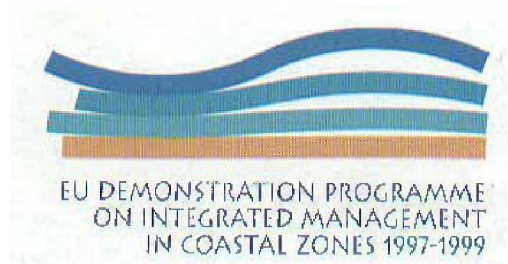


AN ASSESSMENT OF THE SOCIO-ECONOMIC COSTS & BENEFITS OF INTEGRATED COASTAL ZONE MANAGEMENT

CONTRACT No : B4-3040/99/134414/MAR/D2

**FINAL REPORT TO
THE EUROPEAN COMMISSION**

NOVEMBER 2000



**FIRM CRICHTON ROBERTS LTD
AND
GRADUATE SCHOOL OF ENVIRONMENTAL STUDIES
UNIVERSITY OF STRATHCLYDE**

AN ASSESSMENT OF THE SOCIO-ECONOMIC COSTS & BENEFITS OF INTEGRATED COASTAL ZONE MANAGEMENT

FINAL REPORT TO

THE EUROPEAN COMMISSION

REPORT CONTENTS

Executive Summary

1 :	Introduction and Background to the Report	1
2 :	ICZM Definitions, Typologies and Assessment	6
3 :	Key Features of European Coastal Zones	13
4 :	ICZM Features in the EU Demonstration Initiatives	18
5 :	Measuring Socio-Economic Costs & Benefits	25
6 :	Socio-Economic Costs & Benefits at the European Level	33
7 :	The Strategic Implications for the European Union	39

Annex Documents

A :	ICZM Bibliography	43
B :	The Participating ICZM Initiatives	51
C :	The ICZM Survey Questionnaire and Documentation	52
D :	The ICZM Assessment Team	57

Firn Crichton Roberts Ltd

Venture Court
35 High Street
Pittenweem
Fife KY10 2PG
Scotland, UK

Graduate School of Environmental Studies

University of Strathclyde
Wolfson Building
106 Rottenrow East
Glasgow G4 0NW
Scotland, UK

Tel : 00 44 1333 312 065 Fax : 00 44 1333 311 544
E-mail : firm.crichton.roberts@mcmail.com

Tel : 00 44 141 548 3644 Fax : 00 44 141 552 5498
E-mail : derekmcglashan@ftnetwork.com

NOVEMBER 2000

AN ASSESSMENT OF THE SOCIO-ECONOMIC COSTS AND BENEFITS OF INTEGRATED COASTAL ZONE MANAGEMENT

FINAL REPORT TO THE EUROPEAN COMMISSION

EXECUTIVE SUMMARY

1. In January 2000 the European Commission awarded a contract to a team from Fim Crichton Roberts Ltd and the Graduate School of Environmental Studies at the University of Strathclyde to assess the socio-economic benefits generated to date through the adoption of Integrated Coastal Zone Management (ICZM) in Europe. A central challenge for the team was to evolve an effective and logical methodological framework for assessing socio-economic benefits generated in Europe, especially by the ICZM Demonstration projects supported by the European Commission.
2. The work programme began with a major literature review of ICZM project impacts in Europe and internationally, followed by the development of assessment typologies covering both the structure of coastal zones and the economic, social and environmental impacts of ICZM. At the centre of the assessment was the use of the annual and capital values of ecosystem services in 16 biomes as identified by Costanza *et al* in 1997⁽¹⁾. A questionnaire survey of all EU Demonstration Projects and other European and international ICZM initiatives was undertaken; and the survey results were combined with desk and on-line research to feed into a socio-economic benefits model. The results from this model were then scaled-up to provide the team's assessment of socio-economic benefits of ICZM at the European level.
3. During the assessment there was the need to confront the current absence of accepted definitions of coastal zones, ICZM and socio-economic impacts; the difficulties in accessing consistent and comparable data for coastal zones; and the need to identify the biome composition of Europe's coasts. A total of 39 ICZM initiatives participated in the assessment, with 21 of the Demonstration Projects providing comprehensive data and information : these have provided the basis for scaling benefits up to the European level. The team acknowledges the important contribution of the ICZM managers involved.
4. There are over 53,000 km of coastline within the 13 EU Member States with direct access to the sea; with a great diversity of coastline lengths, biome types and socio-economic structures. For the 21 ICZM projects with biome data, open oceans, continental shelves and estuaries represent over 61% of the total (offshore & onshore) area of the project's coastal zones. These coastal waters generate nearly 75% of the annual ecosystem services benefit in the coastal zones using Costanza values. The total annual value of these benefits in the zones exceeds €18 billion annually, making coastal zones the most valuable areas within the European Union.
5. The team sought to identify the management and operational best-practice features of ICZM initiatives, the majority of which have not yet evolved from their initial strategy and planning phases to operational programmes and projects. The key economic sectors in the zones were identified and assessed with tourism and leisure, agriculture and food, sea fisheries, ports and shipping, and residential housing being most common. The ICZM impacts on coastal zone sectors have been most positive on tourism & leisure, housing, and forestry. The major environmental pressures in the zones were reported as being tourism, water pollution, habitat loss, coastal erosion and urban expansion.

6. The assessment identified both qualitative and quantitative socio-economic benefits of ICZM initiatives. The most important qualitative benefits were greater understanding of coastal zones amongst school children; a better mutual understanding between ICZM partners; the creation of an enhanced feeling of community; more sustainable tourism; improved decision-making; and more coherent spatial planning. These qualitative benefits appear to be enduring and to provide the basis for further ICZM activity in the future. Expenditure within the European ICZM projects responding to the survey was just over €22 million for the 1996-2000 period; with total ICZM related expenditure in Europe probable exceeding €60 million over the same period. Further investigation is required of European ICZM expenditure.

7. The survey suggests that there are low-level ICZM initiatives involving an average total project expenditure of €0.5 million plus €50/Km of coastline; and high level initiatives averaging €5.0 million plus €250/km coastline. These two broad bands of costs were used in the team's modelling of socio-economic costs and benefits. The gross benefits of ICZM were developed in terms of habitat protection, local infrastructure and business, and for tourism, both for the ICZM zones and for the 13 coastal Member State of the European Union. At the national level, the annual value of ICZM benefits ranged from €65 million for Eire to €883 million for the United Kingdom. The modelling also suggests that 78% of these benefits at the European Union level come via industry benefits; 13% from tourism; and the remainder from habitat enhancement.

8. In terms of the annual value of the **net** benefits generated by ICZM initiatives the modelling suggest that these were €127.1 million for low level initiatives (a benefit : cost ratio of 13.6 : 1); and €659.8 million for high level ICZM initiatives (8.6 : 1). These have been derived using a very conservative approach to valuing benefits. They exclude the important qualitative benefits of ICZM initiatives which cannot be valued without additional investigation at the level of the individual ICZMs. These include organisational and planning efficiency gains, improved resource use, and greater economic and environmental sustainability of coastal communities.

9. The team suggests that, despite the Demonstration Programme, there has been a relative "*policy-off*" situation in relation to a European wide approach to ICZM. The proposed European ICZM Strategy currently being promoted by the European Commission is seeking to encourage a "*policy-on*" approach : the assessment modelling suggests that such a positive policy stance can produce socio-economic benefits up to four times higher than those identified by the team. Given the value of the ecosystem benefits generated by Europe's coastal zone, investment in ICZM policy initiatives has a comparatively high rate of return compared to non-coastal projects in other areas of the European Union.

10. The assessment concludes that the European Commission's support for the ICZM Demonstration Programme has helped raise understanding of the importance and value of coastal zones to the European Union. The net socio-economic benefits significantly exceed the ICZM expenditures involved; and this argues strongly for funding support for ICZM projects, both through national governments and the European Commission. The report concludes with a series of recommendations and proposals on the definition, delivery, management and evaluation of future ICZM initiatives; and a suggestion that the team's survey be undertaken in 2005 to identify the longer-gestation benefits and impacts.

(1) Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hammon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. and van den Belt, M. (1997) The value of the world's ecosystem services and natural capital. *Nature* **387**, 253-260.

1. INTRODUCTION AND BACKGROUND TO THE REPORT

- 1.1 In January 2000 The European Commission awarded a contract to a team from Firm Crichton Roberts Ltd (FCR) and the Graduate School of Environmental Studies at the University of Strathclyde in Glasgow (GSES) to assess the socio-economic costs and benefits of Integrated Coastal Zone Management (ICZM). The method chosen to do this was through identifying and measuring the socio-economic costs and benefits generated both within the 35 Demonstration Projects supported by the European Commission, and in other appropriate ICZM initiatives. The results of this challenging and interesting assessment contract are presented in this final report to and the European Commission.
- 1.2 This first section of the report begins reviewing the strategic and operational objectives agreed for the contract, commenting on these in light of the evaluation programme undertaken since. The team's assessment approach and methodology, and the work programme undertaken during 2000 are then explained; and the specific evaluation challenges confronted during this period are then reviewed. The structure and contents of this report are then explained; and we end with the team's acknowledgements to all those who have kindly given some of their valuable time to participate in the ICZM survey that lies at the core of the team's assessment methodology. Annexes to the report contain the bibliography of the main publications and reports consulted during the literature review; the project papers provided to our survey partners; the ICZM survey questionnaire; and a description of the ICZM project database compiled by the team from the survey responses. The full ICZM database has been separately provided to The European Commission on CD.

THE ASSESSMENT AIMS & OBJECTIVES

- 1.3 The joint proposal from the assessment team to the European Commission identified four strategic and seven operational assessment objectives for this assessment of the socio-economic costs and benefits of ICZM initiatives. These are described below.

THE STRATEGIC PROJECT OBJECTIVES

- 1.4 The assessment work programme as agreed with the European Commission had four inter-related strategic objectives. These were to:
- ☐ Assess the strategic economic and social roles and importance of the European Coastal Zone as currently defined, both in terms of the present and future contribution of the zone to the economic and social development of the European Union and its Associated States.
 - ☐ Develop and provide, in a consistent and comparable manner, concrete and robust information on the overall economic and social benefits that can be generated for the local and European economies through the delivery of more integrated sustained approaches to the development and management of coastal zones.
 - ☐ Evolve an effective, consistent and logically sound methodology for identifying, assessing and quantitatively measuring the economic and social costs and benefits that have been promoted and/or generated by the recent ICZM demonstration projects in the European coastal zone supported by the Commission.
 - ☐ Produce a comprehensive written report on the assignment presenting the results, conclusions and recommendations of the team's assessment of the costs and benefits of ICZM as generated through the demonstration projects; and to make recommendations to the European Commission on the future assessment of the longer-term costs and benefits involved.

This report presents the results of the assessment team in addressing these four strategic assessment objectives.

THE OPERATIONAL PROJECT OBJECTIVES

1.5 In addition to the above central objectives for the assessment, the Commission and the FCR-GSES team agreed seven inter-related operational objectives to be pursued by the assessment team. These were to:

- ☐ Undertake a structured and succinct review of existing studies and literature on the economic and social costs and benefits stemming from ICZM to generate a clear, coherent taxonomy of ICZM costs and benefits both at local and regional levels.
- ☐ Establish an effective and achievable means for assessing the level, nature and duration of the principal types of ICZM economic and social costs and benefits; the spatial distribution and differences of such costs and benefits; and a practical quantification of these that can contribute to future policy development.
- ☐ Demonstrate, in a coherent comparable manner, practical examples of each of the main benefits and costs generated through ICZM (both from European and other experience), identifying wherever possible the specific contributions made through ICZM programme initiatives, and the key quantitative and qualitative expressions of these.
- ☐ Scale-up the resulting quantitative measures of European ICZM costs and benefits generated by the individual ICZM demonstration projects to generate estimates of these costs and benefits which might be expected to occur at the European scale should the results and recommendations of the six thematic studies in the Demonstration Programme be promoted through a future European ICZM strategy and action programme.
- ☐ Report upon the distribution of socio-economic costs and benefits by the individual Member States of the European Union through an extrapolation of the quantified results from existing ICZM programmes; and possibly assessing these through comparison of *ICZM-on* and *ICZM-off* policy scenarios.
- ☐ Collect, collate and provide both the socio-economic report conclusions and the supporting evidence, calculations and documentation, in a high quality and well-written format that also enables future researchers to take the investigation forward as a means of assessing the longer-term socio-economic costs and benefits.
- ☐ Make recommendations to the European Commission on the future R&D priorities of ICZM strategy, policy and programmes, following the results and conclusions of this initial assessment, including possible future thematic research issues.

The subsequent sections of this report address all of these operational assessment objectives. The final section presents the team's conclusions on the appropriateness of these original operational objectives, and the implications for future benefit and impact research.

THE ASSESSMENT APPROACH & WORK PROGRAMME

1.6 In seeking to establish the socio-economic costs and benefits associated with ICZM initiatives in the European Union and internationally the team's assessment methodology was based upon a carefully phased work programme to generate six assessment components essential to the identification of benefits. These six components, each of which is briefly described below, were:

- ☐ A typology of coastal environmental and economic areas
- ☐ A typology of economic, social and environmental impacts
- ☐ An analytical database of ICZM projects
- ☐ A spreadsheet model to generate comparable costs and benefits values
- ☐ A questionnaire to selected ICZM projects to secure essential data
- ☐ The use of ecosystem valuations and global flow values

Each of these six methodological components is explained in section 2 of the report; and a detailed

methodological paper is separately available from the assessment team.

THE ASSESSMENT WORK PROGRAMME

- 1.7 The assessment team pursued the strategic and operational objectives for this assignment through a carefully designed mix of desk and on-line research; a questionnaire survey of ICZM initiatives in Europe and internationally; a review of published reports by EU Demonstration projects; spreadsheet modelling; team development discussions; and meetings with the European Commission in Brussels. This work programme was undertaken through the team undertaking 13 inter-related assessment tasks undertaken in a generally sequential manner between February and October 2000. These tasks were:

- | | |
|--|---|
| 1 : Initial Scoping & Components Research | 8 : Interim Project Report |
| 2 : Developing Typologies & Measures | 9 : Scaling Up of Benefits |
| 3 : Questionnaire Design | 10 : Second European Commission Meeting |
| 4 : Initial Meeting with European Commission | 11 : Revised Final Report |
| 5 : Circulation of the Questionnaire | 12 : Second Language Version |
| 6 : Follow-up Emails & Telephone Calls | 13 : Delivery of Final Report |
| 7 : Generation of ICZM Benefit Data | |

- 1.8 A full description of the work programme tasks is contained in the separate reports to the European Commission made by the team. The changes to the original proposal that have been made to address the challenges encountered by the team have been relatively minor. The largest challenge arose from the extended questionnaire survey period resulting from the slow response by many of the EU ICZM Demonstration Projects despite regular follow-ups by the assessment team and by the European Commission. This particular aspect of the work has important implications for the European Commission, and these are explained in section 7 of our report.

ASSESSMENT CHALLENGES & RESPONSES

- 1.9 In assessing the socio-economic costs and benefits of ICZM initiatives in Europe and globally the team encountered a range of definitional, methodological, organisational and information-based research and development challenges. Some of these are reported on later in the report, but it is important to briefly review these at this point as they have all impacted on the work programme and the individual tasks. The six major challenges that have been addressed in this contract are:

- ☐ The Definition of ICZM
- ☐ EU and Global Coastal and Biome Data
- ☐ The Demonstration Project Data
- ☐ Socio-Economic Impact Research
- ☐ Questionnaire Comprehension & Response
- ☐ The Development Stage of ICZM Initiatives

Each of these challenges is explained below.

THE DEFINITION OF ICZM

- 1.10 A major assessment challenge facing the team has been the continuing absence of a globally accepted definition of Integrated Coastal Zone Management. ICZM means different things to different people, and consequently we have encountered initiatives with little 'integration' and/or 'management' present. This has resulted in the team trying to assess a great diversity of activities with little in common except a location in or alongside a coastal zone. This potential challenge was recognised in our original tender to The European Commission, and was addressed through the team defining the essential features of ICZM. These are explained in section 2.

EU GLOBAL COASTAL AND BIOME DATA

- 1.11 A second challenge is that concerning a current lack of comparability in relation to the definitions of "coastal zones" and "coastlines"; and of the resulting variable quality of data and information about coastal zones and coastlines in the survey questionnaires and other research material reviewed by the team. In addition, there is as yet little information collected, collated and made available on the

Costanza biomes or biotypes at a national or regional level, despite the increasing policy recognition of the importance of this emerging classification of environmental assets and services. The team has sought to address this constraint through focusing on the more commonly used definitions, and by using reports and on-line information to derive estimates. This aspect of the evaluation is discussed in section 3 of the report.

THE DEMONSTRATION PROJECT DATA

- 1.12 Many of the ICZM Demonstration Project managers responding to the survey questionnaire or contacted by the team were unable to provide quantitative data and statistics for their coastal zones, the local biomes and industries, or for their expenditure on the initiatives. This is understandable as the original ICZM project awards made by the Commission did not require such data to be assembled or reported; and in a few cases basic data on such as the sea and land areas within the zone were unavailable or still undefined. In such cases the team have accepted the international definition of coastal zone used by the United Nations Environmental Programme (UNEP), and have taken landward areas to extend 10 km landwards from the coastline. This is a conservative approach as the influence of coastal zones often extends considerably further inland than 10km. The assessment team agrees that the definition of the “*coastal zone*” should be flexible, but for this type of impact evaluation more specific spatial definitions were required.

SOCIO-ECONOMIC IMPACT RESEARCH

- 1.13 The team’s desk, on-line and telephone research and consultations has generated a huge and rapidly growing corpus of recent and current research into the impact of ICZM initiatives (or coastal development programmes) on the socio-economic structures and values of their local communities. The most recent of the research publications involved are included in the bibliography attached as Annex A to this report. The team has reviewed the relevant benefit and impact results of these studies; and the best practice elements of these helped shape the survey questionnaire. However, the large and complex diversity of benefit and impact valuations encountered have not been brought together and used to determine the European-level value of benefits as this is both a major research exercise in itself, and also the team does not believe that such specific results are transferable into European benefit calculations. This is another issue that we address in the final section of this report.

QUESTIONNAIRE COMPREHENSION & RESPONSE

- 1.14 Not all of the ICZM Demonstration Projects funded by the European Commission participated in the survey; a copy of which is contained in Annex C to this report. The overall quality of the survey responses received is very good; with 21 initiatives within the European Union ICZM Demonstration Programme providing full responses and further initiatives contributing fairly complete returns (except for biome data). The analyses in this report are based upon the number of responses received for each survey question: as this varies, the number of responses involved is given at the foot of each table. We are confident that both the EU ICZM project responses and those from outwith the Demonstration programme are a firm representation of the benefits generated to date during the early planning phase of the Initiatives. The ICZM impact monitoring implications from this for the Commission are reviewed in section 7.

THE DEVELOPMENT STAGE OF ICZM INITIATIVES

- 1.15 The majority of the European Union ICZM Demonstration Projects have recently completed their initial strategic and management planning phases, as indeed have most other ICZM projects identified by the team. As such, they have only just begun to invest in the operational programmes and projects necessary to begin enhancing the environmental and economic quality of their coastal zones in a sustainable manner. The socio-economic benefits and impacts generated since 1996-97 have thus been predominantly in terms of various qualitative benefits for the ICZM stakeholders in terms of improved coastal management partnerships, processes and priorities. The major quantitative socio-economic benefits will thus be generated in the future. The nature of the lags in regional economic systems suggest that ICZM impacts may only be measurable towards the latter years of this present decade. We return to this issue in sections 3 and 7 of the report.

THE STRUCTURE OF THE REPORT

- 1.16 Following this introduction, the report establishes the essential framework for the assessment by defining in an operational sense the concept of Integrated Coastal Zone Management; and also explains the structure and definitions of the other analytical typologies developed by the team as essential to the assessment of ICZM socio-economic costs and benefits. This definition has drawn upon the literature survey, but also represents original development work by the team. In section 3 of the report the context for the assessment is established through an overview of the key features of the coastal zones of EU Member and Associated States, drawing upon currently available information and statistics. This is also an aspect of ICZM policy and management where the team make recommendations later in the report.
- 1.17 The key features of current ICZM initiatives, both within Europe and in other nations, are presented and discussed in section 4, with the important point being made that – especially in the case of European ICZM initiatives – that most projects have only just completed their establishment and planning phases, with relatively little implementation activity and expenditure being visible by mid-2000. This is important in assessing socio-economic costs and benefits, and implies that long-term impact evaluations are important for strategy and policy. Section 5 begins by explaining the economic methodology for measuring gross and net costs and benefits generated by ICZM initiatives; and presents and explains the research results at a national level. The scaling-up of the ICZM project investigations into national and European estimates of socio-economic costs and benefits forms the subject of section 6, where the principal conclusion is that the scale of the net socio-economic benefits of ICZM are of such an importance to justify a major strategic commitment to coastal zone policy and programmes by the European Commission and the governments of its Member States.
- 1.18 The assessment results and conclusions are brought together in section 7 of the team's report which also explores the strategic policy and operational implications for the European Union and Europe's coastal zones and communities. The team's recommendations and proposals to the European Commission are designed to promote such enhancement. The report closes with a series of annex documents including the bibliography created during the literature review; copies of the project document and survey questionnaires sent to ICZM project managers; a short explanation of the ICZM database assembled by the team; and a list of the assessment team members.

ACKNOWLEDGEMENTS

- 1.19 The assessment team wish to take this opportunity of thanking and acknowledging the many contributions made to the evaluation programme by individuals and organisations associated with ICZM initiatives, coastal zones and environmental economics and statistics in Europe and internationally. An especial acknowledgement is made to those members of ICZM programmes and projects in the European Union and other nations who gave up their valuable time to consider, complete and return the team's ICZM survey questionnaire. Whilst we have individually thanked them for participating, we affirm our gratitude, and have listed them in Annex B of this report. Their inputs have made this assessment possible.
- 1.20 We also wish to thank the very large number of research scientists and ICZM teams around the world who have responded to our request for information both on ICZM initiatives and on recent or current research on socio-economic aspects of ICZMs and/or coastal zones. A special acknowledgement goes to Bob Costanza and his team, whose creativity has established the assessment of the economic values of biomes as an established component of global environmental policy. We wish also to thank all those who supplied statistics and data, including Stefan Kleeschute of GIM SA in Brussels and Eurostat; and Sayeed Ahmed of the Department of Geography in the University of Strathclyde who generated national statistics from the GIM database. Above all, we thank Anne Burrill of the European Commission for her valuable comments, contributions, support and advice.

2. DEFINING INTEGRATED COASTAL ZONE MANAGEMENT

- 2.1 An integral and important aspect of the team's work programme has been to develop flexible and practical definitions of key concepts required by the assessment of socio-economic benefits generated by ICZM initiatives. In practice, there may never be a specific generally accepted definition of "ICZM", as it represents a process tool-box which is interactive, constantly evolving, and adapting through a variety of policy and management instruments. "Coastal Zones" also represent a definitional challenge, especially in relation to spatial boundaries around the collection of biomes which largely determine the nature and scale of socio-economic benefits. In this section, we address these central definitional issues; and explain the evaluation methodologies and typologies used to generate the initial estimates of socio-economic benefits. The economic aspects of this methodology are explained in more detail in section 5.

DEFINING COASTAL ZONES AND ICZM

- 2.2 The team has reviewed the diversity of concept definitions for coastal zones and Integrated Coastal Zone Management that have been evolved by international organisations, national governments and academic researchers; and found it difficult to identify concepts which have a practical operational relevance in supporting ICZM strategy and policy. One goal of the survey of ICZM initiatives was therefore to explore the perceptions of ICZM project managers on those two core definitions through operational parameters.

THE COAST AND COASTAL ZONES

- 2.3 The first assessment challenge was what is "the coast?" The coast is obviously the area where the land meets the sea. However, that is more accurately the shore. The coast extends over a much larger area. Hansom (1998) defines it as "*the air-sea-land interface zone around continents and islands*" further noting that inland it reaches as far as the maximum extent of sea-spray, and seawards it reaches to the "outer extent of the continental shelf". Hansom's definition is a geomorphological one, Beatley *et al* (1994) gives an ecological one: "*a transition zone, or an ecotone, lying between oceanic environments (or lakes) and terrestrial systems*". From a pollution perspective a whole river catchment could be considered, as a pollution event in an upland catchment will eventually reach the sea, and from an economic perspective the coastal zone could be highly varied : those dependant on fish for food, industries using ports for transportation, and many large airports are built on coastal plains. Part of the problem is that there is no universal definition of the extent inland of 'the coast' as each specialist will want to put their slant on it, and furthermore, each coast will be different. For the reasons explained in section one, and the fact that each demonstration project used a different spatial definition (in terms of the extent inland and out to sea), the team adopted a flexible approach.
- 2.4 The second related coastal challenge confronted by the team has been trying to secure and collate coherent and consistent information and statistics on the principal physical, economic and environmental features of the coast and coastal zones. It has been an especial goal of the team to ask ICZM project managers for basic biome, economic and environmental data for their coastal zones, but this has proved difficult in that not all ICZM teams appear to have ever assembled the basic data for their coastal zones. The data that has been compiled by the team to provide the base coastal zone data for scaling up the survey results are presented in section 3 where the key features of European coastal zones are reviewed. This is an area where a greater degree of standardisation could have benefits in terms of future inter-project comparisons.

INTEGRATED COASTAL ZONE MANAGEMENT

- 2.5 A considerable volume of literature was collected (academic papers, books, working papers, newsletters and other forms of communication with substantial use of the internet). Once collected material was assessed for relevance and passed round the relevant members of the team for their use. One of the most important questions the team had to ask at the start was what is integrated coastal zone management? A number of academics have already attempted to answer this question to varying

degrees of success. Kay and Alder (1999) rightly point out that it is the latest incarnation of a process of managing our coasts that has evolved since the Rio Conference and the Agenda 21 (UNCED, 1992) document which introduced the new paradigm of 'sustainability'. From this point, the title 'integrated' started to appear in the name of coastal initiatives. O'Riordan and Vellinga (1993) have categorised this evolution of coastal management into four phases, and suggest that we are currently in the third phase. This third phase involves an emphasis on public participation, restoration, environmental management and sustainable development. However, to assess ICZM and its costs and benefits the difference between a project that is, or is not, 'integrated' must be known, and that must first be assessed. An integrated programme is one that is 'complete or unified' (Kenchington & Crawford, 1993), although it may have separate or individual units. Cicin-Sain (1993) suggests a five stage continuum of coastal management from fragmented through communication, coordination and harmonisation to integration. This suggests that coastal management initiatives must evolve into ICZM projects, and so this must be considered.

2.6 However, there are many forms of integration. McGlashan (2000) suggests there are four integrative directions: spatial; temporal; vertical; and, horizontal:

- ☐ **Spatial integration** - includes the cross-cutting problems related to boundaries, how far inland and how far out to sea is considered by the project, marine and terrestrial issues should be given equal weighting, natural processes do not respect administrative boundaries.
- ☐ **Temporal integration** - considers issues of lag-times, therefore decisions made now must consider the impacts well into the future to ensure sustainability, precautionary decision making.
- ☐ **Vertical integration** - all levels inter-link, cooperate and integrate: site plans compliment local plans, which fit with coastal cell plans and national and international strategies, each may have a different role, but they must also compliment. Also in this section is the application of policy within organisations, information must be passed on both up and down within organisations as well as to hierarchical bodies (e.g. planning office - local councils - national government).
- ☐ **Horizontal integration** - the bringing together of different topics in the context of coastal decision making (e.g. coastal defence, economic development, nature conservation etc.) different departments and organisations working with each other rather than in isolation. A holistic view of coastal issues.

The reason for highlighting different types of integration is that it illustrates that few ICZM initiatives exhibit anywhere near all of the integrative directions highlighted above. It shows how embryonic many are, and what they may have to evolve into, or through. It is also important to keep this in mind when the report refers to 'high' and 'low' level ICZM in the cost-benefit calculations phase. The higher level of ICZM the more of these and features will be exhibited.

2.7 A further major issue in ICZM is inclusivity. This is part of the sustainability paradigm, that people are involved, particularly local people, it has been recognised that the most successful initiatives in many countries have been the ones in which the community are involved and enthused (Kelleher & Kenchington, 1991). Further information on participation in the ICZM process can be obtained from King (1999). At this point is worth considering the important comments made by Dobbin (1976), who states that "sciences are broken into specialised disciplines. Nature is not organised that way. Only our knowledge of it is." He then goes on to highlight the differences between a multi and an inter - disciplinary approach: multidisciplinary problems are those splint into distinct sections, solved independently, whereas interdisciplinary problems are "not disassembled", rather it is considered holistically with many specialists working together to solve the problem as a team, tending to bring about more knowledge and "more complete and workable solutions."

2.8 From the above discussion it is clear that there are many views on what ICZM is. However, what is clear is that it is a programme of managing the coast that illustrates some form of cooperation between different agencies and or groups that try to resolve issues of potential conflict. It must also be borne in mind that different states have approached coastal management in different ways. No one mechanism fits all, the different types of coast and the varying degrees of dynamism in the system means that each area will require its own approach: there is no one template for everywhere. We return to these

issues in section 4 when the main organisational, funding and operational priorities of ICZM initiatives identified through the survey are presented.

THE ICZM ASSESSMENT TYPOLOGIES

- 2.9 An important first step in undertaking the assessment of the socio-economic benefits of ICZM initiatives was to establish the core survey and evaluation typologies which the team would use to identify and scale ICZM impacts. The literature review of ICZM surprisingly identified few structured typologies for any of the different aspects and components of ICZM; and thus the team has established its own set of typologies, classifications and ranking criteria for use by initiative managers. These relate to the biomes present in coastal zones; the prime economic sectors and environmental issues in each zone; the organisational and other features found in each ICZM initiative; and the impacts generated by ICZM activities. Each of these aspects of ICZMs were incorporated into the survey questionnaire (see Annex A); and is briefly explained below.

THE COASTAL BIOMES

- 2.10 The environmental biome classification developed by Costanza *et al.* is the one typology adopted by the team in its entirety without change; and this has played a major role in establishing the broad levels of environmental services capital and revenue associated with individual ICZM initiative. The 16 biome (or biotope) classes are shown in table 2.1; and initiative managers were invited to identify how much of their coastal zone was in each of these categories. It should be noted that three of the biome categories are unlikely to be present in European coastal zones, but were included as the survey went to ICZM projects in tropical areas. The one missing biome type is for sandy beaches, where the Costanza team has not produced environmental services values : where this has been encountered, a nominal value has been included.

Table 2.1 : Coastal Biome Typologies

<input type="checkbox"/> Open Ocean	<input type="checkbox"/> Tropical Forest
<input type="checkbox"/> Estuaries	<input type="checkbox"/> Temperate Forest
<input type="checkbox"/> Sea Grass/Algae	<input type="checkbox"/> Grass/Rangelands
<input type="checkbox"/> Coral Reefs	<input type="checkbox"/> Desert
<input type="checkbox"/> Continental shelf	<input type="checkbox"/> Tundra
<input type="checkbox"/> Tidal Marshes	<input type="checkbox"/> Ice/Rock
<input type="checkbox"/> Swamps/Floodplains	<input type="checkbox"/> Cropland
<input type="checkbox"/> Lakes/Rivers	<input type="checkbox"/> Urban Areas

- 2.11 Only 21 of the European Union Demonstration projects were able to provide broad estimates of the percentage shares of biomes in their coastal zones; and some of these have been based upon non-standard definitions of coastal zones. This is an issue that we return to in Section 7 of the report. The biome values reported in section 3 are thus based on the 21 Demonstration projects; and these appear to the team to be intuitively acceptable results. It will be helpful for future EU ICZM programmes and projects to establish this biome distribution for the areas concerned as an integral element of *ex-ante* audits.

THE ECONOMIC STRUCTURE OF COASTAL ZONES

- 2.12 Whilst it will eventually be possible through Eurostat and national statistical agencies to measure the sectoral composition and performance of EU coastal zones and for individual ICZM areas, the team recognised that this was beyond the present evaluation capability as most ICZM project documentation and managers have not defined and detailed their spatial boundaries. The fact that many ICZM managers responding to the survey had little economic knowledge also argued for a relatively simple and robust approach to identifying the prime economic sectors present in each zone. The typology used is shown in table 2.2, and formed the basis for questions 8 and 9 in the survey.

- 2.13 The economic sector categories shown have been designed to be readily recognisable to ICZM project managers; have not been based on the standard ISIC statistical classifications; and are not mutually exclusive. However, the reported survey results do show the main components of coastal zone economies : a more detailed statistical assessment

**Table 2.2 : Broad Economic Sectors
Present in Coastal Zones**

<input type="checkbox"/> Sea Fisheries	<input type="checkbox"/> Ports & shipping
<input type="checkbox"/> Fish Farming	<input type="checkbox"/> Passenger ferries
<input type="checkbox"/> Agriculture & Food	<input type="checkbox"/> Leisure marinas
<input type="checkbox"/> Forestry & Forest Products	<input type="checkbox"/> Airports & air transport
<input type="checkbox"/> Mineral Extraction	<input type="checkbox"/> Tourism & leisure
<input type="checkbox"/> Shipbuilding	<input type="checkbox"/> Financial services
<input type="checkbox"/> Petrochemicals, refining	<input type="checkbox"/> Residential housing
<input type="checkbox"/> Manufacturing sectors	<input type="checkbox"/> Government activities
<input type="checkbox"/> Power Generation	<input type="checkbox"/> Military & defence

will require the tagging of coastal zone areas by Eurostat : we suggest this in section 7 of the report. What is important is to understand the main economic forces that are impacting on European and other coastal zones.

THE ENVIRONMENTAL CHALLENGES IN COASTAL ZONES

2.14 The third assessment typology developed by the team following the literature review is that for the principal environmental challenges facing coastal zones and ICZM managers. Whilst there are established typologies for types of risk, and an increasing body of research evidence on types, levels and value of environmental damage and degradation, there appears to be no simple typology of environmental pressures. The team has thus developed the typology shown in table 2.3 as part of the assessment methodology.

2.15 The fourteen different but inter-related challenges identified by the team as confronting the environment of coastal zones in Europe and elsewhere form a complex group of environmental pressures that vary between different coastal zones. Some of these challenges have been identified in ICZM programme documents, but generally there is little consistent information on these aspects of environmental change across Europe. Detailed research has been undertaken on some aspects of environmental pressures in the ICZM Demonstration areas, and statistical data compiled and presented within the report on *General Principles & Policy Options* prepared by a expert group for the European Commission to launch the Demonstration Programme's consultation phase in 1999.

Table 2.3 : Environmental Challenges in Coastal Zones

<input type="checkbox"/> Coastal erosion	<input type="checkbox"/> Mineral extraction
<input type="checkbox"/> Sediment movement	<input type="checkbox"/> Over-fishing
<input type="checkbox"/> Water pollution	<input type="checkbox"/> Transport congestion
<input type="checkbox"/> Air pollution	<input type="checkbox"/> Endangered species
<input type="checkbox"/> Water shortages	<input type="checkbox"/> Endangered migrants
<input type="checkbox"/> Population growth	<input type="checkbox"/> Habitat loss
<input type="checkbox"/> Tourism & recreation	<input type="checkbox"/> Urban expansion

KEY FEATURES OF ICZMS

2.16 It is probable that the socio-economic benefit and impacts of ICZM initiatives are largely determined by the organisational nature, resources and operational activities undertaken by the management bodies involved. Little investigation has been undertaken on the organisational aspects of ICZM to identify best-practice features and approaches, or indeed on defining what a best-practice ICZM initiative should be in operational terms. The team therefore established 16 key features which might be present in a best-practice ICZM initiative, and asked managers to confirm which of these are present in their initiative. These features are listed in table 2.4 below.

2.17 These ICZM features formed the basis for question 14 in the survey questionnaire, and were a central analytical tool for establishing benefits: the assumption being that the more features that were present in an ICZM initiative, the higher and more sustainable would be the socio-economic benefits. In practice, many of the ICZM managers participating in the survey have only a few of these features; and the results and implications of this aspect of the team's assessment are presented in section 4 of this report.

Table 2.4 : Best Practice Planning, Organisation and Management Features of ICZMs

<input type="checkbox"/> Stakeholder, consultations, commitment	<input type="checkbox"/> Medium-term funding (2-5 years)
<input type="checkbox"/> Comprehensive economic audit	<input type="checkbox"/> Long-term funding (6-10 years)
<input type="checkbox"/> Comprehensive environmental audit	<input type="checkbox"/> Statutory status & powers
<input type="checkbox"/> Physical process/habitat studies	<input type="checkbox"/> Regular performance reviews
<input type="checkbox"/> Zone management strategy	<input type="checkbox"/> Benefit & impact measurement
<input type="checkbox"/> Annual operation plan	<input type="checkbox"/> Associated research programme
<input type="checkbox"/> Permanent management staff	<input type="checkbox"/> Promotion & information activities
<input type="checkbox"/> Performance targets or goals	<input type="checkbox"/> Financial sustainability

ICZM BENEFITS & IMPACTS

2.18 The final assessment typology established by the team was that identifying the type and level of impact made by the individual ICZM initiatives upon the local economy, environment and communities. The managers involved were asked to subjectively identify the main impacts to date of

their initiatives, and to rate these in terms of whether these impacts were positive and thus beneficial or negative and thus imposing public and private costs. The 16 suggested benefits are listed in table 2.5 below, and these formed question 18 in the survey questionnaire.

- 2.19 These qualitative benefits of ICZM initiatives seek to identify improvements in a range of economic, environmental and community issues; and have been designed to be capable of capturing the benefits as perceived by ICZM programme managers. They do not claim to capture quantitative benefits, as this requires detailed survey-based investigations at the level of the individual ICZM which is outwith the capability of this assessment contract, but which should be an important component of the European Commission's future ICZM development initiative. It is important to note that such impact research remains relatively absent in coastal zones, especially where it seeks to assess benefits and impacts across all the relevant impact areas. The ICZM benefits and impacts reported by the 39 surveyed initiatives are presented and discussed in section 5 of this report.

Table 2.5 : ICZM Impacts on the Local Economy, Environment & Community

- 2.20 Our assessment typologies represent an initial attempt by the team to provide a framework for the review and evaluation of ICZM initiatives; and it is accepted that these can (and should) be developed and refined in the future. The survey responses by European and international ICZM projects represent an important baseline dataset that can then be used to monitor, measure and value the qualitative and quantitative benefits of initiatives over the longer-term. This is important given that most EU ICZM Demonstration projects have only just begun to move into their implementation phases when measurable socio-economic impacts will begin to emerge.
- | | |
|---|---|
| <input type="checkbox"/> Coherent spatial planning | <input type="checkbox"/> More sustainable fisheries |
| <input type="checkbox"/> Improved decision-making | <input type="checkbox"/> More sustainable tourism |
| <input type="checkbox"/> Better partner understanding | <input type="checkbox"/> Habitat restoration |
| <input type="checkbox"/> Agreement on priorities | <input type="checkbox"/> Reduced flooding & erosion |
| <input type="checkbox"/> Stronger community feeling | <input type="checkbox"/> Lower environmental risks |
| <input type="checkbox"/> Reduced traffic costs | <input type="checkbox"/> Greater public awareness |
| <input type="checkbox"/> Better quality of life | <input type="checkbox"/> School/Education initiatives |
| <input type="checkbox"/> Reduction of pollution | <input type="checkbox"/> Landscape improvement |

THE ICZM QUESTIONNAIRE SURVEY

- 2.21 Measuring and assessing the costs and benefits of ICZM initiatives was always going to be a challenge, as until this contract was commissioned little work had been done on the results, achievements and impacts of this new approach to coastal management. It was decided that the best way to proceed was to use the EU ICZM demonstration projects as a source of cost-benefit data, and to then use these to scale-up from 'hard' numbers. This avoided excessive guesswork and modelling, enabling the results to be accessible to all who were interested (part of the concept of ICZM); and enable the maximum input and understanding of the dissemination phase following the work. However, this reduced assumption method of assessing the costs and benefits carried with it the recognised risk that not all of the projects would have been keeping up-to-date accounts, or monitoring the impacts of their project. It also required good-will from the project officers to dig-out information and ask themselves what really had been the impacts (positive and negative) of their demonstration project. It was decided that the best way to undertake this type of assessment would be through a structured questionnaire (see next section for more details). In the interest of obtaining more data the team decided to send out questionnaires to other interested projects around the world, specifically targeting those which appeared to represent significant ICZM activities. These were identified through desk and on-line research with a number volunteering through email discussion groups.

THE SURVEY APPROACH & METHODOLOGY

- 2.22 It was decided the most effective way to undertake this assessment was through the use of a structured self-answer questionnaire. The longer the questionnaire, the lower the response rate: for this reason each question was worded carefully, with tick-box option answers where possible. The tick-box style allows recipients to fill the form out more quickly, which results in a higher response rate: it also allows for cross-tabulations of the database used to analyse the questionnaires. It was decided that the optimum length for the questionnaire was four A4 pages, experience has shown that questionnaires

longer than 4 pages tend to be ignored, or filled out in a patchy manner. Therefore, all of the assessment questions had to be ranked, and only the most important could be included, with a minimum of 'open-ended' questions. The questionnaires were sent out in a pack which contained a letter from the team; a 'flyer' giving background information on the project; a letter from Bruno Julien of the European Commission; and a sample completed questionnaire for an exemplar ICZM project. The questionnaires and the accompanying information were sent in French or English, or in both.

THE SURVEY QUESTIONS

- 2.23 The questionnaire (attached as Annex 3) had five sections. The first was titled '*Your Coastal Zone*' and included questions on their definition of the coastal zone, information on the spatial extend of their initiative, length of shoreline, extent offshore, percentage of artificial structures, which major rivers flow into the area and the percentage of the initiative area which fits into the biomes as used by Costanza *et al* (1997). These responses were important in allowing us to understand the setting of the initiative, its boundaries and limits. The second section, titled '*Your Coastal Economy*' asked questions on the local economy including Gross Domestic Product (GDP), tourism visits, fisheries catches etc. Obtaining this type of data was always going to be difficult, however, the team felt that these questions had to be asked, even if just to highlight that this type of data is not being collected, and without it, it is impossible to assess the impact of the initiative upon the economy with accuracy. Other questions ask about the industrial sectors and their relative importance, and if the initiative has had an impact upon them. The third section '*The Major Environmental Issues in Your Zone*' is self explanatory and allowed the initiative managers to tick the issues they felt were important in their areas.
- 2.24 The fourth section explored the '*Key Features of Your ICZM Initiative*'. This section included questions on how long the initiative had been running, what its legal status was, and importantly, features present in the initiative (e.g. habitat studies, a management strategy, permanent staff etc.). This was one of the particularly important sections, it allowed the team to look at how many features the initiative consisted of, out of a possible number of 16. The 16 features were chosen following literature surveys, experience of staff and consultation with the Commission, a number of initiative managers and others of national importance to coastal management. The list of features is far from exhaustive, it merely represents some of the features often found in initiatives across the world and allowed the team to develop a flavour of the breadth of the initiative. If this was to be carried out in a more exhaustive way, ideally indicators would have to be supplied to suit the different forms of initiative, for example the partnership approach may have drawn upon the work of Fry and Jones (2000). However, these indicators had to be general and cover all of the different approaches in the demonstration programme. Questions 15, 16 and 17 were on financial matters: these considered total financial input, the source of ICZM funding, and how it was spent. This expenditure data was important to the team as it allowed an indication of how broad the remit was of the initiative, and provided the basic ICZM costings that fed into the net benefit modelling reported on in sections 4 and 5.
- 2.25 The fifth and last section was particularly important, this is where the impacts of the initiative were considered, the section titled '*The Impacts of Your ICZM Initiative*' asked for rankings of the importance of a number of potential impacts, and how important they were in comparison with each other. They were then asked specifically about negative impacts and whether the initiative had undertaken any studies on monetary value or socio-economic costs and/or benefits of their initiative. The last question asked if they felt there were any particularly important best-practice features that our team should be aware of.

DATABASE COMPILATION & ANALYSIS

- 2.26 All of the qualitative and quantitative data from the questionnaire responses were entered into an MS Access database which was accessed by all of the team members : a short explanation of the structure, contents and coverage of the ICZM database is included as annex 4 of this report. Certain responses, for example on ICZM initiative expenditure, were provided in confidence, and will not be

released outwith the European Commission. It is later recommended that the ICZM database be expanded and updated to enable a continuing longitudinal evaluation of benefits; and that core data be made more widely available. A number of field counts and cross-tabulations were then produced by the team, and these provided the basis for the team's modelling and assessment of socio-economic benefits of ICZM initiatives.

SURVEY RESPONSES & INFORMATION QUALITY

- 2.27 The survey questionnaire was mailed and emailed to the managers of all of the 35 European Commission ICZM Demonstration initiatives, and to 30 other ICZM projects identified as appropriate by the assessment team. In addition, the Scottish Coastal Forum in Scotland arranged for its portfolio of ICZM projects to also participate in the assessment. Over the March-July 2000 period, the survey questionnaire was completed and returned by a total of 40 ICZM project managers, including 27 of the Commission's Demonstration initiatives. A list of the participating ICZM projects is provided in Annex B to this report.
- 2.28 The quality of information provided in the returned questionnaire was generally very good, and most managers were able to answer and rate the assessment measures involved. One area where the response was lower is statistical information on the spatial area and biome composition of the coastal zones within initiatives, and this is a research issue to be pursued in future. As the assessment approach adopted by the team required data on Costanza biomes in each zone, it was decided (after follow-up contacts with ICZM managers) to designate the 21 Demonstration initiatives with useable biome and other statistical information as a core group for modelling and reporting purposes. These are referred to as "*the 21 Core ICZM initiatives*" in the analyses within this report.
- 2.29 The intensive follow-up phone and email programme undertaken by the team in May and July 2000 was important in ensuring a comprehensive response; and the survey challenges were reported on in the team's "*Interim Report*" to the Commission in August 2000. ICZM managers varied in their ability to complete and respond to all the survey questions, and thus there are different numbers of respondents shown between the tables of this report. Three of the survey questionnaires were returned with less than 50% of the questions completed (all in Europe); and the respondent numbers are shown at the foot of relevant tables in the report.

3. KEY FEATURES OF EUROPEAN COASTAL ZONES

- 3.1 An interesting discovery by the assessment team is that, as yet, there is not generally available statistical information on either the individual ICZM initiatives or indeed of European coastal zones. Data exist but is either in a mapped GIS format or scattered between a series of different sources. An understanding of the scale, nature and structure of Europe's coastal zones is important as this is required to scale up the cost-benefit and impacts. This section of the report provides basic statistical information on Europe's coastal zones and coastlines based both upon the ICZM survey returns, and other presently available information; and also provides the team's initial estimates for the annual value of environmental services produced by the physical nature of selected European ICZM areas using the values generated by Costanza's research. These two sets of ICZM features are important as they provide the context for the estimates of socio-economic benefit values generated by the present assessment which are described in section 6 of this report.

THE EUROPEAN COAST & COASTAL ZONES

- 3.2 As noted in section 2, there is currently an absence of readily available published data on European coastlines, coastal zones and coastal biomes; and the assessment team has sought to assemble this information as an essential requirement for scaling-up the ICZM benefit results to provide estimates of the value of socio-economic impacts of ICZM that might be achieved at the European Union level through the pursuit of an effective EU ICZM strategy and investment programme.

THE EUROPEAN COAST & COASTLINE

- 3.3 The European coast is varied and, in places highly dynamic in form. This is part of the problem of managing the coast, each area is different. Each measurement of the length of coast is also different as there are many ways to calculate the length of the coast. Some calculations include the tidal extents of rivers, some ignore rivers and estuaries altogether, the scale at which the measurement is made will also affect how much of the indented nature of some coastlines are included. An example of this is the United Kingdom (UK), where the team used data from World Resources Institute (WRI). The UK coast is considered by WRI to be 12,429 Km in length, but Scottish Natural Heritage (Lees, 1999) stated that the Scottish coast in fact exceeded 11,800 Km (almost equal to that quoted for the whole of the UK!). The team thus decided to use WRI data to ensure that coastline measurement is consistent. The CORINE coastal erosion database (Quellenec, 1998) has, however, different coastline lengths for the EU: the coastline data used by the assessment team covers all EU Member States as well as other European nations, thus the WRI data is preferred.
- 3.4 The best available information on the length of Europe's coastline, both for Member and Associate states, is shown in table 3.1 below, which is based upon data compiled by WRI. This suggests that the 13 Member States with coastlines have over 53,000 Km of coastline, with Greece and the United Kingdom accounting for 49% of this between them. The great diversity in national coastline lengths also suggests that there will be major differences in the policy importance and socio-economic benefits value of ICZM between the EU's Member States, and the benefit results set out in section 6 confirm this. This divergence has important policy and operational implications for future ICZM strategy within the European Union.
- 3.5 The importance of EU's neighbouring states is clearly shown in table 3.1, with a further 60,800 Km of coastline, although this figure is inflated through the inclusion of the Russian Federation's coastal areas outwith Europe. As the economic and environmental benefits of ICZM spill over national boundaries, it will obviously be important to encourage and support collaborative ICZM initiatives involving EU and other European states; and this argues for a continuation of ICZM support through the EU's development funding to the emerging nations of Central and Eastern Europe, and around the Mediterranean.

Table 3.1 : Coastline Lengths and Maritime Zone Areas for European Union Member States, and for Other European Nations

Country	Length of Coastline Km	Maritime Zone Shelf - 200M KKM2	Population 1998M	GNP 1998 US\$B
Belgium	64	3	10	259.0
Denmark	3379	69	5	176.4
Finland	1126	98	5	124.3
France	3427	148	59	1466.2
Germany	2389	41	82	2122.7
Greece	13676	25	11	122.9
Ireland	1448	126	4	67.5
Italy	4996	144	58	1166.2
Netherlands	451	85	16	388.7
Portugal	1693	39	10	106.4
Spain	4964	170	39	553.7
Sweden	3218	155	9	226.9
United Kingdom	12429	492	59	1263.8
European Union Member States	53260	1595	375	8261.9
Albania	418	5	3	2.7
Bosnia & Hertzegovina	20	na	na	na
Bulgaria	354	12	8	10.1
Croatia	5790	na	5	20.7
Estonia	1393	na	1	4.9
Iceland	4988	134	0.5	na
Latvia	531	na	2	5.9
Lithuania	108	na	4	9.0
Norway	5832	103	4	152.1
Poland	491	28	39	150.8
Romania	225	24	22	31.3
Russian Federation	37653	na	147	337.9
Slovenia	32	na	2	19.4
Ukraine	2782	na	50	42.7
Yugoslavia	199	na	na	na
Other European Nations	60816	-	287.5*	787.5*
Europe (EU + Other)	114076	-	662.5	9049.4
Europe : Excluding Russian Federation	76423	-	515.5	874.5

Sources : World Resources Institute *et al.* *World Resources : A Guide to the Global Environment 1996-97* (New York, Oxford University Press, 1996), data table 11.4; World Bank, *Entering the 21st Century : World Development Report 1999-2000*. (Washington, Oxford University Press, 1999), table 1, p230. * Excluding the 'not available' nations.

EUROPEAN COASTAL ZONES

- 3.6 The absence of a commonly agreed and internationally recognised definition of *coastal zones* encompassing marine, shoreline and landward areas, has meant that a diverse set of definitions and boundaries currently exist. The World Resources Institute has also compiled data for the offshore areas of coastal states that lie between the shoreline and 200 metre water depth, and these are included in table 3.1 as another means of providing a broad context for the ICZM data generated by the assessment survey. It is interesting to note the changes in the relative importance of Member States in relation to the size of their coastal zone compared to their ranking in terms of coastline length. Whilst the UK maintains its relative importance, Greece has a much smaller maritime zone area, whilst France, Italy and Spain are significant coastal zone nations using this definition. This definitional issue is important in scaling-up the survey results, and is considered further in section 5.

THE PHYSICAL NATURE OF EUROPEAN COASTS

- 3.7 Europe is approximately 10 million Km², which is marginally less than 7% of the land surface of the world (Doody, 1999). From a geological perspective the harder rocks tend to dominate in Scotland, Norway and the Northern Baltic. Softer predominantly limestone rocks tend to be found in Southern England and the Atlantic coasts of France, Spain and Portugal. Around much of the North Sea there are low-lying coasts comprising glacial sediments including much of the east coast of England, and much of the Southern North Sea. The Mediterranean has a mix of hard and soft coasts, with Croatia having 'megacliffs' which can rise to over 1000m (Lovric, 1993). Relative sea level has also fluctuated during the recent geological past.

- 3.8 Although relatively stable for the last 7000 years at a global scale, much of Europe is still adjusting through isostatic compensation to the last ice age (Dawson, 1992). In northern Europe this is in the form of a rising level of the land relative to the sea, but in the southern UK the land is falling. These changes are compounded by the globally rising sea levels, with some of Europe escaping the sea level rise due to isostatic rebound, notably parts of Scotland and the northern Baltic nations. Another important coastal factor is that of tides, which vary from place to place dependant on a number of factors (see Hansom, 1988). Europe exhibits the full range of tidal classifications: *macro-tidal* (tidal range greater than 4m), *meso-tidal* (tidal range 2-4m) or *micro-tidal* (less than 2m tidal range). Macro-tidal environments are found predominantly along the Atlantic coast, especially in the larger estuaries, whereas an example of micro-tidal is the Mediterranean, which has almost no tidal range.
- 3.9 The CORINE coastal erosion data (Queennec, 1998) enables the different erosional trends across Europe to be identified. When averaged out, 54.9% of the EU coast is stable; 19.5% is eroding; 8.4% accreting; and 17.2% lacks information or is 'not applicable' (including ports, harbours and estuaries). When the CORINE data is considered at a higher resolution, large variations in the areas with stable or dynamic coasts become apparent. A similar diversity can be found in the types of *shoreline* from CORINE (Queennec, 1998). When averaged out the EU coast consists of: 47.9% rocky coasts; 36.5% beaches; 6.7% muddy coasts; 7.9% artificial coasts; and the remainder being estuaries (1%). It is worth noting that estuaries often consist of predominantly sandy, muddy and artificial coasts.
- 3.10 Pollution is also a major management issue for Europe's coastal zones, especially in specific areas, and all residents of European coastal areas are increasingly aware of the problems. Pollution has been highlighted as an ICZM issue, with particular worries related to the oil industry in the North Sea and in the new 'Atlantic Frontier' off the north west coast of Scotland. There is concern over pollution in the English Channel, because of the number of ships that pass through the narrow straights; but particularly problematic are the enclosed seas of the Baltic and the Mediterranean, especially through the increasing volume of tourists. Hinrichson (1990) suggests that it takes 80 years for the waters of the Mediterranean to refresh themselves; and Cencicni *et al.* (1988) gave examples of environmental degradation at four sites on the Italian coast, which highlight problems common to many coastal areas, particularly those in low level sandy coastal areas. McGlashan and Duck (2000) have proposed a protocol to overcome these environmental challenges within the framework of ICZM.
- 3.11 As with any coastal environment, each section of the coast in Europe needs to be considered within its local setting, although there is nothing to stop comparisons between areas in different countries: for example comparisons between the Eden Estuary in Scotland and the Ria de Foz in Spain (Duck *et al.*, 1995). McLusky and McIntyre (1995) highlight the differences between northern and southern estuaries and coastal regions; including the important point that many of the northern European coastal areas are experiencing the land levels rising at, or above the rate of global sea level rise, whereas in the southern European states the coastal regions are only experiencing the sea level rise. Fernandes *et al* (1995) compare the management of two European estuaries, one northern, one southern; and there are numerous other case studies of individual European coastal locations and their management (see Healy & Doody, 1995; Jones *et al*, 1996; Požar-Donac, 2000).

THE VALUE OF EUROPE'S COASTAL ZONES

- 3.12 The assessment survey sought information on the percentage distribution of thirteen distinctive biomes (or biotopes) within each of the ICZM areas with the intention of making an estimate of the annual value of the environmental services generated by the portfolio of biomes in each coastal zone. It is important at this point to briefly explain the composition of the environmental biomes (or biotopes) proposed by Costanza in the seminal 1997 research report (Costanza, 1997); and also the basis of the value of ecosystem services annually generated by each of these biomes.

ECOSYSTEM BIOMES AND SERVICES

- 3.13 The sixteen biomes that have become increasingly accepted as a common basis for environmental and economic analysis and policy development are the results of an intensive workshop held in the National Centre for Ecological Analysis and Synthesis at the University of California at Santa Barbara

in 1996. The basis, composition and structure of the 16 basic ecosystem biomes are described in Costanza *et al.* (1997); and 12 of these biomes are present in Europe: the tables in this report thus exclude three tropical biomes. The relevant European biomes are shown in table 3.2 below; and the survey sought information from ICZM initiative managers on the size and composition of coastal zones in terms of these 12 biomes. As noted above, only 21 of the Demonstration Projects were able to provide this information.

- 3.14 An extensive literature search and consultation programme by the Costanza group identified over 100 research studies which had generated estimates of the monetary value of the ecosystem services generated by each biotope. The research defined 17 distinct types of ecosystem services including such as gas and climate regulation; water regulation and supply; erosion and pollution prevention; biological controls; food and raw material production; genetic resources and pollination; and recreational and cultural services. The values of these services were brought onto a common 1993 US \$ basis; and aggregated to generate estimates of the annual dollar value per Hectare of 17 ecosystem services across the 16 biomes. This initial estimate of ecosystem services values, also produced as a capital stock value, has encouraged a continuing international research effort to refine, extend and update the Costanza group research. The assessment team adopted this framework for assessing the socio-economic benefits of ICZM.
- 3.15 No attempt has been made to update Costanza's values to allow for inflation, or to make other sophisticated adjustments to the relative values developed by Costanza. What is important to the assessment is the broad overall value of the ICZM biomes and the relative differences between them. In the event, only 21 of the ICZM Demonstration initiatives were able to provide useable estimates of the relative importance of the Costanza biomes with their coastal zone. These have provided the basis for the initial estimates of the environmental benefits generated within each ICZM shown in table 3.2 below.

Table 3.2 : Biome Areas and The Annual Value of Their Ecosystem Services Benefits in 21 Integrated Coastal Zone Management Initiative Areas in Europe : € Million 2000

Costanza Biomes	Biome Areas		Annual Value of	Annual Value Per Biome	
	Km ²	%	Environmental Services €K/Km ²	€ Million	%
(1)	(2)	(3)	(4)	(5)	(6)
Open Ocean	30,632.50	32.87	26.1	800.50	4.49
Estuarial Waters	2,129.96	3.36	2,367.7	7,410.73	41.44
Sea Grass	1,376.37	1.48	197.0	281.18	1.52
Continental Shelf	23,157.38	24.85	166.9	3,866.28	21.62
Tidal Marshes	2,059.39	2.21	1,036.0	2,133.45	11.94
Swamps & Flood Plains	840.50	0.90	2,030.4	1,706.59	9.46
Lakes & Rivers	1,408.85	1.51	881.2	1,241.53	6.95
Temperate Forests	9,755.31	10.47	31.3	305.57	1.71
Grass & Rangeland	2,977.67	3.19	24.1	71.63	0.41
Rock/Ice	6,083.00	6.53	-	-	-
Cropland	6,490.99	6.96	9.5	61.93	0.36
Urban Areas	5,097.04	5.47	-	-	-
Other Areas ⁽⁷⁾	183.28	0.20	10.4 ⁽⁸⁾	1.9	0.01
Core 21 Total Area	93,192.24	100.0		17,871.13	100.0

Sources : EC-ICZM Questionnaires; Costanza 1997. Notes : (1) Biomes as defined by Costanza *et al.* (1997), excluding tropical biomes. (2) Based on estimated areas in each biome as reported by ICZM Project Managers in 21 ICZM Demonstration Initiatives. (3) Percent of total ICZM area. (4) Annual Value of environmental services per Km² generated by each biome, US\$, 1993; converted into Euros at 1/7/99; not adjusted to 2000 dollar prices. (5) Annual value of environmental services for the biomes in 21 ICZM Demonstration Initiatives : Col (2) x Col (4), 1993 US\$. (6) Percent of total annual environmental services in the 21 areas. (7) Other areas are *Beach & Sand Dunes*, for which Costanza values have not yet been calculated. (8) Initial nominal value of \$10.0/Km² has been used.

- 3.16 The main points of relevance to the present assessment that emerge from the initial baseline calculations of environmental services value within these 21 EU ICZM Demonstration areas are that:
- The 93,000 Km² of coastal zone areas (including landward areas and shorelines) in the 21 ICZM initiatives together generate nearly *€18 billion* of positive environmental benefits each year. This is a major contribution to capital value and income flows of these areas, and in some cases, exceeds the value of their annual GNP.

- ❑ The majority of the environmental services income within the 21 ICZM areas is generated through the positive benefits of the estuaries (41.4%); the areas of continental shelf (21.6%), and tidal marshes (11.9%), each reflecting high Costanza values for these three biomes. The coastal waters of Europe, therefore, generate nearly 75% of the ecosystem services benefits for its coastal zones.
 - ❑ The landward areas of the coastal zones contribute relatively little (2.5%) in environmental services terms, reflecting not just the limited landward area included in ICZM initiatives, but the very low Costanza values attributed to cropland, grass & rangeland, and urban areas.
- 3.17 The broad results presented in table 3.1, should be regarded with caution given the basis of their compilation and calculation, strongly suggest that Europe's marine, coastal and estuarine waters are of fundamental economic importance to the EU's people and communities. Further, they are of far greater relative importance than the landward areas, and as such confirm the policy priority of ICZM initiatives within the European Commission's development strategies and budgets. The broad pattern of socio-economic benefits generated by biomes, industry and tourism are presented in table 5.3 of this report.
- 3.18 If these initial estimates based upon 21 ICZM areas within Europe are accepted as broadly representative of the right *order-of-magnitude* of the annual value of environmental services benefits, it may be possible to scale-up the values to produce an estimate for the benefits created for the European Union as a whole. If it is assumed that the biome structure for Europe as a whole is broadly similar to that within the 21 ICZM areas, the annual value of environmental services benefits generated by Europe's coastal zones may be around *€240 billion*. In the economic modelling of ICZM socio-economic benefits, the team decided to reduce the ecosystem services benefits generated by estuaries by 50 percent to reflect the fact that the initial Demonstration initiatives were over-represented in terms of those incorporating estuaries with their high Costanza benefit values. This was undertaken deliberately in order to remain conservative in estimating benefit values, and thus to avoid generating very high benefit levels. The decision to use 50 percent reduction was based on a review of the individual ICZM biome structures in the context of Europe's coastline. The broad initial benchmark values shown in table 3.2 should be borne in mind when considering the value of the socio-economic benefits generated through active ICZM initiatives in sections 5 and 6 of this report.
- 3.19 The survey returns for the 21 ICZM Demonstration project areas in Europe represent only a relatively small proportion of the spatial area of Europe's coastal zones; and also have to address the problem of different definitions and biome components used by ICZM initiative managers. With these caveats in mind, a number of interesting points are revealed by table 3.2:
- ❑ Whilst estuarial waters only account for 3.36% of the coastal zone areas within the 21 initiatives, they are likely to generate over 40% of the annual ecosystem services benefits on the basis of their Costanza values.
 - ❑ Tidal marshes and flood plains, representing just over 3.11% of the ICZM coastal zone areas, are estimated to generate 21.38% of total annual ecosystem services benefits for those areas, reflecting their relatively high Costanza values, roughly the same as the continental shelf.
 - ❑ Estuarial waters, tidal marshes, flood plains and the continental shelf together represent over 84% of the annual ecosystem services value for the 21 zones. It is thus the nature of the offshore areas which determine the relative ecosystem services **capital** value of each zone : on-shore and land-uses are only 15% of the annual value.
- 3.20 The principal implication of this is that it is the water-based biomes around Europe that are important, and achieving a 10% enhancement in their environmental quality will significantly exceed a similar level of improvement for the associated coastline and landwards parts of zones, on the basis of the figures shown in table 3.2. However, much of the offshore environmental quality is dependent upon and a consequence of the improved economic and environmental management of onshore industries

and biomes. This issue is further addressed in section 5.

4. ICZM FEATURES IN THE EU DEMONSTRATION PROJECTS

- 4.1 In this section of the report we present an overview of the main features of the ICZM initiatives responding to the survey questionnaire, and assess this portfolio of features in relation to perceived best practice and the concept of ICZM discussed earlier in section 2. As each of the demonstration projects have evolved separately within the guise of ICZM they all have different features, some having many, some having few. As stated in the methodology, the features list was not exhaustive, space was a major constraint, therefore the list contained some of the main features that the assessment team thought were important to the functioning of an effective best-practice ICZM. The results in this section are shown separately for the 21 'core' EC ICZM demonstration projects, and for 33 ICZMs providing responses, including a number of international and Scottish projects.

ICZM FEATURES IN THE EC ICZM DEMONSTRATION PROJECTS

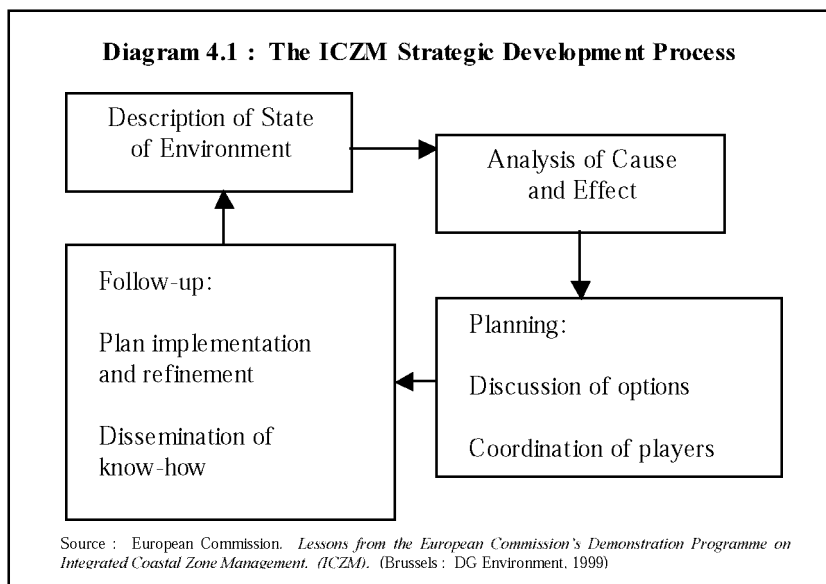
- 4.2 Table 4.1 illustrates the ICZM features that may be considered essential in a best practice ICZM. 'Stakeholder consultation and commitment', was the most common, as 19 of the 21 EC demonstration projects (90%) considered themselves having this feature, not surprising as participation and education are both key processes in ICZM and important in the current sustainability paradigm. The second most common feature is a 'zone management strategy', found in 18 of the 21 core initiatives. In many ways it was surprising that all of the initiatives did not have a management strategy, as it would be a logical conclusion to the demonstration projects. The third most common was 'promotion and information activities', again this is one of the key principals of ICZM, the dissemination of information relating to sustainable management of coastal resources.
- 4.3 The fourth most common feature identified was the existence of 'medium term funding (3-5 years)', in part this is because the projects were funded for 3 years under the demonstration project scheme, some of the respondents considered past funding when answering this question, whereas the assessment team had sustainable funding that include perception of considered funding secured for the future. Therefore, this is probably ranked higher that it should be, but still represents a significant worry, as it highlights the lack of financial security in the Demonstration projects.

**Table 4.1 : ICZM Best Practice Features Identified As Present
In European and International ICZM Projects**

Best Practice ICZM Features	21 Core EC Initiatives		33 ICZM Initiatives ⁽¹⁾	
	#	Rank	#	Rank
Stakeholder Consultations & Commitment	19	1	28	=1
Zone Management Strategy	18	2	28	=1
Promotion & Information Activities	17	3	26	2
Medium-Term (3-5 years) Funding ⁽²⁾	11	4	16	3
Comprehensive Environmental Audit	10	5	15	=4
Physical Process/Habitat Studies	9	6	15	=4
Associated Research Programme	8	7	14	5
Benefits & Impact Measurement	7	8	11	7
Permanent Management Staff	6	9	13	=6
Performance Targets or Goals	6	=9	13	=6
Annual Operations Plan	4	10	9	8
Comprehensive Economic Audit	4	=10	6	=11
Statutory Powers in Zone	4	=10	7	10
Regular Performance Reviews	3	11	8	9
Financial Sustainability	3	=11	6	=11
Long-term (6-10 years) funding	2	12	4	12

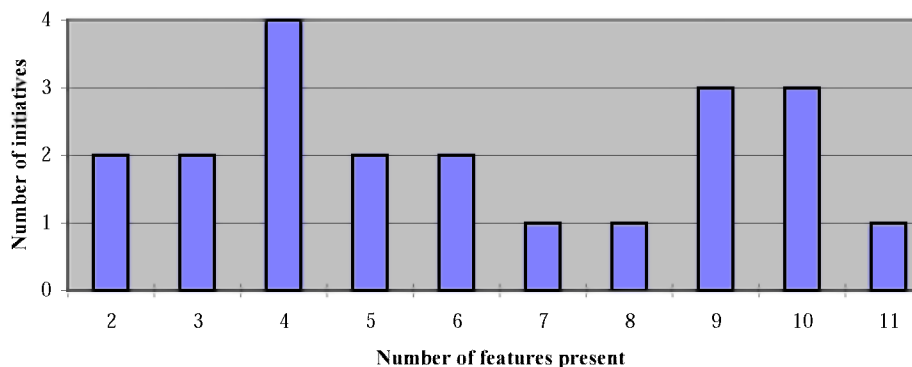
Source: EC-ICZM Survey. Question 14. Note (1) Includes the 21 Core ICZM Initiatives. (2) Taken by ICZM managers to include initial/Demonstration Programme funding.

- 4.4 Only 10 out of the 21 initiatives (less than 50%) had undertaken a 'comprehensive environmental audit' (the fifth most common feature). The team found this surprising, as the state of the environment before a project must surely be one of the key sets of baseline data required to assess how effective the initiative has been during its lifespan. Therefore, such an evaluation would be ideal at the outset, and followed up by future evaluations ideally on repeated occasions in the future to allow for monitoring of progress against the baseline, and fits in with Olsen's (1993) 6 stages of ICZM planning. This is something that should be key to any future ICZM demonstration projects. Only a few initiatives had undertaken ex-ante 'physical process or habitat studies'. An important conclusion in the Commission's 1999 ex-post report (*Lessons from the European Commission's Demonstration Programme in ICZM*) was that a principle of ICZM should be to work with natural processes: this requires ex-ante audits and investigations to be effective. This important point has been stressed by many, including McGlashan and Duck (2000), and the recently announced European Coastal Strategy (European Commission, 2000). The schematic diagram 4.1 emphasises the cyclic nature of the ICZM process. Some initiatives may not have needed to commission physical process or habitat studies as these may already exist. However, monitoring should have been done at some point in each initiative; or the initiative must have shown a clear commitment to undertake such work in the future.



- 4.5 It is also interesting that only eight of the twenty one had an 'associated research programme', this will to some extent have been dictated by how committed local universities were. At the opposite end of the scale were (in joint tenth place) 'annual operations plans' and 'statutory powers in the coastal zone'. Given the nature of the demonstration projects the low ranking of statutory powers was not surprising. However, annual operations plans are surely necessary to meet the targets and goals set by each of the initiatives; and should certainly be developed as the individual projects move forward through the implementation phases. In joint eleventh place were 'regular performance reviews' and 'financial sustainability', and the least common feature was 'long-term funding' (2/21) not particularly surprising, but a major concern in terms of project sustainability.
- 4.6 For the full benefits of ICZM to become apparent, initiatives must have permanent management structures and sustainable funding. If projects do not have annual operations plans and regular performance reviews, it will be impossible for them to assess their progress, therefore making assessment of the benefits of ICZM difficult. Finally, if an initiatives does not have sustainable funding, project staff spend much of their time looking for funding to keep the project going, rather than undertaking ICZM related work; the cost increases; and the benefits are small as little is being achieved. When little is being achieved, less organisations are likely to fund the initiatives.
- 4.7 The number of features in each initiative is also interesting. The average number of ICZM features across all of the core 21 EC ICZM initiatives is 6.2 and for all 33 ICZM projects is 6.6, and Figure 4.2 illustrates the number of initiatives within the core group of EC ICZM demonstration projects.

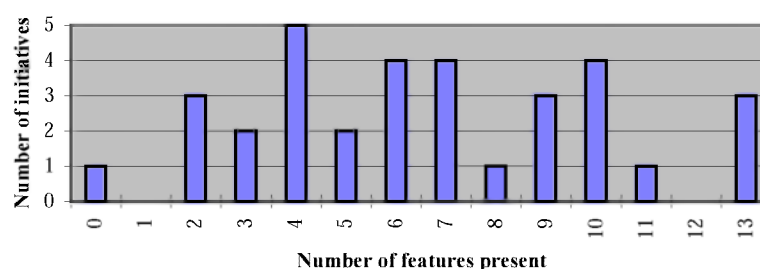
Figure 4.2 : The Number of Features Present in the 'Core' 21 EC ICZM Demonstration Initiatives



ICZM FEATURES IN ALL ICZM SURVEY INITIATIVES

- 4.8 When all thirty three initiatives were analysed similar trends to the above were found and are illustrated below in Figure 4.3 : 'Stakeholder consultation and commitment' was jointly most popular with a 'zone management strategy' for 28 of the 33 initiatives. 'Promotion and information activities' was second (with 26 from 33) and 'medium term funding' was third (16/33). Jointly in fourth place (with 15/33, only 45%) were 'comprehensive environmental audit' and 'physical process / habitat studies'. The 'associated research programmes' were exhibited in fourteen of the thirty three, making it fifth. 'Regular performance reviews' came out a little higher than with core EC study, with 8 out of the 33, with it being the 9th most common feature. 'Statutory powers' was tenth in this group of initiatives as well as the core EC group (only 7/33 initiatives). The 'comprehensive economic audit' and 'financial sustainability' were both jointly in eleventh spot (6/33 = 18%), with 'long term funding' being the least common again with only four of the thirty three (12%) considering themselves to have long term funding. Figure 4.3 below illustrates that the majority of international ICZM initiatives tend to have 2-10 features, with a limited number at either end of the extreme: one with none of the features, and three with thirteen. The initiatives with thirteen features were 'Coastal Zone Management in Sri Lanka', 'Montego Bay Marine Park' (both National Government Agency led) and 'Sefton Coast Management Scheme' (informal multi-agency partnership).

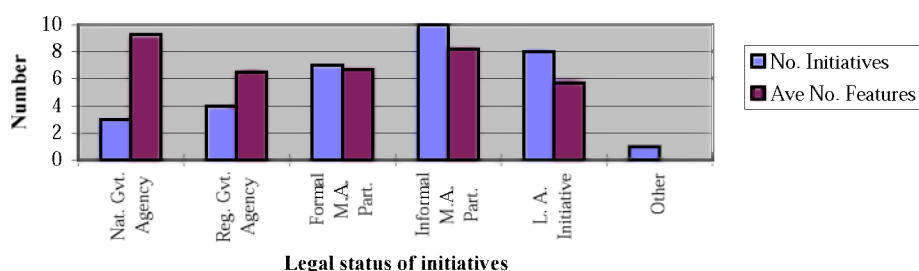
Figure 4.3 : Number of Features Present in the Full 33 ICZM Initiatives



- 4.9 When the legal status of the initiatives is compared to the averaged number of features in each initiative there are some interesting observations (see figure 4.4 below). From the small survey undertaken, the comparison of the legal status of the initiative and the number of features shows that the National Government Agency route to coastal management provides the largest number of features (9.3), although it has the smallest number of initiatives in the survey (with the exception of 'other'). Informal Multi-Agency Partnerships is the most common form of status amongst the survey, with an average number of features of 8.2. The Regional Government Agency, Formal Multi-Agency Partnership and Local Authority Partnership have similar averaged numbers of features, 6.5, 6.7 and

5.7 respectively. The 'other' has none of the features listed in the questionnaire.

Figure 4.4 : Legal Status of Initiative Versus Averaged Number of Features



ICZM IMPACTS ON ECONOMIC SECTORS

4.10 Questions 8 and 9 in the survey asked about the effect of the ICZM initiative on the main economic sectors. The response is briefly summarised in table 4.2 below. Analysis of the 33 initiatives with a suitable response shows that in general the impacts of the initiatives upon their local economies have been beneficial, with only Government activities highlighted as having a negative impact as a result of the ICZM initiative. It may be that this was a 'protest vote', or the voicing of the frustrations of initiative managers over the apathy of all European governments over coastal issues. 'Mineral extraction' and 'financial services' came out as having no real impact. At the other end of the impact scale, the largest positive ICZM impacts were those on 'tourism and leisure', and next came 'residential housing': both can be rapidly and visibly improved through management strategies for coastal zones. In terms of the reverse relationship, namely the relative impact of economic sectors on coastal zones (table 4.2 below), 'tourism and leisure' is also a dominant influence; and this specific impact relationship has been addressed in programme activities by a number of ICZM initiatives. Other economic sectors having significant impacts on coastal zones have been 'shipbuilding', 'agriculture and food' and 'fish farming'. The 'financial services' sector is seen as having no impact at all on coastal zones.

Table 4.2 : Relative Importance of Economic Sectors in 33 ICZM Areas and Impact of ICZM Upon Them : 2000

Economic Sector	Sector Presence in ICZM		Initiative Impact	
	% Present (1)	Average Importance (2)	Percent Positive (3)	Average Rank (4)
Tourism & Leisure	88	1.97	82	1.77
Agriculture & Food	79	2.75	64	2.57
Sea Fisheries	76	3.80	64	2.50
Ports & Shipping	73	3.10	61	2.60
Residential Housing	67	2.90	61	2.20
Leisure Marinas	48	4.00	52	2.50
Manufacturing Sectors	42	4.40	30	2.60
Military & Defence	39	4.00	39	2.76
Fish Farming	36	2.90	48	2.40
Mineral Extraction	36	3.70	39	3.10
Passenger Ferries	33	3.20	39	2.80
Forestry & Forest Products	33	4.00	24	2.25
Government Activities	33	4.00	39	4.60
Petrochemicals	30	3.20	40	2.80
Shipbuilding	24	2.30	27	2.90
Airports & Air Transport	24	5.00	24	2.75
Power Generation	18	4.60	24	2.75
Financial Services	15	-	18	3.16

Source : EC-ICZM Survey; 33 Responses. Notes : (1) Percentage of ICZM Initiatives reporting sector presence. (2) Average of importance rankings. (3) Percentage of ICZM Initiatives managers reporting positive impact of Initiative on sector. (4) Average of Impact rankings.

ENVIRONMENTAL CHALLENGES IN ICZM AREAS

4.11 The ICZM managers also identified a range of environmental issues in their coastal zones (table 4.3 below). The impact of 'tourism' is seen as a concern by most managers (82%); and thus it is encouraging that the ICZM initiatives appear (para 4.10) to be reducing the adverse effects of tourism and leisure on the coastal environment. 'Water pollution' (70% of initiatives), 'habitat loss' (67%), 'coastal erosion' (64%), and 'urban expansion' (61%) were also seen as generating environmental problems in the zones. However, in terms of the importance of these environmental issues, 'coastal erosion' was ranked highest (1.5), followed by 'tourism', 'urban expansion' and 'water pollution'. The 'other' category in table 4.3 includes 'flooding', 'drinking water quality', 'industrial installation', and 'government' as environmental concerns mentioned by ICZM Managers. These environmental concerns provide an agenda for environmental actions and investment in European and other coastal zones; and establish an important rationale for the European Union's future ICZM policy and management strategy.

Table 4.3 : Major Environmental Issues Reported in Coastal Zones

Environmental Issue	% of Initiatives Noting Problem	Average Rank⁽¹⁾
Tourism	82	2.5
Water pollution	76	2.8
Habitat loss	67	3.9
Coastal erosion	64	1.5
Urban expansion	61	2.6
Endangered native species	58	4.5
Overfishing	58	3.5
Mineral extraction	55	5.3
Sediment movement	55	7.6
Endangered migrant species	45	4.2
Population	42	3.2
Transport congestion	39	3.3
Water shortages	33	4.5
Air Pollution	24	7.3
Other	21	2.9

Source : ICZM Survey, 2000. 30 Responses. Note : (1) The average ranking of importance in each zone for these reporting ; '1' = most important issues; '15' = least important issue.

THE NATURE OF ICZM ORGANISATIONS

4.12 The year of formation of the initiatives is also very interesting. Table 4.4 illustrates the year of formation and the status of all of the initiatives that responded to question 13. It makes interesting reading. Only one of the three 'National Government Agency' ICZM initiatives was formed since 1995, and that was in 1999. These are a very rare type of initiative, and in the medium term appear quite successful in comparison with the other types of initiative (see paragraph 4.8). None of the 'Local Authority' initiatives assessed were formed before 1996. 1997 was by far the most popular year of formation with 36% of the initiatives assessed in this question being formed that year. The period 1996-1998 was also very productive in setting up new initiatives, 26 in total, two thirds of the initiatives assessed under this question. This suggests that the demonstration project was highly successful in starting up new ICZM initiatives. Hopefully this can continue with EG Environment continuing to encourage new ICZM projects to form, and to help those in existence to evolve into more mature and successful projects. Nine of the initiatives had been in existence prior to 1995.

Table 4.4 : Status of ICZM Organisation and Year of ICZM Formation

Organisational Status Of ICZM Initiatives	#	Year of Formation of ICZM Initiative					
		Pre 1995	1995	1996	1997	1998	1999
National Government Agency	3	2	-	-	-	-	1
Regional Government Agency	4	2	-	-	2	-	-
Formal Multi-Agency Partnership	7	2	-	-	2	3	-
Informal Multi-Agency Partnership	15	2	1	2	7	1	2
Local Authority Initiative	8	-	-	3	3	2	-
Other	2	1	-	1	-	-	-
All Responding	39	9	1	6	14	6	3

Source : EC-ICZM Survey. Question 13. 39 responses.

THE FUNDING OF ICZM INITIATIVES

- 4.13 Whilst not directly relevant to the modelling of socio-economic benefits, the survey evidence on the funding of ICZM initiatives has a longer-term strategic and policy relevance. Funding of the ICZM initiatives is illustrated in table 4.5 below. The most important contributors for all assessed initiatives were 'international organisations', followed by 'national government', three quarters of which came directly from national governments. 'Regional government' was the next most important source, again with direct funding being the most important route. The European Union came in fourth position (across all initiatives) and the final three were 'local authorities', 'NGOs' and the 'private sector'. For the 21 core EC demonstration projects, the most important funding source by a substantial margin was the European Union, with 43.4% of the total funding; second was regional government with 34% (28% direct, 6% indirect); third were local authorities at 9.3%; and national governments fourth with 9% (2% direct and 7% indirect). Three categories had very small inputs of finance to ICZM initiatives, namely: international organisations (1.8%); private sector (1.3%); and, NGOs (1.2%).
- 4.14 The differences between the demonstration projects and the study of all of the initiatives highlights some interesting differences, notable are the roles of international organisations and national governments in funding ICZM initiatives outwith Europe. European governments appear to have a lower regard for coastal management issues and in particular funding of ICZM initiatives, whereas non-European states appear to be more committed. The commitment of international organisations is interesting, some of which will have been funded partly or substantially by money from European states: European governments would appear to be more willing to fund coastal management in countries outwith Europe rather than within their own nation states or through the European Commission. This has strategic implications for the European Union which we return to in section 7.

Table 4.5 : Sources of Funding for ICZM Initiatives : € Thousand and Percentage of Total

Funding Source	21 Core ICZMs	Other European ⁽¹⁾	International	Other UK	All Survey ICZMs	Funding % By Source
National Governments	1,975.28	300.00	21,950.50	3,772.56	27,998.34	28.14
➤ Direct	447.00	300.00	20,395.00	45.00	21,187.00	21.30
➤ Indirect	1,528.28	-	1,555.50	3,727.56	6,811.34	6.84
Regional Governments	7,373.48	-	3,629.50	11,375.72	22,378.70	22.50
➤ Direct	6,129.35	-	-	11,372.72	17,502.07	17.59
➤ Indirect	1,244.13	-	3,629.50	3.00	4,876.63	4.91
Local Authorities	2,030.96	-	-	419.40	2,450.36	2.46
European Union	9,409.73	953.65	-	2,447.90	12,811.28	12.88
International Organisations	408.25	-	31,804.00	-	32,212.25	32.38
Private Sector	223.75	-	-	50.40	274.15	0.28
NGOs	260.55	-	1,037.00	59.12	1,356.67	1.36
Total Funding €K	21,682.00	1,253.65	58,421.00	18,125.10	99,481.75	100.00
Distribution %	21.79	1.26	58.73	18.22	100.0	100.00

Source : EC-ICZM Survey; Question 17. 33 responses. Note : (1) Excluding 'Other UK'.

- 4.15 Whilst not directly associated with the economic modelling of socio-economic benefits, we have thought it important to present the survey information on the sources of ICZM funding shown in table 4.5 as this has not been previously available; and because this funding represents the cost of ICZM initiatives. What is clear, both from the survey returns and the literature review, is that the level of funding per coastal zone area is significantly smaller than for projects promoted by international organisations. Further research is required to investigate what level of support is required to generate measurable sustainable ICZM benefits.
- 4.16 The survey responses have generated a significant collection of data on ICZM initiatives in Europe; and this can form an effective baseline for monitoring and evaluating the future evolution and impact of ICZM initiatives in a longitudinal manner. This information will also help establish best practice, both in ICZM management and in impact monitoring.

5. MEASURING SOCIO-ECONOMIC COSTS & BENEFITS

- 5.1 In this section of the report we explain the approach and methodology adopted by the team to define, measure and evaluate the socio-economic costs and benefits of Integrated Coastal Zone Initiatives within Europe, in terms of both qualitative and quantitative impacts. The focus of the research results reported are very much on the European Demonstration projects for the reasons explained in sections 1 and 2 of the report, but the framework generated by the team is capable of adoption for other ICZM initiatives outwith the European Union. As will become clear, this is still an emerging area of impact evaluation research, and one where the European Commission can play a major leadership role. The section begins with a short review of the qualitative and quantitative aspects of socio-economic impacts of ICZM, and then separately presents the results of the team's research into socio-economic costs and socio-economic benefits. The section concludes with a consideration of the net benefits of ICZM.

DEFINING & MEASURING ICZM COSTS & BENEFITS

- 5.2 During the assessment the team sought to identify, measure and scale both the qualitative and quantitative impacts of ICZM initiatives in Europe and elsewhere. It is important therefore to briefly distinguish between these two inter-related components of the overall socio-economic impacts, and to explain their different impact profiles and implications.

QUALITATIVE IMPACTS OF ICZM

- 5.3 There are two separate sets of qualitative socio-economic benefits: the socio-economic changes leading to the evolution of sustainable coastal communities; and the institutional and procedural changes which enable such improvements to take place. The first benefit stream will encompass such as a more balanced human population; an improved quality in the local social fabric and social behaviour; fostering pride in local cultural activities and traditions; and enterprise and employment creation. The literature survey and the ICZM survey identified very few quantified examples of such socio-economic impacts of ICZM, probably because most ICZM initiatives have yet to move into their operational phase. This also reflects the analytical difficulties in separating ICZM impacts from those generated by other non-ICZM policies and programmes.

Table 5.1 : Perceived Development Benefits To Date of European and International ICZM Projects

Perceived Benefits	# Initiatives with Benefits	Total Ranking Points by ICZM Initiative	Average Ranking Per ICZM Initiative
More coherent spatial planning	23	96	4.17
Improved decision making	30	126	4.20
Better partner understanding	28	127	4.53
Achieved agreement on priorities	25	103	4.12
Stronger community feeling	22	93	4.23
Reduced traffic costs	5	15	3.00
Better quality of life	15	56	3.73
Reduction in pollution	13	46	3.53
More sustainable fisheries	13	43	3.30
More sustainable tourism	22	93	4.22
Habitat restoration	17	65	3.82
Reduced flooding & erosion	8	32	4.00
Lower environmental vulnerability	15	57	3.80
Greater public awareness	28	117	4.18
School & education initiatives	20	91	4.55
Landscape improvement	15	57	3.80
Others	2	6	3.00
	301	1223	4.06

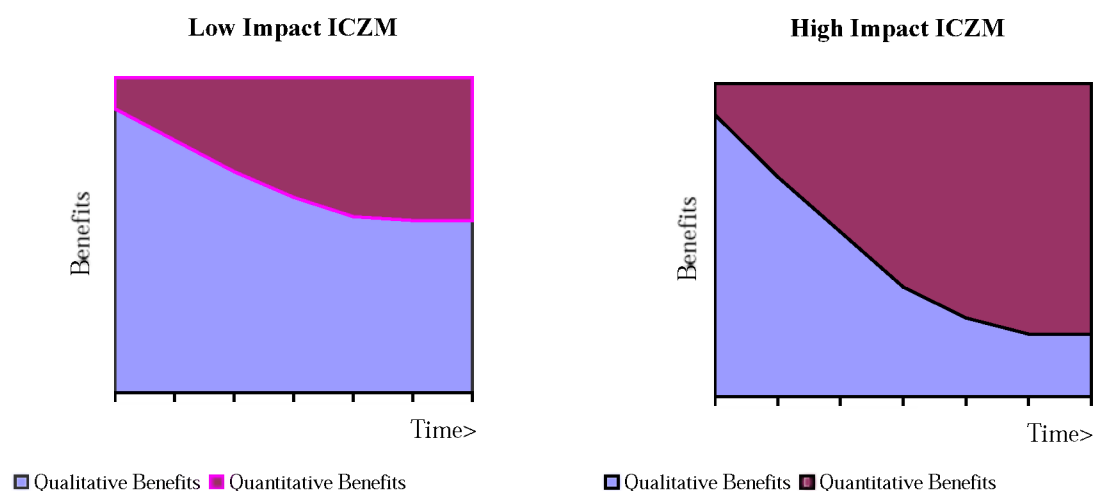
Source : EC-ICZM Survey. Question 18

- 5.4 The ICZM survey has, however, identified a *perception* by managers that gains are emerging (table 5.2). These include such as traffic costs; an improved quality-of life; more sustainable economic activities; and landscape enhancements: but quantified measures of such gains have not emerged to date. Of more immediate importance appear to be the institutional and procedural benefits of ICZM initiatives: more coherent spatial planning; improved decision-making; and better partner understanding. These reflect the positive stakeholder relationships engendered by ICZM initiatives; and are necessary to establish the institutional framework and activities which will encourage the emergence of sustainable economies and societies in coastal zones.

QUANTITATIVE IMPACTS OF ICZM

- 5.5 The team has defined quantitative impacts as those costs and benefits of ICZM initiatives that can either be directly measured in a statistical sense or that can be inferred through economic modelling of key economic, social and environmental variables in a market context. These have also been explained in terms of the base typologies in section 2, and explored through Q10, 14 and 15 in the survey. The main quantitative benefits, with the exception of current and capital expenditure on ICZM by the partner stakeholders, are likely to take time to accommodate to the point where they are separately measurable from other economic, social and environmental trends; and these benefits will normally be experienced by private sector households, enterprises and organisations. These different ICZM impacts between public and private sectors is another important feature of this national and European policy area.
- 5.6 It is important to understand the methodology developed by the team to generate the estimates of the quantitative measures of the aggregated costs and benefits of ICZM initiatives in Europe on a country wide basis. Throughout we have adopted a conservative approach, erring on the high side for costs and the low side for benefits. We have had to make a number of assumptions (described below) in order to offer approximations of both costs and benefits, and we explain these in the relevant sections below. We recognise the potential for improvement in these estimates as more extensive and reliable data becomes available, but this will require the adoption of a simple robust performance measurement framework and schedule for ICZM initiatives. We have used “High” and “Low” level ICZM expenditures as two scenarios for our estimates of the cost component of socio-economic benefits, and these are explained in para 5.16 of the report. It is important to note that as yet there are no signs of “High Level” ICZM in the EU, in terms of their having the majority of integrative directions noted by McGlashan (2000) and many of the features from question 14 of the questionnaire. These would be mature and productive ICZM initiatives that do not require to spend the majority of their project staff time seeking funding to survive into next year.
- 5.7 The differential impact profiles for the net qualitative and quantitative benefits of ICZM initiatives can be best demonstrated in relation to the net benefits time profile shown in diagram 5.1 below. This shows the different impact profiles for “Low” and “High Level” ICZM initiatives, with both demonstrating the earlier experience of qualitative benefits together with the lag in the generation of the more measurable quantitative benefits. The comments of the ICZM survey respondents suggest that most have recognised this distinction, especially as the majority of the EU Demonstration projects have been in their foundation planning stage where system benefits dominate for participating stakeholders.
- 5.8 The longer-term monitoring of ICZM initiatives should seek to better understand the different factors that affect and shape this flow of net benefits; and use the results of this understanding to improve policy and management effectiveness.

Diagram 5.1 : Schematic Representation of Percentage Composition of Net Qualitative and Quantitative Benefits Value Flow in Low & High Impact ICZMs



THE SOCIO-ECONOMIC COSTS OF ICZM

- 5.9 The ICZM survey questionnaire sought information on the total expenditure incurred on the initiatives activities by all the participating partners; and asked ICZM project managers to provide estimates of the percentage allocation of such expenditure between the management of the initiative; research and planning activities; promotion and information; and capital investment in specific projects. This information was provided on a confidential basis to the team, and thus will not be identified at the level of the individual initiative. The broad patterns of expenditure, based upon the ICZM projects providing this information, are shown below in table 5.2; and this level of expenditure then provided the basis for the derivation of the ICZM socio-economic costs feeding into the overall impact model.

DIRECT EXPENDITURE BY ICZMS

- 5.10 The level and purpose of dedicated ICZM expenditure as reported by 36 ICZM initiatives is shown in table 5.2 below, and a number of important features stand out of relevance to the estimation of the net socio-economic benefits of ICZM initiatives. These are summarised below.

Table 5.2 : Purpose of Expenditure by ICZM Initiatives
€ Thousand, Total Project Spend; and Percentage of Total⁽¹⁾

ICZM Type	Initiative Management	Promotion & Information	Research & Planning	Capital Investment	Other Spend	Total Committed Expenditure
Total Expenditure : €K						
21 Core Initiatives	4,380.27	3,151.15	8,056.96	4,644.62	624.75	20,857.75
Other European ⁽²⁾	647.22	145.59	666.60	83.59	-	1,543.00
International	10,224.82	5,537.58	16,903.10	24,369.50	-	57,035.00
Other United Kingdom	2,234.65	1,240.32	1,150.52	13,617.51	-	18,243.00
All Survey ICZMs : €K	17,486.96	10,074.64	26,777.18	42,715.22	624.75	97,678.75
Proportion of Expenditure :						
%						
21 Core Initiatives	21.00	15.11	38.63	22.26	3.00	100.0
Other European ⁽²⁾	41.95	9.43	43.20	5.42	-	100.0
International	17.93	9.71	29.64	42.72	-	100.0
Other United Kingdom	12.25	6.80	6.30	74.65	-	100.0
All Survey ICZMs : %	17.90	10.31	27.41	43.74	0.64	100.0

Source : EC-ICZM Survey, Question 16. 36 responses. Notes : (1) Data on ICZM expenditure by purpose was provided by 19 of the Core Initiatives, 4 other EU projects, 4 international projects, and 9 non-Demonstration UK ICZM initiatives. (2) Excluding 'Other United Kingdom'.

- 5.11 The total reported expenditure by the 36 ICZM initiatives responding to the survey was €97.6 million, but this was dominated by four big international ICZM projects with major operational budgets far in excess of the EU Demonstration Initiatives. For the core 21 EU Demonstration initiatives, the reported direct expenditure was just under €21 million, representing an average project spend of €993K. It is also relevant to note that the United Kingdom's ICZM expenditure outwith the EU Demonstration initiatives came to €18.2 million – almost as large as the 21 EU core projects. This represents a significant annual investment in ICZM throughout Europe, especially as a number of the EU Demonstration initiatives failed to participate in the survey : their expenditure will be additional to that shown in table 5.2 above. It may well be that the total ICZM expenditure in Europe over the post-1996 period has exceeded €60 million, perhaps averaging €12-15 million annually. Further investigation is required to confirm this.
- 5.12 The pattern of expenditure by ICZM organisations participating in the survey presented in table 5.2 is also of interest and relevance to the determination of their socio-economic benefits and impacts. As expected for ICZM initiatives in their planning and launch phase, the largest proportion of their total expenditure has been on research and planning, and on the management and administration of the initiatives. These two expenditure items accounted for nearly 60% of total spend by the core project, and just under 85% for the other EU projects. It is probable that the future pattern of expenditure by European ICZM initiatives will also encompass a higher level of operational capital project expenditure. However, it appears small in comparison with the annual US spend on ICZM, which in 1987 came to \$42.5 million (Charlier, 1989).

INDIRECT EXPENDITURE BY ICZMS

- 5.13 In addition to the above direct expenditure in terms of cash flows that can be audited, there will be a range of indirect costs associated with ICZM management and initiatives. The most important of these will be the value of the time contributed to the initiatives by all those who contribute their unpaid time for management, consultation or operational reasons. It is impossible to estimate this without detailed survey research and time-recording by the individuals involved, but at the notional rate of €80/hour used by similar UK project evaluations it will be a significant expenditure item where the ICZM inputs diverts people away from their prime business or government remits. There are also the indirect costs through ICZM initiatives having adverse effects on business, tourism and the environment; but the survey did not generate any examples of this.

SCALING-UP ICZM COSTS TO THE EUROPEAN LEVEL

- 5.14 In order to assess the costs of ICZM initiatives in EC countries it was necessary to calculate approximate costs for Low level ICZM and High level ICZMs. The methodology for calculating costs presented a number of challenges. Questionnaire returns from both EC ICZM initiatives and those from outwith the EC provided a range of costs for projects (Q15) dependant upon the level of activity associated with each. These cost estimates were converted to 1999 base-year Euros and divided by a) the area covered by the ICZM initiative (Q2) and b) the length of shoreline for the project area (Q3). These values were then correlated with major environmental issues in the zone (Q10), ICZM features present (Q14) and Inputs of the ICZM initiative, Q17).
- 5.15 These correlations were disappointing as no statistically significant correlations were found. In part we believe this is because of inconsistencies in the way in which questionnaires were completed. In particular the spatial areas which the ICZM projects covered were highly variable because of the absence of a standard boundary definition. Distances offshore, and consequently the area of open ocean included varied from 0 Km to 200 Km offshore, areas of land covered were equally variable. As we had no consistent data on the spatial area of the initiatives, the team instead sought to standardise the expenditure (cost) information by creating a measure of ICZM expenditure per kilometre of coastline, a statistic that was reported by nearly all of the survey respondents. It is felt that this is defensible as there will be a relationship between length of coastline, coastal zone areas and expenditure.
- 5.16 The survey responses revealed a wide variety of annualised and standardised total costs for ICZM

initiatives ranging from just under €50 to €2,700 (excluding exceptional cases which involved major capital expenditures on coastal protection). The marginal costs of additional kilometres of coastline clustered into two broad groups with maxima around €50 and €250. In calculating the ICZM costs for Member States we estimate that Low Level ICZM initiatives would cost €0.5 million plus €50 per Km, and High Level ICZM cost would be €5 million plus €250 per Km of coastline. This gives an EU-wide average annual cost in excess of €710K for Low Level ICZM initiatives, rising to more than €6 million for High Level ICZM programmes. The comparative policy-on/policy-off aspects of this are discussed in section 6 of the report.

- 5.17 Throughout our analysis, it has been assumed that the costs of ICZM initiatives (both Low and High Level scenarios) exclude the cost of constructing sea walls or coastal defence structures, as these are justified on a case-by-case basis. ICZM initiatives may have a beneficial role in determining the most appropriate location and type of structures for coastal defence, but funding for these would be separately sourced. These cost estimates have been used to generate the ICZM costs shown in tables 6.1 and 6.2 of this report in terms of Low Level and High Level ICZM initiatives.

THE SOCIO-ECONOMIC BENEFITS OF ICZM

- 5.18 The team sought to identify and value the socio-economic benefits generated by ICZM initiatives in terms of both qualitative and quantitative benefits. The results of this aspect of the assessment are presented below. In considering these benefits, it is important to again remember that the majority of the ICZM initiatives, especially in Europe, are only just entering their implementation phase where expenditure and investment begin to generate visible and measurable benefits.

QUALITATIVE BENEFITS OF ICZM

- 5.19 The main qualitative benefits identified by ICZM project managers through the survey are summarised in table 5.3 below, with impacts separately tabulated for the EU Demonstration initiatives and for other ICZM programmes participating in the survey.

Table 5.3 : Principal Qualitative Benefits Reported by Project Managers of 39 Integrated Coastal Zone Management Initiatives

ICZM Benefits Experienced	Identified Benefits Mentioned		Average Impact Score	Major Positive Benefits
	# (1)	% (2)	# (3)	# (4)
Improved Decision-Making	33	84.6	1.84	9
Better Partner Understanding	32	82.1	1.41	17
Greater Public Awareness	32	82.1	1.81	8
Agreement on Priorities	29	74.4	1.83	5
More Sustainable Tourism	28	71.8	2.00	1
Coherent Spatial Planning	26	66.7	1.85	9
Stronger Community Feeling	24	61.5	2.04	4
School & Education Initiatives	22	56.4	1.91	5
Habitat Restoration	20	51.3	2.05	2
Better Quality of Life	18	46.1	1.89	1
More Sustainable Fisheries	16	41.0	2.31	2
Reduction of Pollution	16	41.0	2.25	-
Landscape Improvement	16	41.0	1.94	3
Lower Environmental Vulnerability	16	41.0	2.19	1
Reduced Flooding & Erosion	11	28.2	2.40	-
Reduced Traffic Costs	5	12.8	3.00	-
Total Mentions of ICZM Benefits	344	55.1	1.94	57

Source : ICZM Survey, 2000; Q18. Notes : (1) Total number of mentions by 39 ICZMs. (2) Mentions as % 39. (3) Average of importance scores for each factor where 1 = large positive impact; 2 = some positive impact; 3 = no impact; 4 = some negative impact; 5 = large negative impact. The lower the score, the higher the positive impact. (4) Number of "1" impact ratings.

- 5.20 The assessment survey identified a range of significant qualitative benefits generated for ICZM stakeholders through the activities and expenditure undertaken to date : these benefits are summarised in table 5.3. The main findings that emerge are that:
- The core stakeholder organisations have found that ICZM brings major benefits in terms of improvements in their ICZM decision-making; in generating a better mutual understanding of ICZM project partners; greater awareness on planning and operational priorities; and more coherence in the spatial planning of coastal zones.
 - The initiatives have already generated benefits for the wider community living and working in coastal areas with ICZM initiatives through greater public awareness of the importance of their coastal areas and habitats; a stronger community feeling, probably reflecting effective and widespread consultation programmes during ICZM planning phases; and the introduction of school and education initiatives to raise the longer term appreciation of coastal zone roles and sensitivity.
 - The more visible and measurable impacts, in terms of experiencing a better quality of life through reduction in pollution, congestion and other costs are only just beginning to emerge, with less than half the initiatives reporting benefits of this type. The exception to this is the achievement of a more sustainable approach to tourism, which has been experienced in over 70% of this initial survey of ICZMs.
- 5.21 The pattern of qualitative benefits of ICZM initiatives to date is thus one of improvements and gains in the efficiency of the ICZM planning and strategy development process; with the visible measurable benefits likely to be directly experienced by coastal zone residents growing in importance over the longer-term.

QUANTITATIVE BENEFITS OF ICZM

- 5.22 Demonstration projects have not as yet systematically measured or recorded the value of the economic benefits from their activities; but consistently reported benefits of ICZM associated with three areas : habitat protection; local infrastructure and business; and coastal tourism. We have therefore sought to estimate the value associated with each of these three classes of socio-economic benefit. The approach adopted has been to consider the baseline flow of values of each type, and to then estimate the impact of ICZM initiatives on this baseline, adopting both Low Level and High Level initiative models.
- 5.23 **Habitat Protection Benefit** values were calculated using average values for biome types defined by Costanza *et al* in 1997. In order to avoid double counting, Costanza's biome values were modified by subtracting from the total value of ecosystem service benefits, estimates for "food production" and "recreation" both of which contain an element of marketed goods. The resultant values (illustrated in table 5.4) represent the annualised flow of non-marketed welfare benefits from the coastal habitat. In the absence of coastal zone management (a do nothing scenario) we estimated that this flow of habitat benefits was vulnerable to deterioration. In order to estimate the degree of deterioration possible we used the calculated "fragmentation index" (European Commission, 1999) as a proxy for the degree of deterioration in habitat up to a maximum of 0.1% of annual adjusted biome value. We further assumed that the Low Level ICZM project could halt or mitigate up to one quarter of this deterioration, and that the High Level ICZM could halt or mitigate up to three quarters of this deterioration. Given there is considerable evidence indicating a loss of biodiversity and ecosystem functionality through poor management of the coastal zone (Turner & Jones, 1991; Crooks & Turner, 1999; Kay & Alder, 1999; Cicin-Sian, Knecht, 1999), we believe this to be a conservative estimate since in some cases (para 5.2) ICZM has resulted in positive enhancement rather than mere preservation of existing habitat.

Table 5.4 : Derivation of Non-Market Values of Ecosystem Services Per Km² By Biome Type

Biome Type	Total Ecosystem Services Value	US \$K/Km ² /Per Annum		Non-Market Ecosystem Services Value
		Market Value Deductions		
		Food	Recreation	
Open Ocean	25.2	1.5	-	23.7
Estuarial Waters	2,283.2	52.1	38.1	2,193.0
Sea Grass	190.0	-	-	190.0
Continental Shelf	161.0	6.8	-	154.2
Tidal Marshes	999.0	46.6	65.8	886.6
Swamps & Flood Plains	1,958.0	4.7	49.1	1,904.2
Lakes & Rivers	849.8	4.1	23.0	822.7
Temperate Forests	30.2	5.0	3.6	21.6
Grasses & Rangeland	23.2	6.7	0.2	16.3
Rock/Ice	-	-	-	-
Cropland	9.2	5.4	-	3.8
Urban Areas	-	-	-	-
Other Areas	10.0	-	-	10.0

Source : Costanza et al. (1997). Note : For explanation, see text para 5.23. Values are thousands of US Dollars, per square kilometre, per year.

5.24 **Local Infrastructure and Business Benefits** values have also been estimated using a variation from baseline approach. The baseline was calculated by taking National GDP in 1999 base Euros; subtracting the contribution to GDP from tourism (which we deal with separately); and estimating the value of GDP generated at the coast. The “do nothing” scenario assumes no change in the baseline. For ICZM initiatives we estimate that 5% of economic stakeholders at the coast can be direct beneficiaries of ICZM initiatives, and that the GDP contribution of these can be enhanced by 0.1% for High Level ICZM and 0.01% for Low Level ICZM. The information from demonstration projects suggests that in some cases (such as the Forth) the potential contribution to GDP is substantially higher, with more than 10% of local economic stakeholders effected beneficially by as much as 1% of GDP contribution (20 times our High Level ICZM estimate). However, since this could not be established empirically at this time, and in the absence of supporting evidence across the demonstration projects, we believe that our estimated values serve as a conservative starting point for estimation of this group of economic benefits. A conservative number of 5% was thus chosen because it was considerably lower than is suggested in the literature through case studies (FCR 1997; Rayment *et al* 2000; Posford Duvivier Environment, 1996).

5.25 **Tourism Benefits** were particularly highlighted by the demonstration projects and the other ICZM initiatives surveyed. Tourism related GDP at the coast is used as the baseline, and as with infrastructure and business benefits above our do nothing scenario assumes no change in baseline value. Adopting a similar logic for tourism as above we estimate that the tourism benefits will accrue to 10% of coastal tourism actors who may benefit from 0.25% increase in GDP contribution under our High Level ICZM scenario and by 0.025% under our Low Level ICZM scenario. Studies in the literature suggest that our choice of values is exceptionally conservative. The work by Rayment *et al* (2000) showed that visitors to 6 survey sites in Norfolk (UK) generated £14.1 million for the local economy, allocated between four main reasons for visits (birds & wildlife; scenery & landscape; beaches; peace & tranquillity); and all principally reflecting the value of a high quality natural environment. The reason for the larger benefits in the tourism sector is because the literature shows that the contributor to the local economy from the exploitation of marine habitats is substantial to both tourism and industry, but a larger proportion of tourism ‘actors’ benefit. We found indicative evidence of substantially greater tourism gains but sought to power the model using figures below the lowest range of expectations to be conservative.

- 5.26 The reason the team chose the Costanza *et al* (1997) approach was that it allowed for little in the way of correction, analysis and evaluation of many hundreds of papers that covered analysis of specific habitats or environments (eg. Nein, 1999; Stedje & Feather, 1996; Blakemore & Williams, 1998; Terchunian & Smith, 1998; Marlowe, 1999; Goodman *et al*, 1998). This would then have led to studies of intrinsic and aesthetic values (Nordstrom, 1990 & 1993), followed by economic costs of fluctuations on relative sea level (Turner *et al* 1997) and so on. These difficulties are briefly touched upon by Cicin-Sian & Knecht (1998). The advantage of the Costanza *et al* (1997) approach is that they utilised 17 types of ecosystem services to derive ecosystem benefit values (presented in table 5.6) derived from many scientific studies, removing the need for significant collating and analysis. The supplementary Costanza information on the Internet (www.nature.com) expands on the paper and gives considerably more information and relevant references and data. This supplementary information allowed the team to separate market values from non-market values. Table 5.4 shows the breakdown between the full Costanza values and the values used by the team following the removal of market values. Furthermore, we have not accounted for inflation in the Costanza values used, and this also emphasises the conservative nature of our initial socio-economic benefits.

Table 5.5 : The Estimated Annual Value of ICZM Benefits By Origin for The European Union Coastal Member States : Percentage Share and € Million, 1998

EU Coastal Nations	Annual Value of ICZM Environmental Benefits (€Million)			
	% Biomes	% Industry	% Tourism	Total
United Kingdom	10.0	77.2	12.8	883.4
France	4.3	82.0	13.7	782.1
Italy	4.0	84.0	12.0	711.2
Sweden	31.0	62.4	6.6	163.8
Spain	8.6	65.9	25.5	392.4
Finland	32.2	65.6	2.2	98.3
Germany	2.3	86.1	11.6	450.6
Eire	39.2	50.4	10.4	65.3
Netherlands	7.9	82.8	9.3	209.9
Denmark	14.3	77.0	8.7	119.1
Greece	7.6	74.6	17.8	124.2
Portugal	11.6	76.0	12.4	68.2
Belgium	0.6	91.7	7.7	125.4
European Union Total	354.4	3,293.8	546.1	4,194.4
% Distribution	8.5	78.5	13.0	100.0

Source : ICZM Survey, 2000; and economic modelling.

Table 5.6 : Ecosystem Services Used by Costanza *et al* to Derive the Ecosystem Services Values

1. Gas Regulation	10. Pollination
2. Climate Regulation	11. Biological Control
3. Disturbance Regulation	12. Refugia
4. Water Regulation	13. Food Production
5. Water Supply	14. Raw Materials
6. Erosion Control & Sediment Retention	15. Genetic Resources
7. Soil Formation	16. Recreation
8. Nutrient Cycling	17. Cultural
9. Waste Treatment	

Source : Costanza *et al* 1997, p254

6. SOCIO-ECONOMIC COSTS & BENEFITS AT THE EUROPEAN LEVEL

6.1 Following on from the explanation in section 5 of the team's methodology for estimating the national socio-economic costs and benefits of active Integrated Coastal Zone Management Initiatives, this section presents the results of the scaling-up of these national benefits and impacts to the European level. The scaling-up has been undertaken following the methodology described in section 5. There are three components of ICZM benefits (illustrated on tables 6.1 and 6.2) : those generated by the biomes in the local ecosystem; the non-tourism industry benefits; and tourism sector benefits. The costs are based on the methodology as described in para 5.16. We again emphase that the net ICZM benefits are, in reality, liable to be considerably higher, but at first instance we thought it essential to base our calculations and values on the conservative side. We expect (and would hope) that these initial estimates of benefits are revised as further work is undertaken in the field. The nature and implications of net ICZM benefits for Europe are then explained, and the ICZM benefits compared to the national and European economies in order to provide a scalar context. The section concludes with a brief consideration of policy-on and policy-off scenarios for ICZM in the European Union.

THE SOCIO-ECONOMIC BENEFITS OF ICZM FOR EUROPE

6.2 The assessment of the value of the socio-economic benefits of ICZM at the European level has been made in relation to two ICZM scenarios : a relatively Low Level of activity and commitment; and a more comprehensive and determined (High Level) investment in ICZM activities. The results for these two scenarios, both deliberately conservative, are presented in tables 6.1 and 6.2 below; and the main features of each scenario compared in table 6.3.

6.3 The national and European level values of net ICZM benefits generated by the team's survey and economic modelling fully confirm the perceived importance and benefits of committing financial and other resources into ICZM programmes and projects. The principal results and conclusions shown in tables 6.1 and 6.2 are summarised below.

- ☐ The net annual value (NAV) of the benefits of ICZM initiatives at the European level are important, ranging from €127 million under the Low Level scenario, to nearly €660 million through a High Level ICZM approach. (The scenario levels were explained in section 5.24).
- ☐ The value of the annual ICZM benefits generated significantly exceed the value of the associated ICZM expenditure-based costs by 13.5 times in the Low Level scenario, and by 8.6 times in the High Level ICZM scenario where significantly higher levels of costs reduce the NAV.
- ☐ At the national level, the NAV of Low Level ICZM initiatives range from over €30 million in the case of the United Kingdom down to just over €1 million for Belgium, with this range of benefits principally reflecting different groupings of coastal biomes and lengths of national coastlines. For High Level ICZM, this national range encompasses UK at the top with NAV of benefits of €154 million to Portugal with €7.6 million.
- ☐ If the non-marketed benefits of habitat preservation are excluded the net benefits of both Low Level and High Level ICZM remain, although in both cases the Republic of Ireland shows a slight net loss (€95,000 and €546,000 for Low Level and High Level ICZM respectively). This is a reflection of Eire's long coastline relative to the size of its economy, and coastal tourist industry in particular.
- ☐ It is also interesting that the structure of annual ICZM benefits varies sharply between the Member states under both the Low Level and High Level scenarios. Habitat retention and enhancement accounts for most of the ICZM benefits in the Scandinavian countries and Eire; whilst industry and tourism benefits dominate the NAVs for the larger industrial nations.

- 6.4 These initial estimates of the net annual value of the socio-economic benefits of ICZM initiatives in Europe should be regarded (even with the High Level scenario) as conservative, especially as they exclude the perceived NAV of the qualitative benefits of ICZM activities as identified by project partners reported in section 5. The principal conclusion must therefore be that the investment in ICZM by Europe is a high-yielding investment where both private and public sector returns are high.

Table 6.1 : Scaled-Up Value of ICZM Costs & Benefits : Low Level
ICZM Scenario : Annual Value; Thousand Euros

EU Coastal Nations	ICZM Costs € K (1)	ICZM Benefits			Net ICZM Benefit €K (5)
		Industry & Tourism €K (2)	Habitat Enhancement €K (3)	Total Benefit €K (4)	
United Kingdom ⁽⁶⁾	1,163	9,638	22,111	31,749	30,586
France	696	9,083	8,435	17,519	16,822
Italy	777	8,108	7,064	15,173	14,395
Sweden	685	1,291	12,705	13,995	13,310
Spain	776	5,090	8,389	13,479	12,702
Finland	649	698	7,920	8,619	7,969
Germany	642	5,183	2,595	7,778	7,136
Eire	593	498	6,409	6,907	6,314
Netherlands	542	2,223	4,171	6,395	5,853
Denmark	694	1,180	4,246	5,427	4,733
Greece	1,228	1,477	2,379	3,856	2,628
Portugal	606	727	1,995	2,723	2,116
Belgium	522	1,391	199	1,591	1,069
European Union Total	10,157	47,847	89,485	137,332	127,174
National Average ⁽⁷⁾	781	368	6,883	10,564	9,783

Sources : ICZM Survey, 2000; Notes : (1) Derived from the lower level of ICZM initiative expenditure identified by the survey; see para 5.10 f. (2) See paras 5.24-5.25. (3) see para 5.23. (4) Col 2 and Col 3. (5) Col 4 – Col 1. (6) UK includes non-EU Demonstration Programme ICZM initiatives data. (7) Average per EU coastal Member state.

Table 6.2 : Scaled-Up Value of ICZM Costs & Benefits : High Level
ICZM Scenario : Annual Value; Thousand Euros

EU Coastal Nations	ICZM Costs € K (1)	ICZM Benefits			Net ICZM Benefit €K (5)
		Industry & Tourism €K (2)	Habitat Enhancement €K (3)	Total Benefit €K (4)	
United Kingdom ⁽⁶⁾	8,407	96,384	66,332	162,717	154,309
France	6,073	90,832	25,306	116,138	110,065
Italy	6,480	81,085	21,193	102,278	95,798
Sweden	6,019	12,908	38,114	51,022	45,003
Spain	6,472	50,896	25,167	76,063	69,592
Finland	5,838	6,983	23,761	30,744	24,906
Germany	5,804	51,833	7,785	59,618	53,814
Eire	5,530	4,984	19,227	24,211	18,650
Netherlands	5,302	22,235	12,513	34,750	29,446
Denmark	6,061	11,803	12,740	24,542	18,481
Greece	8,731	14,774	7,136	21,910	13,180
Portugal	5,624	7,276	5,985	13,261	7,637
Belgium	5,202	13,911	5,996	14,511	9,309
European Union Total	87,081	478,468	268,455	746,923	659,841
National Average ⁽⁷⁾	6,698	36,805	20,650	57,455	50,757

Sources : ICZM Survey, 2000; Notes : (1) Derived from the higher level of ICZM initiative expenditure identified by the survey; see para 5.10 f. (2) See paras 5.24-5.25. (3) see para 5.23. (4) Col 2 and Col 3. (5) Col 4 – Col 1. (6) UK includes non-EU Demonstration Programme ICZM initiatives data. (7) Average per EU coastal Member state.

- 6.5 The level of these initial socio-economic benefits make a strong case for the further development of ICZM initiatives throughout the European Union, and tend to suggest that the more comprehensive such initiatives the greater the potential benefits both in terms of habitat enhancement and more

directly in terms of enhancement of the business and tourism infrastructure leading to substantial bottom line benefits. Into the future, the potential increased pressure on coastal ecosystems and coastal communities can only strengthen the case for development of ICZM initiatives throughout the European Union, especially where the organisations and individuals designing and managing such initiatives learn from best-practice approaches that can enhance the net socio-economic benefits in a sustainable manner.

THE STRATEGIC SOCIO-ECONOMIC BENEFITS OF ICZM

- 6.6 The conservative modelling approach adopted by the team for deriving estimates of the socio-economic benefits of ICZM initiatives has demonstrated that the value of the benefits under both Low and High Level ICZMs significantly outweigh the costs to generate these benefits. This can be best seen in summary table 6.3 below. Under the Low Level modest approach to delivering ICZM, the benefit to cost ratio is 13.6 : 1, whilst the higher expenditure, more active implementation of ICZM has a respectable 8.6 : 1 benefit-cost ratio. Again, it must be stressed that these are conservative estimates, which exclude other significant qualitative gains from ICZM.

Table 6.3 : The Gross and Net Annual Value of the Socio-Economic Benefits of ICZM Initiatives to the European Union; € Million

Benefit Component	Low Level ICZM € Million	High Level ICZM € Million
Total ICZM Benefits	137.3	746.9
➤ <i>Tourism & Industry Benefits</i>	47.8	478.5
➤ <i>Habitat Enhancement</i>	89.4	268.4
Total ICZM Costs	10.1	87.0
Net ICZM Benefits	127.1	659.8
Basic Benefit : Cost Ratio	13.6	8.6

Source : ICZM Survey & Modelling

- 6.7 In addition to the quantitative benefits for the European Union presented in table 6.3, other tangible socio-economic gains are not captured by the survey and modelling approach adopted by the team. The most important of these relate to organisational and planning benefits; resource-use benefits; and the real gains from improving sustainability in socio-economic communities and systems. A brief comment on each of these is made below : all require further detailed investigation.

ORGANISATIONAL & PLANNING BENEFITS

- 6.8 The qualitative benefits for organisations and enterprises involved in ICZM initiatives presented in table 5.2 of the report have a monetary value, although it is difficult to determine this without significant research. The reported improvements in decision-making, the identification of priorities, and more coherent spatial planning will progressively lead to a more effective and productive use of the scarce public and private sector resources invested in ICZM projects; and the resulting value of these savings can also be credited to the ICZM initiatives where these form the rationale for such improvements. The ICZM survey clearly confirms the importance of such system qualitative benefits.

RESOURCE USE BENEFITS

- 6.9 There will probably be a monetary value for the longer-term socio-economic benefits of ICZM in terms of the improved use, protection and preservation of natural resources within and around coastal zones where the ICZM has directly addressed such challenges. The results of habitat restoration, the adoption of a more sustainable approach to tourism, and the rebuilding of commercial fish stocks all generate additional value both in an environmental services context, and in terms of creating and safeguarding sustainable businesses, income and employment. The ICZM questionnaires and literature survey have shown the growing importance of such longer-term socio-economic benefits, which are in addition to those captured by the survey-based modelling undertaken by the team. Capturing them is difficult without comprehensive survey programmes both at the level of the individual ICZMs and across all the ICZMs in Europe. This is an investigative task for the future.

SOCIO-ECONOMIC SUSTAINABILITY OF COASTAL COMMUNITIES

6.10 The long-term strategic objective for ICZM initiatives, both at local and regional levels, must be to change both human behaviour and aspirations and institutional frameworks, to secure the sustainable management and use of the natural environment. This is especially important in coastal zones which, as explained in section 3, are the most valuable of the earth's biomes in terms of their ecosystem services. The increased public awareness of the benefits of ICZM identified in the survey (table 5.3) is an important initial move towards greater economic, environmental and social sustainability in coastal zones. However, other local, national or regional policies and investment in areas such as enterprise and industry; construction and infrastructure; housing, education and landscape; law and order; and population movements may have relatively greater socio-economic benefits and impacts within coastal zones. The holistic approach of recent ICZM initiatives in the European Union can thus act as a model for the further integration of policies required to pursue socio-economic sustainability in coastal communities.

ICZM BENEFITS TO NATIONAL & EUROPEAN ECONOMIES

6.11 It is also important to understand and appreciate the relative importance of the socio-economic benefits generated by ICZM initiatives to their respective national economies, and to the European Union as a whole. The most appropriate means of assessing this is in terms of the value of the Low and High level ICZM benefits as a percentage of the GNP of the coastal states Members and of the overall European Union economy. The results of this broad calculation are shown in table 6.4 below. It should be noted that current methods of measuring Gross National Product include some minor elements of the ICZM benefits. Consequently, the figures in table 6.4 should be regarded as an initial attempt to assess the *relative* impact of ICZM benefits on individual Member states, rather than precise and fully documented statistical measures. They are thus "Costanza-type" estimates.

Table 6.4 : The Relative Importance of Net ICZM Benefits to the National Economies of EU Member States : 1998-99

Member State	National GNP	Low Level Scenario Net ICZM Benefits		High Level Scenario Relative GNP	
	€ Billion 1998	ICZM Benefits € Million	ICZM € Ratio	ICZM Benefits € Million	ICZM € Ratio
	(1)	(2)	(3)	(4)	(5)
Eire	74.2	6.3	8.49	18.6	25.1
Finland	136.6	7.9	5.78	24.9	18.2
Sweden	249.4	13.3	5.33	45.0	18.0
Denmark	193.9	6.8	2.42	18.4	9.5
United Kingdom	1,388.9	30.5	2.19	154.3	11.1
Spain	608.5	12.7	2.08	69.5	11.4
Greece	135.1	2.6	1.92	13.1	9.7
Portugal	116.9	2.1	1.79	7.6	6.5
Netherlands	427.2	5.8	1.36	29.4	6.9
Italy	1,281.6	14.3	1.11	85.7	6.7
France	1,611.3	16.8	1.04	110.0	6.8
Belgium	284.6	1.0	0.37	9.3	3.3
Germany	2,332.8	7.1	0.30	53.8	2.3
EU Coastal States	8,841.7	127.2	1.43	659.8	7.5

Source : ICZM Survey & Modelling. Notes : (1) GNP € million, 1998. (2) Forecast net annual value of ICZM benefits, € million, Low Level. (3) NAV of ICZM benefits in terms of € benefits per € million of GNP. (4) Forecast net annual value of ICZM benefits, € million, High Level. (5) NAV of ICZM benefits of GNP.

6.12 The relative importance of the net socio-economic benefit values varies sharply between Member states of the European Union, and this reflects the size of the national economy, the nature of their surrounding coastal zones, and their biome composition. The initial estimates presented in table 6.4 appear to be intuitively and logically sensible; and provide an acceptable basis for policy and planning. The main point that emerges from these initial estimates is that for the European Union as a whole, the estimated value of socio-economic benefits of ICZMs represent 1.43% of EU GNP under

the Low Level scenario, to 7.6% in the High Level case. At the lower level this equates roughly to the relative importance of Portugal; at the higher the benefits broadly equate to the GNP of Spain.

- 6.13 These initial estimates require to be reviewed and developed by others in future, but they suggest that the value of the socio-economic benefits generated by ICZM initiatives are significant, and represent important socio-economic gains to the European Union. The relative importance of ICZM initiatives to both EU and national economies (considering the modelling approach has been conservative at each stage and for each element of the modelling) are such that continued support for ICZM initiatives and activities should be given both national and European policy priority. Expenditure on such initiatives represents a relatively cost-effective and productive means to achieve significant and sustainable economic and environmental benefits throughout Europe.

ICZM POLICY-ON & POLICY-OFF SCENARIOS

- 6.14 The team were requested to address the issue of the potential impact on socio-economic benefits in *policy-on* and *policy-off* situations, and to thereby establish the potential benefits for enhancing or introducing ICZM policy at the national and EU levels. At the time the assessment began there was no formal ICZM policy framework at the European Union level in terms of adopted policy priorities delivered through funded operational programmes and projects assisted by statutory instruments. The Commission has recently adopted the *Communication on the European ICZM Strategy* (European Commission, 2000). This sets out a policy for Europe, and indicates how the Commission will pursue future enhancements of coastal zones through existing programmes and instruments. A diverse set of policy approaches, commitments and targeted expenditure already exists within Member States, representing a number of different positions along the “*policy-off*” continuum. It has not been possible to investigate this national policy framework for ICZM within the present assessment contract, as this is a major assignment in itself.
- 6.15 The team’s perception is that at present there remains a relative “*policy-off*” situation throughout the European Union in terms of the ideal policy framework outlined above: hopefully the recent Communication will change this. The modelling undertaken by the team adopted a two-scenario approach (para 5.16) based on actual levels of ICZM expenditure identified through the survey of ICZM initiatives. The “Low Level” model can be seen as representing the first phase of adopting an ICZM policy at the national level; and the “High Level” model that which might be expected from an active pursuit of ICZM strategy and policies. The modelling results presented in table 6.4 clearly show that the net socio-economic benefits can be as much as 4 times higher when a positive “*policy-on*” approach is adopted. When the conservative modelling approach is taken into account, this clearly suggests that major socio-economic benefits will be generated through adopting a “*policy-on*” position on ICZM.
- 6.16 The “*policy-off*” scenario is perhaps no longer relevant in Europe, as both the European Union and the majority of Member states with coastal zones now accept the importance of ICZM : the new EU ICZM strategy proposals will reinforce this. But an extreme “*policy-off*” position in terms of allocating no financial or other resources to protecting and enhancing all aspects of coastal zones would probably result in a steady rise in socio-economic costs and development constraints which would affect many sectors of the national and European economies. The gains that can be generated through more active ICZM policy and priorities will, on the basis of the team’s modelling, be significant; and worth (table 6.4) upwards of €500 million annually at the European Union level when an active “*policy-on*” strategy is pursued.
- 6.17 In addition to the ecosystem and importance of Europe’s coastal zones, the marine and ocean industries within the national and international economies generate significant and little-recognised income and investment. It has been suggested (Borgese 1998) that the total global annual market value of ocean-related and dependent industries exceeds US \$7 trillion, and it is forecast that this will double in real terms during the 21st century. Other research confirms this importance: the value of the US ocean sector was estimated to be US \$30.6 billion in 1972 (Pontecorvo et al. 1980); and the annual turnover in the United Kingdom’s marine sector was identified as being £51.2 billion at the

end of the 1980s (Department of Trade & Industry, 1997). Combining economic and ecosystem values confirms the fundamental importance of marine and ocean areas, and the majority of this value is within coastal zones.

- 6.18 Moving towards a “*policy-on*” situation for Europe’s coastal zones will, on the basis of the socio-economic benefits identified by the team, produce significant economic, social and environmental gains for Member states and the European Union. As coastal communities become more aware of the nature, roles and value of the complex of activities within coastal zones, long-term policy changes can be introduced to sustainably enhance their economies and environments. These changes will impact upon a range of economic sectors including such as fishing, transportation, construction, tourism and insurance; and the results presented in this report suggest that such impact will be strongly beneficial.

7. THE STRATEGIC IMPLICATIONS FOR THE EUROPEAN UNION

- 7.1 In this final section of the report, the principal conclusions of the assessment are presented; and the implications for the European Union, the European Commission, and Member and Associated states are considered. The team's assessment of ICZM initiatives, both within and outwith the European Union, has revealed a complex and diverse range of ICZM organisations and initiatives, most of which are relatively recent in origin and still emerging from their initial planning and strategy development phase. Our survey and assessment should thus be seen as exploring the socio-economic costs and benefits of ICZM initiatives during their first formative period. The assessment has produced impact and benefit benchmarks against which the future stream of net environmental and economic benefits of ICZM can be measured, monitored and compared. The results of this initial assessment strongly argue for continuing enhanced policy support for ICZM by the European Union, together with the funding and organisation support to effectively deliver this. The main policy implications identified by the team are presented and explained below.

THE ICZM ASSESSMENT CONCLUSIONS

- 7.2 The principal conclusions reached by the team at the end of its assessment of the socio-economic costs and benefits of integrated coastal zone management in Europe can be summarised as :
- ☐ There will be both policy and impact monitoring benefits in agreeing more consistent definitions for “coastal zones” and “integrated coastal zone management”; and in incorporating these in policy and planning.
 - ☐ Europe's coastal zones are an especially important but little recognised socio-economic component of the national and EU economies, with 53 thousand Km of coastline; the 21 coastal zones studied are generating an estimated annual value of environmental services approaching €18 billion.
 - ☐ The present group of ICZM initiatives in Europe, both within and outwith the EU Demonstration programme, are diverse in their organisation, operational features, and strategic priorities; and have involved the expenditure of nearly €22 million over the post-1995 period.
 - ☐ The net value of the socio-economic benefits generated through these European ICZM initiatives, based upon the modelling undertaken by the team, has been a minimum of €127 million to date under very conservative estimates; and would probably reach €660 million under an active ICZM “policy-on” initiative.
 - ☐ Low Level ICZM involve costs of approximately €10 million, and at the High Level €87 million. The resulting benefits far outweigh the costs, but compared to the funding on ICZM in other geographic regions, Low-Level ICZM is low cost.
 - ☐ The EU ICZM initiatives, now completing their formation and strategy development phase, have also generated important qualitative benefits for their stakeholders and communities; and the value of those will grow as initiatives move into their implementation phase.
 - ☐ The survey responses and the economic modelling undertaken by the team confirm that investment in ICZM initiatives has a relatively high level of net socio-economic benefit. These benefits are expected to rise as ICZM projects move into delivery modes, and as more areas of Europe's coastline come within ICZM initiatives.

The ICZM initiative survey and research have, we believe, established an effective baseline to both monitor the future impact of existing initiatives and to establish best practice for new initiatives. There are, however, a number of issues encountered by the team where policy and operational improvements can be considered, and our recommendations on these are presented below.

ICZM POLICY IMPLICATIONS AND RECOMMENDATIONS

- 7.3 The results of this initial benchmark assessment of the socio-economic benefits of ICZM initiatives have a number of implications for the European Union which require to be carefully considered in the strategic context of using ICZM to achieve greater sustainability in Europe's coastal zones and coastal communities over the long-term. These implications are in relation to European ICZM policy and strategy; the ICZM management framework; the formulation and delivery of ICZM programme and project initiatives; and the evaluation and reporting of ICZM activities, achievements and benefits. Each of these are important policy areas in themselves, and require separate development and assessment by the European Commission.

EUROPEAN ICZM POLICY & STRATEGY

- 7.4 The European Commission's support for ICZM initiatives through its Demonstration Programme has played a major role in generating a wider collaborative understanding of the environmental and economic importance of coastal zones to Europe. It has established an EU-wide basis for concerted actions to pursue quality in a sustainable manner; and an initial portfolio of project and programme activities environmental for national and regional economies and environments has been launched and delivered. Our survey suggests that many of the Demonstration Initiatives (and some of the other initiatives) remain dependent upon direct or indirect EU funding support, and thus do not have a secure long-term existence. The majority of European ICZM initiatives do not have access to the continuing funding and other resources required to move into the ICZM implementation phase where investment in operational projects and programmes begins to generate measurable and visible socio-economic benefits. This is an important policy momentum issue for consideration by the European Union and Member states.
- 7.5 The European Commission's continuing policy support for the further adoption of ICZM within coastal zones of the European Union and Associated States is demonstrated through the promotion in Autumn 2000 of the *Communication* for the Commission towards an ICZM Strategy for Europe, and the parallel *Proposal* for an European Parliament and Council Recommendation on the implementation of ICZM in Europe. The future perspective is of introducing relevant ICZM concepts into other European Commission proposals, actions and initiatives rather than promoting and supporting ICZM programmes and projects as a distinctive separate policy strand. The significant socio-economic benefits that have been identified during this assessment would suggest that there is merit in reconsidering the present intention not to continue dedicated programme support for ICZM initiatives within the Commission, Parliament and Council of Ministers.
- 7.6 The sustainability of European ICZM policy and strategy is critical to enhancing the economic and environmental sustainability of Europe's coastal zones; and the prime policy objective within the proposed EU Strategy must be to provide the funding support necessary to move ICZM in Europe from planning into operational implementation. Whilst the assessment survey has identified growing private sector expenditure support for ICZM initiatives and a greater corporate and civic awareness of ICZM benefits, the public and transnational nature of the socio-economic benefits generated by ICZM initiatives will be dependent upon national government and European Commission funding and policy support in the medium-term.
- 7.7 These EU and national policy issues are outwith the terms of reference for the present assessment contract; but the survey consultations with ICZM managers suggest that there is a danger of the momentum and commitment achieved over the past five years being lost through the absence of long-term funding support for Integrated Coastal Zone Management. A strategic policy priority at this time must therefore be to identify, both for Member states and the European Union, the level and nature of resources required to pursue an effective ICZM strategy which will generate measurable socio-economic benefits on the scale suggested by the results of the present assessment.
- 7.8 There are also some technical issues associated with ICZM that require to be addressed and resolved in framing future EU strategy and policy. The most important of the technical policy challenges encountered by the present assessment are:

- ❑ More consistent and comprehensive definitions of *Coastal Zones* and *Integrated Coastal Zone Management* activities within the EU will be helpful for Member states. These should not be overly rigid, but allow different types of coast to be treated in their own spatial and issue-based context. More comprehensive guiding principles and “encouragement” are also required.
- ❑ The current absence of easily and readily available socio-economic and environmental data, information and statistics for the communities and geographical areas within the European Union’s coastal zone regions. Some of the data required for the evaluation of socio-economic benefits is available, but dispersed between a wide range of organisations; often in difficult technical formats; and not capable of use without significant cost, effort and technical expertise.
- ❑ The lack of coherent comparable ex-ante baseline socio-economic and environmental indicators and statistics for the European ICZM initiatives is an operational issue to be addressed at the start of the next phase of European Commission and national government support. Without this requirement, measuring impacts and benefits will be almost impossible.

A significant improvement in these technical areas can be achieved through Eurostat and the European Environmental Agency attaching coastal zone tags to appropriate micro-datasets. Whilst this is unlikely to be introduced in the near term, it is a strategic priority.

- 7.9 The Commission could insist, as a condition of its funding support, that future ICZM initiatives must undertake and publish comprehensive baseline audits; regularly measure and monitor progress against such a baseline; and use a common reporting format. It should ensure that the Commission receives copies of such data and information, which must be retained and used as the basis for future socio-economic and environmental impact studies. This will enable the ultra-long term costs and benefits to be monitored, identified and valued.

THE ICZM MANAGEMENT FRAMEWORK

- 7.10 A key conclusion of our assessment (section 5) is that the most important of the qualitative benefits reported by ICZM initiative managers are those associated with the collaborative involvement of organisations in the planning and management of initiatives. Working together has improved decision-making; ensured a better understanding of stakeholder priorities; ensured agreement on ICZM and related priorities; and begun to generate a more coherent approach to spatial planning. For these qualitative benefits and impacts to be strengthened and extended, the emerging ICZM management frameworks must be maintained over the medium to long-term in Europe; and ICZM management frameworks become an accepted and essential component of national and European-wide economic and environmental development initiatives.
- 7.11 The consultations and responses to the ICZM survey undertaken by the assessment team in mid-2000 suggest that some of the management bodies established for the Demonstration Programme have already begun to lose their momentum or have effectively disappeared. The team’s discussions with ICZM project managers have encountered situations where the original managers have left (often taking essential project knowledge with them); where projects have closed or disappeared; or where the essential national and local commitment has dissipated.
- 7.12 An important assessment conclusion is that the major ICZM socio-economic benefits will be best generated through the Demonstration Initiatives moving into project and programme implementation. The maintenance of an active ICZM management framework is an issue of prime importance to the Commission and national and regional governments. There are clear advantages in encouraging and supporting a variety of different ICZM management formats; but these will only be effective through their longer-term continuation, and through maintaining collaboration and contacts between them and with ICZM initiatives elsewhere. This is an important policy issue.
- 7.13 The ICZM Demonstration Programme has been an important and innovative first step in enhancing the economic and environmental sustainability of Europe’s valuable coastal zones. All of the present projects have the potential to evolve further in the future; and further new initiatives could be

encouraged to emerge. Whilst it appears unlikely that there will be a second ICZM Demonstration programme *per se*, the Strategy statement from the Commission suggests that ICZM initiatives (both existing and new) will be able to seek funding and other support through such as LIFE III, INTEREG, and other regional and environmental initiatives.

FORMULATING & DELIVERING ICZM ACTIVITIES

- 7.14 The assessment consultations and the review of ICZM documentation undertaken by the team suggests that to date, the formulation and delivery of operational ICZM programme and project activities to implement local ICZM strategy and plans is only just beginning with the exception of promotional and educational awareness activities. It also appears that only a minority of the current activities are based upon project planning approaches encompassing goals, targets, costs, benefits and impact monitoring aspects. This is understandable, and the survey has consequently encountered few examples of best-practice capable of wider adoption by ICZM managers.
- 7.15 The assessment team suggest that it might be helpful for future ICZM initiatives and activities throughout Europe for the Commission to actively help ICZM programme and project managers to define, adopt and manage specific operational activities on a common project planning basis. This would enable ICZM initiatives to be better coordinated across the European Union; ensure the consideration and adoption of best practice; and establish the basis for a more coherent approach to the evaluation of ICZM initiatives. In effect, this requires the preparation of a business plan for each operational initiative.

THE EVALUATION OF ICZM INITIATIVES

- 7.16 This assessment has shown that it is important in planning, negotiating and funding multi-year economic and environmental initiatives to ensure that it is possible to monitor, measure and evaluate the impact and benefits of the initiative and its implementation. Many of the ICZM Demonstration Projects contacted during the present assessment had not undertaken any pre-project economic and environmental audits; some were unable to provide even basic statistical information on their areas and activities; and a minority appear to have operated without any performance measurement and/or reporting system. In such a situation, it is difficult for the Commission to establish whether ICZM projects and expenditure represent developmental value-for-money; determine the level, type and sustainability of socio-economic benefits; or to have the information necessary for policy and strategy development at the European Union level.
- 7.17 The team sought to identify and obtain all the relevant evaluation data, information and statistics to support the assessment of socio-economic benefits of ICZM initiatives; but addressing the absence of essential baseline data or audits for many of the individual Demonstration Programmes has been both a challenge and time consuming. It is suggested that in future the Commission requires all funded initiatives to undertake ex-ante economic and environmental audits to establish the baseline quantitative and qualitative data necessary to measure achievement, progress and impacts. This should be on a common format; supported by the improved provision of the coastal zone data called for above; and designed to enable longitudinal monitoring of socio-economic benefit changes and impacts over the longer-term. The data obtained by the team during the present assessment provides a baseline for over 30 European ICZM initiatives; and it is suggested that the mid-2000 survey undertaken by the assessment team be repeated in mid-2005 using the same questions and ratings.

ANNEX A : ICZM BIBLIOGRAPHY

- Adger, W.N. (1997) *Sustainability and Social Resilience in Coastal Resource Use*. UEA: CSERGE Working Paper GEC 97-23.
- Ahmed, S. (2000) *Report on GIS Analysis of EU ICZM Data*. Glasgow University, Glasgow.
- Alenyar, M. (1997) International Seminar on Sustainable development in the Mediterranean: Between reality and Utopia - Conclusions. Can Tápera, Palma, 12-16 March 1997.
- American Coastal Coalition. (2000) *The Economic Benefits of a Healthy Coastline*. <http://www.coastalcoalition.org/facts/statistics/accfacts.html>; Accessed February 2000.
- Anon. (1993) Valuing Environmental Goods (2): The Hedonic Pricing Method. In *Cost-Benefit Analysis and the Environment*, eds. N.Hanley and C.L.Spash. Edward Elgar Publishing Ltd, Cheltenham. 74-82.
- Anon. ed. (1997) *Coastal Management Research: Conference Report*. National Institute for Coastal and Marine Management, RIKZ Rijkswaterstaat, The Netherlands.
- Ayres, R.U. (1998) The price-value paradox. *Ecological Economics* **25**, 17-19.
- Ballinger, R.C., Smith, H.D. and Warren, L.M. (1994) The Management of the Coastal Zone of Europe. *Ocean and Coastal Management* **22**, 45-85.
- Beatley, T., Browner, D.J. & Schwab, A.K. 1994. *An Introduction to Coastal Zone Management*. Island Press, Washington D.C.
- Barrett, M.G. (1991) Future sea-level rise: a working paper. *Proceedings from The Institution of Civil Engineers, Part I* **1**, 1101-1105.
- Bird, E.C.F. (1996) *Beach Management*. John Wiley & Sons, Chichester.
- Blakemore, F.B. and Williams. A.T. (1998) Public Valuation of Beaches in South East Wales, UK. *Shore and Beach* **66 (4)** 18-23.
- Blaikie, P., Cannon, T., Davis, I. and Wisner, B. (1994) *At Risk: Natural hazards, People's Vulnerability and Disasters*. Routledge, London.
- Boelens, R.G.V. (1992) From Policies to Science: Strategies for Marine Environmental Protection. *Marine Pollution Bulletin* **25** (1-4), 14-17.
- Borrubu-Feyerabend, G. (1999) *Participatory Management of Natural Resources*. <http://nrm.massey.ac.nz/changelinks/pmn.html>; Accessed February 2000.
- Borgese, E. M. (1998) *The Oceanic Circle : Governing the Seas as a Global Resource*. United Nations University Press, New York.
- Bowers, J. (1999) *An Economically Efficient Strategy for Coastal Defence and the Conservation of the Intertidal Zone*. A report to The Joint Marine Programme of The Wildlife Trusts and WWK-UK, July 1999.
- Bray, M., Hooke, J. and Carter, D. (1997) Planning for sea-level rise on the south coast of England: advising the decision-makers. *Transactions of the Institute of British Geographers. New Series* **22 (1)**, 13-30.
- Brown, L.R. and Flavin, C. eds. (1999) *State of the World 1999: A Worldwatch Institute Report on Progress Toward a Sustainable Economy*. Earthscan Publications for Worldwatch Institute, London.
- Bruce, J.P., Lee, H. and Haites, E.F. eds. (1996) *Climate Change 1995: Economic and Social Dimensions of Climate Change*. Cambridge University Press, Cambridge.
- Buckingham-Hatfield, S. and Evans, B. (1996) Achieving Sustainability through Environmental Planning. In *Environmental Planning and Sustainability*, eds. S. Buckingham-Hatfield and B. Evans. John Wiley and Sons Ltd, Chichester. 1-18.
- Burbridge, P.R. (1997) A Generic Framework for Measuring Success in Integrated Coastal Management. *Ocean and Coastal Management* **37(2)**, 175-189.
- Burrill, A., Burbridge, P. and Humphrey, S. (2000) Guiding Principles for a European Integrated Coastal Management Strategy. *InterCoast Winter*, 16-17.
- Byrant, D., Rodenburg, E., Cox, T. and Nielsen, D. (2000) *Coastlines at Risk: An Index of Potential Development-Related Threats to Coastal Ecosystems*. <http://www.wri.org/indictcs/coastrsk.htm>; Accessed February 2000.
- Capobianco, M. (1999) *Role and Use of Technologies in Relation to ICZM: Final Report*. European Union, The European Commission, Brussels.
- Cencini, C., Marchi, M., Torresani, S. & Varani, L. 1988. The impact of tourism on the Italian Deltaic Coastlands : four base studies. *Ocean and Coastal Management*, **11** : 353 – 374.
- Cendrero, A. (1989) Land-Use Problems, Planning and Management in the Coastal Zone: An Introduction. *Ocean & Shoreline Management* **12**, 367-381.
- Cesar, H. (1996) *Economic Analysis of Indonesian Coral Reefs*. World Bank, Washington D.C.
- Charlier, R.H. (1989) Coastal Zone: Occupance, Management and Economic Competitiveness. *Ocean & Shoreline Management* **12**, 383-402.
- Cicin-Sain, B. (1993) Sustainable Development and Integrated Coastal Management. *Ocean and Coastal Management* **21**, 11-43.
- Cicin-Sain, B. (1993) Introduction to the Special Issue on Integrated Coastal Management: Concepts, Issues and Methods. *Ocean & Shoreline*

Management **21**, 1-9.

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

Cicin-Sain, B., Knecht, R.W., Vallega, A. and Harakunarak, A. (2000) Education and training in integrated coastal management: lessons from the international arena. *Ocean and Coastal Management* **43**, 291-330.

Clark, J.R. (1997) Coastal zone management for the new century. *Ocean and Coastal Management* **37**(2), 191-216.

Clark, J.R. (1996) *Coastal Zone Management Handbook*. CRC Lewis, Boca Raton.

Clark, M.J. (1998) Flood Insurance as a Management Strategy for UK Coastal Resilience. *The Geographical Journal* **164**(3), 333-343.

Clement, K. (2000) *Economic Development and Environmental Gain : European Environmental Integration and Regional Competitiveness*. Earthscan, London.

Coastal America. (1999) *Coastal America: A Partnership for Action*. <http://www.epa.gov/OWOW/oceans/coastam/index.html>; Accessed 09/07/99.

Coastal Coalition. (1998) *More Facts on the Economic Importance of America's Coastal Region*. <http://www.coastalcoalition.org/facts/statistics/econimpact.html#Delaware>; Accessed 05/04/99.

Coastal Coalition. (1998) *The Economic Impact of Coastal Tourism: A Special American Coastal Coalition Report*. http://www.coastalcoalition.org/facts/economic_tbl.htm; Accessed 05/05/99.

Coastal Programs Division and the Coastal States, Territories and Commonwealths. (1998) *Sustaining America's Coastal Communities and Resources: a strategic framework for the coastal zone management program*. U.S. Department of Commerce.

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

Costanza, R. (1998) The value of ecosystem services. *Ecological Economics* **25**, 1-2.

Costanza, R. (1999) The Ecological, Economic, and Social Importance of the Oceans. *Ecological Economics* **31**, 199-213.

Costanza, R. (2000) The Ecological, Economic, and Social Importance of the Oceans. In *Seas at the Millennium: an environmental evaluation*, volume 3. 271-81, ed. C. Sheppard. Elsevier Science, Amsterdam.

Costanza, R. and Folke, C. (2000) Valuing Ecosystem Services with Efficiency, Fairness and Sustainability as Goals. In *Nature's Services: Societal Dependence on Natural Ecosystems*. ed. G.Daily. Island Press, Washington D.C.

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. and van den Belt, M. (1997) The value of the world's ecosystem services and natural capital. *Nature* **387**, 253-260.

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. and van den Belt, M. (1997) The value of the world's ecosystem services and natural capital. *What's new in Nature*. Supplementary Information <http://www.nature.com/>;

Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P. and van den Belt, M. (1998) The value of the world's ecosystem services: putting the issues in perspective. *Ecological Economics* **25**, 67-72.

Costanza, R., Andrade, F., Antunes, P., van den Belt, M., Boesch, D., Boersma, D., Catarion, F., Hanna, S., Limburg, K., Low, B., Molitor, Pereira, J.G., Rayner, S., Santos, R., Wilson, J. and Young, M. (1999) Ecological economics and sustainable governance of the oceans. *Ecological Economics* **31**, 171-187.

Crooks, S. and Turner, R.K. (1999) Integrated Coastal Management: Sustaining Estuarine Natural Resources. *Advances in Ecological Research* **29**, 241-289.

Dawson, AG (1992) *Ice Age Earth : Late Quaternary Geology and Climate*. Rowledge, London.

Department of Trade and Industry. (1997) *Progress Through Partnership: Marine Foresight 16*. Office of Science and Technology, DTI.

Dee Boersma, P. and Parrish, J.K. (1999) Limiting abuse: marine protected areas, a limited solution. *Ecological Economics* **31**, 287-304.

Dixon, M. (2000) *UK Marine Special Areas of Conservation, Marine Protected Areas or Marine Nature Reserves : a study on their viability as a tool for Integrated Coastal Zone Management*. Unpublished Masters Thesis; GSES, University of Strathclyde.

Dobbin, J.A. (1976). *Planning, Design, and Management of Marine Parks and Reserves*. Harvard University.

Doody, J.P., Pamplin, C.F., Gilbert, C. and Bridge, L. (1998) *Information required for Integrated Coastal Zone Management*. European Union, The European Commission, Brussels.

Doody, J.P. 1999. The Scottish Coast in a European Perspective. In: Baxter, J.M., Duncan, K., Atkins, S.M. & Lees, G. (Eds.) *Scotland's Living Coastline*. The Stationary Office, London. pp15-29.

Duck, R.W., McManus, J. & Diez, J.J. 1995. Comparative study of two largely infilled estuaries : the Eden Estuary (Scotland) and the Ria de Foz (Spain). *Netherlands Journal of Aquatic Ecology*. 29 (3-4) : 203-210.

Ducrotoy, J.P. and Pullen, S. (1999) Integrated Coastal Zone Management: commitments and developments from an International, European, and United Kingdom perspective. *Ocean & Coastal Management* **42**, 1-18.

Edwards, S.F. (1987) *An Introduction to Coastal Zone Economics: concepts, methods and case studies*. Taylor & Francis, London.

- Edwards, S.F., Jones, P.J.S. and Nowell, D.E. (1997) Participation in coastal zone management initiatives: a review and analysis of examples from the UK. *Ocean & Coastal Management* **36** (1-3), 143-165.
- El-Sabh, M., Demers, S.A. and Lafontaine, D. (1998) Coastal Management and Sustainable Development from Stockholm to Rimouski. *Ocean and Coastal Management* **39**, 1-24.
- Emerton, L. (1999) *Economic Tools for the Management of Marine Protected Areas in Eastern Africa*. IUCN, Kenya.
- Environment Australia. (1995) *The Commonwealth Coastal Policy*.
http://www.environment.gov.au/marine/manuals_reports/coastal_policy/cst_ch3.html; Accessed 05/07/99.
- Environment Australia. (1999) *Coastal Tourism – A Manual for Sustainable Development*.
http://www.environment.gov.au/marine/man...s/coastnet/coastal_tourism/part1the.html; Accessed 05/07/99.
- Environmental Protection Agency. (2000) *Indian River Lagoon National Estuary Program*. **June 2000** Issue. Environmental Protection Agency, Washington D.C.
- Environmental Protection Agency. (2000) *National Estuary Program: What Estuaries are in the NEP?*
<http://www.epa.gov/owow/estuaries/find.htm>; Accessed 2/08/00.
- European Commission. (1999) *Lessons from the European Commission's Demonstration Programme on Integrated Coastal Zone Management (ICZM)*. Directorates-General: Environment, Nuclear Safety and Civil Protection; Fisheries: Regional Policies and Cohesion.
- European Commission. (1999) *Towards a European Integrated Coastal Zone Management (ICZM) Strategy: General Principles and Policy Options*. Directorates-General: Environment, Nuclear Safety and Civil Protection; Fisheries: Regional Policies and Cohesion.
- European Commission. (2000). *Proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe*. COM (2000) 545 final. European Commission, Brussels; 8 September 2000.
- European Commission. (2000). *Communication from the Commission to the Council and the European Parliament on Integrated Coastal Zone Management : A Strategy for Europe*. COM (2000) 547 final. European Commission, Brussels; 27 September 2000.
- European Commission, The European Commission. (1999) *Integrated Coastal Zone Management*.
<http://europa.eu.int/comm/environment/iczm/home.htm>; Accessed February 2000.
- European Commission, The European Commission. (1999) *Informal Consultation: Towards a European Integrated Coastal Zone Management (ICZM) Strategy. General Principles and Policy Options: A Summary of Responses*. European Commission, The European Commission, Brussels.
- European Environment Agency. (1999) *Environment in the European Union at the turn of the century*. EEA, Copenhagen.
- Fabbri, K.P. (1998) A methodology for supporting decision making in integrated coastal zone management. *Ocean and Coastal Management* **39**, 51-62.
- Fernandes, T.F., Elliott, M. & Da Silva, M.C. 1995. The management of European Estuaries : a comparison of the features, controls and management framework of the Tagus (Portugal) and Humber (England). *Netherlands Journal of Aquatic Ecology*. 29(3-4): 459-468.
- Fernández, M.A.R. (1997) *Sustainable Use of Island Marine Resources Appropriate Technologies*. From European Conference on Sustainable Island Development: Instruments for Sustainable Island Development, Minorca, April 23-26.
- Ferraretto, Andrea et.al (1998) *Un Parco e la sua economia : indagine sul Parco Nazionale d'Abruzzo e la politica di sviluppo locale*. World Wildlife Fund Italia, Roma.
- Firth Crichton Roberts Ltd. (1998) *An Economic Appraisal of the Forth Estuary and Firth of Forth*. Forth Estuary Forum, Edinburgh.
- Fisheries Research Services. (1998) *Report and Accounts 1997-1998*.
- Foell, J., Harrison, E. and Stirrat, R.L. (2000) *Participatory Approaches to Natural Resource Management: The Case of Coastal Zone Management in the Puttalam District*. <http://www.sussex.ac.uk/Units/CDE/research/coastal/sf.html>; Accessed 22/06/00.
- Freeman, A.M. (1995) Hedonic Pricing Methods. In *The Handbook of Environmental Economics*, ed. D.W.Bromley. Basil Blackwell Ltd, Oxford. 672-685.
- French, P.W. (1997) *Coastal and Estuarine Management*. Routledge, London.
- Fry, V.E. & Jones, P.J.S. (2000). *The Development of Indicators of Estuary Management Partnership Success*. Report from UCL to English Nature under the Estuaries Initiative Review.
- Gaterell, M.R., Morse, G.K. and Lester, J.N. (1999) Investment in the aquatic environment 11: Comparison of two techniques for evaluating environmental benefits. *Journal of Environmental Management* **56**, 11-24.
- Geographic Information Management (1999) *Coastal Typologies: Map Production and Spatial Analysis, Final Report*. European Commission: Directorate-General of Environment, Nuclear Safety and Civil Protection, Brussels.
- Gibson, J. (1999) *Legal and Regulatory Bodies: Appropriateness to Integrated Coastal Zone Management*. European Union, The European Commission, Brussels.
- Glomes, F. (1998) *The Review of the NOAA National Coastal Zone Management Programs for Estuary and Coastal Wetland Protection*.
<http://www.oceansconservation.com/iczm/gomes.htm>; Accessed 22/06/99.
- Goodman, S.L., Seabrooke, W. and Jaffry, S.A. (1998) Considering Conservation Value in Economic Appraisals of Coastal Resources. *Journal of Environmental Planning and Management* **41(3)**, 313-336.

- Grenell, P. (1991) Non-Regulatory Approaches to Management of Coastal Resources and Development in San Francisco Bay. *Marine Pollution Bulletin* **23**, 503-507.
- Grigalunas, T.A. and Congar, R. eds. (1995) Environmental Economics for Integrated Coastal Area Management: Valuation Methods and Policy Instruments. *Regional Seas Reports and Studies* **164**, United Nations Environment Programme.
- Hale, L.Z. (1993) Why Coastal Zone Management and Economic Development are Complementary and Mutually Beneficial. In *Are Coastal Zone Management and Economic Development Complementary in Sri Lanka*, eds. A.T. White and M. Wijeratne. Proceedings of a seminar, Colombo, Sri Lanka, March 19 1993, 13-22.
- Hansom, J.D. (1988) *Coasts*. Cambridge University Press, Cambridge.
- Hanson, A.J. (1998) Sustainable development and the oceans. *Ocean and Coastal Management* **39**, 167-177.
- Healy, M.G. and Doody, J.P. eds. (1995) *Directions in European Coastal Management*. Samara Publishing Limited, Cardigan.
- Hegarty, A. (1997) Start with what the people know: a community based approach to integrated coastal zone management. *Ocean and Coastal Management* **36(1-3)**, 167-203.
- Higgins, S.H. (2000) *Will Tourists Come if the Beaches Disappear?* <http://www.coastalcoalition.org/facts/statistics/broward1.html>; Accessed February 2000.
- Hildebrand, L.P. and Norrena, E.J. (1992) Approaches and Progress Toward Effective Integrated Coastal Zone Management. *Marine Pollution Bulletin* **25** (1), 94-97.
- Hildreth, R.G. (1992) Australian Coastal Management: Some North American Perspectives on Recent Queensland and Other Initiatives. *Coastal Management* **20**, 255-268.
- Hinrichsen, D. (1998) *Coastal Waters of the World: Trends, Threats and Strategies*. Island Press, Washington D.C.
- Hinrichsen, D. 1990. *Our Common Seas: Coasts in crisis*. Earthscan, London.
- Hudson, B.J. 1996. *Cities on the shore: the urban littoral frontier*, Pinter, London.
- Humphrey, S. *Questionnaire to the Demonstration Projects on Integrated Coastal Zone Management: Summary of Responses*.
- Humphrey, S. and Burbridge, P. (1999) *Planning and Management Processes: Sectoral and Territorial Cooperation*. European Union, The European Commission, Brussels.
- Imperial, M.T. and Hennessey, T.M. (1996) An Ecosystem-Based Approach to Managing Estuaries: An Assessment of the National Estuary Program. *Coastal Management* **24**, 115-139.
- Jemmett, A. (1998) Implementing Estuary Management Plans – a Case Study from the Dee Estuary. *The Geographical Journal* **164(3)**, 307-318.
- Jennison, M. & Kay, D. 1999. Estuarine Management by Partnership: its potential and implications. In: Baxter, J.M., Duncan, K., Atkins, S.M. & Lees, G. (Eds.) *Scotland's Living Coastline*. The Stationary Office, London. pp93-103.
- Jones, P.S., Healy, M.G. and Williams, A.T. (1996) *Studies in European Coastal Management*. Samara Publishing Limited, Cardigan.
- Kay, R. and Alder, J. (1999) *Coastal Planning and Management*. E & FN Spon, London.
- Kelleher, G. & Kenchington, R. (1991). *Guidelines for Establishing Marine Protected Areas*. IUCN, Gland, Switzerland.
- Kenchington, R. and Crawford, D. (1993) On the Meaning of Integration in Coastal Zone Management. *Ocean and Coastal Management* **21**, 109-127.
- Kilvington, M. (1998) *The Whaingaroa Catchment Management Project: A Multi-stakeholder Approach to Sustainable Catchment Management*. Environment Waikato, Hamilton East. <http://www.landcare.cri.nz/science/social/index.shtml?whaingaroa>;
- King, G. (1999) *Participation in the ICZM Processes: Mechanisms and Procedures Needed*. European Union, The European Commission, Brussels.
- King, P. (1999) *Executive Summary of 1999 Report on: The Fiscal Impact of Beaches*. http://www.coastalcoalition.org/facts/execsum99_fiscalimpactbeaches.html; Accessed 02/08/2000.
- Klee, G.A. (1999) *The Coastal Environment: Towards Integrated Coastal and Marine Sanctuary Management*. Prentice Hall, New Jersey.
- Klein, J.J.T., Smit, M.J., Goosen, H. and Hulbergen, C.H. (1998) Resilience and Vulnerability: Coastal Dynamics or Dutch Dikes? *The Geographical Journal* **164(3)**, 259-268.
- Knecht, R.W. and Archer, J. (1993) 'Integration' in the US Coastal Zone Management Program. *Ocean and Coastal Management* **21**, 183-199.
- Knecht, R.W., Cicin-Sain, B. and Fisk, G.W. (1996) Perceptions of the Performance of State Coastal Zone Management Programs in the United States. *Coastal Management* **24**, 141-163.
- Leaf, R., Pethick, J. and Townend, I. (1998) Realizing the Benefits of Shoreline Management. *The Geographical Journal* **164(3)**, 282-290.
- Lieven, J. (2000) *Towards Integrated Management of Coastal and Marine Ecological corridors at the Pan-European Level: A Study at the Science/Policy Interface*. European Union for Coastal Conservation, Leiden, The Netherlands.
- Lodovisi, A., 1989. Historical Evolution of the Coastal Settlement in Italy : modern times. In : Fabri, P. (Ed.) *Coastlines of Italy*; American Society of Civil Engineers, New York. 160-169.

- Lovric, A.Z. 1993. Dry coastal ecosystems of Croatia and Yugoslavia. In: Van der Maarel, E. (Ed.) *Ecosystems of the World, Vol. 2A Dry Coastal Ecosystems. Polar Regions and Europe*, Elsevier Amsterdam, pp391-420.
- Low, B., Costanza, R., Ostrom, E., Wilson, J. and Simon, C.P. (1999) Human-ecosystem interactions: a dynamic integrated model. *Ecological Economic* **31**, 227-242.
- Lowry, K., Olsen, S. and Tobey, J. (1999) Donor evaluations of ICM initiatives: what can be learned from them? *Ocean and Coastal Management* **42**, 767-789.
- McGlashan, D.J. (2000) Coastal Management in the Future. In *Seas at the Millennium: an environmental evaluation*, ed. C. Sheppard. Pergamon, Oxford. Volume 3, *in press*.
- McGlashan, D.J. and Duck, R.W. (2000) A protocol for the development of undeveloped coasts. *Periodicum Biologorum*. Volume 102 (1).
- McInnes, R.G., Jewell, S. and Roberts, H. (1998) Coastal Management on the Isle of Wight, UK. *The Geographical Journal* **164**(3), 291-306.
- Madduma Bandara, C.M. (1993) Policy Needs for Promotion of Preventive Planning in Coastal Management. In *Are Coastal Zone Management and Economic Development Complementary in Sri Lanka*, ed. A.T. White and M. Wijeratne. Proceedings of a seminar, Colombo, Sri Lanka, March 19 1993. 43-51.
- Makoloweka, S. and Shurcliff, K. (1997) Coastal Management in Tanga, Tanzania: a decentralized community-based approach. *Ocean and Coastal Management* **37**(3), 349-357.
- Mandale, M., Foster, M.E. and Chiasson, P.Y. (2000) *The Economic Value of Marine-Related Resources in New Brunswick*. New Brunswick Department of Fisheries and Aquaculture and the Department of Fisheries and Oceans.
- Manzano, S. and Timoria, N. (2000) *Small Enterprise as a tool for coastal management: The San Vicente Experience*. <http://www.oneocean.org/overseas/2000003/index.html>; Accessed 02/08/2000.
- Marlowe, H. (1999) *Assessing the Economic Benefits of America's Coastal Regions*. <http://www.coastalcoalition.org/>; Accessed February 2000.
- Maul, G.A. (1996) Ocean Science in Relation to Sustainable Economic Development and Coastal Area Management of Small Islands. In *Small Islands: Marine Science and Sustainable Development*. Coastal and Estuarine Studies **51**, American Geophysical Union, Washington DC, 1-17.
- Meltzer, E. (1998) *Guidelines for Offshore Marine Protected Areas in Canada*. <http://www.oceansconservation.com/iczm/meltzrea.htm>; Accessed 22/06/99.
- Meltzer, E. (1998) *International Review Of Integrated Coastal Zone Management*. <http://www.oceansconservation.com/iczm/meltzer1.htm>; Accessed 22/06/99.
- Meltzer Research and Consulting. (1996) *International Review of Integrated Coastal Zone Management. Volume I: Annotated Bibliography*. http://www.oceansconservation.com/iczm/g_iczm.htm; Accessed 22/06/99.
- Meltzer Research and Consulting. (1996) *International Review of Integrated Coastal Zone Management. Volume II: National Models*. http://www.oceansconservation.com/iczm/us_bib.htm; Accessed 22/06/99.
- Meltzer Research and Consulting. (1996) *International Review of Integrated Coastal Zone Management. Volume III: Analysis and Potential Applicability to Canada*. <http://www.oceansconservation.com/iczm/bibint.htm>; Accessed 22/06/99.
- Meltzer Research and Consulting. (1996) *A Strategy for Achieving Integrated Management*. http://www.oceansconservation.com/iczm/model_coasts.htm; Accessed 22/06/99.
- Meltzer Research and Consulting. (1998) *Potential Application of International ICZM Models for Coastal Zone Management in Atlantic Canada*. <http://www.oceansconservation.com/iczm/meltzer2.htm>; Accessed 22/06/99.
- Merler, A. (1997) *Resources Management: A Transboundary cooperation*. From European Conference on Sustainable Island Development: Instruments for Sustainable Island Development, Minorca, April 23-26.
- Mitchell, K. (1998) European Seminar on Implementing the Habitats Directive in Marine and Coastal Areas: Background Paper. In *European Commission: Implementing the Habitats Directive in Marine and Coastal Areas*. European Commission THE EUROPEAN COMMISSION, Environment, Nuclear Security and Civil Protection, 3-10.
- Ngoile, M.A.K. and Linden, O. (1997) Lessons Learned from Eastern Africa: the Development of Policy on ICZM at National and Regional Levels. *Ocean and Coastal Management* **37**(3), 295-318.
- Nicholas Pearson Associates. (1996) *Coastal Zone Management – Towards Best Practice*. Department of the Environment, London.
- Nicholls, R.J. and Branson, J. (1998) Coastal Resilience and Planning for an Uncertain Future: An Introduction. *The Geographical Journal* **164**(3), 255-258.
- Nichols, K. (1999) Coming to Terms with "Integrated Coastal Management": Problems of Meaning and Method in a New Arena of Resource Regulation. *Professional Geographer* **51**(3), 388-399.
- Nordstrom, K.F. (2000) *Beaches and Dunes of Developed Coasts*. Cambridge University Press, Cambridge.
- Nordstrom, K.F. (1993) Intrinsic Value and Landscape Evaluation. *Geographical Review* **83**, 473-6.
- Nordstrom, K.F. (1990) The Concept of Intrinsic Value and Depositional Coastal Landforms. *Geographical Review* **80**, 68-81.
- O'Connor, R.E., Bord, R.J. and Pflugh, K.K. (1994) The Two Faces of Coastal Environmentalism: Environmental Protection and Development of Cape May. *Coastal Management* **22**, 183-194.

- OCRM (1996) *Linking Environmental Project Outputs and Social Benefits: Bringing Economics, Ecology and Psychology Together*. <http://www.epa.gov/owow/watershed/proceed/stedge.htm>; accessed February 2000.
- OCRM (1997) *National CZM Effectiveness Study: How Well Has the Federal Coastal Zone Management Act Worked?* <http://www.epa.gov/owow/estuaries/coastlines/summer97/>; Accessed February 2000.
- OCRM (1999) *Environmental Economics in Estuary Management: The Peconic Estuary Program*. <http://www.epa.gov/owow/wtr1/estuaries/coastlines/aug99/envrEcon.html>; Accessed February 2000.
- OECD (1997) *Integrated Coastal Zone Management: Review of Progress in Selected OECD Countries*. Organisation for Economic Co-operation and Development, Paris.
- Okemwa, E. N., Ruwa, R.K. and Mwandotto, B.A.J. (1997) Integrated coastal zone management in Kenya: initial experiences and progress. *Ocean and Coastal Management* **37**(3), 319-247.
- Olsen, S., Tobey, J. and Kerr, M. (1997) A Common Framework for Learning From ICM Experience. *Ocean and Coastal Management* **37**(2), 155-174.
- Olsen, S.B. (1993) Will Integrated Coastal Management Programs be Sustainable: the Constituency Problem. *Ocean and Coastal Management* **21**, 201-225.
- Olsen, S.B. ed. (1998) Focus on: Coastal Economics. Themed issue of *Intercoast Network* **32**.
- Olsen, S.B., Lowry, K. and Tobey, J. (1999) *A Manual for Assessing Progress in Coastal Management: Coastal Management Report #2211 – January 1999*. Coastal Resources Center, University of Rhode Island.
- O’Riordan, T. and Vellinga, P. (1993) Integrated Coastal Zone Management: the next steps. In *Worldcoast '93*, eds. P. Beukenkamp, P. Gunther and R. Klien. National Institute for Coastal and Estuarine Management, Coastal Zone Management Centre, Noordwijk, The Netherlands, pp406-413.
- Palmquist, R.B. (1999) Hedonic Models. In *Handbook of Environmental and Resource Economics*, ed. J.C.J.M. van den Bergh. Edward Elgar Publishing Ltd, Cheltenham. 765-776.
- Parkes, J.G.M. (1996) *A Historical Perspective on Coastal Zone Management in Canada*. <http://www.oceansconservation.com/iczm/mparks.htm>; Accessed 22/06/99.
- Parkes, J.G.M. and Manning E.W. (1998) *An Historical Perspective of Coastal Zone Management in Canada*. Department of Fisheries and Oceans, Ontario. <http://www.oceansconservation.com/iczm/parkes.htm>; Accessed 22/06/99
- Parry, M. and Duncan, R. (eds) (1995) *The Economic Implications of Climate Change in Britain*. Earthscan Publications Ltd, London.
- Penning-Rowsell, E.C., Green, C.H., Thompson, P.M., Coker, A.M., Tunstall, S.M., Richards, C. and Parker, D.J. (1992) *The economics of coastal management: A Manual of benefit assessment techniques*. Belhaven Press, London.
- Pimm, S.L. (1997) *The value of everything*. <http://www.nature.com/>; Accessed February 2000.
- Platt-McGinn, A. (1999) Charting a New Course for Oceans. In *State of the World 1999: A Worldwatch Institute Report on Progress Toward a Sustainable Economy*, eds. L.R. Brown and C. Flavin. Earthscan Publications for Worldwatch Institute, London.
- Plummer, J.N. (1994) Establishing Vegetative Buffers on Existing Lots: A Policy for Mitigating Impacts to Coastal Resources. *Coastal Management* **22**, 427-430.
- Pontecorvo, G., Wilkenson, M., Anderson, R. and Holdowsky, M., (1980). Contribution of the ocean sector to the United States economy. *Science* **208** : 1000-1006.
- Posford Duvivier Environment. (1996) *Financial values of five important marine/coastal wildlife areas in England*. English Nature, Peterborough.
- Požar-Domac, A (ed). (2000) Responsible Coastal Zone Management : The Challenge of the 21st Century. *Periodicum Biologorum*, 102.
- Pugh, D. and Skinner, L. (1996) *An analysis of Marine-Related Activities in the UK Economy and Supporting Science and Technology*. Inter-Agency Committee on Marine Science and Technology, c/o Southampton Oceanography Centre, Southampton.
- Randazzo, G., Mergad, R & Tribilato, K. (2000) “An investigation of beach user perceptions in the Province of Ragusa, Sicily, Italy”. *Periodicum Biologorum*, 102.
- Rao, P.K. (2000) *Sustainable Development: Economics and Policy*. Blackwell, Oxford.
- Rayment, M., Lewis, P. and Henderson, R. (2000) *Valuing Norfolk's Coast: The Economic Benefits of Environmental and Wildlife Tourism*. RSPB.
- Rein, F.A. (1999) An Economic Analysis of Vegetative Buffer Strip Implementation Case Study: Elkhorn Slough, Monterey Bay, California. *Coastal Management* **27**, 377-390.
- Rijsberman, F. (ed.) (1998) *Conflict Management and Consensus Building for Integrated Coastal Management in Latin America and the Caribbean*. Resource Analysis, DEFLT, The Netherlands.
- RSPB. (2000) *Valuing Norfolk's Coast*. RSPB East Anglia Office, Norwich.
- Ruiz, L.F.V. and de Quirós, F.B. (1994) Cost-benefit analysis of Shore Protection Investments. In *Coastal Engineering*, ed. B.L. Edge. From proceedings of the 24th international conference, October 23-28 1994, Kobe, Japan.
- Sanderatne, N. (1993) Coastal Conservation – The Economic Dimension. In *Are Coastal Zone Management and Economic Development Complementary in Sri Lanka*, ed. A.T. White and M. Wijeratne. Proceedings of a seminar, Colombo, Sri Lanka, March 19 1993. 29-36.

- Sanderson, H.T. (1998) *A Swim Against the Current – Recent Experiences From Norwegian Coastal Zone Management*. Presented at Coastman's Second Workshop, December 3-5, 1998 in Rennes, France.
- Sievert, R.F. and Diamante-Fabunan, D.A.D. (2000) *People power vs illegal fishing: can it work?* <http://www.oneocean.org/overseas/200002/index.html>; Accessed 02/08/2000.
- Smith, K. (1992) *Environmental Hazards: Assessing Risk and Reducing Disaster*. Routledge, London.
- Smith, T.F. (1999) *Discussion Paper: Development of a National Framework for Australian Estuary Management*. <http://www.geog.unsw.edu.au/estuary/discussion%20paper.htm>; Accessed 30/08/99.
- Sorensen, J. (1997) National and International Efforts at Integrated Coastal Management: Definitions, Achievements, and Lessons. *Coastal Management* **25**, 3-41.
- Stedje, G.D. and Feather, T. (1996) *Linking Environmental Project Outputs and Social Benefits: Bringing Economics, Ecology and Psychology Together*. Included in Watershed 69, Environmental Protection Agency.
- Stoker, G. (1993) Coastal Zone Protection and Planning. *Journal of Planning and Environmental Law* **1** (June), 521-526.
- Strong, W. (2000) *The Economic Benefits of Beaches – Part 1*. <http://www.Coastalcoalition.org/facts/statistics/annamari.html>; Accessed February 2000.
- Talaue-McManus, L. and Thia-Eng, C. (1997) The Lingayen Gulf (Philippines) experience: if we have to do it again. *Ocean and Coastal Management* **37**(2), 217-232.
- Templett, P.H. (1996) Coastal Management, Oceanography, and Sustainability of Small Island Developing States. In *Small Islands: Marine Science and Sustainable Development*, ed. G.A. Maul. Coastal and Estuarine Studies **51**, American Geophysical Union, Washington DC, 366-84.
- Terchunian, A.V. and Smith, J.A. (1998) An Economic Snap Shot of Long Island's Barrier Island System. *Shore and Beach* **66** (4), 9-11.
- Thia-Eng, C. (1993) Essential Elements of Integrated Coastal Zone Management. *Ocean & Coastal Management* **21**, 81-108.
- Thia-Eng, C. (1997) Introduction to the Special Issue on Lessons Learned in Integrated Coastal Management. *Ocean and Coastal Management* **37**(2), 153-154.
- Thia-Eng, C., Yu, H. and Guoqiang, C. (1997) From sectoral to integrated coastal management: a case in Xiamen, China. *Ocean and Coastal Management* **37**(2), 233-251.
- Torresani, S., 1989. Historical Evolution of the Coastal Settlement in Italy : modern times. In : Fabri, P. (Ed.) *Coastlines of Italy*; American Society of Civil Engineers, New York. 150-159.
- Trezza, B. (1998) Economic Activities and the Environment. *International Journal of Environmental Studies* **1**.
- Troost, D.G. (1999) *Environment and Develop in Coastal Regions and in Small Islands (CSI)*. UNESCO (United Nations Educational, Scientific and Cultural Organisation), Paris.
- Tunstall, S.M. and Penning-Towsell, E.C. (1998) The English Beach: experiences and values. *The Geographical Journal* **164**(3), 319-332.
- Turner, R.K., Adger, W.N. and Brouwer, R. (1998) Ecosystem services value, research needs, and policy relevance: a commentary. *Ecological Economics* **25**, 61-65.
- Turner, R.K., Adger, W.N. and Doktor, P. (1995) Assessing the economic costs of sea level rise. *Environment and Planning A* **27**, 1777-1796.
- Turner, R.K., Lorenzoni, I., Beaumont, N., Bateman, I.J., Langford, I.H. and McDonald, A.L. (1998) Coastal Management for Sustainable Development: Analysing Environmental and Socio-Economic Changes on the UK Coast. *The Geographical Journal* **164** (3), 269-281.
- Turner, R.K., Lorenzoni, I., Beaumont, N., Bateman, I.J., Langford, I.H. and McDonald, A.L. (1999) *Coastal Management for Sustainable Development: Analysing Environmental and Socio-Economic Changes on the UK Coast*. CSERGE Working Paper GEC 97-25.
- UNCED (1992) Agenda 21 – United Nations Conference on Environment and Development: Outcomes of the Conference, Rio de Janeiro, Brazil, 3-14 June. 147-185.
- UNESCO. (1992) *Coastal systems studies and sustainable development*. Proceedings of the COMAR Interregional Scientific Conference UNESCO, Paris, 21-25 May 1991.
- UNESCO. (1999) *Environment and development in coastal regions and in small islands: Towards Wise Coastal Practices for Sustainable Human Development – fostering intersectoral action worldwide*. United Nations Educational, Scientific and Cultural Organisation, Paris. <http://www.unesco.org/csi/wise1.htm>; Accessed 28/07/99
- UNEP. (1995) *Global Programme of Action for the Protection of the Marine Environment from Land Based Activities*. United Nations Environment Programme, Nairobi, Kenya.
- UNEP. (1999) *Global Environment Outlook 2000 – Overview*. United Nations Environment Programme, Nairobi, Kenya.
- USGS. (2000) *Global Ecosystems Dataset*. <http://edcdaac.usgs.gov/glcc/glcc.html>; Accessed 02/08/2000.
- Vallejo, S.M. (1993) The Integration of Coastal Zone Management into National Development Planning. *Ocean and Coastal Management* **21**, 163-182.
- Vicente, V.P. (1996) Littoral Ecological Stability and Economic Development in Small Island States: The Need for an Equilibrium. In *Small Islands: Marine Science and Sustainable Development*. ed. G.A. Maul. Coastal and Estuarine Studies, **51**, 266-283.

- Viles, H. and Spencer, T. (1995) *Coastal Problems: Geomorphology, Ecology and Society at the Coast*. Edward Arnold, London.
- Wells, M.P. (1997) Economic Perspectives on Nature Tourism, Conservation and Development. *Environmental Economics Series 55*. World Bank, Washington D.C.
- Westbrook, S. and Burns, B. (1999) *The Economic Impact of the Operations of Marine Harvest McConnell in the Highlands of Scotland*. Marine Harvest McConnell, Edinburgh.
- White, A.T. and Wijeratne, M. eds. (1993) *Are Coastal Zone Management and Economic Development Complementary in Sri Lanka*. Proceedings of the seminar on Coastal Zone Management and Economic Development, Colombo, Sri Lanka, March 19 1993.
- Wilkinson, D. (1999) *The Influence of EU Policies on the Evolution of Coastal Zones*. European Union, The European Commission, Brussels.
- Wooster, W.S. and Burke, W.T. (eds.) (1998) *School of Marine Affairs, 25th Anniversary Public Proceedings*, May 7-8, University of Washington, Seattle.
- World Resources Institute. (1996) *World Resources 1994-95: A Guide to the Global Environment*. Oxford University Press, York.
- World Resources Institute. (2000) *Sustainable Marine Resource Management*. <http://www.wri.org/biodiv/gbs-iv07.html>: Accessed February 2000.
- World Resources Institute. (1997) *Tools for Protecting Marine Biodiversity*. http://www.wri.org/wr-96-97/bi_txt6.html: Accessed February 2000.
- World Travel & Tourism Council (1999). *Key Statistics 1999*.
- Zunica, M. 1976. Human influence on the Italian coastal areas. 23rd International Geographical Congress. 87-92.

ANNEX B : THE PARTICIPATING ICZM INITIATIVES

The following ICZM Project and Programme Managers kindly contributed to the assessment through completing and returning the ICZM cost-benefit impact questionnaire.

CONTACT	ICZM INITIATIVE
EC DEMONSTRATION PROJECTS	
Andrew Cooper	Implementing Alternative Strategies in Irish Beach & Dune Management, Coleraine, N. Ireland
Malcolm Turnbull	Strategy for an Open Coast, Dorchester, UK
Emmanouil Koutrakis	Strymouikos Gulf Coastal Zone Management Project
Mark Jennison	Forth Estuary Forum
Kitty Sommer/Laks Maimborg	The Coastlink Baltic Project (Terra Network No 13)
Ifigenia Geskou	Magnesia Project, Greece
Joao Vargues	Terra CZM, Faro, Portugal
Barbara Tjialla	Terra Coastlink Project No 13, Ioannina, Greece
Clive Gilbert	Kent Coast Link, UK
Gregory Papadopoulos	Terra CZM Project, Kavala, Greece
Harry Coccossis	Programme for Integrated Coastal Zone Management: The Case of Cyclades/P.I.C.AMCY, Greece
Peter de Wolf	Terra Coastal Link Management, Belgium
Rolf Nystrom	The Coastal Planning of the Gulf of Finland
Margaret Quinn	Coastlink: Down Project (Terra), N. Ireland
Kevin Lynch	Bantry Bay Charter, Cork, Ireland
Anita Bisofa	Integrated Coastal Zone Management Plan for Baltic Sea - Coast of Latvia
Florence Senechal	Contract de Baie de la Rade de Brest, France
Maria Evangelidou	Program Terra - Posidonia, Greece
Jaunius Grigas	"ECPhare project ""Integrated Coastal Zone Management in the Baltic States and Poland, Lithuania
Pierluigi Caputi	Rationale for Integrated Coastal Area Management Project, L'Aquila, Italy
Cebria Molinero Lloret	CONCERCOST, Gandia, Spain
Tor Henning Jorgensen	Norwegian Coast (18 municipalities in Nordland County)
Brian Shipman	Atlantic Living Coastlines, Cornwall
Filomena Martins	Integrated Management Programme for Ria Aveiro – Maria Project, Portugal
Juan Pere	Coastlink ANAS, Portugal and Spain
Robin McInnes	Isle of Wight Council, UK
Carmela Cotrone	Posidonia Project, Napoli
INTERNATIONAL ICZM PROJECTS	
Kristen L. Clarke	Montego Bay, Marine Park, Jamaica
Robert Day	Indian River Lagoon Programme, Florida, USA
R.A.D.B. Samaranayake	Coastal Resources Development Devision, Colombo, Sri Lanka
R Krishnamourthy	Indo-British ICZM Training, Chennai, India
John Houston	Sefton Coast Management Scheme, Merseyside
SCOTTISH COASTAL FORUM ICZM PROJECTS	
Rachel Harding-Hill	Moray Firth Partnership
Clare Aspinall	Firth of Clyde Forum
Mary Lewis	Solway Firth Partnership
Iain Grant	Cromarty Firth Liaison Group
Euan Hutchison	Loch Ryan Advisory Management Forum
Helene Burningham	Tay Estuary Forum
Angus A. McHattie	The Minch Project
Nick Riddiford	Fair Isle Marine Environment and Tourism Initiative

ANNEX C : THE ICZM SURVEY QUESTIONNAIRE

AN ASSESSMENT OF THE SOCIO-ECONOMIC COSTS & BENEFITS OF INTEGRATED COASTAL ZONE MANAGEMENT

THE COASTAL ZONE INITIATIVE

ICZM Initiative : _____

Contact Person : _____ Tel : _____

Title : _____ Fax : _____

Address : _____ E-mail : _____

_____ Web Site : _____

_____ Postcode/Zip : _____

An example questionnaire is included to help you complete this short evaluation

YOUR COASTAL ZONE

- 1 : We would appreciate your definition of “the coastal zone” as used in your particular initiative:

- 2 : What is the approximate spatial extent of the marine, shoreline and terrestrial areas included within your Coastal Zone? Please tick the measure used.

	Area	Measure (please circle one used)
Marine Waters		Km ² / Hectares / Miles ² / Acres
Estuarial Waters		Km ² / Hectares / Miles ² / Acres
Terrestrial Land		Km ² / Hectares / Miles ² / Acres
Total Zone Area		Km² / Hectares / Miles² / Acres

- 3 : How far offshore does your Coastal Zone extend? _____ Km/Miles

What is the length of the shoreline within the Zone? _____ Km/Miles

- 4 : What percentage of the shoreline in the Coastal Zone is artificial (eg. flood defences; ports & harbours; erosion & flood protection)?
- _____ %

5 : Which major rivers flow into your Coastal Zone?

1 : _____

3 : _____

2 : _____

4 : _____

6 : We would be grateful if you could estimate (very broadly) the area percentage of the following Biomes (Costanza *et al*, 1997) within your Coastal Zone? Also, has your initiative impacted on degradation to date? (please circle : 1 = Halted Degradation; 2 = Slowed Degradation; 3 = No Effect)

		%						%					
<input type="checkbox"/>	Open Ocean	_____	1	2	3	<input type="checkbox"/>	Tropical Forest	_____	1	2	3		
<input type="checkbox"/>	Estuaries	_____	1	2	3	<input type="checkbox"/>	Temperate Forest	_____	1	2	3		
<input type="checkbox"/>	Sea Grass/Algae Beds	_____	1	2	3	<input type="checkbox"/>	Grass/Rangelands	_____	1	2	3		
<input type="checkbox"/>	Coral Reefs	_____	1	2	3	<input type="checkbox"/>	Desert	_____	1	2	3		
<input type="checkbox"/>	Shelf	_____	1	2	3	<input type="checkbox"/>	Tundra	_____	1	2	3		
<input type="checkbox"/>	Tidal Marshes	_____	1	2	3	<input type="checkbox"/>	Ice/Rock	_____	1	2	3		
<input type="checkbox"/>	Swamps/Floodplains	_____	1	2	3	<input type="checkbox"/>	Cropland	_____	1	2	3		
<input type="checkbox"/>	Lakes/Rivers	_____	1	2	3	<input type="checkbox"/>	Urban Areas	_____	1	2	3		

YOUR COASTAL ECONOMY

7 : Could you please provide broad indications of the size and nature of the economy associated with your Coastal Zone? (*) please indicate currency _____.

<input type="checkbox"/>	Resident Population :	# _____	Gross Domestic Product(*) :	Value _____
<input type="checkbox"/>	Total Employment :	# _____	Annual Tourism Visits :	# _____
<input type="checkbox"/>	Total Unemployment :	# _____	Offshore Fisheries Catch :	Tonnes _____
<input type="checkbox"/>	Housing Stock :	# _____	Local Authority Expenditure(*) :	Value _____

8 : Which are the main economic sectors associated with your Coastal Zone? Please rank five most important (1 : most important, etc), and ☐ others with a major presence in your zone.

	Rank		Rank		Rank
<input type="checkbox"/> Petrochemicals/refining	_____	<input type="checkbox"/> Ports & shipping	_____	<input type="checkbox"/> Forestry & forest products	_____
<input type="checkbox"/> Power generation	_____	<input type="checkbox"/> Passenger ferries	_____	<input type="checkbox"/> Airports & air transport	_____
<input type="checkbox"/> Sea fisheries	_____	<input type="checkbox"/> Mineral extraction	_____	<input type="checkbox"/> Tourism & leisure	_____
<input type="checkbox"/> Fish farming	_____	<input type="checkbox"/> Manufacturing sectors	_____	<input type="checkbox"/> Residential housing	_____
<input type="checkbox"/> Leisure marinas	_____	<input type="checkbox"/> Agriculture & food	_____	<input type="checkbox"/> Government activities	_____
<input type="checkbox"/> Shipbuilding	_____	<input type="checkbox"/> Financial services	_____	<input type="checkbox"/> Military & defence	_____

9 : Has the existence of an ICZM initiative had an impact on the main economic sectors present in your Coastal Zone? Please circle the appropriate response (1 = large positive impact; 2 = some positive impacts; 3 = no impact; 4 = some negative impacts; 5 = large negative impacts)

Impact				Impact				Impact												
<input type="checkbox"/>	Petrochemicals/refining	1	2	3	4	5	<input type="checkbox"/>	Ports & shipping	1	2	3	4	5	<input type="checkbox"/>	Forestry & forest products	1	2	3	4	5
<input type="checkbox"/>	Power generation	1	2	3	4	5	<input type="checkbox"/>	Passenger ferries	1	2	3	4	5	<input type="checkbox"/>	Airports & air transport	1	2	3	4	5
<input type="checkbox"/>	Sea fisheries	1	2	3	4	5	<input type="checkbox"/>	Mineral extraction	1	2	3	4	5	<input type="checkbox"/>	Tourism & leisure	1	2	3	4	5
<input type="checkbox"/>	Fish farming	1	2	3	4	5	<input type="checkbox"/>	Manufacturing sectors	1	2	3	4	5	<input type="checkbox"/>	Residential housing	1	2	3	4	5
<input type="checkbox"/>	Leisure marinas	1	2	3	4	5	<input type="checkbox"/>	Agriculture & food	1	2	3	4	5	<input type="checkbox"/>	Government activities	1	2	3	4	5
<input type="checkbox"/>	Shipbuilding	1	2	3	4	5	<input type="checkbox"/>	Financial services	1	2	3	4	5	<input type="checkbox"/>	Military & defence	1	2	3	4	5

THE MAJOR ENVIRONMENTAL ISSUES IN YOUR ZONE

10 : Could you please indicate which of the following challenges to the environment are present in your Coastal Zone? Please rank these in order of importance (1 = most important issue, etc), and ☐ others present.

	Rank		Rank		Rank
<input type="checkbox"/> Coastal erosion	_____	<input type="checkbox"/> Population growth	_____	<input type="checkbox"/> Endangered native species	_____
<input type="checkbox"/> Sediment movement	_____	<input type="checkbox"/> Tourism & recreation	_____	<input type="checkbox"/> Endangered migrant species	_____
<input type="checkbox"/> Water pollution	_____	<input type="checkbox"/> Mineral extraction	_____	<input type="checkbox"/> Habitat loss	_____
<input type="checkbox"/> Air pollution	_____	<input type="checkbox"/> Over-fishing	_____	<input type="checkbox"/> Urban expansion	_____
<input type="checkbox"/> Water shortages	_____	<input type="checkbox"/> Transport congestion	_____	<input type="checkbox"/> Other: _____	_____

11 : What percentage (broadly) of your Coastal Zone currently has designated environmental protection status through international, national or local statutes?

_____ %

KEY FEATURES OF YOUR ICZM INITIATIVE

12 : When did your Coastal Zone initiative:

- ☐ Begin (year) : _____
- ☐ End (year) : _____
- ☐ If still underway, when is it scheduled to end (year) : _____

13 : What is the legal status of your Coastal Zone initiative? (please ☐ one)

- ☐ National Government Agency ☐ Formal Multi-Agency Partnership ☐ Local Authority Initiative
- ☐ Regional Government Agency ☐ Informal Multi-Agency Partnership ☐ Other: _____

14 : Please indicate which of the following features of Integrated Coastal Zone Management are present in your Coastal Zone initiative? (please ☐ all present)

- | | |
|---|---|
| <input type="checkbox"/> Stakeholder consultations & commitment | <input type="checkbox"/> Medium-term funding (2-5 years) |
| <input type="checkbox"/> Comprehensive economic audit | <input type="checkbox"/> Long-term funding (6-10 years) |
| <input type="checkbox"/> Comprehensive environmental audit | <input type="checkbox"/> Statutory status & powers |
| <input type="checkbox"/> Physical process/habitat studies | <input type="checkbox"/> Regular performance reviews |
| <input type="checkbox"/> Zone management strategy | <input type="checkbox"/> Benefit & impact measurement |
| <input type="checkbox"/> Annual operation plan | <input type="checkbox"/> Associated research programme |
| <input type="checkbox"/> Permanent management staff | <input type="checkbox"/> Promotion & information activities |
| <input type="checkbox"/> Performance targets or goals | <input type="checkbox"/> Financial sustainability |

* The answers to questions 15, 16 and 17 will be regarded as confidential to the research team.

15 : What *approximately* has been the total expenditure on your Coastal Zone initiative during the period of its existence? Please indicate currency used; and the years over which it was spent?

- ☐ Total Initiative Expenditure : _____ ☐ Period of Expenditure _____ to _____

16 : Of this total expenditure on your Coastal Zone initiative, approximately how much in percentage terms has gone on the following ICZM activities?

- | | |
|---|---|
| <input type="checkbox"/> Initiative Management: _____ % | <input type="checkbox"/> Promotion & Information: _____ % |
| <input type="checkbox"/> Research & Planning: _____ % | <input type="checkbox"/> Capital Investment: _____ % |

17 : Of the funding provided for your Coastal Zone initiative, approximately what percentage came from the following sources?

- | | |
|---|---|
| <input type="checkbox"/> National Government (direct) _____ % | <input type="checkbox"/> European Union : _____ % |
| <input type="checkbox"/> National Government (indirect) _____ % | <input type="checkbox"/> International Organisations : _____ % |
| <input type="checkbox"/> Regional Government (direct) _____ % | <input type="checkbox"/> Private Sector (firms, etc) : _____ % |
| <input type="checkbox"/> Regional Government (indirect) _____ % | <input type="checkbox"/> Non Governmental Organisations _____ % |
| <input type="checkbox"/> Other : _____ | |

THE IMPACTS OF YOUR ICZM INITIATIVE

18 : What do you think are the main impacts that have come from your ICZM initiative to date? Please rank top 5 (1 = most important, etc) and ☐ others of importance; and assess the nature of impacts (1 = large positive impact; 2 = some positive impact; 3 = no impact; 4 = some negative impact; 5 = large negative impact)

Rank	Nature of Impacts	Rank	Nature of Impacts
___ Coherent spatial planning	1 2 3 4 5	___ More sustainable fisheries	1 2 3 4 5
___ Improved decision making	1 2 3 4 5	___ More sustainable tourism	1 2 3 4 5
___ Better partner understand	1 2 3 4 5	___ Habitat restoration	1 2 3 4 5
___ Agreement on priorities	1 2 3 4 5	___ Reduced flooding/erosion	1 2 3 4 5
___ Stronger community feeling	1 2 3 4 5	___ Lower environmental vulnerability	1 2 3 4 5
___ Reduced traffic costs	1 2 3 4 5	___ Greater public awareness	1 2 3 4 5
___ Better quality of life	1 2 3 4 5	___ School & education initiatives	1 2 3 4 5
___ Reduction of pollution	1 2 3 4 5	___ Landscape improvement	1 2 3 4 5
___ Other (please rank & explain) 1 2 3 4 5: _____			

19 : Do you think that your ICZM initiative has had any *negative* aspects in terms of additional costs and pressures upon the Coastal Zone and the main stakeholders? (please ☐)

- ☐ Yes (please go to 20) ☐ Don't Know ☐ No

20 : If 'Yes' please list the nature of the three most important of these *negative* impacts on extra costs

- 1 : _____
- 2 : _____
- 3 : _____

21 : Have any research studies been undertaken on the *monetary value* of the socio-economic costs and/or benefits produced by your Coastal Zone initiative, or are any planned for the future? (please ☐)

- ☐ Yes ☐ No ☐ Planned for the future ☐ Don't Know

**The evaluation team would welcome information on, and if possible a copy of such studies, and indeed of other research that assesses the impacts of coastal zone management to date.*

22 : Finally, are there any other coastal zone management best practice features or benefits that you feel we should be aware of in relation to your coastal Initiative?

This questionnaire was completed by (name) : _____

Organisation : _____

Phone # : _____ Fax # : _____ E-mail : _____

On behalf of The European Commission in the European Commission, and of the members of the Firm Crichton Roberts Ltd and University of Strathclyde research team, we thank you most sincerely for giving us some of your valuable time to participate in this policy based assessment of the socio-economic costs and benefits of coastal zone management initiatives. We are much in your debt. Please return the questionnaire to us in the envelope provided.

☐ Tick if you wish to receive the results of this evaluation (☐)

For approval to use this questionnaire format for surveys of local ICZM initiatives and an electronic version of the questionnaire please contact Firm Crichton Roberts Ltd at firm.crichton.roberts@mcmail.com . Coastal zone documents can also be e-mailed to this address.

ANNEX D : THE ICZM ASSESSMENT TEAM

FIRN CRICHTON ROBERTS LTD

John Finn Project Director
Lesley Rennie
Lisa Smith
Lauren Colvin

**GRADUATE SCHOOL OF ENVIRONMENTAL STUDIES
UNIVERSITY OF STRATHCLYDE**

Norman Clark
Derek McGlashan⁽¹⁾
Evan Williams⁽²⁾
Ymene Fouli⁽³⁾

- (1) Department of Geography
University of Dundee
Dundee DD1 4HN
Scotland
United Kingdom

derekmcglashan@ftnetwork.com

- (2) Scottish Environmental Protection Agency
Erskine Court
Castle Business Park
Stirling FK9 4TR
Scotland
United Kingdom

evan.williams@sepa.org.uk

- (3) Pennsylvania State University
Pennsylvania
USA

ymenefouli@yahoo.com