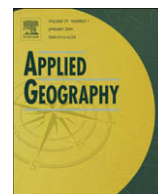




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Integrated Coastal Management: A comparative analysis of four UK initiatives

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The effectiveness of institutional arrangements and policies for governance has become a key question within the sustainability paradigm, not least in coastal areas which have unique issues and jurisdictions across the land–sea interface. In the UK, approximately 60 non-statutory coastal management initiatives have been established at the local/regional level since the 1990s, based on a variety of programmes and projects. Proposals for a UK Marine Bill have raised questions about the role of non-statutory initiatives in the system of governance. The traditional sectoral approach to management and planning is being modified due to the pressure of increased human activities, but doubts exist about what effective contribution local and regional partnerships can make. The paper reports extensive examples of Integrated Coastal Management initiatives engaging institutions and society to produce outputs which have transformed management, promoting long-term, collaborative, participatory and ecologically sustainable approaches. The paper concludes that there are demonstrable benefits in taking a partnership approach to coastal management at a local level, yet these forms of planning and management are not widely accepted or embedded within the current system of governance.

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Introduction

Responsibilities for marine and coastal matters in the UK, like many other coastal developed states, are divided between a variety of government agencies and departments (Smith et al., 2008). Ballinger (2005) explains the historical development of the UK system of planning and management. A recent national stocktaking exercise for the latest EU recommendation on Integrated Coastal Zone Management (ICZM) (CEC, 2007) outlined the great variety of administrative bodies and associated legislation, which work against the long-term interests of sustainable management (Atkins, 2004).

Since the 1990s, a feature of ICM implementation in the UK has been the development of local and regional coastal initiatives, through a bottom up approach, or as part of a variety of national programmes. These initiatives are largely non-statutory and rely on voluntary participation by government, private and civil society stakeholders. They operate in different types of association, including 'Partnerships,' 'Networks,' 'Fora,' or newly constituted authorities. They aim to reduce the sectoral divide in co-operation at a local level, by providing multi-stakeholder approaches to planning and management.

Despite their aim to improve decision-making at the coast, questions remain about their effective contribution to the overall system of governance. The traditional sectoral approach to management and planning is being modified

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through UK Marine Bill¹, but doubts exist about what effective contribution local and regional non-statutory initiatives can make.

Evaluation of the effectiveness of these initiatives has so far been done using indicator or performance-based approaches (Jemmett, Kennedy, Masters, & Witt, 1999; Jennison, 2001; Pickaver, 2008). These measure the initiative's success against stated aims. The reviews have documented difficulties experienced in implementing strategies, as well as the lack of full engagement, insecure funding and staffing as constraining factors. Worldwide development of assessment methodologies (IOC, 2006; Olsen, 2003) has sought to move beyond programme performance to consider the wider links between the work of ICM initiatives and the changes they produce. These assessments consider how initiatives bring about changes in the approach and attitudes of coastal stakeholders, and their overall contribution to sustainability and good governance. This paper presents an analysis of the effectiveness of ICM initiatives in the UK by examining the processes and mechanisms used, and considering how these contribute to sustainability at the coast.

Methods

The research used the approach of grounded theory (Glaser & Strauss, 1967) to develop an overview of the processes and mechanisms which are used by ICM initiatives and the changes in governance which they achieve. Grounded theory is a qualitative research method which utilises a rigorous process of coding and grouping of interview data to develop explanations of the phenomena under study. Grounded theory derives theory from data by systematically working out hypotheses and concepts in relation to the data during the course of research (Huberman & Miles, 1994). ICM initiative officers were approached in four case study areas to identify the key 20 stakeholder organisations representing public, private and voluntary sectors. The research methodology sought to enter into communicative interaction with these practitioners (Habermas, 1998). Eighty semi-structured interviews were conducted with stakeholders in order to explore their experience of activities of the ICM initiatives. A range of qualitative, quantitative and secondary data collection methods were also used to catalogue the work and achievement of the initiatives. The four case studies were chosen for their contrasting contexts (Table 1). The prevalence of operating causal mechanisms was compared across case studies. The fact that similar mechanisms were found to work across such contrasting environments and contexts is an indication of their significance. This approach is termed 'ramification across contrasting case studies' (Yin, 2003) and provided an analytical technique which attempted to generalise results for UK coasts. Where examples of citations from interview data are provided in the results below, these are based on computer assisted coding using *MaxQDA* software. So the citations represent but one instance of an archetype for which many other examples can be provided.

The four case study initiatives have produced a series of regional and sub-regional strategies. They have constructed partnerships to develop coastal policy for distinct geographical areas based on biogeophysical systems such as Estuaries or Harbours or coastal regions. Fig. 1a, b, c, and d highlights the way in which each initiative has sought to integrate land–sea components in defining their coastal remit. The initiatives include intertidal areas and do not just focus solely marine or terrestrial issues. They bring together administrative jurisdictions along and across the shoreline.

The case studies are all examples of multi-stakeholder/multi-purpose coastal initiatives operating at a sub-national level. They have varying histories, both in terms of the national programmes which have led to their establishment and the lead agencies and periods within which they have been established. The contributory national programmes include: the Countryside Commission's *Heritage Coasts* (Ceredigion); English Nature's *Campaign for a Living Coastline* (Blackwater and Colne Estuaries in Essex); and uniquely in the case of Chichester Harbour, an individual act of parliament. Despite the different provenance of the ICM initiatives, there is significant commonality between each initiative's goals and objectives. These include such contingent goals as:

- 'acting as a mechanism for agreeing priorities for the area' (*Essex Estuaries Initiative*, 1999, p. 5);
- 'highlighting examples of good and bad practice' (*Severn Estuary Partnership*, 2001, p. 3);
- 'encouraging community involvement in coastal and marine issues' (*Ceredigion County Council*, 2000, p. 35); and to
- 'maintain a balance between various interests and users' (*Chichester Harbour Conservancy*, 1999, p. 15).

It is at the local level that operational goals are set to maintain, improve, and conserve coastal areas. The initiatives have used a number of different tools in order to apply local solutions. These range from topic groups to voluntary agreements, advisory committees, and workshops. Although the mechanisms are not necessarily alike, the production of a strategy or plan is a central element to each initiative. The initiatives have also sought to develop a range of 'services' on behalf of their partners, such as repositories for coastal information and initiatives for public engagement. There are also common planning and policy cycles, whereby the initiatives review existing planning documents and produce updated documents every 5–10 years. These commonalities mean that it is possible to make some general statements about ICM initiatives in the UK.

¹ <http://www.defra.gov.uk/marine/legislation/index.htm> and draft Scottish Bill <http://www.scotland.gov.uk/Publications/2008/07/11100221/17>.

Table 1

Case studies of coastal management in the UK.

Case	Coastal/areal definition exposure	Management typologies	Programme: politico-legal	Temporal	Physical environment
Essex Estuaries	480 km coastline 4 small coastal plain Estuaries, large mudflats	Planning, Onshore and offshore	English (Blackwater and Crouch: EN Estuaries Initiative)	First iteration 1997	Soft submergent river/tidally dominated
Ceredigion Coast	96 km coastline open coast	Planning and direct regulation. Onshore and offshore?	Welsh Marine Heritage Coast Initiative	First iteration 1979	Cliffed submergent wave dominated
Severn Estuary	353 km coastline. UK's biggest coastal plain Estuary	Planning, Onshore and offshore	English/Welsh (Locally Sponsored Non-Statutory Initiative LA/EA led)	First iteration 1995	Soft submergent tidally dominated
Chichester Harbour	74 sq km harbour area semi-enclosed harbour	Planning and direct regulation. Onshore	English Statutory Initiative	First iteration 1968	Soft submergent

Results

The research found evidence for 149 processes and mechanisms in use, of which 66 were validated across all four initiatives. Processes are the activities and efforts co-ordinated by ICM initiatives which contribute to the management of the coast (for example volunteer monitoring by members of the community). Forty-two of these were found to be relevant across all cases and sectors of organisations. Mechanisms consist of the tools, networks, or structures that are used in management the coast (for example, the use of focus groups and plans to identify key coastal issues). Twenty-four were found to be significant across all cases and sectors.

The following nine sub-sections of the paper present these processes and mechanisms. They are described according to categories for successful Integrated Coastal Management, generated from a synthesis of studies on ICM and the literature on successful environmental management (Stojanovic, Ballinger, & Lalwani, 2004). Table 2 lists the categories in the order in which they are considered below. The reader can contrast and compare these factors with the success categories listed in the relevant EU 'policy' document, the EU recommendation on ICZM (CEC, 2002). The EU ICZM principles are arguably the major policy guidance on implementing ICM in Europe.

Comprehensive

ICM initiatives seek to promote a comprehensive view of the issues and human activities in the coastal zone on the basis of natural features. This is illustrated in the case studies through the creation of an integrated strategy for each area. These have involved a wide range of stakeholders in analysing and prioritising issues for action. By bringing together different policy agendas, the initiatives have provided an opportunity for sectoral plans to be based on a comprehensive understanding of inter-related factors. A comprehensive approach is well illustrated within the case studies. For example, a Local Authority Planner, describes how a regional strategy in Essex has supported tactical and operational management:

“English Nature and Environment Agency are trying to do loads of work to actually protect eroding saltmarsh, but there is a requirement for wider policymakers to get involved. This idea of joined up thinking– to bring any influence they have in relation to developments that might put greater pressure in that zone – there is a need to inform people about wider drivers such as housing and economic development so that they can see pressures that are likely to work towards conflict.”

Specific techniques for integrated analysis are often employed to come to a comprehensive understanding. The valuation of Chichester Harbour required trans-disciplinary synthesis of data, including a combination of socio-economic data on settlement areas, planning designations and house values, and environmental information such as the valuation of the land in terms of the function it provides for migratory birds. This has provided a benchmark for evaluation in the various trade-offs concerning development and conservation within the harbour.

Finally, the case study ICM initiatives have been important in generating networks of communication in the horizontal and vertical dimensions of management from national to local levels. They act as a 'Single Window' or 'One Stop Shop' to provide a place (real or virtual) that decision-makers associate with coastal issues, where before there may have been no single organisation with overall responsibility. As such, they are able to act as a repository for information and generate more comprehensive understanding of coastal issues and solutions.

Participatory

UK ICM initiatives have developed processes and mechanisms to engage communities of interest and the general public in the planning and management of the coast. Whilst political and ethical reasons are often put forward for public participation in coastal management, ICM initiatives have also promoted practicable benefits, in terms of improved adoption of policy by stakeholders, and more responsive and informed decision-making by statutory authorities. The process is two-way, with

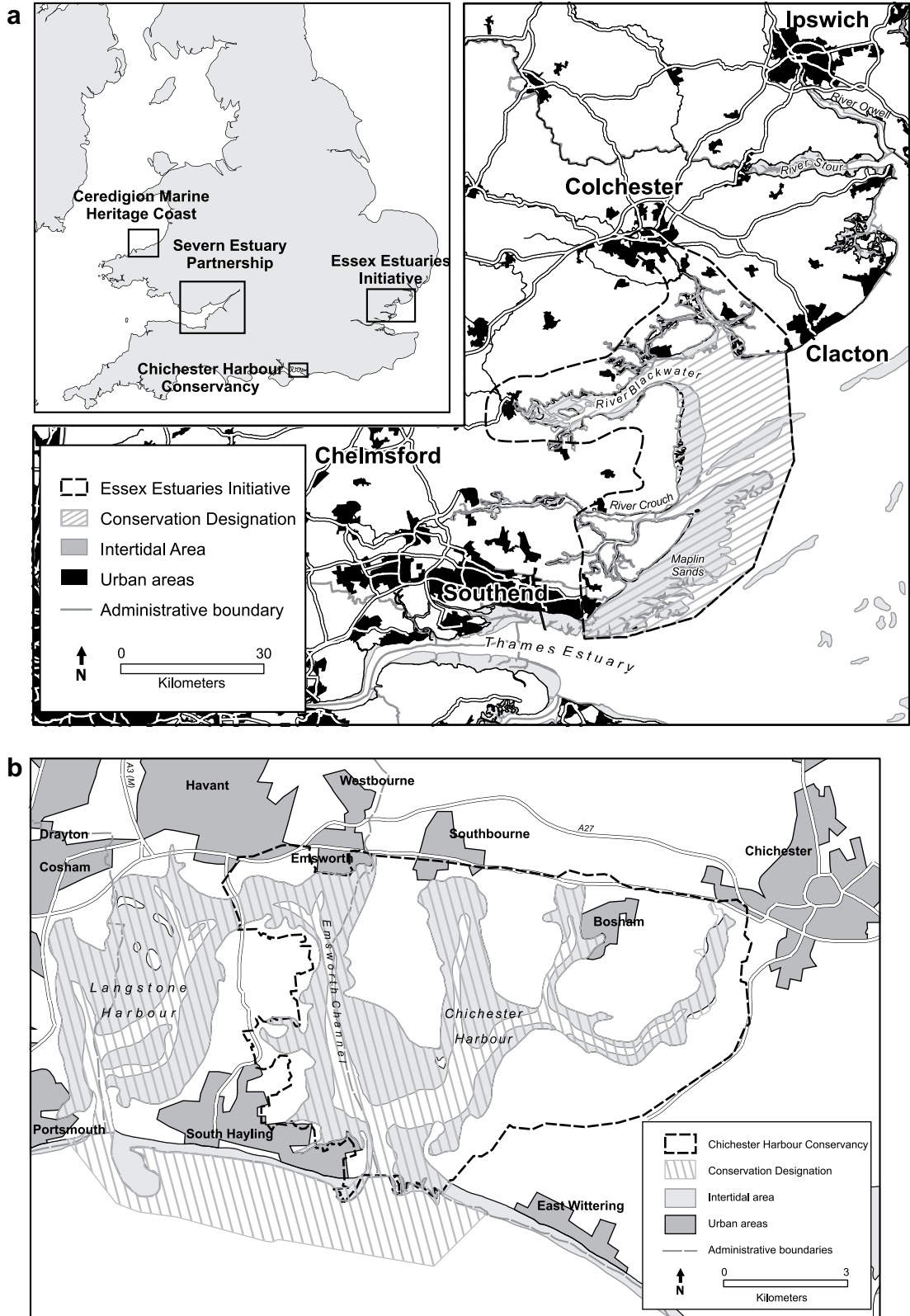


Fig. 1. Coverage of case study ICM initiatives: (a) Essex, (b) Chichester, (c) Severn, (d) Ceredigion.

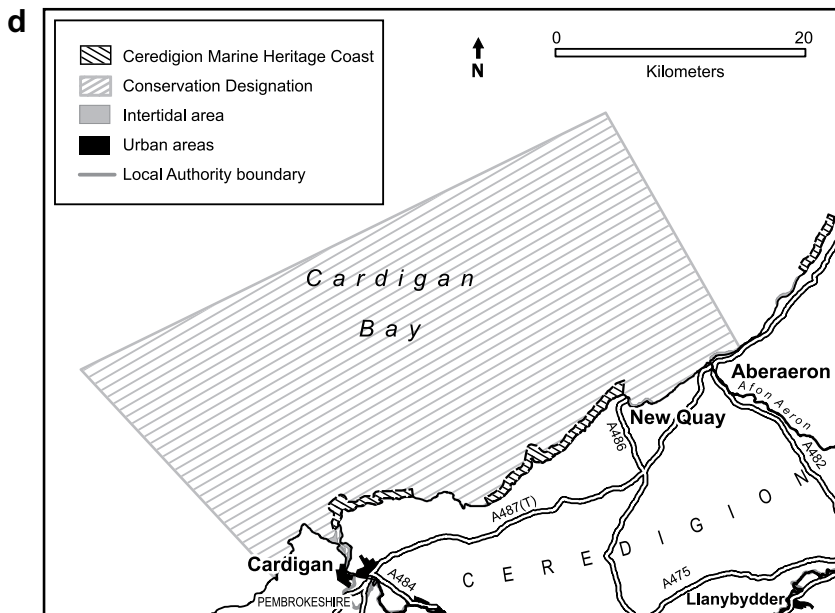
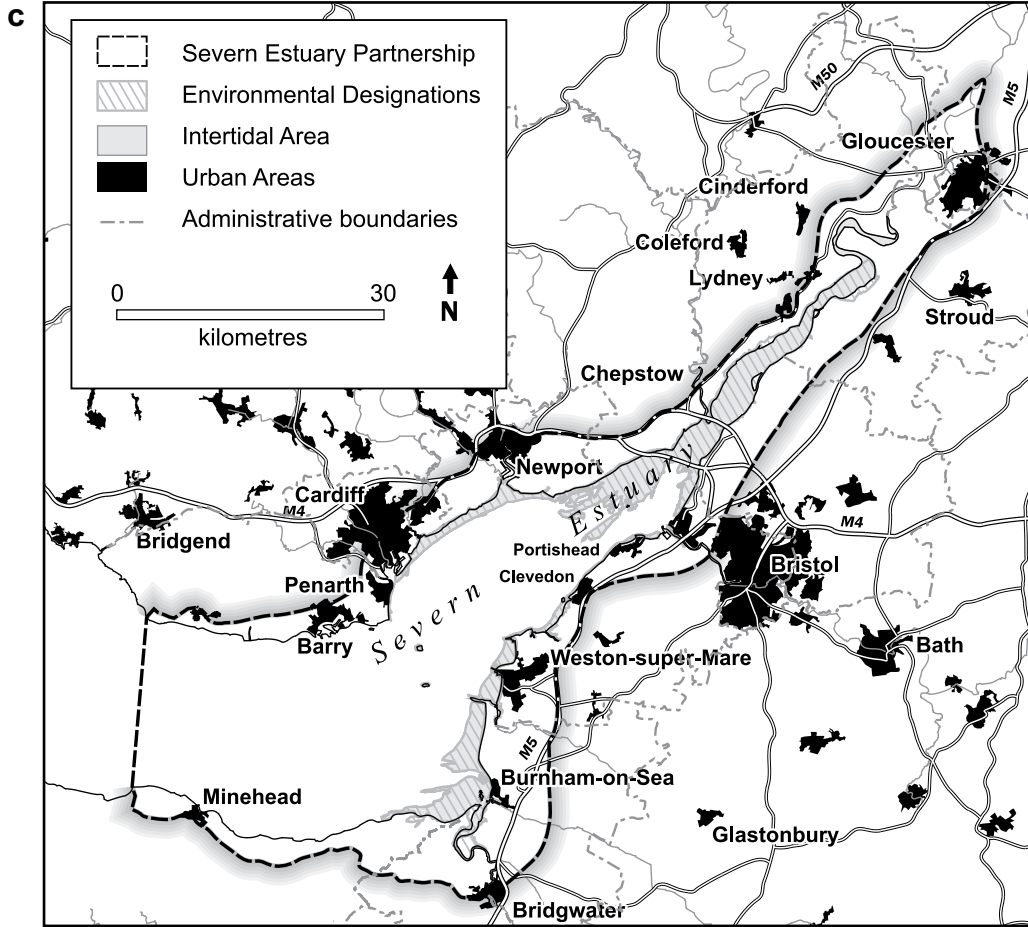


Fig. 1. (continued).

Table 2

Comparison of factors for successful Integrated Coastal Management.

Factors for successful ICM generated from a synthesis of studies on ICM (Stojanovic et al., 2004)	EU ICZM principles (CEC, 2000, pp. 25–27)
Comprehensive	A broad “Holistic” perspective
Participatory	Participatory planning
Co-operative	Support & involvement of all relevant administrative bodies
Contingent	Reflect local specificity
Precautionary	A long-term perspective
long-term	A long-term perspective
Focused	–
Incremental	Adaptive management during a gradual process
Adaptive	Adaptive management during a gradual process
–	Work with natural processes
–	Use of a combination of instruments

mechanisms which allow stakeholders and the general public to contribute to management, and government organisations to facilitate public input on their strategies and activities. Whilst the literature indicates that several qualifying phenomena can affect the quality of participation (McKenna & Cooper, 2006; Stojanovic & Ballinger, 2009), the discussion below provides evidence to illustrate the central role of participation in local ICM initiatives.

The use of volunteer recording, notably in the Ceredigion case, has motivated the public to become involved in the task of monitoring and managing their local environment. In a number of instances, these efforts have been co-ordinated through national programmes such as those by Marine Conservation Society conducting litter and beach surveys, or the use of volunteer enthusiasts in the bird counts conducted for Wetland Bird Survey. The usefulness of voluntary data collection is qualified in a comment by an NGO Policy officer in the Ceredigion case:

“There are two levels: there are regular volunteers who will do regular watches from the same spot and then obviously casual observations. The latter are not so much use to us in research terms because we can’t be sure of the quality of the data, but it can point us to hot spots. Even if the species identified are wrong, we can know that there are a lot of creatures being seen at that station, off that headland. So we can go and have a look and investigate and send a more qualified observer.”

Members of the public are also involved in management beyond the function of monitoring. Sometimes members of the public will take responsibility for implementation, becoming a voluntary warden for a stretch of coast (a system in Ceredigion case), or be appointed to represent an NGO for planning permissions within a local region.

In a number of cases, there was regular questioning of key contacts: as is a case with a Fisherman on an Essex island, an amateur archaeologist on the Gwent Levels, or a set of residents alongside Fareham Creek – in various examples selected from the case studies. One particular use of public knowledge is where the experience of members of the public is able to ramify or refute the views of coastal managers through stakeholder verification. An instance of this process is allegorically described by an Environmental Policy Officer of a Sporting NGO in the Severn case:

“But you will find someone who comes along and roles up their sleeve and says, ‘I have been fishing this estuary man and boy for the last 35 years and I can tell you that is not what the case is.’ Or someone who is out of coastal management school or went to work at a conservation agency last week, if they are sensible will take away that knowledge, because no one is pretending that the people there from a scientific background will have the answer to everything. They are working off their hymn sheet and the hymn sheet is a certain kind of document. It may look pretty and it may be well printed, but it is not necessarily right. And it has hundreds of pages so we don’t have time to check everyone. So we rely on people at a local level to do the best they can with it.”

However, the use of non-scientific information is not without problems. In 20% of the instances where interviewees mention public participation, the respondents went on to discuss the problems of misinformation arising from this interchange. Some typical pitfalls are described in a statement by an Engineering Officer, from a Local Authority in Chichester Case, which compares the opinions of common knowledge with scientific evidence:

“Another thing that people tend to know is that the beach used to be sandy and it isn’t sandy anymore – and they think that is because we have buried the beach with shingle. But again when you look at old photographs you discover that the beach was always a shingle ridge that from time to time got covered with sand. So a lot of common knowledge you can’t disabuse people of it because they won’t believe you. But the hard science shows otherwise. You need to listen to what people tell you but also need to go and measure it, because their perception of erosion and erosion risk very often is coloured by the fact they will move their fence forward to the crest of the beach and then they are surprised that it gets undermined, whereas we know that the beach moves forward or back 5–10 m on a cyclical basis. Knowing that it doesn’t come back more than ten metres is more important than worrying about whether you have put your fence forward and had it undermined.”

Yet the provision of information by the public is enlightening and extensively used. Local environmental knowledge represents an important body of information. It is clearly a valid input to much decision-making at the coast, since there are 48 instances of its use within the case studies (notwithstanding some of the problem issues discussed above). Over 250 responses from separate organisations or individuals concerning the coast are stored in a database maintained by a planning section of a Ceredigion Local Authority. Furthermore, the database enables tracking of the changes made to an associated consultation document based on this feedback. A large body of knowledge that is particularly useful belongs to the section of the public who are presently working and living in the coastal environment. These people are able to understand patterns and changes, or witness events, because they are regularly at the coast. Certain experts may become well known to coastal practitioners as reliable sources of information. The task involves identifying knowledgeable members of the community (for example, fishermen, amateur naturalists or sailors) who are able to form a network of consultees that will regularly input their information.

The case study ICM initiatives often use structures such as Advisory Committees to co-ordinate the input voluntary information flows. These occur at a range of levels: from liaison groups at individual sites of coastal industries, and harbour user groups (which are present in the Ceredigion and Severn cases), to broad interest groups established by law (as in the Chichester case, where the advisory group provides feedback on the agendas of the Conservancy meetings). Advisory Committees provide a regular and structured way to input this information.

The initiatives have also developed significant resources for the purposes of 'public education'. This is a broad term, which from the evidence of the case studies is found to encompass three general aims. The first is in explaining techniques, often concerning the nature of operations, for example – 'why a particular flood defence scheme could be suitable', or 'how boat users can dispose of waste properly.' The second area is to convey information about the importance of particular issues. The aim of this is to influence changes in public behaviour that will lead to benefit for the coastal environment. In a number of cases, a pertinent example is the information given by wardens in explaining the problems of disturbance for a seabird colony during the breeding season. The third aim is to influence the values of the public, educating them to the importance of conservation, or the economic necessities and benefits of various developments. A key strength of the ICM initiatives is the ability of project officers to use their communications experience to develop narrative forms of presentation (sometimes in the context of guided walks, or media presentations on the radio or TV) and relate complex (and sometimes marginal) issues of coastal environment to the lifestyles and interests of local people.

Co-operative

One of the central aims of ICM is to create opportunities for co-operation and collaboration between different agents in the coastal zone. ICM initiatives commonly use a partnership structure to network organisations and individuals, and reduce the blocks that prevent co-operation by generating trust and identifying synergies for working together (Lymbery, 2008).

A significant success of the ICM initiatives has been simply to raise awareness about the different roles and activities of organisations in the coastal zone. In view of the complex variety of responsibilities, this is not a simple task. The benefits of dissemination are explained by a Local Authority Planner from the Ceredigion case:

"I think the main strength has been to find out what everyone's doing. Both in terms of who is responsible and what activities are going on. I was at workshop the other day, and it was just amazing the number of new people one met and thought 'I didn't know you were doing that' and we all agreed that was the strength of the day and in terms of preparation of the strategy. We are producing a coasts and countryside strategy and I really do feel one of the strengths doing such things is the bringing together of a wide range of organisations and individuals that hitherto one was not even aware of."

At a deeper level of co-operation, the research findings show that different organisations may instigate joint projects in areas such as research, monitoring or technical interventions. In the Chichester case, study on coastal processes commissioned by two local coastal authorities eventually led to the establishment of a working group with regular reporting and joint research projects. These joint projects are also evident as public-private partnerships, one example being a joint study to provide a test case for the affects of aggregate dredging, shared between the British Marine Aggregates Producers Association (BMAPA), the Crown Estate, and the Centre for the Environment, Fisheries and Aquaculture Science (CEFAS) in East Anglia. Joint projects can lead to more efficient use of resources and allow benefits to be distributed to the widest range of constituencies.

One dimension of co-operation that is particularly highlighted in the ICM strategies is that between Science and Policy. From a survey of stakeholders involved in the case studies, 41% of the organisations involved experienced some form of co-operation with scientific institutions. In many cases, this involves work with established UK marine consultancies and geographically proximate universities. Evidence for collaboration includes: in the Ceredigion case, Bangor and Aberystwyth Universities; in the Chichester case Southampton, Portsmouth, Brighton and Bournemouth; in the Essex case, Essex University, University College London and University of East Anglia; and in the Severn case Cardiff, Swansea and Bristol. Evidence for collaboration from outside the geographical area was found in four instances, demonstrating the limited knowledge of specialist research outside academia. Key to these partnerships is a number of sub-processes: student-level

placements, the development of research agendas by ICM initiatives (Stojanovic, Ball, Ballinger, Lymbery, & Dodds, in press), and the use of workshops by universities to develop applied, policy-relevant research.

A wide array of tools and structures are presently used to link different organisations in the management of the coastal zone. Memoranda of understanding are used to develop agreements between organisations about sharing of information, joint research and monitoring. In the Essex case, two government agencies, English Nature² and the Environment Agency, have a service level agreement that has led to the rationalisation of data collection costs, and the prevention of duplicative sampling. The Memorandum has been put into action on a number of occasions. One example involves joint work on a managed retreat site, where both organisations collect data in a single, integrated project. Aspects of the site relating to engineering and conservation have been jointly explored.

Contingent

The coasts around the UK have some of the most diverse varying physical characteristics and levels and types of human activity within Europe (Ballinger, Smith, & Warren, 1994; Smith, 1999). This challenge requires a flexible and locally specific approach. ICM initiatives are able to adapt to address local needs by using a variety of process and mechanisms described below.

The research findings show that where contacts have been established via fora, decision-makers can build on these contacts to generate large, informal networks of consultation. This may occur in the context of working together on specific issues, or through an individual, playing the role of a 'gatekeeper' to feedback information and ideas between linked spheres of work. These informal networks are described by a Planning Manager from a Government Agency in the Chichester case:

"We network quite well on our Area Environmental Group, we see people on a quarterly basis at that. If they have a particular problem it is a phone call to one of us and that starts the ball rolling. It is that sort of arrangement and most people appreciate that we have a large amount of information and data, and will try and further and foster those relationships. We regularly go round and meet all the Local Authorities, and we tend to meet the chief executives (that's a formal liaison). There is a complete binding together. We don't work in isolation."

Fora and discussion groups hosted by the ICM initiatives are frequently mentioned by respondents as effective vehicles for exchange views and opinions. The important mechanisms in such meetings are gathering input and disseminating information. A comment from a Coastal Scientist in the Severn case advocates the ability of such meetings to provide a synthesis of viewpoints:

"In terms of processes, I think when you are talking about any reasonable size of development, the best thing to do is get all the parties round the table at the first stage, because it saves huge amounts of time for everybody. And you all know where you stand. That is the biggest thing I have learnt over the last few years or so."

In another example, a Harbourmaster in the Ceredigion case describes the contrast between 'talking in the round' and the adversarial exchanges experienced as part of statutory or regulatory meetings.

"That's the only place you can talk to other stakeholders in a relaxed manner, because most of them tend to be part time or rushing around. And it's nice to sit somewhere where you know you are going to be for a good time and then say 'lets argue about it' and then you get a deeper understanding."

Contingent approaches also reflect diversity by devising locally specific measures. An example in the case of biodiversity is described by two environmental policy officers from Conservation NGOs in the Chichester case:

"If you look in the national set of sustainability indicators, the breeding bird one is one that we have had a good input into. It has also been regionalised, so there is a regional bird indicator which is fed into the regional sustainability indicators for the South East. Although it is possible to work out these indicators down to about regional level, actually getting to a finer level is not generally possible because of the level of data available. At individual sites where there has been detailed monitoring and one could look at that. At a site scale you can come up with indicators for quality...the ideal would be able to raise that up to a landscape scale."

Precautionary

Precautionary approaches are employed in a number of circumstances where decision-makers must work with limited information and uncertainty (Stojanovic et al., 2004). Within established environmental management techniques such as Environmental Assessment, Risk Assessment and Economic Assessment, uncertainty is conventionally addressed through the definition of confidence limits.³ There has been some application of carrying capacities and assimilative capacities to protect

² English Nature's role has been subsumed within a new organisation, Natural England.

³ Confidence limits have a role in encapsulating precautionary nature of findings. These are attached to provide a measure of certainty about a piece of information, and will inform a decision-maker using that information.

sensitive and vulnerable ecosystems by putting values on the sustainable use of resources such as tourism visitor numbers or fishing effort.

The research findings show that neither the use of confidence limits or carrying capacity is widely or systematically applied although there are a few examples of some of these approaches for each case study. For example, confidence limits have been devised for a number of conservation features including sub-littoral habitats in the Ceredigion case.

ICM initiatives have been useful in dealing with uncertainty about potential developments. They have provided an informal network of contacts and experts, for the various marine consents systems below low water, and the planning control system for coastal developments. Both systems require a significant amount of information in order to review environmental impacts. However, the process of accessing historical Environmental Statements and technical summaries is presently dependent on searching case records in public organisations. In the period leading up to the adoption of Strategic Environmental Assessment, ICM initiatives have played a role in encouraging potential re-use of this information, and bringing together regulators, developers and scientists to learn in an ongoing way from monitoring, research and Environmental Impact Assessments, rather than tackling issues on a project-by-project basis. The ongoing learning necessary for a precautionary approach will continue to require better linkages between national studies on issues such as coastal processes (which have often been developed to satisfy the requirements of national programmes) with information and understanding at a local scale.

The onus of a precautionary approach is to deal with scientific uncertainties and lack of evidence, in order to prevent irreversible and costly damages. ICM initiatives have the potential to support this by encouraging good practice in assessment, and providing a venue for ongoing learning from the multiplicity of studies and assessments conducted in the coastal zone.

Long-term

To manage the coastal environment, it is widely acknowledged that there is a need to have an accurate long-term understanding of change in order to answer a number of scientific and management questions about the coastal environment (Carter & Woodroffe, 1994). The lack of a long-term approach is aptly described by a coastal warden from an Environmental NGO, discussing present research studies in Chichester Harbour:

“The problem we have is this project approach or single interest approach where we have a problem, look at it, and that work is not built upon subsequently. There are individual ad hoc reports. It would be useful for example to have more updates to studies.”

ICM initiatives can make concerted efforts to institutionalise long-term knowledge amongst a wider constituency of stakeholders, and support the efforts of partner organisations to develop good practice. Within the case studies there are a variety of solutions to this which include collating information for State of the Coast Reports, and generating timeseries datasets.

A strategic overview of information has been prepared in publications such as State of the Environment/State of the Coast Reports, which aim to clearly establish the existing state on a number of environmental indicators, and identifying standards for a desired state. Such comprehensive overviews are dependent on long-term infrastructures to collate more basic information including: contact databases, which are important in identifying the extensive range of stakeholders with complex jurisdictions and responsibilities in the coastal zone; bibliographic databases which catalogue successive scientific research efforts; and integrated monitoring programmes which provide baseline information for state of the coast reporting (but which may currently be designed to provide outputs for scientific investigation rather than management reporting). Current efforts at research and management are generally operating within separate institutional mechanisms, and on an ad hoc or project-by-project basis. ICM initiatives form a new basis for co-ordinating this information at a local/regional level.

Corporate knowledge⁴ is a valuable resource, allowing people to refer immediately to relevant historical reports and deal with issues that resurface on cyclical basis. But it is also a vulnerable commodity since there is no guarantee that it will be transmitted through generations of employees. The working of an individual filing system may be restricted to the knowledge of a few employees in one organisation – this is exacerbated by the peripheral status of coastal issues in many organisations. This situation is described by an Environmental Manager of a utility in the Severn case:

“As a rule, assume that most private organisations will not have intimate knowledge of coastal information. Industry with coastal interests will not always have an interest in coastal management. Different types of company will have varying interests. The environmental management activities of the company often happen on an ad hoc basis – approaching environmental problems incrementally – because the company can’t afford to do otherwise. Over a five year cycle common issues will begin to resurface, but the problem is keeping the corporate memory alive. In some companies this will constitute the memory of a particular person. Can even the relevant reports be found once this person moves on?”

Timeseries information is vital in assessing environmental phenomena, since environmental systems are often non-stationary and non-linear with the passage of time. There are a number of impressive examples of long-term datasets in UK coastal management. A few examples include; birds data ranging back to 1960s (allowing plots of changes in bird population

⁴ A long-term knowledge of research projects and studies by members of an organisation.

by location), and some biological surveys held by sea fisheries committees. The development of a Photo ID system of dolphins in the Ceredigion case illustrates the difficulties of securing long-term funding for long-term monitoring programmes. The system is designed to track populations of protected species but has been unable to be regularly updated, although it is still of some use. Remote sensing is altering the way in which timeseries data are collected. An example includes the use of photography over time showing beach morphology. The necessity and complexities of timeseries data are described by a Resource manager in the Severn case:

“At the moment it is so difficult: some of the references might go back eight, ten or fifteen years ago, and then you might go back to OS maps from the 1950s to try and begin to see how change has occurred and then provide some sound advice. But quite often I have a data series of ten year beach profiles and any specialist and look at a ten year data set and say, ‘there might be a trend, there might not be, we need another ten years of data before we know.’”

Focused

Given the wealth of issues related to the coastal environment, there is a need to prioritise action to deal with urgent problems, and to focus on specific goals in order to achieve progress (Stojanovic et al., 2004). Within the ICM initiatives, this is achieved using a variety of processes and mechanisms, including focus groups, ‘filters’ to deal with information overload, and group prioritisation techniques.

The Focus Group is an established tool in both coastal management and general environmental initiatives that allows small groups of decision-makers to proceed with an identified topic in a manner that would be impossible in larger group without wide agreement. Focus groups are able to act quickly to produce information on well defined, priority issues, operating as a sub-project to produce information for a wider coastal strategy. Focus groups reflect the reality that certain issues are important locally, and this generates a requirement to concentrate and disseminate data for the priority coastal issues in each region. Sectoral initiatives often co-ordinate large amounts of information on key coastal problems or issues. Two examples from the case studies include: Water Quality in Ceredigion under the Green Seas Initiative, and Coastal retreat in Essex as part of the Meadows of the Sea Project. ICM initiatives can also provide the ‘filters’ to condense this information and present it in variety of forms which target appropriate information at different readerships, to help solve the problem of information overload.

ICM initiatives are able to mobilise members of communities and organisations for action. In a working group in the Chichester case, the RSPB formally represent naturalists from the local Wildlife Trusts and Ornithological Societies. A single representative may be required to put forward positions on behalf of similar organisations and allow the group to maintain a workable size. A similar agreement for the informal representation of interests exists between the National Farmers Union and Country Land and Business Association in the Severn case. Representatives can be clearly recognised and called upon to provide access to bodies of knowledge when relevant. This is particularly important role in modern societies where the knowledge base about coastal issues may become very specialised, in tandem with management responsibilities becoming very compartmentalised. Solving priority issues will require an understanding of interconnecting phenomena.

Group prioritisation of issues within the coastal zone allows coastal managers to focus on critical interventions. The use of Stakeholder Decision Analysis in the Severn case allowed a group of stakeholders to deliberate and ‘vote’ about the important issues on the estuary. This also provided a deliberation mechanism to develop learning amongst stakeholders. The Severn Estuary Partnership uses regular meetings to update stakeholders on progress and the outputs of projects and scientific studies. These can be effectively linked to repositories at a national scale, such as CoastWeb by Coastnet,⁵ which enable ICM partnerships to apply best practice from similar projects in other places to practical problems on their coast.

Incremental

A certain amount of pragmatism is required in managing the coastal environment. Decision-makers are inevitably dealing: with snapshots in time of the human and natural environment, and with sub-optimal information. This entails the use of processes that allow managers to develop their understanding, and identify critical information gaps. Managers working in the coastal environment are frequently having to undertake analyses without comprehensive information, and learn to work with “*information that is close enough to the format you need it in, for the application that you are going to use it for*” (Pers. com. Chichester).

A well used technique in coastal management in the UK is the scoping study, which has been a major feature in both the governmental initiatives relevant to coastal management (e.g. Coastal Habitat Management Plans) and in European sponsored ICM initiatives, because the nature of their funding arrangements provides pump-priming to test long-term feasibility. Deliberate attempts to prioritise information needs can also take place at a smaller timescale. In each ICM initiative there is evidence of information management, and in the Essex case is being undertaken as a regional, group-exercise through a series of workshops. More informally, a further example is provided by a Scientist from a government agency in the Chichester case:

⁵ <http://www.coastweb.info/>.

“Under the umbrella of the Solent Forum I am organising a seminar on eutrophication covering the Solent area. The aim of that is to bring everyone doing work on eutro research into a room, so we can instil on them the questions we want answered, and they can target their research.”

Linked with prioritising information needs is the development of a general systems approach to model the system being managed and identify the role of different stakeholders in solving key questions/taking key actions. This approach is described by an Environmental Manager from an ICM initiative in the Chichester case who considers the role of voluntary groups in establishing baseline information needs:

“The need for data is often produced from an evaluation exercise looking at what is needed to better understand the harbour, focusing in on unanswered questions and unfound datasets. For example, taking a simple dredge in the harbour and considering the question of whether it would have an adverse affect on certain species. Data needs are identified on a stage by stage basis. It is especially important scoping information about the environment in general at the first stage, and also subsidiary questions that arise at subsequent stages. For example once important issues have been prioritised, then questions arise on what information might be needed to answer question x in order to do y, and who might hold such information”

In the Essex case, the scientific organisation CEFAS are using the local Essex Estuaries initiative as a test case for local information needs, in order to model their data provision throughout the UK. On the North Essex coast, a research and monitoring group for the estuary has focused on gathering a baseline of information with different organisations, collaborating to manage data, and also lobbying for the collection of more data. A similar research group exists in the Ceredigion case. Baseline information focuses on the minimum information requirements to understand the nature of the coastal environment. This is commonly developed through group-work, and the process is served by a number of existing fora. This point is expanded in a comment Environmental Manager from a Port in the Essex case:

“With large schemes we are looking to facilitate, there is a need for EIA and appropriate assessment. Certainly we believe that coastal management initiatives are quite a prime group to bring people and information to us, and to actually say as part of the scoping ‘what do you want?’ It’s a sort of an interface between the statutory agencies, other groups and the development industry.”

Since generating information about the coastal environment inevitably involves generating a large amount of data, tools such as Information Systems and GIS have an important role in dealing with information overload. It might be considered impossible to comprehensively collect all relevant data at once, but the long-term custodianship of information sources in a dedicated system provides a vehicle for incremental growth of knowledge. In many cases, increased understanding is dependent on better information flows, which itself is dependent upon better access and inter-operability between information systems which are already currently in use. An example of such improvements in the Ceredigion case is the use of the archaeological Regional Site and Monuments Records (RSMR) in order to effectively process coastal planning permissions. This RSMR being continually being updated, so it is important that it is maintained in one central place, but its use can be more effectively extended beyond the custodian organisation by providing an interface for local authorities.

Adaptive

A truly adaptive approach to management attends to the lessons learnt about the success of management; learning is viewed as one of the products of management. Most coastal management programmes in the UK have review cycle between 5 and 10 years. Some of the case study initiatives have had formal reviews of their progress at various stages, however ICM initiatives in the UK are not noted for the strength of their review process (Jemmett et al., 1999; Scottish Executive Social Research, 2002).

The case study findings showed some examples where assessments of success are built into the project cycles of a number of sectoral projects, to provide information about the final achievements of a scheme. This might lead to the building of particular datasets, such as reviews of percentages of EU Bathing Water Quality passes for each region. More fundamental ‘evaluations of the whole system of management’ are also apparent in each case, although they are less common, and tempered by the political sensitivity of negative information, and the lack of time and resources allotted to the review stages of the management process (One exception is the EU Demonstration Project ICM initiatives in the UK, which had a well funded review stage). The following comment by a Conservation Officer of an NGO in Essex is somewhat typical description of the lack of review procedures:

“I was trying to think what reviews have been carried out – I can’t think of any that have occurred in the last year or so...There have been larger scale reviews with the Environment Agency of seawall management but that was nearly eighteen years ago... They need to be regular, otherwise you never know if what you are setting out to achieve in the first place is being achieved, or you’re actually fighting a never ending uphill struggle.”

Much of the activity going on in coastal zones is innovative by nature, especially with respect to new forms of resource exploitation or technologies, and gradual awareness of these corresponds to the idea of ‘diffusion of innovation.’ This diffusion of ideas is served by a number of tools developed by ICM initiatives, including newsletters and co-operative groups and

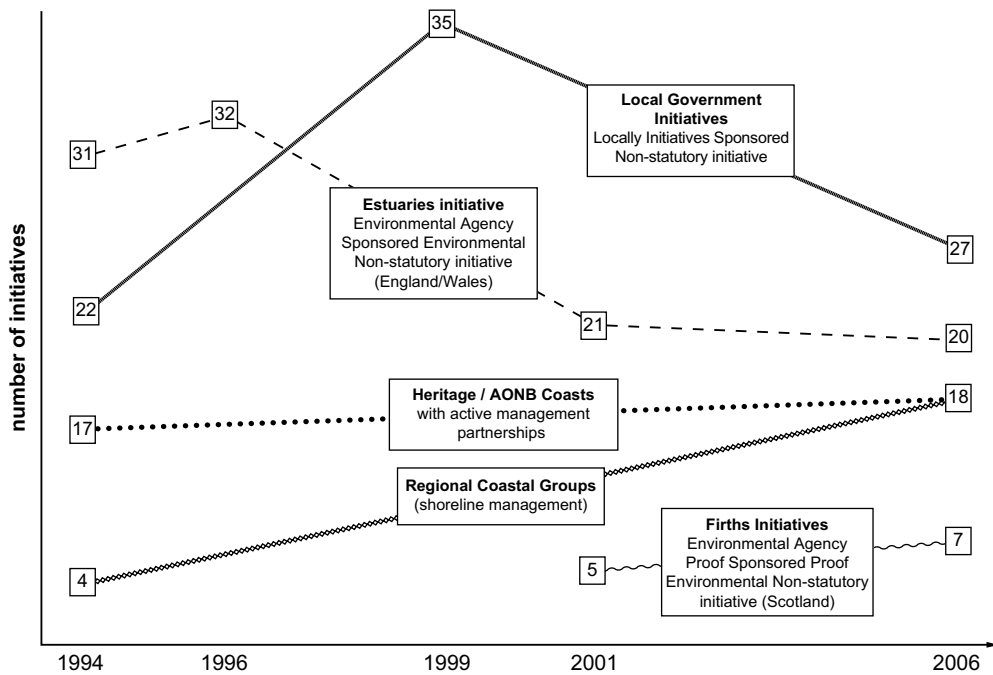


Fig. 2. Decline in UK local and regional coastal initiatives 1994–2006.

meetings. In the following comment, a Coastal Engineer from the Ceredigion case describes the benefits of regional Shoreline Management Group planning meetings, allowing for the diffusion of ideas:

“One thing we found is that there was a small presentation by another county on how they dredge their harbours and it was becoming an issue for us at that time. Also there was some good work presented on the aesthetics of coast protection – whether we could do some more to improve the landscape and the environment.”

Successful *ad hoc* approaches become apparent when they are adopted as formal structures for managing information. One example is the adoption of voluntary sector approaches by public organisations. In the Chichester case, a survey of boat moorings by the RYA has been regularly taken over by a statutory organisation, the Conservancy. In another case, an online review of coastal pollution started by the voluntary group, Friends of the Earth, has been continued and developed by the Environment Agency. In a variation on the above examples, bag returns being voluntarily used by wildfowling to generate information about the extent of their activity are now becoming compulsory forms of information for wildfowling to secure leases for access to the foreshore. These examples illustrate statutory systems learning from innovative approaches and including them within the framework for management.

Conclusions

The sections above provide evidence for a mid range theory about successful Integrated Coastal Management, as encouraged by ICM initiatives in the UK and accomplished by partner organisations. The empirical data demonstrates a wide range of achievements and activities at local and regional levels. Combined together these processes and mechanisms provide a powerful and mutually consistent explanation for how ICM initiatives make a positive difference to coastal planning and management. Only those processes and frameworks which were found across all four case studies are described here, so the research provides a relatively conservative estimate of the important phenomena. It is acknowledged that there are many ways of achieving or implementing individual management techniques. Yet in developed societies (with multiple jurisdictions and responsible agencies, resultant bureaucracies, specialisation of knowledge, increasing sophistication and spatial extent of human activities) a framework for ICM is likely to be required to make planning and management effective. Despite the many practical ways in which ICM initiatives promote more sustainable coastal management, their effectiveness is contested. Therefore, the final section of the paper considers the implications of evidence presented above for those who are considering institutional arrangements and policies for governance in the coastal zone.

Implications

The ICM initiatives reviewed in this study have undertaken a range of work which contributes to both to strategic management (e.g. co-ordinating the actions of organisations) and technical management (e.g. improving monitoring

arrangements) (Smith & Halliday, 1992). It is through an ICM initiative at the local level that agreed goals for sustainable development of the coast can be established by a process which allows stakeholders to envision aspirations for the future. These goals will be translated into a series of contingent objectives, which vary according to the coastal issues, human activities and the ways of planning and managing occurring on each coast (Vallega, 1999). An important dimension is the emergence of regional governance, which can be discerned in the delineation of regional seas for strategic assessment and the approach of some regional development agencies to co-ordinate coastal management and put coastal issues on the agenda of local government (Rupprecht Consult & International Ocean Institute, 2006; Smith & Potts, 2005).

This research provides evidence for the effectiveness of ICM initiatives, and the way in which they encourage more effective governance by promoting long-term, collaborative, participatory and ecologically sustainable approaches. By seeking to isolate the process and mechanisms which have contributed to changing governance at the coast, the results have inevitably focused on the achievements of coastal initiatives. This is in marked contrast to much recent research which has focused on the failures and shortfalls of non-statutory initiatives (Fletcher, 2007; Hoare, 2002; McKenna & Cooper, 2006). Whilst acknowledging that many coastal initiatives have struggled with issues such as weak status and insecure funding, this research provides positive evidence about their contribution at a time when many initiatives are under threat. Fig. 2 provides a record of initiatives extant in 2006. The initiatives are undergoing 'coastal policy squeeze' (Shipman & Stojanovic, 2007) as they compete with other forms of regulation for funding, time and recognition.

Each country is developing Integrated Coastal Management from its individual history of existing policies and programmes in the coastal zone. There are many elements to the 'integration' of coastal management occurring at National, Regional and Local scales. This paper has considered ICM initiatives operating at the regional and local levels. They can be a crucial component to develop learning and co-ordinated planning and management for a particular *place* through a partnership approach. By undertaking a structural analysis, this paper has revealed how ICM initiatives use processes and mechanisms to develop the system of planning and management. The improvements which these initiatives have the potential to make can be summarised by their unique contributions:

- a more democratically inclusive way of planning, prioritising and managing the coast, where before there existed no local initiative for the coast based on biogeographical characteristics;
- a politically elegant way of coalescing interest groups around issues in that place, where before there only existed 'consultation mechanisms' by individual institutions.

Meanwhile, academic and policy debates continue to question the usefulness of ICM initiatives. Given this contrast, it remains to be seen whether enabling conditions for initiatives to be effective will be established, or whether marine legislation in Europe will turn its attention to other forms of planning and management.

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