is fair to suppose that there will be an array of 1st, 2nd and probably 3rd Order local outcomes. Torell et al (2003) also describe the national ICM initiative in Tanzania, the goal of which was to "establish a foundation for effective coastal governance in Tanzania". The lead national institution was the National Environment Management Council, and the main achievements were:

- A formalized mandate for national-level coastal management. This took the form of a National Integrated Coastal Environment Management Strategy, to the year 2025. It is not legally binding but is an official national strategy, and the inter-sectoral, participatory process by which it was prepared adds substantial value. Some elements, such as control of mariculture development, began implementation even before the strategy was approved.
- Establishment of a nested planning decision-making system, which links the local to the national levels.
- Improved knowledge and human capacity in relation to ICM.
- Learning from and contribution to regional collaboration and capacity building efforts, including those carried out under Nairobi Convention.

We do not have information about the outcomes of Phase III of the programme.

FINANCIAL SUSTAINABILITY

The scale of investment in the region by WWF is high and the financial sustainability of the sites they are supporting, as well as national and regional processes, is an important issue for WWF. However, we are not aware of any specific measures taken to achieve financial sustainability.

The core needs of the Secretariat of the RS programme are covered by (i) UNEP, which hosts it, (ii) secondment of staff by governments (member States and others), (iii) donor funding, especially SIDA and

(iv) annual contributions to the Trust Fund by member governments. Ultimately, sustainability will depend on the last of these sources becoming larger and more reliable. Contributions have increased and most member countries pay something each year, nevertheless the total is only of the Order of \$150-200K per year, which is a fraction of the core budget.

The scale of the LME investments by GEF and NORAD is large but we have not investigated what the estimated implications are in terms of increases in national and regional budgets, in order to sustain what the projects develop. It is common for GEF projects to include investment in the development of sustainable financing mechanisms, but we do not know how successful they have been in achieving this aim.

We have not investigated the issue of financial sustainability within the portfolio of ICM projects in the region.

SUSTAINABILITY OF GOVERNANCE

There is a complex array of institutions and programmes active in one way or another in coastal and marine management in the region, and it is difficult to perceive a common vision for coastal and marine governance. The EAME programme is clearly a WWF-led programme, which has established connections with local, national and regional governance structures. However, whether it in fact strengthens that nested, inter-connected governance hierarchy is unclear. It may well be doing so but there are also risks associated with large-scale investment, which runs parallel to institutionalised structures and leaves ultimate investment decision-making in the hands of an NGO or donor. Under-funded national institutions can find their authority undermined. Also, the committees and liaison officers for the EAME programme may be the same or different from the focal points of the RS programme, the LME programme and national ICM structures.

The RS programme, by contrast, is firmly embedded within the institutionalised governance structure, since it is an inter-governmental mechanism. Furthermore, the Secretariat has moved in recent years to enhance its effectiveness, by strengthening links with civil society. While some member governments may still be somewhat uneasy about this more open “partnership” model, it is surely making for a more credible, resilient body, with a much wider constituency of supporters and stakeholders to ensure its sustainability.

Under the RS umbrella, the Secretariat for Eastern Africa Coastal Area Management served for a few years as a means to assist the Eastern African coastal countries to implement and coordinate coastal management activities, following up on the 1993 Arusha Resolution and the 1996 Seychelles Statement on Integrated Coastal Zone Management. Priority areas included capacity building, environmental assessment of coastal activities, and sustainable financing of coastal management. However, it lasted only as long as the donor funding (mainly SIDA) and ceased to exist around 2003, suggesting that it was not sufficiently valued by actors in the region for them to pay for its services.

Of the GEF/LME projects, the one that is nearing completion, WIO-LaB, seems to have worked with and through the RS Secretariat and strengthened governance structures and institutions in relation to land-based pollution at the regional level and national levels. The other two GEF/LME projects are harder to fathom. In particular, the ASC-LME project includes, under the objective of strengthening scientific and management expertise, the aim “to implement an ecosystem approach to management of the LME resources through information-driven governance and policy reforms at the regional level, in partnership with the member countries and other stakeholders”. With other components of the project focusing on oceanographic research and TDA, we have the impression that the over-arching nature of governance and the supporting role of science may have been reversed. There are parallels here to the issues discussed below for the Caribbean, to which innovative solutions have been proposed (see Section A5.4.2). The current suite of regional and national projects, with multiple implementing agencies, have a strong emphasis on technical aspects rather than governance. By way of illustration, we can speculate what the GEF portfolio would have looked like, if its starting point had been a comprehensive analysis of the inter-connected hierarchy of governance structures, institutions and capacities, from local up to regional levels, and its central objective had been to build sustainable, effective governance. This approach might have generated a very different portfolio, perhaps with more investment in addressing issues of resource access rights, empowering and enabling local communities to manage their resources with support from local government, supporting sustainable livelihoods, strengthening critical institutions, making judicial processes quicker and more transparent, establishing incentives for private sector engagement in conservation, or creating sustainable financing mechanisms for institutions and processes that are crucial to the nested governance system. This list is not a recommendation, just an illustration of the kinds of activity the alternative approach might generate.

It has also been suggested that the ASC-LME programme structure might evolve into a permanent mechanism for regional cooperation. On the face of it, this would be a duplication of the RS secretariat and would debilitate the latter, because it would be a parallel mechanism with overlapping functions and more money. Strengthening the institutionalised RS mechanism would seem to be a much better way to go, especially given that the RS has brought NGOs and private sector within its array of close partners.

Governance strengthening is at the core of most ICM projects and this is well illustrated by the examples described by Torell et al (2003). Indeed, the rationale for developing the Tanzania national project was that the collection of local ICM projects would benefit greatly from strengthening of policy and capacity further up in the governance system i.e. at the national level. Furthermore the project setting all this up itself operated within the relevant government institution and functioned as a model for such a national ICM programme, focusing on roles such as monitoring implementation of policy, providing technical support to local level ICM, facilitating exchanges between local ICM projects and so on. This facilitated the transition from project to institutionalised system.

As CI plans for a possible Western Indian Ocean Seascope, a logical starting point would be an analysis of this array of geographies and associated regional institutions and coordination mechanisms, so that the Seascope programme could reinforce existing mechanism(s), rather than add to the complexity. Such an analysis was not a feature of preliminary planning for the proposed Seascope in 2006-7, but that situation may well have changed by now.

An important, positive development in terms of governance is the establishment in 2006 of the "Consortium for the Conservation of Coastal and Marine Ecosystems in the Western Indian Ocean", known as WIO-C, with the aim of finding ways to make the multiplicity of projects more effective in influencing decision-making and changing the face of natural resource management in the WIO (<http://www.wiolab.org/links/2other-wio-projects>). The nine founding members were UNEP, WWF, IUCN, WIOMSA, EAWLS, CORDIO, IOC, WCS and NEPAD. An important statement by the members is that they are committed to "anchor the consortium in the Nairobi Convention".

CONCLUSIONS

The move from an assortment of site projects to a MER programme has made an important difference for WWF's programme in the field, with sites being chosen and recognized for their contribution to the long-term Biodiversity Vision, increased communication between them, increased attention to larger-scale factors such as national policies, and a big increase in total WWF funding. These benefits will be maintained as WWF shifts the approach to that of EAME being a Network Initiative. However, the benefits seem to derive simply from local projects being connected to the bigger picture, rather than from anything to do with the Ecoregion as a biogeographical unit or with Ecosystem-Based Management. The one exception to this is that the long-term species, site and "seascope" objectives were set in the context of an Ecoregional expert analysis.

Looking at the four approaches being applied in the region, the impression gained is of multiple connections but no real long-term, shared vision of coastal and marine governance at multiple scales from local to regional. The RS programme and many ICM projects definitely make important contributions to strengthening governance, the former mainly at the regional and national levels and the latter mainly at the local level but also, in at least one case, at the national level. On the other hand, decision-making and liaison on the EAME programme uses EAME-specific structures and processes, with a decisive role for WWF, which could reduce the effectiveness of its efforts to strengthen governance. The GEF/LME projects seem to be technically focused, with governance having a subsidiary rather than over-arching role.

We also have a sense of a multiplicity of implementing agencies, focal points, liaison officers, advisory committees and monitoring mechanisms, again driven more by the requirements of individual projects and donors than by an overall plan for good communications, coordination, accountability and adaptive management.

Perhaps the establishment of the WIO-C will be a significant step towards not only increased coordination but also a more governance-driven approach by the major investors in the region.

This case study is too complex to allow us to draw definite conclusions; probably we are missing or misinterpreting important information. Nevertheless, we can recommend that, if CI is to launch a Seascope Initiative in this region (which would be welcome), then it should analyse the governance structures it is trying to strengthen, including the multiple levels and the inter-connections between them, and how it can

most strategically achieve that strengthening. The governance of the Seascape Initiative itself can make a difference, if it is designed from the outset to do so, rather than as a conventional project. In this way, CI's funding— quite modest in comparison with the GEF and WWF investments— could add substantial value.

A5.2.2 GALAPAGOS MARINE ECOREGION–WWF

DESCRIPTION

The Galapagos MER corresponds to the Galapagos Marine Reserve, comprising about 130,000 sq km of ocean in and around the Galapagos Archipelago in the Eastern Tropical Pacific. The Marine Reserve is a multiple use MPA, with some 18% of the coastline in No Take Zones, but all offshore areas open to “artisanal” fishing but not industrial fishing. Since 2001 it has been part of the Galapagos World Heritage Site, which in 2006 was put on the list of World Heritage in danger, due to the multiple threats related to exponential growth in human population and tourism, a consequent increase in invasive alien species, unsustainable fishing and weak governance.

Research by the Charles Darwin Foundation has led to Galapagos Marine Reserve being upgraded in MEOW to a “realm”, containing three Ecoregions: North, West and East Galapagos (Spalding et al, 2007). However, this has not had any practical effect on the WWF programme. WWF had been supporting conservation of Galapagos on and off for many years, before defining it as two Ecoregions (marine and terrestrial) and producing in 2002, together with the Charles Darwin Foundation, the 50-year Biodiversity Vision for them. The Vision document, which included quite detailed scenarios based on different assumptions about future policy and management decisions for Galapagos, had a significant effect on the WWF programme of investments, but relatively little impact outside that. This may be attributed to relatively narrow ownership of the Vision (principally the scientific and conservationist community) and lack of follow-up, including a lack of socio-political, economic and institutional analysis to complement the biological analysis, and hence allow the development of a conservation strategy. This may have been due mainly to personnel changes in key institutions (CDF and the Galapagos National Park).

For WWF, the Biodiversity Vision led on to the development in 2005 of a new strategy for their investment in Galapagos, which set its priority conservation targets, integrated marine and terrestrial conservation, and defined a niche for WWF within a broader strategy for the archipelago. This strategy was produced in-house and then refined with key partners in Galapagos.

The WWF strategy for the Marine Ecoregion includes support to zoning and enforcement, as well as the promotion of sustainable artisanal fisheries. The latter involves collaboration with WWF's fisheries program, which operates at the scale of the whole eastern Pacific, engaging with the fishing industry through IATTC and promoting voluntary measures for small-scale fishers to reduce turtle by-catch by using “circle hooks”.

The Ecoregion lies within the area of the ETPS Initiative and there has been collaboration with CI on activities of mutual interest, such as the introduction of a satellite-based Vessel Monitoring System. In general, the respective strategies are mutually compatible, except for some divergence in relation to fisheries, with CI being less supportive of fisheries development, on the grounds that a substantial reduction of fisheries in Galapagos could, in CI's view, lead to major gains, in terms of biodiversity, economics (improved tourism resource), society (reduced conflict) and sustainability (especially resilience to climate change). The difference may lie less in whether such a win-win situation could theoretically exist and more in whether there is a socially and politically feasible route to get there. Even though this example of divergent strategies exists, its origin has nothing to do with differences between Seascape and Ecoregion approaches.

The Ecoregion also lies within the area of the South-East Pacific Regional Seas program. However, there has been almost no interaction between the two.

INVESTMENT

Designation by WWF of the Galapagos Marine Reserve as a priority Marine Ecoregion has had a substantial impact on the level of funding made available by WWF. After several years at a modest level it rose sharply to around \$1m a year from 2005 onwards, plus an additional \$500K in 2007 to repair a patrol boat. Donors include private individuals and foundations supporting WWF, as well as USAID, which funded

the work of an alliance of nine NGOs, headed by WWF.

There are many organisations involved in conservation of Galapagos, and most WWF activities have benefited from co-financing. This is probably because of common interests and/or the priorities identified by the Galapagos National Park Service, rather than shared commitment to WWF's Biodiversity Vision and strategy for the Ecoregion, which are not widely known.

OUTCOMES

The surge of investment in the past five years, together with co-financing by CI, Wild Aid and others, has generated significant conservation outcomes, especially 2nd Order outcomes, notably:

- Definition and physical demarcation of the No Take Zones with the Galapagos Marine Reserve.
- Introduction of VMS to control boats over 20 tonnes, coupled with installation of software for "virtual" demarcation i.e. sounding an alert on board when the boat approaches a No Take Zone. VMS for smaller boats is in the pipeline.
- Development of alternative fishing methods including (i) the deployment of Fish Aggregating Devices (FAD's) within the Reserve but away from the most sensitive areas (coasts and seamounts), and (ii) piloting an activity whereby tourists accompany fishermen and join in fishing activities.

In terms of 3rd Order results, there is evidence that the FAD's and fishing with tourists are generating economic returns for fishermen. It is too early to say whether there are corresponding biodiversity benefits.

FINANCIAL SUSTAINABILITY

Compared to most conservation authorities, the Galapagos National Park Service, together with collaborating agencies (notably the Ecuadorian Navy) has a huge task to protect 130,000 sq km of ocean and a large archipelago plagued with invasive species. It also has very substantial annual income, which has grown rapidly since the enactment in 1998 of the Special Law for Galapagos, which allowed about 50% of tourism fees to be retained for conservation purposes and managed with some autonomy. The Park Service's annual budget jumped from around \$1m before the law to around \$4-5 million, and the tourism boom of the past decade has increased this to an amount in excess of \$12 million. So with a well funded institution having responsibility for the whole protected area, is financial sustainability of the Marine Ecoregion assured? Not necessarily. The quality of expenditure has been patchy, there is a need for institutional reform and strengthening of the Park Service, and the government has re-centralized the financial management of the Park Service, making it more difficult to spend the budget at all, let alone effectively. Lastly, a new law is in preparation, which will change both the institutional arrangements and the financial basis of the Park and Marine Reserve. Ecuador's new Constitution, approved in 2008, makes conservation the priority in Galapagos, so this legislative reform represents an opportunity to put things right. However, it also gives increased power to entities that have hitherto been advocates of development that is detrimental to conservation, so there is also a risk that these and other interested parties will use misleading arguments to override the needs of conservation in terms of financing, governance and policy. Galapagos is never short of controversy!

Recognizing that the financial boom time for the Park Service was unlikely to last, WWF has proposed initiatives to provide the Park Service with additional, more flexible income, through a specific window within National Environment Fund, and/or raising donations from visitors to Galapagos. The first of these efforts has not yet prospered. The second is likely to materialize. If it does, then it is vital that it be done in a way that increases rather than decreases the core funding available to the Charles Darwin Foundation, which depends on such donations. A strong, effective CDF is essential to the sustainability of Galapagos but, despite its long history, its financial base remains inadequate and insecure.

SUSTAINABILITY OF GOVERNANCE

In governance terms, the Galapagos Marine Ecoregion is a single protected area, with a fairly well defined set of stakeholders, so does not pose the same challenges as a multi-country ecoregion. Nevertheless,

it is a complex area, not only because of the different interests (tourism, fishing, science, biodiversity etc) but also because of the need to balance local interests with the national commitment to conserve the archipelago. The majority of Galapagos residents are people who have migrated to the archipelago for economic reasons. Policies and decisions necessary for conservation, such as limits on growth or removal of subsidies, will not be popular locally. The Management Plan of the Galapagos Marine Reserve, approved in 1999, set up a participatory governance structure, which sought to balance sectoral interests and to balance local and national interests, and to put a premium on local consensus. It has had successes and failures, the evaluation of which is beyond the scope of this study. The new law for Galapagos, mentioned above, will undoubtedly modify the governance structure. The challenge for WWF's Marine Ecoregion programme will be first to provide advice so that the strengths of the current governance structure are retained and built upon, and then to support the building of capacities necessary for the new governance structure to work effectively.

CONCLUSIONS

The existing legal framework and governance structure for the Galapagos Marine Reserve have made it relatively straightforward for WWF to develop an integrated strategy and programme, in pursuit of its Biodiversity Vision for the Galapagos Marine Ecoregion. That is not to say that the conservation challenges are minor—on the contrary, they are so complex that there is not consensus on the optimal strategy for addressing them—just that operating at the Ecoregion scale is feasible. WWF has made substantial investments in the Ecoregion in the past 5 years and the programme has achieved significant 2nd Order outcomes in line with the strategy it is pursuing, mainly with the Galapagos National Park Service. There are many international conservation players in Galapagos and several of them have contributed to these outcomes. Hopefully, the 2nd Order outcomes will lead on in due course to 3rd Order outcomes, i.e. measurable biodiversity benefits, but WWF and others will need to remain engaged for several years to come, as Galapagos is living through a period of rapid change in legal, institutional, political, social, economic and—not least—ecological terms.

A5.3 LARGE MARINE ECOSYSTEMS

A5.3.1 UNDP/GEF YELLOW SEA LARGE MARINE ECOSYSTEM PROJECT AND OVERLAPPING INITIATIVES (MER, RS)

DESCRIPTION

The Yellow Sea is an area of high biodiversity and a source of marine resources for human nutrition, economic development, recreation and tourism. It supports substantial populations of fish, invertebrates, marine mammals and seabirds. Globally, the Yellow Sea LME has been one of the most significantly affected by human development. The Yellow Sea faces serious environmental problems, many of a transboundary nature, which arise from anthropogenic causes. China, Japan and Korea, with their massive populations living in the Yellow Sea drainage basin, share common problems with pollution abatement and control from municipal and industrial sites, and contributions from non-point source contaminants from agricultural practices and sea-based sources. Loss of biomass, biodiversity and habitat results from intensive economic development in the coastal zone and from the unsustainable exploitation of natural resources. The countries are urgently seeking to address problems of reduced fish catch and shifts in species biomass and biodiversity (caused in part by overfishing), red tide outbreaks, degradation of coastal habitats (caused by explosive coastal development), and effects of climate variability on the YSLME.

The YSLME project is a GEF/UNDP project, approved in 2002, which focuses on transboundary issues. The objective is to achieve ecosystem-based, environmentally sustainable management and use of the YSLME and its watershed by reducing development stress and promoting sustainable exploitation of the ecosystem of this densely populated, heavily urbanized and industrialized, semi-enclosed shelf sea. The areas of activity relate to making fishing more sustainable, curbing pollution, protecting biodiversity and building capacity for ecosystem-based management. As in all GEF LME projects, the first step was the TDA.

The TDA has provided additional knowledge about the Yellow Sea and identified a series of management actions for the region, for implementation through the regional SAP. China and ROK are also preparing National SAPs and have increased cooperation on environmental management. This project works closely with the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the North-West Pacific Region, known as NOWPAP. This is a Regional Seas programme, covering a wider area than the Yellow Sea. The overall goal of NOWPAP is “the wise use, development and management of the marine and coastal environment so as to obtain the utmost long-term benefits for the human populations of the region, while securing the region’s sustainability for future generations”.

The YSLME project also collaborates with WWF, for whom the Yellow Sea is one of their 35 “Critical Places” around the planet, especially for its marine mammals and sea turtles, as well as its importance for human well-being. The YSLME Project has worked closely with WWF Marine Ecoregion since project inception, ensuring that a common front is presented to the public and dividing tasks e.g. YSLME targets national and local government and youth, while the WWF Yellow Sea Ecoregion Support Program targets local government, local communities, and the general public.

Yellow Sea Partnership

The Yellow Sea Partnership is a mechanism to facilitate cooperation and coordination among various organisations which conduct activities for environmental conservation in the Yellow Sea. The Partnership is expected to maximise the effectiveness and efficiency of each conservation activity. Under the Partnership, member organisations or Partners communicate and collaborate actively through holding regular meetings, developing a strategy and plans, and implementing joint activities. The Yellow Sea Partnership is open to any interested parties, including those representing scientific, academic, governmental, non-governmental, and international organisations, in addition to the general public, community groups, and private sector. Currently, there are 13 organisations and programmes participating in the Partnership (www.yslme.org):

- Global Village of Beijing (GVB)
- Korea Ocean Research and Development Institute (KORDI)
- Marine Stewardship Council (MSC)
- Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)
- The Nature Conservancy (TNC) Beijing
- UNEP Regional Seas Programme Northwest Pacific Action Plan (NOWPAP)
- UNDP/GEF Yellow Sea Large Marine Ecosystem (YSLME) Project
- United Nations Development Programme (UNDP) China
- Wetlands International (WI)
- Worldwide Fund for Nature – China
- Worldwide Fund for Nature – Hong Kong
- Worldwide Fund for Nature – Japan
- WWF/KORDI/KEI Yellow Sea Eco-Region Planning Programme (YSEPP)

INVESTMENT

The GEF project has a budget of \$25 million, of which \$14m come from GEF and the rest from governments and UNDP. NGOs and research institutes have joined the Yellow Sea Partnership and also contribute resources.

OUTCOMES

The main outcome so far of the YSLME project is the TDA itself, which has provided additional knowledge about the Yellow Sea, for example in relation to land-based sources of pollution, red tides, the status of fisheries etc. The results so far are predominantly 1st order: the establishment of the plans, the structures and mechanisms for implementation, and the political commitment. The process has increased co-operation between China and ROK for certain issues and ensured that

countries endorsing the SAP are committed to the proposed management framework of the LME. Stakeholder consultations carried out when preparing the National SAP have ensured a high level of support for the SAP amongst decision-makers.

Some 2nd Order results have also been registered, including reduction in non-point sources of nutrients, which cause red tides, and improved control of coastal development projects. Further 2nd and 3rd Order results should be generated as the SAP is implemented, particularly in regard to reduction of fishing effort (a 30% reduction has been agreed by China and ROK) and development of economic alternatives based on mariculture.

In parallel with this diagnostic and start-up phases of YSLME, the NOWPAP programme has been proceeding with a variety of activities, implemented through the four Regional Activity Centres (RACs) and their networks, set up in 2000-2002:

- Integrated Report on Harmful Algal Blooms (HAB);
- Countermeasures against HABs in the NOWPAP Region;
- Integrated Report on Remote Sensing Applications for Marine Environment Monitoring;
- First NEAR-GOOS-NOWPAP Joint Training Course on Remote Sensing Data Analysis
- Eutrophication Monitoring Guidelines by Remote Sensing;
- Regional Databases on Institutions, Experts, GIS, Remote Sensing Applications and marine litter.
- Regional Oil Spill Contingency Plan with Extended Geographical Coverage;
- Regional Reports on Shoreline Clean-up, Sensitivity Mapping and Dispersant Applications
- Regional Overview on Atmospheric Deposition of Contaminants to the Marine and Coastal Environment;
- Regional Overview on River and Direct Inputs of Contaminants to the Marine and Coastal Environment.

Since the 10th Intergovernmental Meeting (2005), new activities have been initiated by the Regional Action Committees such as:

- Regional and National Reports on Marine Biodiversity Data and Information;
- Regional Overview and National Reports on Marine and Coastal Nature Reserves;
- Internet Communication System for information on marine environment quality;
- Regional Contingency Plan for Hazardous and Noxious Substances (HNS) as an integral part of the already existing oil spill contingency plan;
- Integrated Coastal Zone and River Basin Management (ICARM): on-going;
- State of Marine Environment Reporting (SOMER).

Several activities have been / are being implemented jointly by several Regional Activity Centres and the Regional Coordinating Unit (RCU):

- Marine Litter Activity (MALITA). This activity has been completed successfully in 2007 due to the joint efforts made by RACs and RCU and strong support by the member states. The next stage of this activity is the NOWPAP Regional Action Plan on Marine Litter (RAP MALI) which is implemented since 2008.
- Regional Overview of Legal Aspects of the Protection and Management of the Marine and Coastal Environment of the Northwest Pacific Region. This overview was updated
- State of Marine Environment Report (SOMER). POMRAC prepared a comprehensive review of marine environmental problems in the region based on the analysis of data and information from different sources, including other RACs

FINANCIAL SUSTAINABILITY

The YSLME Project does not yet have a long-term sustainable financing mechanism. The expectation is that, with enhanced knowledge of the environmental issues and how to manage them, as well as direct experience of the social and economic benefits, the countries concerned will sustain what this externally funded project initiated. ROK is no longer eligible for GEF funding, but will during Phase 2 continue to apply the 5-module approach to monitoring and adaptive management of the LME.

SUSTAINABILITY OF GOVERNANCE

Support for each sub-project varies, mainly because of differences in the way that governments and decision-makers have been approached. Cultural, political and social sensitivities need to be addressed and understood before deciding how best to approach decision-makers.

The YSLME Project has sufficient recognition, support and legitimacy with stakeholders to be resilient to political changes in the participating country, including persistence through changes of government. In the opinion of YSLME project personnel, it is the approach to dealing with governments and stakeholders that is crucial. They do not really care about the differences between LME, MER, RS and other approaches, as long as their objectives and interests are understood and incorporated into the project.

There is an intention to set up a LME Commission similar to that of the Benguela Current (Section A5.3.3).

CONCLUSIONS

According to Ms Connie Chiang, Environment Officer YSLME Project (pers. comm.), the choice of LAMM approach does not determine success. Rather, success depends on many things, including, but not limited to, awareness of the importance of marine conservation, the political will of stakeholders to carry out the project, relevance to the implementation site, adoption of an approach that accepts stakeholder input and is not too top-down, and a good project implementation team. If the YSLME project were not established, then another project, such as NOWPAP, could serve the same purpose of providing a means by which countries can collaborate in addressing their shared environmental problems. Indeed NOWPAP has been working for some years on issues, such as pollution, which overlap with YSLME.

A5.3.2 UNEP/GEF SOUTH CHINA SEA LARGE MARINE ECOSYSTEM PROJECT

DESCRIPTION

The UNEP/GEF Project “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” (South China Sea Project) was initiated in 1996 by the secretariat of COBSEA and the UNEP/GEF Secretariat in Nairobi. It involves seven countries: Cambodia, China, Indonesia, Malaysia, Philippines, Thailand and Viet Nam. As for all GEF projects in LMEs, funding approval by the GEF required the preparation of a Transboundary Diagnostic Analysis (TDA) and a Strategic Action Plan (SAP).

Once a consensus of all countries on the TDA and SAP was arrived at in 2002, three years were spent further developing the SAP by forming national committees responsible for the four components of the project. Three priority areas of concern identified in the TDA were: the loss and degradation of four coastal habitats; over-exploitation of fisheries in the Gulf of Thailand; and land-based pollution. The fourth component of the project was that concerned with regional coordination including facilitation of national level execution and securing inter-country agreement on project related matters. After three years, countries chose demonstration sites for each of the habitats. This project was undertaken by national level institutions contracted directly to UNEP as the Implementing Agency of the GEF. The management structure puts decision-making power in the hands of the Project Steering Committee (PSC), which is composed solely of two representatives of each participating country (total 14 members), with the Project Director serving as Secretary to the Committee. In 2001, this was the only multi-lateral inter-governmental forum addressing issues specific to the South China Sea and it is considered to have helped the success of the project, by ensuring real ownership of decisions by the governments concerned, without undue influence by donors or other parties (UNEP, 2005b). (www.unepscs.org/SCS_Documents/startdown/270.html).

The project structure emphasized and fostered networking in several different ways. The opportunities for groups of specialists from each country to meet together are perhaps the simplest. They serve as a conduit for ideas and information from the national to the regional from the regional to the national. Thus, the mangrove scientists are networked together and linked nationally and regionally with other habitat specialists, pollution experts, fisheries specialists, lawyers and economists. By having each regional entity working together, the opportunities for learning are expanded.

INVESTMENT

One of the conditions imposed by GEF was that reciprocal funding be found on a dollar for dollar basis for any funds provided.

The composition of the PSC results in the country representatives themselves deciding upon what will and will not be done and the allocation of budgets to activities, within the overall limitations set by the GEF. For habitat degradation and loss GEF provided US\$8.8 million, governments US\$7.4 million and other sources US\$4.9 million; for overexploitation of fisheries in the Gulf of Thailand US\$1.7 million, 0.7 million and 1 million from GEF, governments and other sources respectively; for land-based pollution US\$1.8 million, 0.5 million and 0.1 million respectively and for project coordination and management US\$3.5 million, 0.3 million and 0.5 million respectively. Overheads were supported by GEF at US\$0.6 million.

There are no current plans for a second phase of funding for the project.

STRUCTURE AND OPERATION OF THE PROJECT

This project operation unveiled as a massive organisational task, involving the day-to-day operation

of the network; the convening of 100 regional meetings in 54 months; management of all financial matters associated with a budget of 36 million US\$; and due diligence oversight of 59 operational Memoranda of Understanding.

The regional meetings developed a common regional perspective and formed an epistemic community of scientists and managers with a common regional perception of marine environmental problems and potential solutions. The interactions of this community with political decision makers were strengthened by: the convening of all regional meetings at the demonstration sites; the convening of three regional scientific conferences with 120, 180 and 150 participants; and three Mayors' Roundtables. During these events scientists and operational level managers interacted with political decision makers from the central, provincial and local, government levels.

At the national level over 70 reviews of the state of significant coastal habitats, over fishing and land-based pollution were published in national languages and the texts, in English, were consolidated into regional publications. Based in part on these reviews, in excess of 160 coastal locations were characterised with respect to their biological diversity, national, regional and global significance using a regionally developed and agreed set of criteria (Pernetta, 2009).

CONSERVATION OUTCOMES

The overall thrust of this project was about establishing the knowledge base, the political commitment, the coordination mechanisms and the capacities to take action on all the transboundary problems identified. Thus the outcomes are predominantly 1st order.

Some 39 sectoral National Action Plans (NAP's) were developed, as the basis for the elaboration of the regional SAP, the final text of which was approved by the eighth and final meeting of the Project Steering Committee in August 2008. The SAP was built on the work of the four habitat sub-components, together with that of the fisheries and Land-based Pollution components.

Implementation of the NAPs in support of the SAP targets is already underway in all countries. In relation to land-based pollution, certain 2nd Order results have been produced: application of agreed water quality standards in prioritising action on pollution hotspots at a regional level; and the implementation of two pilot activities using innovative ways of addressing sewage pollution.

The project, in partnership with FAO and SEAFDEC, (particularly the latter organisation) has developed and promoted the concept of fisheries refugia culminating in the publication of regional guidelines for their establishment as part of the ASEAN/SEAFDEC regional guidelines for implementing the FAO "Code of Conduct for Responsible Fisheries". This concept represents an innovative approach to addressing the problems of over-fishing and getting fisheries and environmental managers to jointly evaluate mechanisms for maintaining fish stocks in areas where the predominant fishing effort is from the small-scale sector. The refugia concept and approach developed over the last 18 months of the South China Sea Project became a 2nd Order outcome soon after, when it was adopted and applied in two countries.

Since information is a major output of the project, great effort has been made to ensure its accessibility. On Google Earth one can interactively access information about the project's partner network, explore the project's suite of habitat demonstration sites, and access information and data for more than 135 mangrove, coral reef, seagrass, and wetland sites studied during the project.

Two significant contributions to achieving project success were contributed by the Regional Task Force on Legal Matters. The first was the development of proposed mechanisms for implementation of the SAP under the umbrella of COBSEA and the second was the commissioning of the review of regional seas governance mechanisms. These contributions provide a solid basis for consideration of more formal, long-lasting arrangements for regional cooperation in the management of the South China Sea.

Another significant and perhaps unique element of the South China Sea project was the development of detailed economic values for coastal habitat goods and services and their use in determining regionally applicable Total Economic Values (Pernetta, 2009).

In addition to this wide-ranging work on setting up the mechanisms for large-scale, cooperative implementation, the project also implemented demonstration projects. From 160 locations characterized in national reports, 11 demonstration sites were selected in an objective manner using a scientifically based, regionally agreed approach involving cluster analysis and ranking based on agreed criteria. The demonstration site and pilot activities formed a major part of the operational phase of the South China Sea Project, and are mentioned in the project summary as follows:

“...nine demonstration management activities at sites of regional and global significance; a regional management plan for maintenance of transboundary fish stocks in the Gulf of Thailand; pilot activities relating to alternative remedial actions to address priority transboundary pollutants and adopted water quality objectives and standards. Activities include national level analyses and reviews, management of demonstration activities and regional harmonisation and co-ordination of national level actions”

The original planned purpose of the habitat demonstration sites and pilot activities in land-based pollution management was to serve as demonstration approaches that could be incorporated into the activities undertaken in the framework of the SAP and NAP implementation. It was foreseen therefore that in parallel with the elaboration of the NAPs and SAP, practical, on-the-ground activities would be executed that showed how the actions envisaged in the NAPs and SAP could be implemented over the next ten years (Pernetta, 2009). The project report lists ten achievements of the demonstration sites and pilot activities:

- Establishment and operation of a regional network to ensure information and experience exchange in the region.
- Establishment of effective mechanisms for local coordination of planning and management of the environment and natural resources.
- Capacity building for long term management of coastal resources and environment
- Provision of sound scientific information and data as baselines for habitat and resource management
- Planning for long term, multi-sectoral coordination and management for multiple use of resources
- Promotion of knowledge and awareness for consensus and support to sustainable management practices.
- Support for supplementary or alternative livelihoods of local communities
- Encouraged transboundary management of resources and environment between Kampot–Phu Quoc and Trat–Peam Krasop
- Rehabilitation of mangroves and initial improvement of habitat state in transplanted corals.
- Pilot activities to reduce waste discharge to the marine environment

In fact, these are all 1st and 2nd Order outcomes, except the ninth achievement, which may be a 3rd Order but no areas of rehabilitation or transplanting are given. The conservation outcomes have not yet been realized (Pernetta, 2009).

FINANCIAL SUSTAINABILITY

Although this was a GEF Project set to run for five years the implication was that countries would benefit from the demonstration sites and pilot studies and follow these with interventions of their own. There has not been enough time to determine whether this has occurred or will occur. Probably, some countries will have greater commitment and capacity to follow through than others. Furthermore, focal points for each of the habitats and components were established in each of the countries and it was expected that these focal points would continue in perpetuity enhancing the knowledge and conservation of these habitats in the case of the habitat component and fisheries and land-based pollution components.

The operational demonstration sites are co-financed from municipal, local and provincial government levels greatly exceeding the original estimates at the time of project approval.

The Regional Task Force on Economic Valuation has completed specific technical guidelines for the determination of the economic values of habitat goods and services; assembled a regional database of empirical economic values; and developed “regional total economic values” for specific habitats. The purpose of this activity was to complete the cost benefit analysis of actions outlined in the Strategic Action Programme as a mechanism for justifying regional actions in addressing the problems of marine and coastal environments.

SUSTAINABILITY OF GOVERNANCE

The project was directed through the Project Steering Committee (PSC) all of whose members were national representatives. Decisions on the governance of the project came from the PSC. The everyday running of the project was by the Project Coordinating Unit. At the demonstration site level there was governance by participants and municipal, local and provincial governments. With funding being available, the governance of the demonstration sites should continue until their completion. A review of Regional Seas governance mechanisms including instruments and institutional arrangements and an evaluation of their applicability to the South China Sea was commissioned. This provides a solid basis for consideration of more formal, long-lasting arrangements for regional co-operation in the management of the South China Sea.

Clearly, much attention has been given to the question of sustainable governance. Indeed, the project has been designed and implemented with the idea that once all the structures and mechanisms are in place, and the technical information is available, then implementation will follow, even though there is no Phase 2 project. However, five years is a short time to achieve the momentum for sustainable, self-driven implementation, especially with the demonstration projects having themselves been only partially implemented. Countries with weaker governance and administrative capacity may struggle to move to the stage of full implementation without the support of a donor-funded project.

Given the likely challenge of maintaining the momentum, it is curious that the LME project did not seek greater collaboration with other initiatives and institutions, including COBSEA which helped to obtain the GEF funding for it. Having not been involved in project implementation, it seems that COBSEA may again have a role, now that the project is ending. The final report of the project mentions that COBSEA may take responsibility for oversight of the implementation of the Strategic Action Programme. It has also been recommended that the COBSEA Secretariat maintain a South China Sea website. It is unclear where the human and financial resources would come from for COBSEA to take on such responsibilities in relation to SAP implementation.

Other NGOs and regional organisations working in the area, e.g., PEMSEA at Chonburi, Xiamen and Sihanoukville and WWF and CI in the Coral Triangle, were also not involved in the project. It might have been expected that representatives from the national committees of the UNEP/GEF SCS Project would reach out to these other projects into contact with the project, but this did not happen

and an opportunity to forge alliances may have been missed.

CONCLUSION

It is to be hoped that the investment in diagnosing the problems, setting up the institutional structures and launching the demonstration projects will indeed set the ball rolling and lead on to full-scale implementation by the countries concerned, and hence to reversal of the degradation of the South China Sea. If not, an enormous amount of time will have been invested in meetings and planning sessions to no great purpose! Certainly, it is an interesting approach to take and one worth tracking.

The project strategy seems to be unrelated to designation of this as an LME project. For the secretariat of COBSEA, which participated in the design of the project, the term LME was there as a flag, required by GEF, but without apparent influence on project design or even boundaries: the boundaries of the South China Sea and the Gulf of Thailand were used to describe the project.

A5.3.3 UNDP/GEF BENGUELA CURRENT LARGE MARINE ECOSYSTEM PROJECT

DESCRIPTION

The Benguela Current LME extends from the EEZ of Namibia, through Angola and as far as the Agulhas Current in South Africa. It has an area of 1.5 million km², of which 0.59% is protected. It is bounded in the north and south by the Angola Current and the Agulhas Current respectively. A strong, wind-driven upwelling dominates the LME. The system is complex and shows highly variable seasonal, inter-annual and decadal variability and periodic regime shifts in local fish populations (Shannon and O'Toole, 1998; 1999; 2003).

The BCLME is one of the most productive upwelling regions in the world (UNDP, 2008). It supports a high biological diversity and biomass of birds, fish, zooplankton and marine mammals. Its rocky reefs support high biomass of kelps. Nearshore and offshore deposits of precious minerals and oil and gas make it of great economic importance.

Decline in commercial fish stocks and non-optimal harvesting of living resources are major transboundary problems in the LME and are the main focus of the BCLME project (GEF/UNDP/UNOPS/NOAA 1999). Other transboundary problems identified by the project were: uncertainty regarding ecosystem status and yields in a highly variable environment; deterioration in water quality—chronic and catastrophic; habitat destruction and alteration, including modifications to the seabed and degradation of the coastal zone; loss of biotic integrity and threat to biodiversity; inadequate capacity to assess ecosystem health; and harmful algal blooms.

The three countries differ significantly in the economic importance of the sector (higher in Namibia and Angola) and the size of the artisanal fishing sector (highest by far in Angola), and institutional capacities, but all three have relatively top-down fisheries governance structures, which use scientific advice but have room for improvement in enforcement/compliance, Angola being the weakest in this regard (Cochrane et al, 2009). The three countries concerned are all immersed in processes of political and social transition, which influence their perspectives on natural resource governance and the roles of stakeholders.

The UNDP/GEF project for BCLME, recommended to us by K. Sherman (pers. comm.) as an example of a successful LME project, started in 2002 and the first phase was completed in 2008 with the establishment of the world's first Commission for the assessment and coordinated management of an LME—the Benguela Current Commission. A second phase has been developed to implement the SAP (UNDP, 2008). Its objective is “the overall reduction in degradation of the BCLME, with emphasis on the restoration of its depleted fisheries, through effective implementation

and long-term sustainability of the BCLME SAP”.

Benguela Current Partnership

The United Nations Development Programme (UNDP) is the GEF Implementing Agency for this project. The Executing Agency is the United Nations Office for Project Services or UNOPS. The Programme Steering Committee comprises three members from each of the participating countries, and a representative each from UNDP-GEF, SADC and the Benguela Environment Fisheries Interaction and Training (BENEFIT) programme. The Programme Coordination Unit (PCU) provides a coordination and management structure for the development and implementation of the BCLME Programme. The PCU comprises the Chief Technical Advisor (CTA), Office Manager, Secretary, and contract personnel. The CTA is responsible for the overall coordination of all aspects of the BCLME Programme.

An Activity Centre is located in each of the three participating countries. The Activity Centres have been created through in-kind contributions by the governments of the participating countries, and with significant funding from donors.

Working with and through the CTA, the directors of the three Activity Centres are responsible for developing and coordinating the work of the Activity Centres and assisting the Advisory Groups assigned to their respective Activity Centres. The Advisory Groups provide technical expertise to the BCLME Programme. They are required to provide the PCU with the best possible advice and information on topics key to implementation of the BCLME Strategic Action Plan. They also translate a part of the overall budget into specific projects and activities to address transboundary problems. The Advisory Groups consist of two members from each of the participating countries.

INVESTMENT

The GEF project had a budget of more than \$38 million, of which \$15.2m came from GEF, \$16m from the three member countries and about \$7m from other sources such as BENEFIT. A second phase is being funded by GEF, northern country development agencies and funds derived from marine economic activities (K. Sherman, pers. comm.).

OUTCOMES

One of the main goals of the BCLME Programme was the creation of the Benguela Current Commission, with the following objective: “To establish a formal structure for cooperation between the contracting states, that will facilitate the understanding, protection, conservation, and sustainable use of the Benguela Current LME by the Contracting States and to further the objectives in the Strategic Action Programme” (full text at www.bclme.org). This was formalised through the signing by the three countries of an Interim Agreement in 2006. This interim management arrangement will last for four years and be the precursor of the fully fledged Benguela Current Commission, whose function will be to implement an ecosystem based approach to ocean governance in the Benguela region. This is a 1st Order result using the Olsen (2003) framework.

By July 2006, before the BCC was even established, the BCLME Programme had allocated more than US\$10 million in support of 75 projects and activities; that total has now passed the 100 mark. The projects are being implemented by a wide variety of clients, including government institutes, universities, private consultancies and BENEFIT. Each project is designed to address transboundary environmental problems and contribute to the integrated and sustainable management of the Benguela LME. For example, a cluster of projects is testing the cumulative impact of offshore marine diamond mining on the ecosystem. The projects will pull together the results from several previous studies and make clear recommendations to the governments of South Africa and Namibia about the impact that diamond mining may have on the environment over extended periods of time. A second cluster of projects is assessing and mapping the biodiversity of the estuarine, coastal, nearshore and offshore environments of the BCLME, and identifying suitable sites for aquaculture.

The ultimate goal of these projects is to produce a strategic planning tool that is capable of providing advice on the protection of sensitive areas and vulnerable species, and identifying possible sites for marine protected areas and aquaculture installations.

The three countries are working to mitigate the impact of environmental change by establishing a cost effective Environmental Early Warning System (EEWS) for the Benguela region. The idea is to provide the management agencies in the three countries with early warning of extreme environmental events so that they can take well informed decisions.

All the 100 or so projects listed on the website (www.bclme.org) are generating information, plans, feasibility studies and recommendations, and/or building capacity. These are 1st Order Results, which are expected and intended to lead on to 2nd Order results i.e. management action by the governments and stakeholders concerned, such as changing fishing practices, enforcing new quotas, protecting spawning habitat or preventing disposal of garbage at sea. The extent to which such 2nd Order results have followed from the numerous 1st Order results is unknown to us, but will depend on the multi-level governance system and the capacities, constraints and resources of the institutions and stakeholders involved therein. It would be expected to take longer for 3rd Order results to materialise – perhaps a decade in the case of parameters like improved top-level fish stocks or improved catch per unit effort.

FINANCIAL SUSTAINABILITY

The BCLME Project has a long-term sustainable financing mechanism through the agreement of the BCC and the support of the three countries. The GEF has pledged further funds to build the institutional and legal structure of the Commission. Norway and Iceland have agreed to provide generous funding for a comprehensive scientific programme of activities, capacity building and further use of a research vessel for surveying transboundary BCLME productivity, oceanography, fish stocks, pollution and ecosystem health. The BCC will partner industry and other stakeholders to implement ecosystem management, ocean governance, conserve and rebuild fisheries, protect the marine environment and support the development of BCLME goods and services.

SUSTAINABILITY OF GOVERNANCE

The three member countries of the BCLME were originally cooperating through BENEFIT, with support from NORAD and GTZ, in a programme to enhance scientific capacity required for sustainable use of the living resources of the BCLME. This group then obtained GEF funding for the BCLME Programme. Thus, this project has built upon an existing initiative, with advantages for both efficacy and sustainability of the project. Although the BCC is an inter-governmental cooperation mechanism, the programme has involved a variety of academic, private sector and other civil society organisations in the implementation, and has also linked up with other regional and international bodies, such as the South East Atlantic Fisheries Organisation and Global Oceans Observation System, all of which surely enhances the effectiveness and durability of the programme. Prospects for sustainability are also enhanced by cooperation with the established UNEP Regional Seas Programme for the West and Central Africa Region on a number of projects.

Moving from the level of transboundary cooperation and establishment of broad alliances to the governance of specific resources, the BCLME Phase 1 study of the feasibility of an Ecosystem Approach to Fisheries (Cochrane et al, 2007) analyses the local and national issues affecting a number of fisheries. Drawing on that same study Cochrane et al (2009) report results from “Risk Assessment for Sustainable Fisheries” workshops, that identify major institutional needs and problems. Some constraints concern human and financial resources for operations but others concern fundamental issues of governance, including the role of stakeholders in decision-making and management, and resource access rights. It is not surprising that these basic issues were raised, given the social and political changes experienced in these countries since the 1990’s and the top-down nature of fisheries management in all three. Cochrane et al (2009) state that, in

contrast to biological and fish stock indicators, the indicators of social, economic and governance performance are poorly defined and not routinely measured. They conclude that, “the lack of more explicit social and and economic indicators has been a serious omission and needs to be addressed within the region as a whole if the national and regional policies discussed earlier are to be achieved”. Notwithstanding the observation of Cochrane and colleagues, the UNDP (2008) project document states that “Angola, Namibia and South Africa each have adequate national governance and institutional systems in place to regulate the management of their respective domestic fisheries”. The document puts more emphasis on the need to train and retain skilled personnel than on reforming governance, but it does include an output on national level policy and management reform and states that “countries will adopt an internal national structure for stakeholder participation in the national implementation of the Treaty and decisions of the Ministerial Conference”. Nevertheless, the Phase 1 project would have benefited greatly from a multi-level, multi-sector analysis of governance across the LME, which could have been used to identify and negotiate measures to reform and strengthen governance of specific resources and elements of the ecosystem. Overall, it appears that there is much to be done on governance at the national and sub-national levels, before the countries can aspire to sustainability of governance across the LME.

CONCLUSIONS

The synthesis and assessment of information on the BCLME were compiled in six comprehensive reports consisting of fisheries, oceanography and environmental variability, marine diamond mining, coastal environments, offshore oil and gas exploration and production, and socioeconomics of maritime industries. This TDA was then used to develop a Strategic Action Plan. The major outcome of the Programme so far is the establishment of the BCC as a body for inter-governmental cooperation on transboundary issues. Over 100 projects were designed and implemented in six years. Many were completed by 2008 and policy actions developed for further implementation (Sherman et al. 2009; Sherman and Hempel, 2008). Thus, it appears that by supporting a successful existing initiative (BENEFIT), working through civil society organisations, and linking with other established bodies, this GEF/LME project has been able to enhance its impact and its prospects of sustainability.

Footnote

Another GEF project, the Guinea Current GEF/LME project, is taking a similar approach in terms of establishing an inter-governmental commission, but has yet to achieve the effectiveness of the BCLME project. It is described briefly in the box below.

GUINEA CURRENT LME ANOTHER LME WITH AN INTER-GOVERNMENTAL COMMISSION

The Abidjan Convention for Co-operation in the Protection, Management and Development of the Marine and Coastal Environment of the West and Central African (WACAF) Region was born out of the need to undertake regional and common approaches to the prevention, reduction and combating of pollution in the marine environment, the coastal areas and related inland waters of western Africa. It entered into force in 1984. A GEF-funded pilot phase project titled, **“Water Pollution Control and Biodiversity Conservation in the Gulf of Guinea Large Marine Ecosystem”** was carried out from 1995 to 1999. It involved six countries in the region (Benin, Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo) with technical assistance of UNIDO, UNDP, UNEP and NOAA and the collaboration of a host of national, regional and international organizations. The second phase of the project, **“Combating Living Resource Depletion and Coastal Area degradation In the Guinea Current Large Marine Ecosystem through Ecosystem Based Action”** included ten more countries (Angola, Congo Brazzaville, Congo-Kinshasa, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Liberia, São Tomé and Príncipe and Sierra Leone). The Guinea Current region was one of the first regions where the LME concept was applied for coastal and marine environmental management. This phase included the preparation of a TDA and SAP. A project goal is to build capacity of the countries to work together and with other GEF projects in West Africa and define priority transboundary environmental issues within the framework of the Abidjan Convention and the UNEP Regional Seas Programme. The Guinea Current LME is pursuing a similar institutional approach to that of Benguela LME, with the formation of an Interim Commission in 2006, just a month after the Benguela equivalent. However, with many more countries involved and no equivalent to BENEFIT, on which to build, it is progressing more slowly.

A5.4 REGIONAL SEAS

A5.4.1 COORDINATING BODY OF THE SEAS OF EAST ASIA (COBSEA)

DESCRIPTION

The “Action Plan for the protection and development of the marine and coastal areas of the East Asian Region” was approved in 1981. The Action Plan is steered from Bangkok by its coordinating body, COBSEA (UNEP, 2005a). There is no regional convention but instead the programme promotes compliance with existing environmental treaties and is based on member country goodwill.

East Asia's astonishing variety of political, economic and social systems is matched by its environment: ship-crowded straits, island groups, wide gulfs, shallow estuaries and some of the most heavily populated countries in the world, where millions rely on fish for much of their protein. The threats to the region are just as varied, including erosion and siltation from land development, logging and mining, blast fishing in coral reefs, conversion of mangroves, overfishing, unimpeded coastal development and disposal of untreated wastes. Seven areas of focus were identified for the region by COBSEA:

- Develop and maintain a regional metadatabase.
- Promote, improve, network and maintain marine protected areas in the region.
- Implement activities to restore marine habitats.
- Assist with State of Environment reporting for agencies preparing such reports and marine and coastal assessment.
- Implement activities to reduce land-based sources of pollution.
- Encourage monitoring and environmental assessment including mapping in the region.
- Encourage and implement projects to build capacity in the member countries to counter environmental degradation and to educate all members of the community in caring for the marine resources of the region.

INVESTMENT

COBSEA has, up to 2007, been supported by UNEP with member countries' pledges adding to the funding. Since 2007 funds from the COBSEA Trust Fund have probably been used to offset the difference between the pledged amount of \$US 171K and the cost of running the secretariat and the action plan (\$US 1.2 million for each of 2006 and 2007). Added to this has been about \$US300K from SIDA for staff travel, assistance to countries, meetings and a senior consultant (UNEP, 2006).

Though these are all the funds administered directly by COBSEA, it has been successful in raising donor funds for programs within its area of operation, notably the US\$32 million for the UNEP/GEF South China Seas project (see Section A7.3.2)

CONSERVATION OUTCOMES

The real value and mandate of COBSEA is to coordinate all activities that conserve, restore or sustainably manage the seas of East Asia. Its outcomes therefore tend to be 1st Order policy decisions, plans, funds raised, capacities built, coordination enhanced etc. Commitment by member countries to some of these 1st Order outcomes is questionable (Kirkman, 2006). It is difficult to pinpoint or measure 2nd or 3rd Order results attributable to COBSEA. This is particularly the case, because there are a number of other inter-governmental bodies and initiatives with overlapping geography and mandate, including PEMSEA and the ASEAN Environment Program. Nevertheless, the COBSEA secretariat has had a clear role in raising donor funds for a number of projects, which have gone on to achieve 2nd and 3rd Order results in the region.

FINANCIAL SUSTAINABILITY

Pressure from UNEP in 2003 on member countries to raise their contributions to COBSEA did not result in any country increasing its pledge. This was mainly because members knew that there was more than \$US 1 million in the Trust Fund. The SIDA funding is not indefinite but was used to change the direction of the COBSEA towards a more technical, rather than political, coordinating function. The financial sustainability of COBSEA as a regional coordination mechanism for the marine environment will be put to the test in the near future, when the Trust Fund is used up and governments must either increase the contributions or let the secretariat disappear.

SUSTAINABILITY OF GOVERNANCE

Like other Regional Seas programmes, COBSEA was set up specifically to add an inter-governmental level to the existing governance structure for the marine environment. Initially it was rooted firmly in the ASEAN system, with five ASEAN member countries, but the expansion in 1994 to include five more countries, three of which do not belong to ASEAN, may have weakened that link. The resistance to a legally binding convention, the weak political support shown by member countries (Kirkman, 2006) and the absence of a solid constituency of institutions championing COBSEA do not bode well for its sustainability. On the other hand, when asked at numerous COBSEA meetings whether countries wanted to continue, no country wanted to leave. As with the financial question, the time will soon come when participating governments have to either reinforce their commitment or let this inter-governmental mechanism disappear.

CONCLUSIONS

The success of COBSEA is debated by Kirkman (2003), who describes some significant 1st Order results but questions member country commitment and the rather loose oversight by UNEP. Member countries have not hitherto prioritised the Regional Seas Programme and seem reluctant to go the route advocated by UNEP of progressing towards a convention and then useful protocols like, for example, the Wider Caribbean Regional Seas Programme (see Section A5.4.2). Nevertheless, there is still a prospect of COBSEA becoming a sustainable inter-governmental coordination mechanism, especially if members value the services to be provided under the new White Paper, agreed in 2007. Amongst the case studies, COBSEA is notable as an example of a politically motivated LAMM that is not ecosystem-based or carrying out field-based projects to improve or maintain the marine environment.

A5.4.2 WIDER CARIBBEAN REGIONAL SEAS PROGRAMME, TOGETHER WITH TNC ECOREGION ASSESSMENT AND GEF LARGE MARINE ECOSYSTEM PROGRAM

DESCRIPTION

The Wider Caribbean Region has 28 member states, whose waters contain a rich biodiversity and are subject to intensive human use of many kinds, demanding management. The Caribbean is an area of strategic importance with maritime and shipping activities and a critical dependence by its people on marine resources. It is facing severe problems of over-fishing and pollution, especially sewage pollution, which have degraded ecosystems, rendering them even more vulnerable to the increasing threat of climate change.

The Regional Seas programme here is the Caribbean Environment Program (CEP), which is governed by the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (known as the Cartagena Convention) of 1983. The Convention is a framework for regional cooperation whose specific areas of focus include protecting the marine environment from pollution from ships, dumping of wastes, land-based and seabed activities, airborne pollution and conservation of wildlife and specially protected areas. The Convention is supported by three Protocols which address specific environmental issues through cooperation in combating oil spills, managing specially protected areas and wildlife and monitoring pollution from land-based sources and activities.

In a region that has many international bodies with mandates related to environment, CEP is unique in that it includes all the countries within or bordering the Caribbean Sea. The CEP's mission is to promote regional co-operation for the protection and development of the marine environment of the Wider Caribbean Region. The CEP has three main sub-programmes: Assessment and Management of Environment Pollution (AMEP); Specially Protected Areas and Wildlife (SPAW) and; Communication, Education, Training and Awareness (CETA).

AMEP aims to control, prevent and reduce pollution of the coastal and marine environment from land and marine-based sources and activities thereby enabling Countries of the Wider Caribbean to meet their obligations under the Land Based Sources of Marine Pollution and Oil Spills Protocols of the Cartagena Convention. It has a strong emphasis on solid and liquid waste management, but also includes integrated watershed management and environmental monitoring.

SPAW aims to increase the number of protected areas, to improve their management and to develop regional cooperation and coordination in relation to biodiversity conservation. Thematic areas include management of critical species, protected areas, marine ecosystem management and sustainable tourism.

CETA aims to build public awareness, support and capacity in relation to environmental management, through education, training, information management and dissemination, and communications including use of mass media.

Through Memoranda of Understanding CEP cooperates with other multilateral environmental conventions in the region, including CBD, Hazardous Wastes (Basel), CITES and RAMSAR. CEP is also the regional contact point for the International Coral Reef Initiative (ICRI) and the International Coral Reef Action Network (ICRAN), and is co-chair of the White Water to Blue Water Initiative. The latter initiative seeks to develop partnerships that would enhance integrated approaches in areas such as wastewater and sanitation, sustainable agriculture, integrated coastal management, sustainable tourism, and environmentally sound marine transport in the Caribbean.

The Wider Caribbean is the area covered by some other international organisations, including FAO, the Western Central Atlantic Fishery Commission, and the Caribbean and Adjacent Areas Subcommission (IOCaribe) of the Inter-governmental Oceanographic Commission of UNESCO (Fanning et al. 2009). However, there are many international initiatives that cover part of this region.

At the scale of the Insular Caribbean, TNC has carried out an Ecoregional Assessment, which covers several Marine Ecoregions (originally three, but this number is increased on the new classification by Spalding et al. 2007). TNC's original aim was to produce a conservation blueprint for the Wider Caribbean but over time it shifted to the production of a GIS database and planning tools for terrestrial, freshwater and marine conservation in the Insular Caribbean: the Caribbean Decision Support System (CDSS). This is summarised by its creators (Huggins et al. 2007) as follows:

“... a regional biodiversity assessment was initiated that built a framework of data and tools to aid systematic conservation planning and decision making and to guide conservation strategy development. This framework has been developed into the Caribbean Decision Support System (CDSS). The CDSS encompasses two primary components: the first is a detailed database housing vast geospatial information layers about a) habitats (e.g. turtle breeding grounds, mangroves, and coral reefs); b) threats to habitats (e.g. tourism, pollution and road construction); and c) protected areas; and the second component is a suite of tools designed to a) create environmental risk surfaces that indicate the level of threat to a particular habitat or species and are used to identify and assess protected area networks and conservation measures; b) identify critical areas of rare habitats across a landscape, and; c) facilitate the use of the site selection software MARXAN (Ball & Possingham, 2000; www.ecology.uq.edu.au/marxan) to create optimal protected area scenarios based on quantitative conservation

goals while minimizing impending threats to habitats. Using the CDSS and working with local experts, the Caribbean biodiversity conservation assessment identified a portfolio of priority areas that represent the region's biodiversity to achieve regional goals and objectives."

The analysis is at the level of a cluster of Ecoregions, but the use of the database and tools seems to be mainly for national purposes. There is no regional institutional "owner" of the map of priorities and recommended strategies. TNC has a substantial portfolio of projects in the Caribbean, a few regional in character, e.g. sea turtle conservation, but the majority focus on individual PA's or on national PA systems. They include the "Caribbean Challenge", which creates an incentive for countries to establish MPA's, target 20% of marine and coastal habitats protected by 2020, by offering to provide technical support and co-finance trust funds. The CEP also supports the Caribbean Challenge.

The Wider Caribbean encompasses four LME's and two of these (Caribbean Sea and North Brazil Current) are the subject of a new GEF/UNDP Large Marine Ecosystem project, approved by GEF in 2008 and starting in 2009 on full implementation (Fanning et al, 2009). Led by IOCaribe, it is a 26-country, \$7 million project aiming to address constraints affecting management of transboundary living marine resources. Actions include implementing governance reform, filling knowledge gaps, and establishing ecosystem-wide monitoring and evaluation. A Memorandum of Understanding has been signed between CEP and IOCaribe to facilitate coordination between their respective programmes, and CEP will lead the biodiversity component.

Within the Caribbean there are other programs, spanning marine areas large and small. The best known is the Meso American Barrier Reef Programme, which is Ecoregion-based and supported by WWF, TNC and others. It has achieved significant conservation outcomes and would be worthy of a case study on its own. However, we have not considered it in our brief study.

The Integrated Coastal Management approach has also been applied widely in the Caribbean. Our understanding is that it has been used most widely in situations where tourism and urban development are putting intense pressure on the coastal environment, with less attention to fisheries issues. We have not tried to include ICM in this case study.

INVESTMENT

In addition to annual contributions by member States, the CEP has attracted donor funding from a variety of sources, including the governments of Sweden, USA, France and Netherlands, the MacArthur Foundation, the UN Foundation and, more recently, GEF. GEF has funded one project to reduce pesticide run-off and another to build partnerships in Integrating Watershed and Coastal Areas Management (IWCAM) for Caribbean Small Island Developing States. The \$22m IWCAM project was approved in 2004, involves 13 States, and focuses on freshwater supplies, coastal and freshwater quality, land use, and sanitation and hygiene.

There have been many other environmental investments at the regional scale in the Caribbean, coordinated by other institutions. One of the most notable is the Fisheries Resource Assessment and Management Program, funded by CIDA (Canadian \$20m) and coordinated by CARICOM.

TNC has invested \$2–3m annually in its Caribbean programme and has pledged to invest a total of \$20m (\$12m of technical inputs and \$8.6m to capitalise trust funds) in the "Caribbean Challenge", an initiative which TNC helped to set up, to support government efforts to expand and strengthen their PA networks. Leveraged funds from KfW and others will bring the total trust fund capital to \$40m. However, there is no apparent connection with the Ecoregion concept. Rather, the TNC website describes the Caribbean Challenge as marking a step up for TNC from single-site projects to national PA systems (<http://www.nature.org/initiatives/protectedareas/features/art24943.html>).

OUTCOMES

The CEP has been successful in focusing attention on the environmental issues and in bringing together people and institutions from across the region to address them. It can point to a number of 1st Order outcomes, most importantly the array of commitments by governments to act on pollution prevention and biodiversity protection. The agreements are supposed to be binding, although there are no sanctions for non-compliance. They require constant reinforcement and re-education, as government personnel change. Other examples amongst the many 1st Order outcomes are:

- Capacities built through CaMPAM, the Caribbean Marine Protected Area Managers network and forum;
- Adoption of SPAW guidelines for creation of MPA's;
- Adoption of the Global Plan of Action to address land-based sources of marine pollution;
- Strategic Recovery Plans and Action Plans for various taxa: sea turtles, manatees, marine mammals;
- Increased public environmental awareness achieved through production and use of a suite of promotional and educational materials.

In some cases these 1st Order outcomes have led to 2nd and 3rd Order results, notably reductions in oil pollution and solid waste pollution and recovery of sea turtle populations. Increasingly, CEP projects combine region-wide cooperation and capacity building with practical demonstration projects that deliver site-specific 2nd and 3rd Order results e.g. a water supply and sanitation project in Jamaica, for which UNDP co-financed the necessary infrastructure, or a SIDA-financed project with a small grants facility for sustainable artisanal fishing.

However, in many areas, including sediment and sewage pollution, fisheries resources and biodiversity, the general pattern is one of continuing deterioration across much of the Caribbean, indicating that many 1st Order results are failing to generate action on the ground. It appears that the governance system is breaking down between this inter-governmental level and national or local levels, at which management action needs to be taken. This is especially true in areas where solutions require capital investment (e.g. for sewage treatment) or field management capacity (e.g. fisheries management). A case study by Sheehy (2004) states that national organisations have in many cases failed to implement the policies and actions agreed under CEP, for a variety of reasons: competing priorities in these under-developed countries, unsustainable consumption patterns driven by poverty (e.g. local fishing) or consumer lifestyle (e.g. USA), weak institutions, corruption, poorly managed development, and the failure to make oil and tourism industries pay for the waste management facilities their activities demand. A study by Singh (2008) analyses the region's poor performance on environmental management from a governance perspective, and documents in detail the array of cooperation mechanisms, the abundance of legal instruments and their limited implementation. It is evident that effective intervention to improve resource and environmental management on a large scale will need to be based on thorough understanding of the governance system, including all its levels and interactions. In response to these challenges CEP is developing new projects, including one for a wastewater management fund and others for regional training in preparation of wastewater management proposals and in project management.

Like the CEP, the TNC Caribbean Decision Support System in itself can aspire mainly to 1st Order outcomes, in this case to do with the availability and use of information for planning and decision-making. There is no regional institution with a high degree of ownership of the CDSS, consequently the 1st Order outcomes associated with it tend to be at site or national, rather than regional, level. One exception is the mapping of sea turtle nesting beaches, undertaken with the Wider Caribbean Sea Turtle Network (WIDECAST). This regional network cooperated in mapping 3500 nesting

beaches (up from 700 known before the project) and is using this data to inform a successful regional turtle conservation programme. Turtles (and perhaps cetaceans?) apart, the main uses of the CDSS have been for internal TNC decision-making and for national analyses of gaps in the Protected Area system e.g. by Bahamas, Grenada, St Vincent and Cayman Islands.

The assumption that access to high quality, multidisciplinary information will lead to better decision-making and hence to improved management will be true in some places, principally those in which high-capacity organisations like TNC or WWF are available to build local management capacity, including the capacity to use information effectively. In other places, constraints of inadequate governance structure, low technical capacity or lack of funding will prevent the benefits of information being realised. Taken as a whole, TNC's Caribbean programme has achieved significant site- and national-level outcomes, including 2nd and 3rd Order outcomes. It is also a strong advocate for an ecosystem-based approach to artisanal fisheries management, to the extent permitted by the scant data on ecological features (e.g. different shelf types, coral reefs, nurseries, spawning aggregation sites) and impacts of fishing on the multi-species assemblages of coral reefs. However, the "Ecoregion" concept, as such, seems to be marginal to TNC's intervention strategy.

The CLME project is just beginning, so has no outcomes to report. Uniquely amongst LME projects, it will focus on the exploration of various governance mechanisms to manage sustainably key resources, such as large pelagics, shrimp, flying fish, lobster, conch, coral reef fish, other coral reef resources, seabirds and invasive marine species.

FINANCIAL SUSTAINABILITY

The CEP has basic funding from member governments to cover its core costs and ensure its continued existence. The majority of member countries contribute regularly, roughly in proportion to their GDP's. The total income to the Trust Fund has averaged US\$940K per year during 1999-2008, but tends to fluctuate and has not kept pace with inflation of core costs. A few countries that are in arrears contribute in kind, for example by hosting specialist Regional Activity Centres or hosting large inter-governmental meetings. Certain wealthier countries also contribute modest funding to the CEP Action Plan. The continuing core income indicates that the member countries value the existence of this long-established Regional Seas programme, although not enough to invest substantial sums and enable it to thrive. Rather, the countries' expectation is that the CEP will bring in donor funding for projects and hence be a net financial contributor to national budgets. This is one reason why some countries favour CEP projects that have a strong component of practical action in demonstration sites, in addition to the regional coordination, capacity building and cooperation aspects. Whatever the motives, the CEP programme has been able to sustain itself financially, at times with difficulty.

TNC's Caribbean Programme includes substantial investment in sustainable financing mechanisms for MPA's, notably through the Caribbean Challenge and support to the establishment of entry fee mechanisms, earmarked for conservation management rather than general government funds. The GEF-funded CLME project includes a component to identify mechanisms for sustainable financing, which could then be developed during a potential second phase of the project. At a Global Island Partnership (GLISPA) event in May 2008, where the Caribbean Challenge was launched, the CEO of GEF committed that organisation to supporting that initiative, saying "We recognize the visionary leadership of these island nations and together we can help ensure the long term financing necessary to realize our shared conservation goals". Thus, there seems to be an intention to align sustainable financing strategies for MPA's, which are one important component of marine biodiversity conservation.

In all the above, it is striking how little the economic users of the marine ecosystem, especially the tourism industry but also the fishing sector, contribute to its conservation and management. While they would doubtless argue that they contribute through taxes and levies, this is an inadequate response given not only the large income they derive from the natural resources but also their huge direct and indirect environmental impact, which has to be managed and mitigated.

SUSTAINABILITY OF GOVERNANCE

Like most Regional Seas programs, the starting point for CEP was a regional agreement and an inter-governmental body, so it will be sustained as long as the participating governments value the objectives of the agreement and the coordinating role of CEP. The CEP has existed 25 years, so has proved its durability. Nevertheless, there is a continuing task of communicating to governments and stakeholders the value of both the marine resources and the work of CEP.

The CEP has also realised that sustainability of a regional governance mechanism depends on bringing major regional stakeholders, including environmental NGOs and industries such as tourism, within the mechanism. Thus, TNC, WWF and other NGOs have attended meetings of the CEP planning body (the Scientific and Technical Advisory Committee) as observers and to present their own work. Though some governments have reservations about letting “outsiders” into an inter-governmental space, the CEP itself is convinced of the additional capacity and commitment that they bring and has made important progress towards being more inclusive. This is reinforced by CEP’s role as regional focal point for ICRAN, which emphasizes the role of local communities and the tourism sector.

The status of CEP as a UNEP-administered Regional Seas programme has generated an interesting dilemma with regard to sustainable governance. The well established ownership by member governments of the CEP agenda is in potential conflict with priorities asserted by UNEP, as it tries to forge a coherent global agenda for the Regional Seas programme. In purely administrative terms, UNEP takes a 13% overhead on CEP projects and provides some \$25K a year, an administrative officer and some financial control functions. In programmatic terms UNEP has hitherto been hands-off but has recently identified six strategic global objectives, for which it will mobilize resources. From CEP’s point of view, this could divert fund-raising efforts away from any Caribbean government priorities, which do not correspond to the global priorities. It will be important to resolve this tension in a way that reinforces CEP as a regional coordination mechanism for delivery of both UNEP’s global mandate and the region’s environmental priorities.

TNC is also contributing to efforts to build sustainable governance, primarily of MPA’s, through collaboration with CEP and national governments, capacity building, and encouraging big industries, especially tourism, to assume a proactive role as stakeholders concerned about the sustainability of their businesses.

The CLME project, which is just starting up, has made sustainable governance its central axis. During the preparation of the project, the sheer complexity of governance in the Caribbean exposed the limitations of the LME approach, with its emphasis on five pre-determined modules of information as the basis for analysis and intervention. This led Fanning et al (2007) and Mahon et al. (2009) to propose an alternative framework, with governance at its centre. Mahon et al. (2009) and Fanning et al. (2007) argue that, whilst the LME system’s five modules may serve a monitoring and evaluation purpose, they should not drive the strategy of how to achieve effective ecosystem conservation, because their five equivalent compartments neither facilitate integrated management nor reflect the relationship between governance and the other four modules of scientific information (three natural and one social science). They point out that governance is overarching and the analysis of the strengths and weaknesses of the governance system should drive the strategy for intervention, including the needs for information, which may or may not correspond to the standard modules. They propose a framework for analysing LME governance, based on multiple “policy cycles” (iterative decision-making processes) at local, national, regional and global scales, which are linked vertically and horizontally.

Looking at the specific case of the Caribbean, Fanning et al (2007) commented that most islands depend directly on their coastal and marine resources for their economic well-being. Consequently, the most effective form of regional cooperation may be through networking at the lower levels of

the governance system rather than a more hierarchical system in which policies flow down from a high-level regional body. If so, CEP's role may shift somewhat from inter-governmental coordination to facilitation of networks and horizontal communication.

The CLME project's focus on governance is a direct consequence of these arguments. The preliminary assessment by Fanning et al (2009) of the governance situation in relation to EBM confirms the complexity of the situation, with overlapping country membership among seven regional organisations dealing with fisheries alone, without even considering the many bodies dealing with coastal zone management, biodiversity, pollution etc. They summarise Caribbean ocean governance as "a diversity of networks of actors serving various purposes that seldom intersect effectively, but with the potential to do so if greater attention is paid to networking".

Thus, as regards the achievement of sustainable, effective governance, the CLME project has three great advantages: (i) its goal is defined in terms of good governance, (ii) it is starting out with a thorough, multi-level analysis of current governance that will enable it to specify that goal in concrete terms, identifying areas for improvement, and (iii) it envisages an incremental approach to strengthening governance that is eminently achievable. In this respect it stands out not only from other LMEs but also from all the other LAMM case studies, notwithstanding the growing focus on governance in the Seascapes programmes, especially Papuan Bird's Head (which is a sub-national LAMM so much simpler institutionally than CLME).

CONCLUSIONS

The Caribbean case is fascinating, because with its political and ecological complexity and tough environmental challenges, it encapsulates many of the issues facing large marine areas. There are successful interventions at all scales from site to Wider Caribbean but the overall picture is one of difficulty in delivering on the range of measures necessary to solve marine environmental problems.

The CEP has been quite effective in delivering on its mandate of inter-governmental cooperation to implement the Cartagena Convention and, 25 years later, it still enjoys the support of the member governments. On the other hand, its inter-governmental agreements are effective only in so far as the decisions flow down and lead to action at the national and local levels, and in this the track record is patchy. Thus the need to understand governance and put it at the centre of the strategy, as advocated by Mahon et al. (2009) and Fanning et al. (2007), applies to the RS programme just as much as to LMEs. Indeed, the proposed framework could be relevant to any large marine management program and could help to crystallize the thinking behind other approaches, especially Seascapes and Ecoregions. CI, TNC and WWF are moving from an approach dominated and driven by natural sciences to one that addresses governance issues too, but they do not yet have a well articulated framework for incorporating governance systems at the core of their programs. The complexity of the Caribbean may have forced the CLME project to adopt a governance-centred strategy, but the approach could be relevant to many LAMMs, especially in developing countries with severe governance limitations.

The TNC Caribbean Decision Support System is also illuminating, in that it shows both the value and limitation of a strictly technical assessment. The value is that, having wisely moved away from the idea of a blueprint for conservation, TNC has produced a tool of potential use to many planning and decision-making processes in the Caribbean. The limitation is that the tool was produced in isolation from those processes, so someone has to find the optimal way to connect into them and "sell" the tool to the decision-makers. Capable TNC field staff is doing just that, with their main clients being national governments and individual MPA's. In all of this work ecological considerations are prominent but the Ecoregion concept as such seems to be largely irrelevant, except perhaps in the case of the Mesoamerican Barrier Reef, which we have not studied here.

Ultimately, EBM in a region as rich and complex as the Caribbean is going to require a blend of top-down, bottom-up and horizontal approaches, skill in making research findings relevant to diverse

socio-cultural settings, and strategies appropriate to the limited human resources available to small island states.

A5.4.3 SOUTH-EAST PACIFIC REGIONAL SEAS PROGRAMME

DESCRIPTION

This Regional Seas programme takes the form of “The South East Pacific Action Plan”, for which the legal framework is the “Convention for the Protection of the Marine Environment and Coastal Areas of the South East Pacific” of 1981. Known as the Lima Convention, it commits the parties— Chile, Peru, Ecuador, Colombia and Panama—to make an effort collectively or individually to prevent, reduce and control the pollution of the marine environment and coastal areas in the South East Pacific and achieve sound management of natural resources. There are six protocols under the Convention, dealing with different aspects of pollution (hydrocarbons, radioactive substances, land-based sources etc), and with conservation of ecosystems including protected areas. Activities under the Plan of Action are grouped under the following areas: Marine pollution research and monitoring; integrated coastal management; protected marine and coastal areas; marine and coastal biodiversity; capacity building. Amongst the programmes directly addressing biodiversity conservation are a regional MPA network, a sea turtle conservation programme, and a marine mammal action plan (CPPS, 2007).

The secretariat of the RS programme is the Permanent Commission of the South Pacific (PCSP), which had already existed for 30 years before the RS programme was started. Initially created by Chile, Peru, Ecuador and Colombia to reinforce the assertion of jurisdiction over Pacific waters out to the 200-mile limit, the Commission’s objectives expanded to include collaboration and policy coordination in relation to legal and policy matters, marine resource conservation and exploitation, extraction of non-living resources, and scientific research, especially oceanography, climate and fisheries. The RS Action Plan was taken on by PCSP as a special programme, with Panama signing up for that programme but not for the rest of the PCSP agenda.

Programme and budget decisions are taken by the inter-governmental body overseeing the PCSP, whilst implementation is organised through the national governments, each of which designates a focal point, which could be a department managing marine resources, or a Navy body, or a government research institute. The governments have not delegated any specific powers to PCSP, so it cannot decide for itself on actions to be taken or positions to be adopted on particular issues (the example of iron fertilisation experiments in the South-East Pacific was an example given in an interview). The “Acuerdo Galapagos” in 2000 was an attempt to agree certain powers for the Commission in relation to regional fisheries management, but in the end it was not ratified.

The mechanisms of government decision-making and implementation can be quite cumbersome. They also limit PCSP to activities in which all five Action Plan countries can participate; PCSP does not get involved in programmes involving only certain members. For example, there is no role for PCSP in the GEF Humboldt Current LME project, because it involves only two of the member countries (Chile and Peru).

INVESTMENT

Most core costs are covered by member government contributions. All activities require additional fund-raising. Recent examples are a US\$700K, three-year ICM project, financed by the IOC, and participation in a GEF global project to tackle the problem of invasive species in ballast water. In general, the levels of investment are modest compared to other programmes considered in this study. Recently some small grants have come from CI to PCSP for work on specific projects of mutual interest e.g. the MPA network.

CONSERVATION OUTCOMES

As a strictly inter-governmental mechanism, the PCSP can only really achieve 1st Order outcomes. Their translation into 2nd and 3rd Order outcomes depends on implementation organised by each government focal point and is variable. Amongst the achievements under the Action Plan are:

- Strengthening of national legislation on pollution and coastal environmental management;
- Training of national personnel involved in coastal environmental management;
- Coordinated regional action plans in relation to marine mammals;
- Agreement on processes for the establishment of MPA's.

PCSP has achieved outcomes of greater importance in others areas, which are part of its mandate but outside the RS Action Plan e.g. in relation to marine law, the economics and management of industrial fisheries, oceanography and climate change.

FINANCIAL SUSTAINABILITY

In the early years UNEP provided some financing for PCSP but that is no longer the case. Rather, the PCSP is sustained mainly by the annual budget contributions, with each country paying about \$40K per year for PCSP general costs and \$40K per year specifically for the RS Action Plan. The total covers most but not all of the core costs, but PCSP has always been able through fund-raising to complete the core budget and finance some activities too.

SUSTAINABILITY OF GOVERNANCE

The longevity of PCSP (over 50 years) and of the RS Action Plan (over 25 years) are testimony to the sustainability of the inter-governmental governance mechanism that has been established. The decision-making is firmly in the hands of the participating governments; no donors or NGOs are involved and even UNEP ability to influence is limited by the fact that it does not contribute financially.

On the other hand, the persistence with a structure that is exclusively governmental in decision-making and implementation limits the impacts of PCSP, especially in a situation where governance within countries can be weak. Some decisions are not implemented simply because the national focal point is unable to do so.

CONCLUSION

Within its limited scope the PCSP has proven its usefulness and value to its clients, who are the five governments for the purposes of the RS Action Plan. However, its impact in terms of achieving the conservation and sustainable development objectives of the RS has been limited. Two factors contribute to this situation. One is the fact that the strictly governmental approach can be bureaucratic, constrains the participation of other actors and stakeholders and makes impacts dependent upon the capacity of national focal points to mobilize colleagues in-country. A second factor may be that PCSP as a whole has — historically at least — given higher priority to their work on the development and management of industrial fisheries than to their work on biodiversity conservation. In this, as in other matters, they have reflected the priorities of the member governments.

A5.5 INTEGRATED COASTAL MANAGEMENT

A5.5.1 ABOUT THE PEMSEA PROGRAMME

As described in Section 3.1.5, PEMSEA is a programme of wide scope, including eight demonstration projects, which spawned at least 18 additional ICM projects. Here we provide two case studies from that programme. Though beyond the scope of our study, the PEMSEA programme as a whole holds many valuable lessons for those seeking to strengthen coastal governance and integrate across sectors. The website (www.pemsea.org) offers a wealth of information, including a general summary document (PEMSEA 2007b).

Twelve countries participate in PEMSEA and most of these are also members of COBSEA. It has therefore been suggested that COBSEA, as a permanent inter-governmental body, might have some role in sustaining long-term the coordination of ICM activities arising from the PEMSEA intervention. Alternatively, the relationship could remain informal (UNEP, 2008).

A5.5.2 XIAMEN ICM CASE STUDY

DESCRIPTION

Xiamen in Fujian Province, in the South China Sea is an international centre for trade. Xiamen is a sheltered, deep water port has always relied on shipping, fisheries (wild caught and aquaculture), and marine mineral production. Tourism has been attracted by its natural scenery, colonial architecture and archaeological sites. Reclamation for sea salt making, aquaculture, recreation and agriculture has been carried out for many years. All these activities led to indiscriminate growth, marine pollution, reduction in fish catch, fish kills and red tides. Sewage treatment was insufficient for a city of well over a million people and poorly designed infrastructure reduced water flow and exchange. The rapid urbanization and industrialization of Xiamen added to the pollution and conflicts between users. Local regulations and rules were often oriented towards single-sector issues and offered little guidance in management of issues across administrative boundaries. There was no legal framework that considered coastal lands and waters as a management unit (PEMSEA, 2006). In the 1980s Xiamen became one of China's Special Economic Zones. Rapid economic development led to many further damage to the environment.

TABLE 5. SELECTED XIAMEN SOCIOECONOMIC INDICATORS
(ADAPTED FROM PEMSEA 2006)

| | |
|--------------------------------------------|-------------------------------------------------------------------|
| Length of coastline | 234 km |
| Sea Area | 390 km ² |
| Land Area | 1,565 km ² |
| Population (2004) | 2.25 million |
| GDP (1995) | US\$ 3.65 billion |
| GDP (2004) | US \$ 12.87 billion |
| Per Capita Net Income of Urban Residents | US\$ 1,888 |
| Total Industrial Value | US\$ 25.3 billion |
| Import and Export Trade Volume | US\$ 28.37 billion |
| Value of Ocean Industry | US\$ 2.64 billion (23.44% of GDP) |
| Green Space | 10 m ² /capita |
| Industrial Solid Waste Generated | 44,330 tonnes |
| Industrial (2001) | 29 million tonnes |
| City Wastewater Generated Municipal (2001) | 126 million tonnes |
| Biodiversity Value | Chinese white dolphin, mangroves, lancelet, egret, horseshoe crab |

Sources: Xiamen Investment Guide, 2006; Environmental Protection Bureau of Xiamen, 2001.

The socioeconomic demography of Xiamen can be seen in Table 5 with figures collected for years between 2001 and 2006. PEMSEA launched its programme in Xiamen in 1994 to demonstrate how ICM could be used to prevent and manage land-based pollution sources in areas undergoing industrialization. There were constraints that needed to be addressed including weak institutional capacity, narrow sector-oriented policies, a lack of coordination, under-use of scientific knowledge in support of policy making, insufficient legal frameworks and law enforcement, low understanding of marine environmental issues and scarcity of funds for integrated management.

The project brought together all the sectors involved, in order to plan and implement solutions to this whole suite of problems.

This ICM programme, implemented by PEMSEA, is a stand-alone project that had no relationship with the LME UNEP/GEF South China Sea Project or with the Regional Seas Programme COBSEA, for which we have also prepared case studies.

INVESTMENT

With political will and the allocation of financial and human resources, Xiamen's politicians, citizens, industry and business combined to improve all aspects of the city's environment. Linking scientists and other technical experts with political decision makers is a key to ICM success. The implementation of ICM led to improvements in the state of environmental quality, habitats and resources.

GEF/UNDP/IMO investments were US\$ 6.5 million, but these were accompanied by other investments of US\$212 million in environmental structure and waste management, plus US\$ 1 million on preservation zones

CONSERVATION OUTCOMES

The issues that have been managed or reduced include:

- Causeway construction and reclamation,
- Intensified coastal uses and construction activities,
- Overexploitation of fisheries resources,
- Discharge of oil and wastes into coastal waters,
- Industrial discharge of nutrients and metals,
- Urban effluent discharge,
- Intensified aquaculture and eeling, and
- Sand quarrying and unregulated construction.

There is an impressive array of 2nd and 3rd Order results in relation to these issues, as detailed in the table in Section 5.6. A few of the 3rd Order results involve species, e.g. increased populations of commercial fish, but unfortunately this all came too late for the white dolphin, which is now probably extinct.

PEMSEA's study on the benefits and costs associated with the adoption of ICM in Xiamen using analysis of the socioeconomic impacts obtained during the initial phase of the ICM programme resulted in some comparative, quantified benefits and costs. Overall the increase in value of economic sectors was US\$ 3,253 million. Reduction of costs including reduced shipping delays, erosion treatment and dredging silted areas was US\$ 16 million. Direct services that improved were protection of endangered species and coastal habitats and nature-based recreational sites valued at US\$ 350 million. A similar amount was saved by improving water quality with a sewage treatment plant.

FINANCIAL SUSTAINABILITY

The Xiamen ICM project has been a success. This has led to a clean and tidy city and harbour. Tourism has increased and the stakeholders are working together to maintain the city as a modern Chinese icon. It is not entirely clear what will happen after PEMSEA leaves but the scale of the economic benefits, and the fact that they were measured, provide compelling arguments to decision-makers concerned more with economic returns than environmental goods.

SUSTAINABILITY OF GOVERNANCE

PEMSEA helped to establish an inter-agency executive committee composed of representatives from 22 local government agencies, including planning, finance, marine affairs, land use, environment, fisheries, port operations and tourism. This Marine Management Division was designated the lead implementing agency and may provide the basis for a long-term structure for integrated management.

Once the stakeholders are familiar with the intervention activities and are convinced that the improvements are beneficial for them, the provincial or city government can help with agreed upon policies, enforce legislation and ensure that sufficient funding is available. The governance of the Xiamen project can be left to local government as long as there is some kind of stakeholders committee that has a say in this governance.

CONCLUSION

The Xiamen case study stands out as one of the most successful in terms of outcomes. It demonstrates that ICM can work in a large, multi-faceted port environment and can improve the management of ecosystems in the municipality, even though it was not designed with ecosystem-based management in mind (PEMSEA, 2006).

Some likely reasons for the success of Xiamen are:

- There was strong political commitment; the Chinese central government was determined to implement the remedial measures for the deteriorating environment, and communicated this to the Municipality, which became similarly committed to ICM.
- The government had the technical and financial capacity to construct some of the costly infrastructure, necessary to resolve problems such as pollution.
- There were important economic as well as environmental gains from the ICM.
- The project has been under way for 15 years — long enough for many 2nd Order and some 3rd Order results to be produced.

The fact that the initial drive from has come from central government could cause concern that things may slide back as central government pulls back and hands responsibility to local government. However, this risk is muc reduced by the compelling economic benefits of improved environmental management. Measuring economic baseline and benefits was a smart move.

A5.5.2 CHONBURI ICM CASE STUDY

The information in this case study is derived from the project website, <http://pemsea.org/sites/thailand-chonburi/>, and extensive interviews with project personnel.

DESCRIPTION

The province of Chonburi is situated at the northern end of the Gulf of Thailand and has many municipalities within it, including the tourist area of Pattaya and industrial areas near Sriracha municipality. The Port of Bangkok is nearby and many large, ocean-going vessels anchor offshore for loading and unloading onto barges. Aquaculture of shrimps, mussels and oysters takes place in these waters where drainage directly into the Gulf would be a problem. The ICM project began in 2001 and started to make an impact in the province in 2006. Its success lies with its ability to join together coastal municipalities in Chonburi to solve province-wide problems. As the Project progressed new participating municipalities sign agreements to apply ICM principles to their environmental and development activities. Currently 26 municipalities have signed the ICM agreement. The Sriracha Municipality is the current secretariat for the Project. Institutional arrangements for the coastal strategy are made through Provincial Orders and a multi-agency and multi- sectoral Provincial ICM Coodinating Committee (PCC).

Like Xiamen, Chonburi falls within the area covered by COBSEA RS Programme, but there has been very little interaction between the two programs.

INVESTMENT

The local governments at provincial and municipal level have increased expenditure on marine management. In Sriracha Municipality, which provides housing and various services for other adjoining municipalities (especially those with industrial estates), there has been substantial parallel investment in economic development, including the development of additional tourism facilities

(e.g., hotels, restaurants, various establishments, parks) and improvement of the local port (i.e., fishing port and passenger transport services to Koh Si Chang). Economic and tourism development have considered ecological protection and social needs (e.g. parks that promote sports and health activities). Improvements in basic services for stakeholders (e.g. one-stop-shop for various registration and permits/licenses at the municipal office) and information access (e.g., increased internet access at the municipal office and public parks, free English lessons for municipal staff) have also been significant.

Sriracha Municipality has also legislated the use of grease traps for restaurants to reduce fat in wastewater. 200 restaurants have already installed the traps (costing at least \$140 per unit). Installation in hotel restaurants is currently being initiated. Other local governments are also applying this system (some have also passed legislation). In the latest ICM Provincial Coordinating Committee Meeting (February 2009), the use of grease traps was promoted to all local governments. Municipalities are preparing a state of the coasts (SOC) report that covers governance aspects as well as specific action programs.

The increased investments in Sriracha Municipality may be attributed to various factors, including increased environmental protection and improvements in the overall environment in the area. Sriracha's efforts in environmental management have been enhanced and highlighted through the implementation of ICM. In contrast to other environmental/coastal management approaches, ICM does not prohibit or discourage development but instead supports developments that balance ecological protection, conservation and socioeconomic considerations (Pers. Comm. Mayor Chatachai Thimkrajang).

CONSERVATION OUTCOMES

The core 1st Order outcome from the Chonburi ICM project has been a common basis and framework for coastal management in Chonburi. This Coastal Strategy process involved the establishment of a functional inter-agency and multi-sectoral provincial Coordinating Committee, which serves as a forum for discussing various issues and ways of addressing them. Prior to the ICM project, decisions were being made by the local government leaders on their own and there was no process of consultation and decision-making.

One of the issues being addressed is the sea-based transfer of cassava flour and other dusty commodities in Sriracha Bay for export, which a scientific study showed is posing ecological and human health risks. Addressing the issue requires the involvement of the local governments, concerned national agencies and private enterprise operators. The Coordinating Committee provided a forum for discussing the issue and developing recommendations for actions by concerned parties.

Presently, the Coordinating Committee is reviewing a draft management plan to address coastal erosion, prepared in accordance with a new national strategy to address coastal erosion.

As part of the ICM institutional arrangements, the 26 mayors/chief executives of participating local governments have been organized into a local ICM consultative board where an ICM Director is elected for a two year term. This has given:

- Increased knowledge and confidence of local officials and personnel on coastal management, resulting from training and study tours
- Increased participation of local stakeholders in coastal management activities
- Recognition of the ICM approach in Chonburi as evidenced by frequent study tours from other coastal areas
- Replication of garbage banks in various municipalities and schools; community members and

students bringing recyclable wastes to garbage banks every week

- From a two to four times increase in crab catch from 2005–2008 (data on income not available) and increased awareness of people on crab conservation (not eating spawning crabs; donating to crab condo)
- Seagrass and mangrove restoration in Sriracha Bay
- 50–100 turtles released annually since 2002
- Improved water circulation on the coast of Sriracha Municipality after the replacement of the bridge leading to Koh Loi, which impeded water circulation
- Changes in stakeholder behavior (enhanced awareness and participation) with regard to waste management, resource protection and conservation.
- Various awards for Sriracha Municipality, including an award for good governance from the Ministry of Interior for three consecutive years (2006–2008) and three municipalities among finalists of Sustainable Healthy City awards.

Among the key factors that contributed to the achievement of the outcomes include the unity of the various sectors and sense of responsibility for maintaining and improving the quality of life and environment in the province, since most of the stakeholders have been born and raised in the area. Another factor is the process of ICM demonstration, development and implementation, which emphasized inter-agency and multi-sectoral collaborations, enhancement of governance mechanisms to support integration and collaboration, local capacity development, and on-the-ground actions involving the communities and stakeholders.

ICM Demonstration and local capacity building

- Demonstration of ICM implementation in five municipalities
- To facilitate demonstration of on-the-ground actions and benefits, implementation of the adopted coastal strategy was further focused initially on Sriracha
- The demonstration in Sriracha created further interest for ICM from other municipalities leading to gradual ICM scaling up.
- Capacity building activities that aimed to draw on available local expertise and strengthen local capacity also enhanced confidence for ICM implementation
- Visits to other ICM sites were also effective in enhancing interest and exchanging approaches and strategies for ICM implementation ('learning by seeing')

A common vision and framework for actions

The development and adoption of a coastal strategy, which defines a shared vision and outlines long-term strategies and actions toward achieving the shared vision, provided a common framework for collaborations for sustainable coastal development

Political commitment, local legislation, institutional arrangements

The adoption of the Coastal Strategy by the provincial and municipal governments in Sept. 2004 catalyzed political support and interest and served as a basis for streamlining and strengthening the initial coordinating and management mechanism for the ICM project, effected through local

legislation (provincial orders)

Short-term action plan

An implementation plan for the coastal strategy (Chonburi ICM Action Plan), initially prepared for 2006–2008 and updated for 2008–2011 enabled the consideration and integration of identified coastal management activities in the provincial environmental management plan and municipal development plans

Resource commitments

The ICM Action Plan serves as a basis for the annual allocation of local government funds for coastal resource and environmental management, and for leveraging additional budgets from the central government and other sources.

Stakeholder participation and support

Recognizing the importance of stakeholder education and participation in implementing the Coastal Strategy, the ICM Action Plan includes numerous opportunities for involving various stakeholders in ICM activities, including sea turtle conservation, mangrove rehabilitation, seagrass transplantation, waste management, etc. ('learning by doing'). Support was also received from the private sector, including the Underwater World at Pattaya, Thai Oil and others for various activities (e.g., sea turtle conservation, training for shoreline oil spill response, etc.)

Leadership of an "ICM Champion"

A key factor in the successful development and implementation of ICM in Chonburi is the commitment and dedication of Mr. Chatchai Thimkrajang, the Mayor of Sriracha Municipality. Having seen the benefits of ICM implementation in Xiamen, China, and other areas, and appreciating how ICM could be employed to stem environmental degradation and improve environmental decision-making and management in Chonburi, he has consistently promoted ICM to the adjoining municipalities in Chonburi as well as to other provinces in the eastern seaboard and other areas of Thailand. He has been instrumental in developing a national network of ICM projects/programs/stakeholders (Coastal Resources Management Alliance of Thailand or CORMAT) to promote ICM implementation and facilitate information and knowledge-sharing.

FINANCIAL SUSTAINABILITY

The adoption and implementation of the Chonburi ICM Action Plan, which requires local governments to allocate \$1,400 to support the operations of the Chonburi ICM Secretariat at Sriracha Municipality and budgets for specified activities, ensures the long-term financial sustainability of ICM implementation in Chonburi. This plan is also used as a basis for requesting central government funds for various coastal management activities.

The involvement of Pattaya City and the Chonburi Provincial Administrative Organisation, which have sizeable budgets, in the Chonburi ICM network also provides a potential source of financial assistance for some financially-constrained municipalities.

Fund-raising activities are also conducted annually. In Sriracha Municipality, some public awareness/education activities at Koh Loy, such as feeding of sea turtles in the conservation pond and release of fishes to the sea, are generating income that supports the maintenance of the island park. Chonburi is also receiving assistance from PEMSEA in developing other project proposals (within the framework of the Coastal Strategy) for submission to the GEF-UNDP Small Grants Programme. Although systematic studies on harvest and income have not been conducted, local fishermen have noted improvements in the catch of crabs and other fish species. The private/commercial/industrial

sector has also been supportive of the program, contributing to various activities.

SUSTAINABILITY OF GOVERNANCE

The PCC serves as the policy and decision-making body for ICM implementation (representatives are heads/sub-heads of institutions; representatives of private sector; headed by the Vice Governor). The ICM secretariat performs a coordinating function especially for activities that require collaboration among members.

A governance system is not yet institutionalised but the existing arrangements are recognised and operational, and are able to mobilize necessary support for relevant agencies and institutions. The governance system has access to available information for decision-making, and has a monitoring and evaluation process in place, although it needs to be strengthened further to systematically reflect the achievement of desired outcomes relative to the targets.

ICM implementation is considered to be contributing significantly to building local capacity to address various challenges to sustainable coastal development. It has resulted in additional costs for various stakeholder groups, such as the 1) local governments (i.e., increased allocation for marine and coastal management; support for the ICM Secretariat, human resources; use of facilities, etc.); 2) government agencies (participation in/support for various activities); 3) private sector (contributions to various activities; installation of grease traps in restaurants, etc.); 4) local schools/universities (participation in/ contribution to various activities); 5) fishermen and communities (participation in various activities). However, the additional costs are considered as worthy investments that will enable achievement of greater benefits.

Distribution of the benefits and costs associated with ICM implementation depends on the extent of implementation of the ICM Action Plan of each participating local government. The Chonburi ICM Secretariat believes that people are happy to participate in ICM activities. Increasing participation in coastal management activities has been observed. People view the ICM activities as opportunities for learning, sharing experiences, and social growth.

CONCLUSIONS

The ICM approach with inter-institutional cooperation, organized around formal agreements and supported by the PEMSEA project, is working very well in Chonburi. Already there are a host of 1st Order results, in terms of the structures, processes, plans and policy commitments necessary for improved, integrated management of the coastal environment. Though the project has been going for only a few years, some 2nd and 3rd Order results are already beginning to emerge, though a more systematic monitoring system will be needed in order to assess these better. It is notable, too, which local government funding mechanisms, linked to the Coastal Strategy Implementation Plan/ ICM Action Plan, are already operating, albeit on a modest scale. This bodes well for sustainability. Amongst the factors contributing to this early success are:

- Local municipality leadership and political commitment, influenced by having seen the success of Xiamen.
- Confidence that the ICM approach combines conservation and development objectives, and that the project would therefore help rather than constrain development.
- Availability of capital for investment in development projects that were conducive to improved environmental management; there seems to have been a positive feedback between environmental improvements attracting new investments and new investments contributing to (or at least being compatible with) environmental improvements.

ANNEX 6. EXAMPLES OF LAMMs IN DEVELOPED COUNTRIES

AUSTRALIA AND ICM

A physical regionalisation of the coast was developed by the Council of Nature Conservation Ministers in 1985 to delineate and describe major regions. This CONCOM regionalisation was not used extensively for marine planning, as it was too general and not adequate for the purpose of identifying candidate areas for the National System of Marine Protected Areas (NSMPA). In 1986, The Australian Committee for IUCN modified the CONCOM to a regionalisation named the ACIUCN. No substantial progress was made until an ecosystem approach, as distinct from a physical approach, was made into regionalisation of the Australian coastline.

The Australian Government used a process of choosing large marine ecosystems to develop the Interim Marine and Coastal Regionalisation for Australia (IMCRA) which was then used to declare a national system of MPAs (Thakaway and Cresswell, 1995).

AUSTRALIAN INTEGRATED COASTAL ZONE MANAGEMENT

www.deh.gov.au/coasts/ICM/

The coastal zone is one of Australia's greatest assets. The fundamental goal of ICM is to maintain, restore or improve the quality of coastal ecosystems and the societies they support. National cooperation is required to achieve ecologically sustainable development through ICM.

The Framework for a National Cooperative Approach to Integrated Coastal Zone Management, endorsed in October 2003, addresses both development and conservation challenges for coastal Australia, which are of national scale and scope. It recognises the need for governments to support ongoing economic, social and environmental well being in the coastal zone. It sets the scene for national cooperation in managing coastal issues and ensuring effective and complementary arrangements within and across jurisdictions, and to better reflect the interests of coastal stakeholders.

The six priority areas addressed in the Framework are:

- integration across the catchment-coast-ocean continuum
- land- and marine-based sources of pollution
- climate change
- pest plants and animals
- planning for population change
- capacity building

While jurisdictions have different legislative and administrative frameworks for managing the coastal zone, adopting a national cooperative approach seeks to address cross-border and sectoral issues, harmonise joint action towards management of common issues, and encourage investments from all jurisdictions.

An implementation plan that seeks nationally cooperative outcomes within nominated timeframes has now been released. The National Cooperative Approach to Integrated Coastal Zone Management – Framework and Implementation Plan sets out, under the strategic priority areas, implementation objectives and actions required to address coastal management issues. Actions identified in the implementation plan will build on existing coastal management initiatives at all levels of government and, where feasible, will be achieved through the efficient allocation of existing resources.

The implementation of the Framework for a National Cooperative Approach to Integrated Coastal

Zone Management is managed through the Intergovernmental Coastal Advisory Group (ICAG), comprised of representatives from the Australian Government, each state government, the Northern Territory Government and the Australian Local Government Association (ALGA). ICAG members meet several times a year to share experiences and to work on Framework implementation.

In Australia, WWF is focusing on helping to establish a world class network of sanctuaries around Australia to ensure threatened marine life is protected and fish stocks recover from threats such as over fishing. As part of this commitment WWF-Australia has joined Save Our Marine Life, a collaboration of global national and state-based environmental organisations to help secure the future of Australia's south west marine environment. This globally significant region is home to a far greater proportion of unique marine life than the Great Barrier Reef and yet less than 1% of it is protected. Save Our Marine Life brings community, science and good public policy together to assist the Australian Government in establishing a network of large no-take marine sanctuaries. WWF assists and assesses programmes but does not work on ecosystem-based management per se.

TNC is working with partners across Australia to protect the lands and waters that all species rely on. The Conservancy is exchanging skills and expertise with Australian conservation organizations in the hopes of making a significant difference in a country that still has so much natural heritage to preserve. These activities are not ecosystem-based rather they centre on conservation of fragile communities or individual organisms.

USA AND LMEs

NOAA was responsible for initiating LMEs in the US and developing countries as a means to characterise ecosystem-based management. LMEs were first designed and used for conservation of the world's fisheries but the term was later broadened to include conservation of biodiversity and sustainable development. The approach is recognised by the US Government through its use by NOAA.

NOAA defines ecoregions in the US as: "Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance. These general purpose regions are critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and non-government organizations that are responsible for different types of resources within the same geographical areas" (Bryce et al., 1999). The LME concept for ecosystem based management and its five module approach (productivity, fish and fisheries, pollution and ecosystem health, socioeconomics, and governance) is also applied in the USA. It has been used to characterise marine issues in the five module approach. www.lme.noaa.gov/index.php?option=com_content&view=article&id=52:lme6&catid=41:briefs&Itemid=72

The first three modules are natural resource science based and well developed. During the past 15 years methods for monitoring and assessing the productivity, fish resources and fisheries, and pollution and ecosystem health of LMEs were developed. Sustained, accurate, and efficient assessments of changing ecosystem states are now feasible because of the advent of advanced technologies applied to coastal ocean observation and prediction systems. Such systems can now measure ocean productivity, changes in fish stocks, and changes in water and sediment quality and general health of the coastal ocean. Consideration of the socioeconomic and governance modules has been more limited, despite the fact that work on these modules is essential to achieving effective ecosystem management. Management of LMEs requires not only knowledge of changing states of the system, but also the effects of change on socioeconomic benefits to be derived from using the LME resources (NOAA, 2000).

NOAA demonstrates the way that the modules have been applied to provide management-type

information. NOAA presents many guidelines for applying LME to ecosystem based management and discusses how government users in the US have coordinated their efforts. The LME approach was adapted by NOAA in 1992 and applied to US waters. The LMEs in the US are the Northeast U.S. Continental Shelf, Southeast U.S. Continental Shelf, Gulf of Alaska, Gulf of Mexico, Eastern Bering Sea, Gulf of Alaska and California Current.

WWFs presence in developed countries seems to be centred at pointing out troubled areas and assessing the needs. In the US, for example the National Estuarine Assessment programme of NOAA conducting a national eutrophication survey in 2007 found that of 141 US estuaries evaluated 30% lacked adequate data for assessing estuarine status. Most systems identified as hypoxic or eutrophic also lacked detailed data on the sources of nutrients or the relative contribution of each source. Some systems that have developed detailed nutrient budgets include Chesapeake Bay, the Gulf of Mexico (Mississippi-Alchafalaya Plume) and Tampa Bay (WWF-Germany, 2008). The need for this assessment was pointed out by WWF but it did not actually do the work.

TNC works in all 50 States to preserve the diversity of life in the United States. Its work is thematic around endangered or rare organisms. Thus, it appears that neither WWF nor TNC undertake ecosystem-based programmes in the USA, as they do elsewhere.

MEDITERRANEAN REGIONAL SEAS PROGRAMME

The Mediterranean was the location of the first Regional Seas Programme, called the Mediterranean Action Plan (MAP), based on the Barcelona Convention of 1975 (<http://www.unepmap.org/index.php>). Starting with 16 nations, its membership has now extended to 21 European, North African and Middle Eastern countries bordering the Mediterranean Sea: Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, the European Community, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey. The MAP is interesting not only for being the longest established RS but also because it brings together developed and developing countries and seems to have acquired greater capacity than other RS programmes to deliver on the actions to which the countries sign up. In our interview with the Permanent Commission of the South Pacific, the Secretary General spoke with admiration, if not envy, of the binding nature of the agreements and the degree of authority delegated by the countries to the MAP secretariat. As a near-enclosed sea with high diversity—biological and social—and huge problems of pollution, over-exploitation and ecological degradation, the Mediterranean certainly needs effective regional management. We have had only a superficial look at the MAP, but summarise here some basic information and one or two observations.

Through the MAP, these Contracting Parties to the Barcelona Convention and its Protocols are determined to meet the challenges of protecting the marine and coastal environment while boosting regional and national plans to achieve sustainable development. Its initial focus was on pollution control, but this shifted towards ICM, as it was apparent that most environmental issues were rooted in inadequate development planning and socio-economic trends that put increasing pressure on coastal resources.

In 1995 MAP moved into a second phase with the adoption of the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II). This reaffirms the main lines of action: pollution reduction, maritime safety, integrated coastal planning, invasive species control, oil pollution control and sustainable development. Interestingly, the Phase II Action Plan emphasises the aim of involving the region's millions of inhabitants in improving environmental management, motivating and empowering them to act.

The work on integrated coastal planning is especially significant, because growing frustration at the inadequate implementation of all the non-binding guidelines led to a breakthrough: the adoption in January 2008 of a legally binding, regional protocol for integrated coastal zone management. The Coastal Management Centre (http://www.pap-thecoastcentre.org/about.php?blob_id=56&lang=en)

reported as follows:

"It became obvious that no real progress would be achieved in the field with new Integrated Coastal Area Management recommendations or guidelines alone, since these would only be repetitions of what already exists, close to stagnation or regression, highlighting once again the lack of effectiveness and implementation of adopted documents. Only specialists are aware of these documents and almost everything has already been written on these issues. Time has now come to take one further step, ensuring more effective application in the field. To this end, the only truly viable legal instrument is the adoption of a legally binding regional instrument. All the parties are convinced that this Protocol is a crucial milestone in the history of MAP. It will allow the countries to better manage their coastal zones, as well as to deal with the emerging coastal environmental challenges, such as the climate change."

In the area of pollution control too, the MAP seems to be getting more determined to achieve regional results, with the recognition of 103 pollution hotspots and 51 sensitive areas requiring special intervention and a deadline of 2025 to complete remedial actions.

The year 1995 also saw the adoption of a new Protocol on Specially Protected Areas, known as the SPA and Biodiversity Protocol. Eight years later, a process supported by GEF culminated in the elaboration of the Strategic Action Plan for the conservation of marine and coastal biodiversity in the Mediterranean (SAP BIO). This provides Contracting Parties to the Barcelona Convention, international and national organisations, NGOs, donors and all other actors involved in the protection and management of the Mediterranean natural environment, with principles, measures and concrete and coordinated actions at national, transboundary and regional level for the conservation of the Mediterranean marine and coastal biodiversity, within the framework of sustainable use and through the implementation of the 1995 SPA Protocol. It advocates concrete actions and recommends practices that aim at mitigation of impacts on biodiversity, adoption of bio-friendly sectoral policies, identifying gaps in knowledge, strengthening legal frameworks, building capacity to implement strategies, integrating SAP BIO actions within general regional and national decision-making processes, strengthening inter-agency cooperation, carrying out MAP actions on biodiversity, and encouraging public awareness and participation. This whole process and its progress on implementation since 2003 merit further study.

Our initial observations, on the basis of a superficial look at the MAP case, are as follows:

- Processes of negotiation and progress towards practical action appear to have been very lengthy and dependent on political will.
- As elsewhere, pollution control was the first and strongest concern bringing the RS countries together.
- ICM is seen to be central to solving the Mediterranean's severe ecological problems and the recent decision to make that approach legally binding represents a major breakthrough.
- It will be interesting to observe how the new ICM protocol is implemented in those member countries with relatively weak governance, in general.
- We would expect that the richer Mediterranean countries will be in a position to help finance some of the actions needed for the common good, thereby eliminating another potential barrier to implementation.
- Biodiversity is also receiving increased attention, though perhaps not with the level of political commitment enjoyed by the ICM and pollution control lines of action.

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