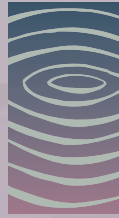


THE HERITAGE COUNCIL



Proposing Policies and Priorities
for the National Heritage

**CONSERVING IRELAND'S
MARITIME HERITAGE**

April 2006

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*Ireland's maritime heritage
is of inestimable value to the nation*

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FOREWORD

The Heritage Council established a Marine and Coastal Committee in 2002. One of the main objectives of the newly formed committee was to draft a policy statement on maritime heritage pursuant to section 7 of the Heritage Act, 1995. The statement was drafted over 18 months and involved widespread consultation. Committee members and members of external organisations made many comments and contributions to this paper, and the Heritage Council would like to take this opportunity to thank all contributors for their valuable assistance.

The policy statement defines maritime heritage and outlines the main issues it faces, in particular those resulting from increasing human activity in the coastal zone. The document is divided into two parts, one dealing with the general principles, and the second section on specific aspects of maritime heritage.

A primary recommendation is the need for a cohesive strategy for the sustainable use and development of marine and coastal areas, one which identifies important heritage features and provides for their long-term protection. The strategy should be based on a comprehensive review of relevant policies and measures currently in place and their efficacy to date and include a management framework for environmental protection and management. Importantly, this strategy should also be supported by a campaign to raise awareness and improve education regarding maritime heritage.





The second part of the document is devoted to specific aspects of maritime heritage including coastal landscapes, seascapes, water quality, biodiversity, fisheries, off-shore resources, cultural heritage, boats, islands, and activities that impact on these such as climate change, recreation and tourism. Recommendations are made for each of these aspects, and may involve a range of organisations.

Maritime heritage is a critical element of our nation's well-being. In addition to its intrinsic value, maritime heritage provides us with important goods and services, as well as space for recreation and tourism. The proposals in this document outline potential future directions for work in this area. The Heritage Council will work to realise the aims contained in it, and is confident that others will also rise to the challenge of managing our maritime heritage in a sustainable way.

Tom O Dwyer
Chairperson
Heritage Council

Michael Starrett
Chief Executive
Heritage Council

April 2006



EXECUTIVE SUMMARY

INTRODUCTION

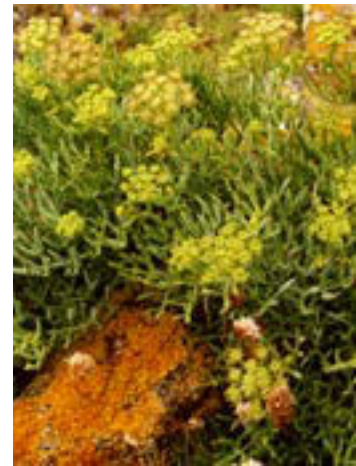
The Heritage Council has prepared this paper pursuant to its responsibilities under the Heritage Act, 1995. It advocates greater recognition of our maritime heritage and the significant role heritage can play in the development of Ireland's marine and coastal resources. It identifies actions to improve the protection, conservation and management of these resources. The concept of heritage sustainability - which places our national heritage at the core of future planning and development decisions - is promoted. Specific recommendations are made for: coastal landscapes, water quality, biodiversity, climate change, off shore activities, fisheries, cultured species, cultural heritage, traditional and heritage boats, offshore islands, recreation and tourism. The document has relevance for many sectors and organisations, and concerted action on these recommendations will bring benefits to all. For its part, the Heritage Council is committed to maintaining momentum where it has the most direct responsibility and involvement.

WHAT IS IRELAND'S MARITIME HERITAGE?

Maritime heritage has cultural, physical and ecological dimensions. It embraces the legacies of past generations that derived a living from the sea, including their traditions, as well as natural features of both coastal and offshore environments from salt-marshes to cold-water corals along with their associated plant and animal communities. From the definition of heritage in the Heritage Act, 1995, maritime heritage covers both terrestrial and water-based elements including fisheries, wildlife habitats, flora and fauna, seascapes, wrecks, coastal monuments and other features of archaeological interest or importance. This document focuses primarily on the coastal and inshore aspects of maritime heritage as these areas are under most pressure from land-based activities. However, some aspects of offshore heritage are covered in relevant sections of Part 2.

WHAT IS ITS SIGNIFICANCE?

Ireland's maritime heritage is of inestimable value to the nation. It enriches the Irish identity, provides goods and services that are vital to Ireland's economy and the well-being of Irish people, and attracts countless visitors from home and abroad.



The sea is a global resource shared between different nations as well as with countless marine species. Managing our maritime heritage for the benefit of future generations is a national obligation that requires vision and political commitment in addition to dedicated policies, legislation and planning and development guidelines.

WHAT ARE THE CENTRAL MESSAGES OF THIS DOCUMENT?

Human pressures on Ireland's coastal areas, amenities and resources are immense and increasing. Around 80% of Ireland's population resides in the 15 coastal counties, almost half of these within 10 km of the coast. At present there is a general lack of awareness of Ireland's maritime heritage, including its cultural, socio-economic and environmental significance. As a consequence, there is an insidious loss of maritime heritage features due to poorly informed planning and development, as well as simple neglect.

Ireland's coastline is not only magnificent in terms of its natural beauty; its many settlements – from port cities to small villages – have evolved over the centuries into attractive human habitats. In recent decades, poorly informed development has in a number of instances severely damaged that settlement heritage. In the absence of a long-term vision for heritage preservation in defined marine and coastal areas, linked to a planning system that places constraints on the types, locations and numbers of structural changes, our maritime heritage will be steadily eroded and irreparably damaged.



The document argues that preservation of our national heritage is one of the principal aims of sustainable development to which Ireland is committed under EU membership. The Heritage Council recognizes that sustainable development has more than simply environmental dimensions and can only be achieved through parallel efforts to build social and economic sustainability in a way that clearly recognizes the importance of sustaining the national heritage.

From a broad environmental perspective, piecemeal development without limits to the ultimate extent of development is inherently unsustainable. This is hugely significant in an overall national heritage context as practically all development affects in some way our native flora and fauna as well as the habitats and ecosystems that sustain them. These natural assets, and the landscapes in which they are set, are part of the national heritage.

For the above reasons, the Heritage Council advocates the concept – heritage sustainability – for use in assessing planning and development proposals in marine and coastal areas. The concept would broaden the scope of impact assessment to cover both natural and cultural aspects of the national heritage, and is a progression of the heritage appraisal of County Development Plans currently promoted by the Council. In the long term, when coupled to a suitable set of sustainability indicators (DoE, 1995b), this would constitute a stronger and more effective management ethic than the one currently pursued i.e., environmental sustainability.

There are clear indications that current approaches to environmental planning and management do not provide adequate protection for many components of our national heritage. This is due in part to a lack of awareness of the significance of our national heritage but also reflects a need for a new concept which does not segregate cultural from natural heritage. In particular, there is need for greater clarity with respect to the overall goals of environmental management in Ireland and the fundamental principles that apply. There is also a need to more clearly distinguish between the 3 interrelated stages of planning, assessment and regulation. A revised and updated management framework (see for example Figure 3) would be of utmost benefit in delivering sustainable development.

TOWARDS A NEW STRATEGY FOR PROTECTING IRELAND'S MARITIME HERITAGE

Part one of this document identifies a number of key policy elements which advocate:

- A cohesive strategy for the sustainable use and development of marine and coastal areas that identifies important heritage features and provides for their long-term protection.

The strategy should include:

- A comprehensive review of relevant policies and measures currently in place, and their efficacy to date, as a pre-requisite to developing an effective strategy for maritime heritage protection;
- A management framework for environmental protection and management that contains clearly-stated principles, policies and objectives;
- The implementation by planning authorities of available heritage appraisal methodologies (Heritage Council, 2000); and
- A campaign to raise awareness and improve education regarding maritime heritage.

SPECIFIC RECOMMENDATIONS

Part 2 of the document gives general descriptions of important maritime heritage features, their cultural and/or environmental significance, and existing legislative or other mechanisms applicable to their protection and management. In each case a number of recommended actions in the fields of policy, management and research are provided. A concise summary of these recommendations is as follows:

COASTAL LANDSCAPES

Ireland has some spectacular coastal landscapes of considerable value to tourism but they are increasingly threatened by insensitive development. Thus:

- In assessing coastal development proposals under the planning legislation, it is vital that responsible agencies take into account the visual impact, especially the location, density and design of proposed buildings, and facilities. Those responsible

for coastal planning decisions should have adequate specialised training in, or access to advice on, all aspects of environmental protection and management, including landscape protection. Decisions should be reached through a multidisciplinary approach involving the requisite professional skills.

WATER QUALITY

The new EU approach to protecting the ecological and chemical quality of estuarine and coastal waters is commendable but presents immense technical and administrative challenges. If it is to succeed, we must:

- Ensure that ecological reference values for marine waterbodies take into account natural variability and, in the case of naturally-occurring pollutants, local geochemistry. Research to improve understanding of natural variability in Irish estuaries and coastal waters should be significantly expanded. Annual expenditure on WFD implementation should be a clearly identifiable component of national and local government accounts.

BIODIVERSITY

National and international initiatives to maintain biodiversity are equally relevant to terrestrial, fresh and salt water environments but overall goals need to be better defined. For the sea, there is a need to:

- Develop and implement the concept of offshore biodiversity protection plans; establish a suitable consultation procedure between the DCMNR and the NPWS on all matters relating to use and development of living marine resources and their habitats; allocate appropriate resources to marine mapping (e.g., via the Biological Records Centre once established) to remedy the dearth of marine distribution data.

CLIMATE CHANGE

The effects of climate change are already evident in European seas. Predicted increases in storm intensity and rising sea levels will exacerbate coastal erosion and flooding with implications for both natural and man-made heritage features. Changes in sea temperatures and salinity will have significant impacts on marine organisms and food-chains, fishing and aquaculture activities. Accordingly:

- In developing plans for maritime heritage, the likely effects of climate change must be taken into account. Measures are needed to accelerate investment and activity to measure key marine climate indicators with links to relevant European and global programmes; in addition, there is a need to develop an unambiguous national policy for erosion and flood management to avoid excessive costs with no real gain to long-term coastal protection.

OFFSHORE ACTIVITIES

Seabed surveys and other research programmes have revealed the wealth of resources in Irish waters including the potential for offshore energy production. However, over-exploitation of Ireland's traditional fisheries, coupled with the effects of climate change and the side effects of resource extraction pose significant threats to marine habitats, food-chains and communities. Advisable management measures include:

- Development of integrated policies for our seas based on UNCLOS of which Ireland is a signatory; carrying out a Strategic Environmental Assessment of the impact of Ireland's renewable energy policy on the marine environment, including the cumulative effects of multiple licenses; assessing the long-term impacts of offshore wind farms and tidal barrages on the natural heritage; prohibiting development and extraction in designated areas and habitats and other biologically diverse underwater sites (e.g., cold-water reefs).

FISHERIES

Fisheries are a vital source of food and employment but many stocks are seriously over-exploited and without strict conservation measures could be lost entirely. Fishing methods need to be modified to reduce environmental and ecological impacts while keeping in mind the socio-economic impacts. Significant improvements could be gained by:

- Ensuring that all relevant scientific data are presented in their purest form and reflected in decisions regarding allowable catches and necessary management measures; encouraging the use of selective fishing gear to reduce the catch of juveniles and by-catch of cetaceans and to avoid damage to benthic communities; eliminating discards of unwanted fish at sea; enforcing closed areas and seasons to allow nursery grounds and juvenile stocks to mature.

CULTURED SPECIES

Aquaculture is an important and viable coastal industry but should be designed, managed and constrained in accordance with environmental characteristics and considerations. Thus, the responsible agencies should:

- Encourage sustainable aquaculture as a means of support for coastal communities and for the protection of scarce native shellfish, fin fish and algae; expand research into sustainable aquaculture techniques, including techniques for assessing carrying capacity under various hydrographic and environmental conditions and the possibilities for integrated aquaculture to reduce the overall ecological footprint; improve the visual impact of aquaculture operations.

CULTURAL HERITAGE

Ireland's colourful maritime heritage is reflected in buildings, customs, traditions and folklore around the coasts but these aspects of our maritime heritage are not sufficiently documented or appreciated. The archaeological and historical significance of these features, their cultural and tourism value, should be more widely promoted by:

- Preparing an inventory, and better descriptions, of maritime heritage buildings and structures associated with coastal life including, *inter alia*, harbours, slips and piers not administered by harbour boards or companies, and vernacular features and artefacts; encouraging and facilitating collections of folklore and stories associated with maritime vernacular structures and artefacts at both county and regional levels; promoting and facilitating work to update the underwater archaeological inventory.

TRADITIONAL AND HERITAGE BOATS

Recent work by the Heritage Council and others has revealed that Ireland has a proud tradition in the design, construction and use of boats for both commercial and recreational purposes. Although private initiatives have succeeded in preserving and maintaining certain types of craft, there is much to be gained from wider efforts to highlight and preserve boating traditions. For example, it would be beneficial to:

- Record surviving traditional/heritage boats, including technical details, using standardised procedures; record the recollections and anecdotes of traditional boat

builders and users to place the boats in their proper cultural and social contexts; preserve examples of heritage boat types afloat and in use and identify others that may need to be conserved; encourage regional and local boat collections, for example in or adjacent to long-established boatyards; develop and sponsor courses in traditional boat building.

OFFSHORE ISLANDS

Island culture and traditions are important components of Ireland's maritime heritage and are a focus for considerable research both at home and abroad. It is therefore justified to strengthen the viability of our island communities and heritage features, for example by:

- Assisting inhabited islands in developing internal governance structures to plan for viable activities on the islands, integrated with heritage conservation and enhancement (e.g., Bere Island Conservation Plan); developing plans for the management of island heritage sites and structures in the light of potential impacts of tourism and climate change.

RECREATION AND TOURISM

Coastal landscapes, beaches and other amenities attract large numbers of visitors from home and abroad and are therefore of immense value to tourism and coastal economies. Nevertheless, coastal heritage features are threatened by unfettered development, by excessive tourist traffic and by climate change. The planning and management of coastal tourism warrants far greater priority than heretofore and would benefit from:

- Increased co-ordination between tourism development agencies, local authorities and other agencies; evaluating the potential of maritime heritage as a recreational or tourism resource e.g., valuation of beaches and other recreational amenities, assessing the cultural and economic benefits of traditional and classic boat rallies etc; assessing the impacts on maritime heritage of recreational and tourism activities, both in specific areas and nationwide.

ABBREVIATIONS

ASI	Areas of Scientific Interest	INSS	Irish National Seabed Survey
BIM	Bord Iascaigh Mhara	NIAH	National Inventory of Architectural
	Heritage		
CFP	Common Fisheries Policy	NDP	National Development Plan
CIL	Commissioners for Irish Lights	NHA	Natural Heritage Area
DCMNR	Dept of Communications, Marine and Natural Resources	NPWS	National Parks and Wildlife Service
DEHLG	Dept of Environment, Heritage and Local Government	pEEZ	proposed Exclusive Economic Zone
EPA	Environmental Protection Agency	RMP	Record of Monuments and Places
GSI	Geological Survey of Ireland	RPS	Record of Protected Structures
IBA	Important Bird Areas	SPA	Special Protection Area
ICES	International Council for the	SAC	Special Area of Conservation
		TAC	Total Allowable Catch
		UNCLOS	United Nations Convention on the Law of

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CONSERVING IRELAND'S MARITIME HERITAGE

PART 1: MANAGEMENT FOR SUSTAINABILITY

Ireland's marine and coastal environments, their natural attributes and resources, have contributed immensely to Ireland's cultural development throughout the ages. The legacies of vibrant coastal communities abound in towns and villages around our shores. Local architecture, traditions and occupations reflect a long history of association with the sea, including contacts with other maritime nations. The natural beauty of the coastline, the richness of its flora and fauna, and the numerous recreational opportunities available, are enjoyed by visitors from home and abroad. These assets are part of Ireland's maritime heritage and it is vital that they are managed in a sustainable way for the benefit of future generations.

This document concentrates primarily on the coastal and inshore aspects of maritime heritage as these aspects are under greater pressure from land-based activities. However policies for offshore heritage resources are also covered in relevant sections.

Human pressures on Ireland's coastal areas, amenities and resources are immense and increasing. Approximately 80% of Ireland's population resides in the 15 coastal counties, almost half of these within 10 km of the coast (Boelens *et al.*, 1999).

In the context of environmental management, the intrinsic values of our maritime heritage are sometimes overlooked. For example, there is a tendency for marine and coastal developments to be pursued in a piecemeal fashion rather than within a framework of integrated planning that recognizes the integrity of our maritime heritage. Such an approach tends to focus on the immediate local benefits from individual developments while ignoring the long-term costs to heritage and, therefore, the costs to the nation as a whole. In the absence of a long-term vision for heritage preservation in defined marine and coastal areas, linked to a planning system that places constraints on the types, locations and numbers of structural changes, our maritime heritage will be steadily eroded and irreparably damaged.

From a broad environmental perspective, piecemeal development without limits on the ultimate extent of development is inherently unsustainable. This is hugely significant in an overall national heritage context as practically all development affects in some way



our native flora and fauna as well as the habitats and ecosystems that sustain them. These natural assets are part of the national heritage.

The way we use marine and coastal resources is critical to their sustainability. Thus, quite apart from new developments, there is a need to continuously assess the impacts of existing practices of resource use and exploitation. Sound management of activities and developments must always be guided by clear, relevant and up-to-date policies. A review of policies applicable to our maritime heritage is long overdue.

SUSTAINABLE USE AND DEVELOPMENT OF MARITIME RESOURCES

The principle of sustainable development has more than simply environmental dimensions. It can only be achieved through parallel efforts to build social and economic sustainability in a way that clearly recognizes the importance of sustaining the national heritage. Ideally, all forms of development would be compatible with social, economic and environmental sustainability (Figure 1).

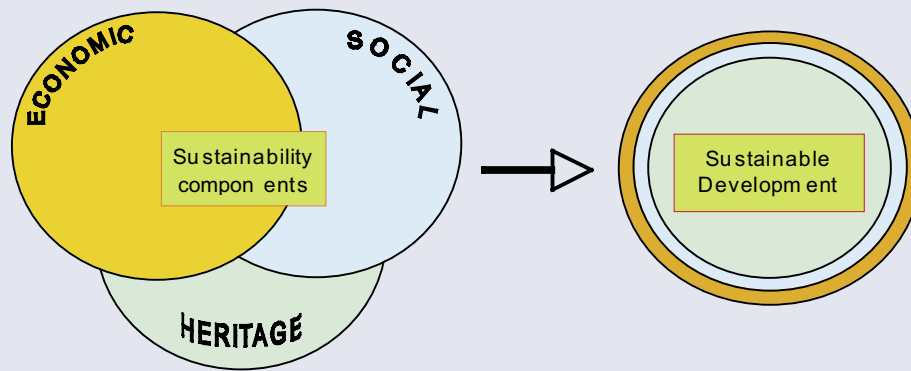


Figure 1: Towards environmentally sustainable development

In his address to a seminar on sustainable development held in Dublin in November 1998 (Meldon, 1998), Michael Layde of the then Department of Environment & Local Government reminded delegates that the capacity of the Earth to absorb the impact of unfettered development is finite and that to exceed this capacity is to destroy the

basis for future growth, and even to send the development process into reverse. He went on to say that 'if current development is not to deplete the natural resource on which future development is predicated we must de-couple economic growth from environmental pressure'.

The concept of sustainability is one of the cornerstones of Ireland's environment policy. The policy requires that 'development must be within the capacity of the environment to support it without suffering lasting damage or depletion' (DoE, 1995a). In an international context, Ireland, along with other members of the United Nations and European Union, is committed to the principle of sustainable development. With particular reference to the marine environment a number of international agreements, including the Law of the Sea Convention (1982), stress the importance of such commitment; it has been expressed as follows:

Social and economic development must be pursued in a manner that does not prejudice options available to future generations for the use of the sea and its amenities (GESAMP, 1991).

The EU is pursuing the idea of sustainability in marine matters through the development of its Marine Strategy. In the communication "Towards a Strategy to Protect and Conserve the Marine Environment" (2002) the EU recommends an eco-system approach to marine policy which would make all sectors involved with the marine environment take into account the side effects of their activities on marine natural resources. The ecosystem approach is defined as the integrated management of human activities, based on knowledge of ecosystem dynamics, to achieve sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.

In the view of the Heritage Council, these obligations rightfully extend to the protection and preservation of Ireland's marine and maritime heritage, including fisheries, wildlife habitats, flora and fauna, seascapes, wrecks, coastal monuments and other features of archaeological interest or importance. As with our entire natural and cultural heritage, the government and people of Ireland have a duty to pass on such assets to future generations in the best possible condition.

Accordingly, in managing our marine and coastal areas, amenities and resources, the sustainability of newly-proposed changes and activities should be evaluated in terms of, *inter alia*, their potential impacts on heritage features and values. It is clearly preferable to minimise, and ultimately to limit, changes that will permanently alter or devalue heritage features both offshore and in the coastal zone. This should not unduly impede the wise use of renewable marine resources that is very much in the national interest.

For the above reasons, the Heritage Council advocates a new concept – heritage sustainability - for use in assessing planning and development proposals in marine and coastal areas. The concept would broaden the scope of impact assessment to cover both natural and cultural components of the national heritage. In the long term, when coupled to a suitable set of sustainability indicators (DoE, 1995b), this would constitute a stronger and more effective management ethic than the one currently pursued i.e., environmental sustainability.

In putting forward this proposal, the Council is aware that Ireland's strategy for sustainable development (DoE, 1997) does not specify the range of environmental features to which the strategy applies. It seems clear, however, that the strategy is aimed primarily at developments affecting the natural, as opposed to cultural and traditional, aspects of Ireland's heritage. A year after the strategy was published, at a conference on sustainability organized by An Taisce and supported by the European Commission, the Department of the Environment & Local Government and the Universities Research Group on the Environment (URGE), an An Taisce spokesman (O'Sullivan, 1998) advocated that coastal resources be defined as both living and non-living attributes of the environment. He cautioned that there is a danger in divorcing resources from their cultural and social context, noting that this is 'a pit into which many planners have fallen'. In answer to the questions 'Are present policies likely to lead to sustainable development?' and 'Are present structures and mechanisms geared to delivering sustainable development?', responses from workshops at the same conference were largely negative. There is clearly a need for a fresh approach.

MANAGING HERITAGE IN COASTAL AREAS

There are no fixed boundaries to the maritime area. In theory, the geographical scope could range from mountain tops to the deep ocean but that would not help to focus on priorities for protecting the (national) coastal and inshore heritage which is under threat from increasing pressures of land-based activities. The outer limit of Ireland's proposed Exclusive Economic Zone (pEEZ), which extends 200-350 miles from shore, encompasses a vast area much of which is beyond the influence of land-based activities as well as the influence of local government planning procedures which halts at present at the mean high water mark. For effective management of the coastal zone and the heritage within that, a practical outer limit of the zone could be the 12 mile limit, i.e., the seaward edge of the foreshore, or in some localities the 50m depth contour. The landward boundary should clearly be flexible, related to the distribution of natural and man-made features that are dependent on the influence of the sea. As a guide, this would seldom extend further inland than about 10 km.

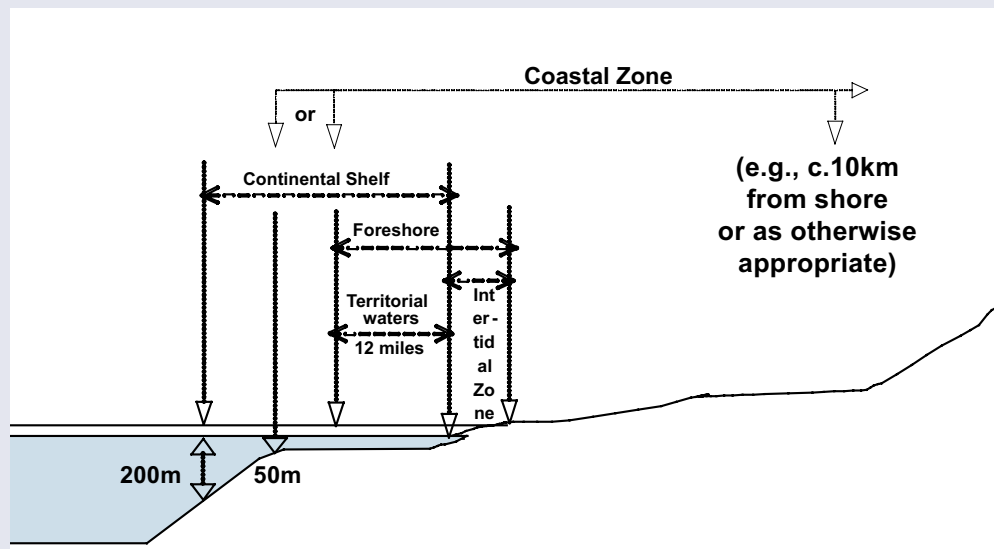


Figure 2: Practical limits of the coastal zone for purpose of managing the maritime heritage

Coastal zone management, otherwise known as Integrated Coastal Management (ICM), has many advantages for maritime heritage. A report on scientific aspects of ICM (GESAMP 1996), describes ICM as 'a process that unites government and the community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources'. A consultant report on ICM commissioned by three government departments was published in 1997 (Brady Shipman Martin 1997). Since then as part of the European Strategy for Integrated Coastal Zone Management there have been a number of successful EU-funded ICM demonstration projects in selected coastal areas including Bantry Bay and Co. Donegal.

Following on from the EU Strategy, a Recommendation on ICZM was signed in 2002. This proposes that Member States initiate action on ICM through the formulation of national strategies. A report carried out by the Department of Environment and Local Government in 2001 concluded that there was an urgent need for coastal zone management policy to guide local authority development plans (DoE, 2001). Despite the EU Recommendation, demonstration projects, reports and the stated commitment of the Government to ICM, there has been little progress in establishing ICM programmes on a broad or permanent basis in Ireland.

The overall goal of ICM is to improve the quality of life of human communities who depend on coastal resources while maintaining the biological diversity and productivity of coastal ecosystems. Socio-economic, cultural and heritage issues are given high priority in developing and implementing ICM plans. Thus, where local communities, sectoral interests and agencies join together in establishing an ICM programme, the prospects for ensuring long-term sustainable use of heritage features and resources are greatly improved. The Heritage Council would strongly endorse the development of a governmental support framework for any such local ICM initiatives. Experience shows that the most successful ICM programmes are often those that apply to limited areas, coastal features and/or activities i.e., there is no *a priori* requirement for ICM programmes to be fully comprehensive in scope or to operate nationwide. Further details on ICM principles and initiatives are available in the *Review of Integrated Coastal*

Zone Management and Principles of Best Practice, carried out for the Heritage Council by the Coastal and Marine Resources Centre (Heritage Council, 2004b).

With the advent of the EU Water Framework Directive (WFD; EU 2000), protection for key elements of aquatic ecosystems (freshwater and marine to a mile seawards of the baseline) is a legal requirement. This should preclude any practice or development that will significantly degrade the aquatic environment. Thus, when fully implemented and enforced, the WFD will be a major factor in ensuring the environmental sustainability of human activities in coastal areas, at least insofar as they affect water and aquatic life.

The WFD will be complemented by the Strategic Environmental Assessment Directive 2001/42/EC (SEA Directive) which will ensure that policies and strategies for coastal areas are assessed and amended where necessary to minimise negative impacts on the environment.

MANAGING COASTAL SETTLEMENTS

Ireland's coastline is not only magnificent in terms of its natural beauty; its many settlements, from port cities to small hamlets, have evolved over the centuries into attractive human habitats. In recent decades, poorly informed development has in a number of instances severely damaged that settlement heritage. It is now imperative that national, county and local planning strategies take seriously the conservation and enhancement of this rich settlement heritage. Levels of development must be seen to harmonise with the scale and character of the relevant settlements; in particular, far more precise guidelines need to be established with regard to the layout of new housing areas. Equally important, far more attention needs to be paid to fostering sympathetic forms of architecture in keeping with the existing townscapes and village-scapes, while the possible impacts of climate change must also be taken into account. In this context, different strategies are needed for coastal settlements in metropolitan hinterlands which are undergoing severe development pressures as against the enhancement strategies needed for coastal communities/settlements experiencing decline. In all cases, the coastal communities living in these settlements should be empowered to play a constructive role in planning the future of their coastal habitats.

TERRESTRIAL AND MARINE DESIGNATIONS

At present there is no direct terrestrial equivalent of the Water Framework Directive and, in view of the constraints to development that would follow from legislation designed to maintain all terrestrial ecosystems in pristine condition, no such instrument is likely. Thus, the primary mechanisms for protecting terrestrial ecosystems will presumably be the existing network of areas designated on the basis of their scientific interest, their importance for wildlife and/or their importance as examples of rare, threatened or ecologically sensitive habitats. However, none of these designations guarantees that the areas concerned will remain free from human interference or damage. A 1992 review of the status of Areas of Scientific Interest (ASIs) in 4 coastal counties noted that 37% had been damaged and a further 16% were under threat. Similar results were found in a survey carried out to assess impacts on designated conservation areas (Neff 1998). Under a 2000 revision of the Wildlife Act (1976), ASIs were assimilated into the newly established Natural Heritage Area (NHA) system which is now the basis of site protection in Ireland. Some of the principal designation systems applicable to Ireland's coastal and marine heritage are summarised below:

Sites under national statute	
Natural Heritage Areas (NHA)	Wildlife Act 1976, 2000 Amendment
Nature Reserve	Wildlife Act 1976
Wildfowl Sanctuary	Wildlife Act 1976
Refuge for Fauna	Wildlife Act 1976
National Park	Mainly through land acquisition by the state
Whale and dolphin sanctuary	Wildlife Act 1976/ Whale Fisheries Act 1937
Protected monuments and places (includes wrecks)	National Monuments Acts 1930-2004
Protected structures	Planning and Development Act 2000
Sites under international conventions & directives	
Special Protection Area (SPA)	Birds Directive (79/409/EEC)
Special Area of Conservation (SAC)	Habitats Directive (92/43/EEC) extends to pEEZ
Wetland sites of international interest	RAMSAR Convention
Biosphere Reserves	Council of Europe
Biogenetic Reserve	UNESCO
World Heritage Sites	UNESCO

A FRAMEWORK FOR EFFECTIVE HERITAGE MANAGEMENT

A variety of legal instruments and management tools is available to national agencies and local authorities in order to protect human health and the environment. Many of these instruments are directed at pollution by substances and wastes but various newly-amended laws have strengthened capacities to protect habitats and other defined areas (e.g., Local Area Plans, landscape conservation areas etc.). In principle, any valued environmental feature can be included in County Development Plans as a means of ensuring the appropriate level of protection or conservation. Of more than 30 'strategies and tools' available for environmental protection and management listed in the EPA's Millenium Report (EPA, 2000) on Ireland's environment, nine were considered applicable to the marine environment. However, if the marine area were to be expanded as recommended in the context of coastal zone management (i.e., marine and coastal areas) it seems likely that all these strategies and tools would apply.

In principle, local government planning procedures and related legal instruments should form a basis for effective management of the natural and man-made heritage of coastal areas. Detailed guidance on appraising the heritage implications of development plans (Heritage Council, 2000) is available to local authorities. However, management procedures operated by local authorities to date may not always be suited to assessing the many social, economic, environmental and cultural factors relevant to taking balanced decisions on the sustainable use and development of coastal areas.

A comprehensive framework for environmental management has 3 major interrelated stages – planning, assessment and regulation. While these components are broadly recognized by Ireland's local government planning procedures, there is often a lack of transparency regarding the various actions and considerations at each stage that lead to decisions concerning particular developments. There is also a lack of clarity regarding the overall goals of environmental management and the fundamental principles that apply. Figure 3 shows some of the key stages in a generic management framework based on proposals from an advisory body to UN agencies (GESAMP 1991). If such a framework were to be adopted by local authorities it would go a long way to alleviating

public concerns regarding the existing planning process and the sometimes contentious decisions that are reached. It should also provide better protection for man-made heritage features. The SEA Directive should also help in achieving sustainability because under the Directive environmental impacts will be considered by policy makers at the same level and at the same time as social and economic issues.

PERFORMANCE AND ACCOUNTABILITY

Any serious attempt to manage our maritime heritage in a sustainable way should incorporate periodic assessments of how well management has performed i.e., has it achieved its objectives? This corresponds with Action 10 in Figure 3.

Despite the strategic goal of introducing national sustainability indicators (DoE, 1997), there is very little evidence that these have been applied or publicized. Thus, there is a lack of accountability among state agencies and local authorities concerning the impact of policies and decisions on the natural and cultural features of coastal and other environments. As population expands, the economy grows and construction continues, the threats to heritage increase and the need for accountability becomes even greater. This warrants far greater attention that it has received to date.

Although the principal responsibility for environmental and resource management lies with the Department of Environment, Heritage & Local Government (DEHLG) and Local Authorities, important supporting roles are provided by the Environmental Protection Agency, the Marine Institute and the heritage sections of the DEHLG i.e., National Monuments Service, and National Parks and Wildlife Service. It is equally important that all these bodies develop and apply transparent criteria for assessing their performance in meeting their own institutional targets, plans and research goals. For example, the Marine Institute instigated a Marine Research, Technology, Development and Innovation Strategy for Ireland (Marine Institute, 1998) that includes various plans and objectives, either for the Institute itself or in collaboration with other agencies, relating to the marine and coastal environments. Some of the research goals, such as improved inventories of habitats and communities, research to support sustainable management regimes and research into mechanisms for improving public participation in natural resource management, are highly relevant to our maritime heritage. Progress in meeting

these goals has been limited and should be reviewed as part of current work to revise and update the strategy.

AWARENESS RAISING AND EDUCATION

There is a general need for the public, and especially young people, to be better informed about the importance of the sea in the contexts of recreation, employment, food supply and the economy as a whole. Greater understanding of the importance of the sea will help to increase support for measures to protect the marine environment under the WFD and other legal instruments.

County heritage plans drawn up through the county heritage fora accord high importance to the raising of awareness of heritage generally. Both the plans and fora could be used to improve understanding of maritime heritage at local and regional levels. Television, radio and written press can reach a wide national audience while events such as regattas, festivals and exhibitions contribute at a more local level. Awareness-raising activities include projects that will provide the general public with high quality information on maritime heritage, accessible on the internet and in hard copy, such as MIDA (Marine Irish Digital Atlas), Bibliomara (an annotated bibliography of the cultural heritage of Ireland's coasts and seas), a forthcoming marine and coastal resource directory (Heritage Council web site) and resources offered by voluntary bodies such as the Irish Whale and Dolphin Group.

Ideally, awareness of the maritime environment and associated management issues should be instilled in all young people through the educational system. There remains a need to integrate into the primary, junior cycle and secondary curricula such topics as the global water cycle, marine climate change, sustainable fishing, life in the sea, biodiversity conservation, risks from waste disposal including sewage, impacts of farming and recreational activities, criteria of water quality, legal requirements and civic responsibilities. Literature designed to develop interest in Ireland's maritime legends, folklore and military history, would also be beneficial. In this way a new generation will gradually arise with greater understanding and appreciation of the vital roles that the sea performs in our everyday lives. This, in turn, would help to stimulate greater public involvement in marine resource management.

Some projects have already taken steps to improve maritime heritage education e.g., *From Skerrydoo to Carrickfadda – a study of Sligo’s coastline*. This project was a partnership between the Heritage Office in Sligo Co Council, Sligo Education Centre and 12 of Sligo’s primary schools from October 2001 - May 2002. Students studied a series of topics relating to their local sea shore through classroom activities and field work. The heritage of the sea shore was recorded and presented through artwork, photographs and multimedia presentations.

TOWARDS A NEW STRATEGY FOR PROTECTING IRELAND’S MARITIME HERITAGE

Part one of this document has identified a number of key policy elements which, taken together, advocate a new cohesive strategy for the sustainable use and development of marine and coastal areas that recognizes important heritage features and provides for their long-term protection.

The strategy should embrace:

- A comprehensive review of relevant policies and measures currently in place, and their efficacy to date, as a pre-requisite to developing an effective strategy for maritime heritage protection;
- A management framework for environmental protection and management that contains clearly-stated principles, policies and objectives;
- The implementation by planning authorities of available heritage appraisal methodologies (Heritage Council, 2000); and
- A campaign to raise awareness and improve education regarding maritime heritage.

Part two provides recommendations applicable to specific components of maritime heritage.

	ACTION	CONSIDERATION/FACTORS
MANAGEMENT PLANNING PROCESS	1 ADOPT OVERALL GOAL	PRINCIPLES SOCIAL NEEDS HUMAN RIGHTS
	2 IDENTIFY SPECIFIC VALUES & RESOURCES, ASSIGN PRIORITIES	NATIONAL PRIORITIES SPATIAL STRATEGY POLICIES ECONOMIC CONSTRAINTS CULTURAL MORES
	3 NOTE HERITAGE CHARACTERISTICS REQUIRED AND TOLERANCES OF CALUES/RESOURCES TO BE PROTECTED	COASTAL MODELS EXPOSURES SEASONALITY
ENVIRONMENTAL IMPACT ASSESSMENT PROCESS	4 DESCRIBE EXISTING HERITAGE: PHYSICAL BIOLOGICAL, ECONOMIC & OTHER CHARACTERISTICS	BROAD SURVEY USE PATTERNS NATURAL PHENOMENAL SEASONAL VARIATION
	5 DESCRIBE AND QUANTIFY EXISTING THREATS, RISKS AND IMPACTS	DISCHARGES HARVESTING DEVELOPMENTS TOURISM
	6 DETERMINE OPPORTUNITIES & MEANS FOR REDUCTION IN THREATS, RISKS AND IMPACTS	PROHIBIT LIMIT ACCESS DIVERT ELSEWHERE TECHNICAL FIX
	7 IDENTIFY AND ASSESS ALTERNATIVE MEANS FOR CONTROL OF THREATS, RISKS AND IMPACTS	ECONOMICS EFFICIENCY COMPLICATIONS EXPERTISE
REGULATORY PROCESS	8 IMPLEMENT MOST EFFECTIVE CONTROL	LEGAL ADMINISTRATIVE TECHNICAL, SOCIAL INCENTIVES
	9 MONITOR TO ASSESS PERFORMANCE OF CONTROLS	REGULAR SAMPLING INDICATORS SOCIAL SURVEY
	10 REVIEW CONTROLS IN THE LIGHT OF PERFORMANCE AND OBSERVED IMPACTS	IMPROVEMENTS INCREASED EFFICIENCY NEW KNOWLEDGE

FIGURE 3: COMPREHENSIVE FRAMEWORK FOR THE MANAGEMENT OF HERITAGE IN COASTAL AREAS.

MAJOR COMPONENTS OF IRELAND'S MARITIME HERITAGE:

PART 2: THEIR STATUS, GOVERNANCE AND MANAGEMENT

2.1 INTRODUCTION

There is a vast amount of technical and descriptive literature about the coasts of Ireland and surrounding waters. This part of the report draws extensively on this literature but does not attempt to summarise it nor to represent all previous findings regarding the condition of Ireland's maritime heritage. The interested reader is strongly encouraged to consult this valuable national archive concerning our coastal environment, its physical character, wildlife, resources and the many natural and anthropogenic pressures to which it is subject. In recent years, a small number of publications have appeared that review and list hundreds of documents addressing many different aspects of our maritime heritage. For convenience, the publications marked by an asterisk (*) in the reference list given at the end of the report can be recommended as initial sources of information.

For each heritage component discussed in this part of the report, a set of recommended actions is provided to assist the relevant departments and agencies in addressing the issues identified. Regarding the order in which these actions are presented, no priority is either intended or implied.

2.2 ENVIRONMENT

2.2.1 *Seascapes*

Seascapes is the term used in the Heritage Act, 1995, for coastal areas including estuaries, bays and lagoons of significant scenic, ecological, geological and other scientific interest, i.e., coastal landscapes. Since 2002 the Heritage Council has been advocating an integrated approach to the development of Ireland's landscapes and seascapes. The recommendations in this report build on that approach. The concept of marine seascapes, based on characterisation of the sea bed, is being developed elsewhere but is outside the framework of this document. Data collected as part of the Irish National Seabed Survey (INSS) will advance greatly the characterisation of Ireland's sea bed.

SCOPE AND RELEVANCE

Ireland's coastline is noted for its magnificent seascapes made up of sandy beaches, rocky inlets, large bays skirted by mountains, offshore islands, drowned valleys and even, in the case of Killary Harbour, a fjord. The west and south coasts, in particular, characterized by small historic port communities in proximity to clean beaches and unspoilt scenery, attract numerous visitors from home and abroad. Thus, in addition to being part of Ireland's natural heritage, seascapes are unquestionably a vital and irreplaceable part of regional economies.

CURRENT STATUS

Ireland's scenic coastline is threatened by poorly planned development, including the spread of holiday homes, caravan parks, golf courses and insensitive siting of tourism and aquaculture facilities. With regard to housing, a report (Boelens *et al.*, 1999) on Ireland's marine areas notes that 'in certain cases this form of development has left an indelible mark on the landscape, with suburban clusters appearing on some previously remote and pristine parts of the coast. In its recent proposals on rural housing, the Heritage Council notes the impact of single houses, especially roadside developments, on seascapes as well as landscapes generally. Visually intrusive developments can permanently detract from the natural beauty of the coast and reduce potential to attract the more discerning, and generally more lucrative, type of tourism. To date, only a few counties have taken steps towards long-term protection for coastal landscapes.

GOVERNANCE

In principle, the visual and aesthetic qualities of coastal landscapes are afforded protection under local planning legislation and, where important wildlife habitats are concerned, under international legal instruments such as the EU Habitats Directive and the European Landscape Convention ratified by Ireland in March 2002.

MANAGEMENT ISSUES

The coast is under pressure from many competing uses and interests. The preservation of Ireland's remaining unspoilt coastal landscapes is not assured and further losses will mark a failure to achieve sustainable development of the coastline. Coastal land-forms and habitats such as dune systems, beaches, estuaries, wetlands, lagoons, sand and gravel deposits, the associated flora and the geological and hydrological processes that

sustain them, are integral parts of the coastal landscape. Combined with the cultural landscapes made up of archaeological, historical and vernacular remains, these form a key part of our national heritage. At present, much of this heritage is under threat from urbanization, speculative housing and tourism infrastructure.

RECOMMENDED ACTIONS

1. The Heritage Council has issued a number of recommendations (Heritage Council, 2002) and priorities to strengthen protection of Ireland's landscapes, drawing on the outcome of an international conference held in Tullamore in 1999. Whereas the recommendations developed are not specific to the coasts, they are in the main as relevant to the coastline as the hinterlands. Particular weight is attached to introducing an agreed and consistent methodology for landscape characterization, embracing both natural and cultural features, and the publication of national landscape guidelines. Progress in these areas has been limited and should now be accelerated.

2. In assessing coastal development proposals under the planning legislation, it is vital that responsible agencies take into account the visual impact, especially the location, density and design of proposed buildings, facilities and amenities and the ecological impact of activities and practices both on and off shore.

3. Those responsible for coastal planning decisions should have adequate specialised training in, or access to advice on, all aspects of environmental protection and management, including landscape protection, and decisions reached through a multidisciplinary approach covering a variety of professional skills.

2.2.2 *Water quality*

SCOPE AND RELEVANCE

Clean beaches safe for bathing, seafood safe to eat, diverse and productive marine ecosystems and healthy populations of marine birds and mammals are national assets and important parts of our national heritage. To various extents, they are all dependent on seawater quality. Thus, measures to protect the quality of seawater and the underlying seabed, and to guard against long-term or large-scale damage to marine resources, are necessary and in the national interest.

Public perceptions about the quality of salt water are different to those of freshwater. A significant percentage of the population lives remote from the sea and, apart from occasional visits to beaches, many people have neither the opportunity nor the knowledge to assess the pollution status and ecological health of estuaries and coastal waters. For regular beach users, a Blue Flag award is an important indicator of water quality. Seawater is not used for drinking and seldom has the clarity of uncontaminated rivers and lakes; thus, the visual appearance of salt-water systems can be misleading.

CURRENT STATUS

All of Ireland's estuaries and coastal waters are affected to some extent by human activities, even though the changes may be minor and difficult to measure. Many estuaries have experienced siltation as a result of farming and construction upstream. Navigation channels and harbours have been deepened by dredging, changing current patterns and communities of bottom-living organisms. Fishing, especially bottom-trawling for flatfish, scallops and prawns have in some places radically altered benthic habitats. Mariculture frequently over-enriches sediments and alters the structure of adjacent communities. For centuries trace amounts of contaminants enter coastal environments from rivers, the atmosphere and by transport from the open ocean. In short, pristine conditions no longer exist in the marine environment and attempts to restore them would be unlikely to succeed.

The last major assessment (Boelens *et al.*, 1999) of Ireland's marine and coastal areas concluded that, from the available evidence, the main human pressures on marine water quality are concentrated in defined areas, broadly summarised as follows:

- Heavily urbanised estuaries, major ports, semi-enclosed bays and inlets, surrounded by high densities of population and industry; and
- Estuaries and inlets receiving high organic/nutrient loads from the catchments or, in a few cases, with a legacy of contaminant inputs from past mining operations.

The report also indicates that contamination from rivers, sewage disposal and the atmosphere has generally been greater, and often more influential, than contamination from industry. Intensive exploitation of living resources, habitat modification and

disturbance, have almost certainly had a greater influence on species and communities than pollution. Contamination by nutrients in run-off from farmland, and the associated effects of eutrophication, represent continuing risks to the quality of seawater and marine life.

GOVERNANCE

Estuaries and coastal waters are protected under both national and international legislation. Ireland ratified the United Nations Convention on the Law of the Sea (UNCLOS) in 1996; in doing so it transferred competence in certain matters to the European Community. UNCLOS establishes for all states the unqualified obligation to protect and preserve the entire marine environment. More specific international obligations exist under the regional OSPAR Convention, including measures to prevent pollution from all sources and habitat loss. At least 10 EU directives contribute to marine environmental protection; they cover the quality of bathing waters and seafood, the conservation of habitats and seabirds and discharges of sewage and nutrients. These international instruments are backed up by at least 14 national laws for protection of the environment, fisheries and marine resources, enacted from 1959 to 1992.

The EU Water Framework Directive (WFD), introduced in December 2000, marks a new departure in protection of near-shore waters in that it requires entire marine ecosystems to be maintained in near-pristine condition. This presents formidable challenges, both administrative and technical. Prior to the WFD, water management in Ireland and elsewhere was based on achieving compliance with environmental quality standards that were considered safe and acceptable while allowing some departure from 'natural' conditions. This approach was founded on the principle that use of waterbodies for the benefit of society was acceptable providing the impacts were limited in magnitude, space and time.



MANAGEMENT ISSUES

The Heritage Council sees the protection and wise management of seawater quality, and the quality of the underlying sediments, as key requirements in preserving Ireland's natural marine heritage. The Council supports the aims of the Water Framework Directive whilst recognizing that implementation of the Directive in the context of the marine environment presents significant technical and administrative challenges. Some important technical issues relevant to implementation of the WFD in transitional and coastal waters are described in the box below. The Council believes that continued use of Best Environmental Practice as a tool in managing and regulating practices affecting seawater to be an appropriate and entirely consistent adjunct to WFD implementation.



**Applying the EU Water Framework Directive (WFD) to marine waters:
some technical issues**

Many of the approaches required by the WFD are new and so far untested. Although the Directive outlines the technical approaches to be adopted in general terms, the precise reference values and monitoring procedures to be used will be determined by expert committees. A problem facing these committees is that, for many of Ireland's estuaries and coastal waters, there has not yet been sufficient research to determine what values represent good ecological and chemical quality. These difficulties are compounded by the knowledge that there is immense variability in conditions at different locations (even over short distances) and times (e.g., seasonal, annual etc.). The Heritage Council stresses the dangers inherent in establishing reference values before the associated variability is properly understood. Attempts to interpret monitoring data on the basis of inappropriate reference values could lead to erroneous conclusions regarding the state of Ireland's marine ecosystems. Current research efforts need to be extended to lay the foundation for successful application of the WFD to the marine environment.

There is a need to identify and monitor natural variations within populations and communities of marine organisms. However, the setting of ecological reference values will be further complicated by predicted changes in marine climate. Increasing seawater temperatures, already occurring in the region, will most likely lead to changes in marine biodiversity and ecology as well as patterns of primary production. Scientific investigations to keep these developments under continuous review should be an integral part of WFD implementation. Taking into account currently predicted climate change scenarios, periodic adjustments to reference values that recognize the changing environmental conditions will almost certainly be needed, possibly at decadal intervals.

Different water quality standards will be considered under the WFD for certain waterbody sectors where valued human activities have resulted in major and irreversible changes i.e., heavily modified water bodies. The objective for these waterbodies is Good Ecological Potential instead of Good Ecological Status. Sectors of the marine environment that might be considered as 'heavily modified' are currently under consideration and possible candidate areas include ports and harbours, estuaries, navigation channels and docks, reservoirs and artificial lakes. Also in this context, important decisions must be made regarding the status of fishing grounds where the fishing methods adopted cause major

changes to natural communities (e.g., benthos). Indeed, in the case of all localities where the environment has been modified as a result of long-established practices, it is important to clarify whether or not in assigning reference values the modified environments will be regarded as natural or 'heavily modified'.

The WFD requires responsible agencies to provide for public participation in preparing water management plans. In a previous submission to government, the Heritage Council highlighted the importance of developing a fully interactive process of public consultation to ensure public confidence in, and support for, the WFD. The Council stressed that the full benefit of public consultation is more likely to be achieved through improved understanding and awareness of water resources, their ecological and social importance and the pressures imposed on them by various human activities. Accordingly, it would be worthwhile to inform the public about the need for, and significance of, the WFD by various means such as leaflets to householders, public seminars and debates and well-publicized programmes on radio and television.

Public support for the WFD will depend on the actual and perceived effects (including socio-economic effects) of WFD implementation. It is important that the relevant water quality reference values are realistic and do not place unnecessary constraints on legitimate and well-established activities that are important to social and economic life in Ireland. The specific goals of the WFD must be feasible and measures introduced to achieve these goals should not be disproportionate to the benefits gained, in either social or economic terms. The Heritage Council interprets the overall goal of the WFD to be the achievement of good ecological and chemical quality of water while allowing for legitimate beneficial uses of both terrestrial and aquatic environments.

A frequently neglected component of awareness creation is the regular publication of state expenditure in protecting and managing water resources. The overall costs of WFD implementation should be clearly apparent to the Irish public. It is important that the costs of water and sewage treatment, pollution abatement, monitoring, WFD administration and ancillary costs become a visible part of annual accounts issued by central and local government. When compared with the value of water supplies, water-based recreation and tourism (e.g., angling, boating, ecotourism etc.) these WFD expenditure statements would serve to demonstrate the net benefits of protecting water resources.

RECOMMENDED ACTIONS

4. A campaign to explain the relevance of the WFD to seawater quality should be mounted at an early date, aimed both at schools and the public at large;
5. It is essential that ecological reference values for marine waterbodies take into account natural variability and, in the case naturally-occurring pollutants, local geochemistry;
6. Research to improve understanding of natural variability in Irish estuaries and coastal waters should be significantly expanded;
7. A programme for monitoring indicators of marine climate change (e.g., sea temperature, sea levels) should be initiated in the very near future;
8. Because parts of some waterbodies can be heavily modified by a range of human activities as well as through physical alteration, human uses of surface waters should be taken into account in designating Heavily Modified Water Bodies (HMWB) as required by the WFD and also in defining sampling strategies for waterbodies not designated as HMWBs;
9. Annual expenditure on WFD implementation should be a clearly identifiable component of national and local government accounts.



2.2.3 *Biodiversity*

SCOPE AND RELEVANCE

Biodiversity is a key feature of our marine and coastal areas. It is the huge variety of plants and animals, from lichens to seaweeds, from insects to birds and mammals, that characterize maritime ecosystems and the genetic variation in each species. Through its role in the construction and maintenance of marine ecosystems, biodiversity provides natural goods and services that support human welfare and, ultimately, life on the planet. Each of the many habitats, from lagoons to machair to mud flats, tidal and the vast sub-tidal areas, has its own plant and animal community. Many species depend on more than one habitat for different stages of their life-cycles. Increasingly, marine and coastal ecosystems are subject to pressures from human activities, often resulting in changes that threaten the continued existence of certain species and even entire communities. Loss of biodiversity is a serious issue and a major consideration in the quest for sustainable development.

CURRENT STATUS

Loss of biodiversity is of major concern to the EU and member states, including Ireland, have initiated strategies to address the problem. Ireland's National Biodiversity Plan issued in April 2002 notes that biodiversity 'is an integral part of Ireland's heritage'. It states that the planned coastal zone management programme should aim to conserve the best remaining areas of importance for biodiversity in the coastal context.

Apart from establishing Special Areas of Conservation (SACs) and designating Natural Heritage Areas (NHAs), so far there is little evidence of progress in protecting Ireland's marine biodiversity. To date, the main emphasis has been on research to improve species' inventories while guidance on how such information should be used is lacking. Nevertheless, during the Irish presidency in 2004, EU Heads of State and Government made a commitment to halt the loss of biodiversity by 2010. A range of measures will be used to achieve this ambitious target. The feasibility and cost of this commitment are, however, far from certain.



GOVERNANCE

Ireland is party to the Convention on Biological Diversity (1992) aimed at both the conservation of biological diversity and the sustainable use of its components. The EU has taken various actions to protect biodiversity, in particular the introduction of the Habitats Directive (1992) transposed into Irish law in 1997. The principal biodiversity-related legislation in Ireland is the Wildlife Act (1976) as amended in 2000. The National Parks and Wildlife Service (NPWS) of the Department of Environment, Heritage and Local Government (DEHLG) has the primary brief for nature conservation in Ireland. The National Biodiversity Plan (2002) promotes a catchment approach to protecting and improving water quality and management in line with the requirements of the Water Framework Directive. Other key objectives of the plan are the provision of special guidelines on preventing impacts on biodiversity from aquaculture and fisheries; biodiversity surveys and research in the marine ecosystem should be enhanced and relevant agencies (e.g., the Marine Institute, Fishery Boards) should develop biodiversity Action Plans and dedicated biodiversity units. Agencies such as the DCMNR are required to draw up sectoral biodiversity plans

Much of the loss of biodiversity in the marine environment results from poorly informed management of living resources and their habitats due to insufficient research. A contributing factor is sometimes conflicting mandates between government departments such as the DCMNR and associated agencies (Marine Institute (MI) and Bord Iascaigh Mhara (BIM)) and the NPWS. Greater commitment to the full implementation of our obligations under international treaties would also be beneficial.

MANAGEMENT ISSUES

Biodiversity is essential for sustaining human life and livelihoods and is a vital provider of natural capital, goods and services on which many communities rely¹. It is important to understand that habitat and ecosystem conservation is the only long-term means of maintaining biodiversity, thus an eco-system approach (see following paragraph) is necessary, supported by appropriate sociological and socio-economic research. Unless accompanied by fishery closures and restrictions on other extractive activities, marine reserves designated to protect biodiversity will not be effective. Deep-water ecosystems, where growth rates and productivity are low, are especially vulnerable to exploitation. In this context, new opportunities for deep-sea research to gain access to



¹ EPBRS, *Killarney Declaration and Recommendations on Biodiversity Research, May 2004*,

off-shore environments is to be welcomed. The National Biodiversity Research Platform was established by the Environmental Protection Agency (EPA) and NPWS in 2003 and is currently prioritizing areas for research in Ireland, including studies of coastal and marine biodiversity.

The EU Communication, "*Towards A Strategy To Protect And Conserve The Marine Environment*" (2002) proposes an ecosystem approach. Management structures in Ireland should be aimed at an ecosystem level as has been adopted by other member states such as the UK, and Netherlands.

Further education is required, especially within schools and local authorities, to convey the importance of biodiversity and its conservation. Local biodiversity plans to be drawn up and implemented by local authorities should assist in this regard. Such plans will be meaningless unless adequate resources and structures are provided to implement them and to review their efficacy. A number of marine and coastal areas are designated under the Birds and Habitats Directives (SPAs, SACs). Others are identified as being of national importance for nature conservation (NHAs). The management plans for these areas should be drawn up in consultation with users and landowners affected and adequate resources provided to implement them. The plans should establish a baseline for the heritage value of the areas against which future changes can be monitored. The involvement of landowners, fishermen and local communities in the management of designated areas is the key to their long-term protection.



While many sites identified under the Ramsar Convention and as Important Bird Areas (IBAs) are already in the list of sites designated under Birds and Habitats Directives (SPAs, SACs), efforts should be made to ensure all Ramsar sites and IBAs are given appropriate statutory protection. Steps should be taken to realise the commitment by Ramsar contracting parties, of which Ireland is one, “to formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory’ (Ramsar Convention Article 3.1). The convention defines wise use of wetland as: “their sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem’ (Davis, 1994).

RECOMMENDED ACTIONS

10. Establish a suitable consultation procedure between the DCMNR and its associated agencies (MI, BIM) and the NPWS on all matters relating to use and development of living marine resources and their habitats;
11. Within sites designated under the Birds and Habitats Directives there should be no expansion of existing, or establishment of new, fisheries until a time that stocks have recovered to good ecological status;
12. In order to conserve biodiversity within designated sites and in buffer zones around these, a network of no-take zones or sanctuaries should be established precluding access and/or particular methods of exploitation;
13. A moratorium be put in place by DCMNR on any extractive activities (fishing, exploitation of mineral resources) in and around designated or pristine cold water coral reefs. Research on geology of the reefs should be permitted where scientifically justified;
14. Management of Ireland’s marine and coastal areas should be aimed at an ecosystem level;
15. The Biological Records Centre should allocate appropriate resources to marine mapping of species distribution, including existing initiatives, to remedy the dearth of marine distribution data.
16. Ensure that Local Biodiversity Action Plans in coastal areas have a marine component;

17. Develop and implement the concept of offshore biodiversity protection plans; and
18. Adopt the wise use of wetlands as espoused in the RAMSAR convention and protect all RAMSAR sites and IBAs.

2.2.4 Climate change

SCOPE AND RELEVANCE

The prospect of climate change, and resulting physical impacts on coastal areas, has great significance for the way we manage our maritime heritage.

Temperature, wind, rain and related phenomena such as ocean currents and salinity, combined with coastal topography, determine the nature of coastal ecosystems. The natural diversity and productivity of our marine environment, fish resources and aquaculture potential, are a result of climatic conditions that have evolved over thousands of years. Relatively rapid changes, such as those now occurring, can be expected to alter the nature and stability of the coastline as well as marine habitats, flora and fauna.

CURRENT STATUS

There is now ample evidence that Ireland's marine climate is changing in response to global warming, caused primarily by high emissions of carbon dioxide to the atmosphere. Presently predicted increases in sea surface temperatures to the east, west and south of Ireland are 1-1.5 °C by 2050s and 2-2.5 °C by the 2080s (Hulme *et al.*, 2002)². Such increases will affect the distribution, diversity and abundance of marine life around the coasts. Some species may move northwards, others will migrate into Irish waters from the south. There are already clear signs of northerly migrations of planktonic species in adjacent waters e.g., the North Sea (Edwards *et al.*, 2002)³.

Continued warming will also cause a rise in sea levels and an increase in storm intensity which, together, will result in increased coastal erosion, flooding and inundation of low-lying areas. Some coastal wetlands may be lost; new ones may be formed further inland. These physical impacts will present greater risks of damage to coastal structures including archaeological remains, quays and harbours. Ecosystem effects will include

² Hulme, M., Jenkins, G.J., Lu, X., Turnpenny, J.R., Mitchell, T.D., Jones, R.G., Lowe, J., Murphy, J.M., Hassell, D., Boorman, P., McDonald, R. and Hill, S. (2002). *Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report*. Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK. 120pp

³ Edwards, M., Richardson, A., Batten, S. & John, A.W.G., 2004. *Ecological Status Report: results from the CPR survey 2002/2003*. SAHFOS Technical Report No.1, 8pp.

changes in plant and animal communities, incursions of exotic species, disruption of shellfish beds, changes in reproductive patterns, food chains and productivity. Provided climatic and related environmental changes take place gradually, it is expected that many natural communities will have the capacity to adapt to the new conditions, rather than undergoing radical change or collapse.

Conversely, there is some evidence that atmospheric warming could eventually lead to a cooling of Ireland's climate due to a slowing down of the Gulf Stream that keeps our surrounding seas far warmer than normal for this latitude. The salinity reductions in sub-Arctic waters that are thought to precede a weakened Gulf Stream, although at an early stage, are already occurring (Gagosian, 2003)⁴. The impacts of this much colder scenario would clearly be different, but certainly no less significant, to those of a warmer climate.

ROLES AND RESPONSIBILITIES

Climate change is of global significance and there are established programmes within the UN system⁵, as well as the EU, to study, model and predict variations in marine climate and to advise governments on likely impacts and necessary adaptive responses. In Ireland, Met Éireann, the MI, EPA, NPWS and university research groups have important roles in facilitating and conducting research into the manifestations and effects of climate change.

MANAGEMENT ISSUES

In developing management plans and policies for protection of any aspect of maritime heritage, the responsible agencies should take into account recent evidence for, and predictions of, climate change effects so as to set priorities and devise the most practical and cost-effective options such as doing nothing, coastal protection, or managed retreat or realignment. For example, it would be important to survey and document the most vulnerable coastal cultural features before they are destabilized, eroded or lost through storm action so that the best possible records are available for future study. Where physical protection measures are feasible (e.g., relocation to more secure sites, coastal defences etc.) the cultural features of greatest national or international value or rarity, and most likely to benefit, should be given priority in terms of available funding and

⁴ *Gagosian, R. B., 2003. Abrupt Climate Change: Should we be worried? Prepared for a panel at the World Economic Forum, Davos, Switzerland. Woods Hole Oceanographic Institution, 15pp.*

⁵ *For example, the Global Ocean Observing System of the Intergovernmental Oceanographic Commission (IOC), the Intergovernmental Panel on Climate Change (IPCC).*

engineering resources. Where important marine habitats are likely to be significantly reduced in extent by climate change, remaining portions of those habitats may warrant designation. Areas with the potential for developing new intertidal habitats should be identified and the development of these habitats actively encouraged. Many intertidal habitats act as important natural sea defences e.g., mudflats and salt marshes, thus emphasizing the need to protect and manage these sites.

As all maritime communities, industries and activities will be affected by climate change, it is essential that monitoring of key marine climate indicators (i.e., physical and biological) is sufficient to develop the best possible capabilities for climate modelling and prediction. There is much scope for improvement in this regard.

Finally, policies to reduce activities that exacerbate climate change should be promoted at national level.

RECOMMENDED ACTIONS

19. In developing plans for the protection and management of maritime heritage, ensure that the likely effects of climate change are taken into account, e.g., through regional planning guidelines and county development plans;
20. Responsible authorities such as DCMNR and local authorities should co-ordinate and prioritise maritime heritage management initiatives in accordance with the vulnerability of heritage features, both natural and cultural, to climate change as well as their cultural importance. Areas with the potential for developing new intertidal habitats should be identified and the development of these habitats actively encouraged;
21. As coastal erosion is largely a natural process and the coast forms an important element of Ireland's heritage, develop an unambiguous national policy for erosion management, with a strong element of public education, in order to avoid excessive costs and negative impacts of inappropriate coastal protection schemes that afford no real gain to long-term coastal protection; and
22. Accelerate investment and activity to measure key marine climate indicators with links to relevant European and global programmes.

2.3 LIVING MARINE RESOURCES

2.3.1 Offshore policy considerations

Over the past decade, we have seen an unprecedented increase in activity in Ireland's offshore waters, (i.e., from 12 nautical miles out) from extensive seabed surveys to the establishment of new deep-water fisheries, energy extraction and discovery of new marine ecosystems. Clearly, we are now in an exciting era of exploration and exploitation and this requires an imaginative policy framework to ensure both exploration and exploitation can work together in equal partnership in Ireland's offshore environment. Some important recent developments are as follows:

Seabed Survey: The Irish National Seabed Survey (INSS – see box) will cover 565,000 km² resulting in the most extensive high resolution map of the seabed of any country in the world. The survey is one of the most exciting and revolutionary initiatives in Ireland's offshore environment. The Survey encompasses an area that is approximately ten times the size of Ireland's land area and this seven year initiative will cost the exchequer €33 million. Maps that result from the INSS are a pre-requisite for the policy evolution, management and sustainable development of Ireland's marine resources to ensure they are not exploited for short-term gain. The Geological Survey of Ireland (GSI) is responsible for the INSS data which is made available to government bodies and research institutions, under a data agreement, to progress an understanding of our heritage and for habitat studies. Applications forms are available on web site www.gwiseabed.ie

Cold water coral: The existence of species-rich, cold-water coral reefs is one of the most fascinating recent discoveries in Ireland. The reefs are some of the most biologically diverse habitats in Irish waters and Ireland is estimated to have nearly 60% of all cold-water coral reefs in the NE Atlantic. Up to 800 species have already been found associated with deep-water corals. These reefs are also of high geological interest and further studies are necessary to gain a fuller understanding and appreciation of this eco-system. It should be recognised that techniques which may be invasive or locally destructive (such as drilling) may be essential. Recent drilling on the Challenger Mound has yielded important information on the genesis of the mound. This mound currently does not have any live coral inhabiting it. Further work will be required to understand why coral continues to thrive on some mounds and not on others.

Deepwater fish species: Catches of demersal fish species in Ireland are increasing. Although quotas for deep-water fish species are small (1,001 tonnes in 2005), non-

quota deep-water species make up a considerable portion of the present increase in demersal catches. We know very little about the life history of these species apart from the knowledge that they are very slow growing and take many years to reach sexual maturity (see Recommended actions, 2.3.2).

Several countries such as Australia have drafted an integrated oceans policy and New Zealand and the USA are working on similar documentation. In all cases the policies are designed to support the sustainable management of sea areas under national jurisdiction using an eco-system approach to the protection of biodiversity. Ireland might consider taking a similar approach, especially in the light of the data generated by the INSS.

RECOMMENDED ACTIONS

23. Development of integrated policies for our seas based on UNCLOS, the EU Marine Strategy and OSPAR;
24. Provide sufficient levels of funding to complete the INSS;
25. Draw up plans for the application of INSS data, including their usage in habitat conservation, biodiversity maintenance and maritime heritage management;
26. Assess the environmental impact of exploration, especially the use of acoustic techniques;
27. Carry out a Strategic Environmental Assessment of the impact of Ireland's renewable energy programmes on the marine environment, including the cumulative effects of multiple licenses;
28. Assess the long-term impacts of offshore wind farms and tidal barrages on the natural heritage;
29. Prohibit the construction of offshore wind farms in designated areas or habitats;
30. Preclude the issue of extraction licences for offshore sites with cold water coral reefs, carbonate mounds and other biologically diverse substrates; and
31. Restrict the harvesting of maërl, an exceptionally biodiverse subtidal habitat; extensive areas of maërl should be preserved and management plans put in place for the sustainable use of specific dead deposits in accordance with the EU Habitats Directive.

NATIONAL SEABED SURVEY

The Irish National Seabed Survey (INSS) Phase 1 (1999-2005) marked Ireland as the first country in the world to proceed with such an extensive project of mapping its national marine territories. The INSS has developed efficient and extensive methodologies and infrastructure and to date has mapped over 87% (~725,000 km²) of the Irish continental marine area. Surveying has so far concentrated on the offshore area in water depths greater than 200m.

With an increasing number of legislative drivers and demands for comprehensive and integrated marine data, mapping of inshore areas (0 to 200m depth) is becoming increasingly vital for the management and sustainable development of Irish marine resources, including conservation of Ireland's maritime heritage. To date the INSS has employed single beam and multi-beam echo sounders for precise recording of seabed depth and terrain, associated back scattering from the multi beam sounder, sub bottom profiling of sub-seabed geological structure and recording of variations in magnetic and gravitational properties. In addition, sediment samples have been taken at regular intervals to validate signals from echo sounders and the water column has been sampled to obtain profiles of conductivity, temperature and depth to allow calculation of density variations which influence the speed of sound through the water column.

The data enable a picture of the seabed's character and topography to be built up including slope, roughness and seabed material. This includes wrecks, which can be seen as outlines on the seabed or appear in sub-bottom data and, in the case of iron ships, in magnetic data.

As the survey has moved into shallower water the rate of coverage has slowed due to the narrower swath coverage of the acoustic survey beams. Phase 2 will enable an increase in the integration of survey functions to accommodate the increasing interest and activity in coastal waters. Greater attention will be paid to economic, social and heritage interests in a more encompassing, ecosystem approach. This will improve the information available for purposes of integrated maritime heritage, conservation and policy development.

2.3.2 Fisheries

SCOPE AND RELEVANCE

Sea fisheries are an important source of food and employment and a vital component of our national maritime heritage. Although the sustainability of fish stocks is a long-established objective of fishery management, this has proved difficult to achieve. A quote from a previous EU Commissioner, Frans Fischler, stresses the importance of good fishery management:

‘Sea fish are a natural, renewable and mobile resource. No fishermen or state owns them. On the contrary, fish stocks are a resource that belongs to all – a common heritage in need of common management. This is why we have formulated rules to protect the wealth of our seas and guarantee the future of the fishing industry. Any activities conducted breaking these rules undermine our efforts to conserve and manage fish stocks and can even lead to the destruction of fishing grounds.’

Within the EU, fisheries management has been governed by the Common Fisheries Policy (CFP) since the early 1970s. Despite the fact that 11% of EU waters are within Ireland’s proposed Exclusive Economic Zone, Ireland enjoys just 4% of the quota.

The modern approach to stock conservation adopts a precautionary approach whereby stocks are managed to maintain fishing mortality rates and spawning stock biomass within pre-set limits (reference points) beyond which the stock is considered to be outside Safe Biological Limits and the fishery to be unsustainable. Management measures include the allocation of resources (Total Allowable Catches and quotas), controls on vessel and fleet size, technical measures (e.g., selective fishing gear types), efficiency assessments and consideration of environmental effects and the welfare of coastal communities. Another management objective is to minimise the impact of fishing activities on marine ecosystems and, in particular, non-target species and sensitive habitats. The CFP also embraces access, control and surveillance, marketing, third country and other agreements and fisheries research. However, it is widely accepted that the CFP has not been successful in realising its objectives.

The recently established Regional Advisory Councils, set up as under the reformed CFP, are giving stakeholders more involvement in the management of fisheries across

European seas to ensure better communications between the European Commission, the fishing industry and scientists. These councils will require adequate funding to ensure their effectiveness.

CURRENT STATUS

Some key whitefish stocks (cod, whiting, hake) in the waters around Ireland are in a critical state and in need of rebuilding. Most pelagic stocks (mackerel, horse mackerel), however, are currently in a relatively healthy state. In the past, scientific advice was based on single stocks (e.g., cod in the Irish Sea) but most fisheries catch a mix of species (e.g., cod, whiting, haddock, and plaice). Scientific advice on fishery management is developed by national representatives to a committee under the International Council for Exploration of the Sea (ICES).

GOVERNANCE

The Sea Fisheries Control and Management Division of the DCMNR is responsible for the development, implementation and enforcement of national and EU regulations on sea fisheries. Its central objective is to maximise the long-term contribution of the sea-fishing sector to the national economy.

The Central and Regional Fisheries Boards are charged with ensuring the observance of the Fishery Acts, By-Laws and Orders. Their purpose is to ensure the protection and conservation of the fishery resource. The Boards' responsibilities cover both inland waterways and coastal waters out to the twelve-mile limit. The species protected include salmon, sea trout, sea bass, molluscs, eels and all freshwater fish.

Bord Iascaigh Mhara (BIM) is charged with the responsibility for promoting the sustainable development of the seafish and aquaculture industry. BIM implements DCMNR policy in relation to fishing vessels less than 12 m, and is, at present, promoting a new, species-based, management framework for inshore fisheries.



MANAGEMENT ISSUES

Negative impacts on heritage from fishing include:

- stocks being exploited beyond recovery levels;
- damage by trawling gear to sea-bottom habitats; and
- by-catch of non-target species (e.g., fish, seabirds and mammals).

Over-fishing is the principal factor in the decline of certain Irish sea fisheries although pollution and, more recently, climate change may also have contributed. Despite constant refinement, and a shift from annual to multi-annual management programmes, management measures have failed to prevent the serious declines that have occurred in recent years.

Although stock assessment has improved greatly in recent decades, it is still difficult for fisheries scientists to determine the extent to which changes in stock status result from over-fishing, environmental factors or both. Thus, the scientists endeavor to counter-balance the uncertainty inherent in stock estimates by recommending precautionary levels of Total Allowable Catches (TACs). It is imperative that scientific advice on TACs is implemented by the responsible agencies.

Ireland has a number of traditional fisheries; many coastal communities depend on fishing for their livelihood. Thus, management to ensure sustainable fisheries



must balance the needs of humans and wildlife. More consultation between fishery managers, fishermen and conservationists would be beneficial. For example, there is a need for increased dialogue between DCMNR, MI, BIM, and NPWS with regard to reducing the impact of fishing, especially bottom-trawling, on certain sensitive marine habitats and communities. The BIM management framework for inshore fisheries may help to some extent in this regard.

RECOMMENDED ACTIONS

32. Continue to manage fish stocks on the basis of safe biological limits;
33. Ensure that all scientific data are presented in their purest form and that all decisions are consistent with the scientific evidence e.g., in the case of TACs;
34. Delay expansion of deep-water fisheries until species' life histories, especially growth rates, stock identities and reproductive biology have been determined;
35. Introduce Environmental Impact Assessments as a pre-operational requirement for new fisheries;
36. Encourage the use of selective fishing gear to reduce the catch of juveniles and by-catch of cetaceans, seals and other non-target species and to avoid damage to benthic communities;
37. Set minimum sizes for commercial fish and shellfish species;
38. Eliminate discarding of unwanted fish at sea;
39. Enforce closed areas and seasons in order for nursery grounds and juvenile stocks to mature;
40. Continue stock recovery programmes for species under threat;
41. Establish marine environment protection schemes (e.g., Special Areas under MARPOL 73/78, Annex 1); and
42. Enforce regulations governing wild salmon and trout exploitation.

2.3.3 Cultured species

SCOPE AND RELEVANCE

There is a long tradition of culturing and harvesting shellfish in Ireland (e.g., oysters) from the earliest settlers onwards. The physical remains of these activities deserve conservation as part of our cultural heritage. However, aquaculture (the farming of both fish and shellfish) has developed significantly in the past century and is now an important supplement to traditional inshore fishery production. Coastal fisheries are extremely depleted. Unless aquaculture activity replaces inshore fishery activity there will be an unavoidable decline in coastal communities and a loss of maritime heritage and traditional skills. In this situation economic activity underpins the survival of heritage.

CURRENT STATUS

Shellfish resources in Ireland have been grossly overexploited to the point where there are not more than three or four extensive beds of the native oyster still in existence. For example, the native oyster is all but commercially extinct in Galway Bay despite the well-known oyster festivals. The techniques of aquaculture will be essential if this situation is to be reversed. Nevertheless, in order to justify expansion of the aquaculture industry, the environmental side-effects must be clearly understood and strictly controlled.

GOVERNANCE

There are three organizations involved in the administration of Ireland's aquaculture operations: DCMNR, BIM and local authorities. The legislation governing aquaculture includes the Foreshore Act (1993), the Fisheries (Consolidation) Act (1959) and the Fisheries Act (1980) with Amendment (1997).

MANAGEMENT ISSUES

There is a long running and emotional debate about the impact of salmon farming on wild salmonid fish but amongst professionals there is no agreement on this issue. However, several points should be made. Sea trout and salmon stocks have declined in the last thirty years as fin-fish farming has expanded but, in the absence of salmon-farming, there is a very real possibility that wild populations would have been driven to extinction by over-fishing, as happened to oyster stocks in many places in Ireland.

Farmed salmon are fed largely on fish and fish oil derived from wild fisheries. Efforts are being made to widen this food base. Marine fisheries are under extreme pressure and using wild fish as a food for farmed fish is an inefficient resource use.

All aquaculture activities change their immediate environment, therefore some control in the location of aquaculture facilities is necessary. To date, however, there is little evidence of a severe impact on the marine environment due to aquaculture activity. The removal of vast quantities of filter feeding shellfish from coastal waters probably changed the marine environment in the last 100 years; shellfish aquaculture goes some way to reversing this change. It must nevertheless be carried out within sustainable limits.

As with fishing activities generally, aquaculture is an often untidy and unsightly activity. Improvement in visual impacts should be encouraged; BIM are already promoting such activity. Importation of organisms for culture purposes (e.g., brood stock, shellfish spat) has also resulted in the introduction of alien species to the Irish environment. This could have severe ecological impacts in some habitats. In all cases where species are imported for purposes of culture or fishery development, the ICES Code of Practice (ICES, 1995) should be applied. Aquaculture should only take place in designated areas where it is demonstrated that there will be no adverse impacts on the ecology of the designated site.

In summary, aspects of aquaculture that affect the national heritage include:

- Benefits to coastal communities;
- Possibilities for restoration of native shellfish beds;
- Poor siting and appearance of fish farms;
- Impacts on water quality both positive and negative;
- Impacts on seabed and benthic communities;
- Impacts on predators;
- Exchange of parasites and pathogens between farmed and wild fish;
- Potential genetic interaction between escaped farmed fish, and wild fish; and
- Inadvertent introduction of alien species (including disease organisms).



RECOMMENDED ACTIONS

43. Encourage sustainable aquaculture as a means of support for coastal communities and to protect scarce native shellfish, fin fish and algae;
44. The responsible agencies should expand research into sustainable aquaculture techniques, including techniques for assessing carrying capacity under various hydrographic and ecological conditions and possibilities for integrated aquaculture to reduce the overall ecological footprint;
45. Continue efforts to improve the visual impact of aquaculture operations on coastal landscapes;
46. Increase vigilance to prevent the accidental introduction of alien species through aquaculture activities;
47. Maintain programmes to assess the impacts of aquaculture on native species, on benthic communities and water quality; and
48. Establish projects to restore naturally occurring, historical shellfish beds e.g., oysters and scallops.



2.4 CULTURAL HERITAGE

2.4.1 MARITIME ARCHAEOLOGY

Our coastal areas contain a wide range of archaeological sites, relating to activities and historical events particular to each locality e.g., promontory forts, burial grounds, middens, landing places and fortifications. More underwater sites such as wrecks (both ship and airplane) and lost cargoes are being discovered due to increased research. The Underwater Archaeology Unit of the Department of Environment, Heritage and Local Government (DEHLG) has been working on a national shipwreck inventory. This archive has nearly 10,000 entries and is available for public inspection. Volume I of this inventory covering Louth, Meath, Dublin and Wicklow will be published shortly. While shipwrecks are part of a separate inventory and rest in a different physical environment to land based sites, it is important to recognise that such wrecks form part of the wider maritime context and are afforded specific protection under the National Monuments Acts.

During the course of the INSS, shipwrecks have been identified and mapped on an ongoing basis. A joint study by the Geological Survey of Ireland (GSI) and the Underwater Archaeology Unit of shipwrecks off the coast of county Donegal is due to start in late 2005.

Inter-tidal zones can contain archaeological structures such as fish traps of timber or stone, the remains of boats, trackways from the prehistoric and later periods, as well as sites and landscapes submerged by sea level rise. The archaeological potential of such marginal zones has been clearly demonstrated e.g., in the Shannon Estuary and at Strangford Lough. Work to identify and protect such remains particularly in areas proposed for development or subject to continued erosion should be given higher priority and adequate resources should be dedicated to this area. The palaeo-ecological value of inter-tidal areas must also be recognised as much information on previous changes in climate is preserved.

Recently, professional maritime archaeologists have begun to carry out underwater archaeological work which has largely been developer-funded. This is likely to place strains upon the archaeological profession in terms of training, conservation and



curation and may need to be addressed as part of a longer term strategy dealing with our marine archaeological heritage. Archaeological objects including sections of wrecked ships are the responsibility of the National Museum of Ireland.

The conservation of archaeological material removed from the sea bed is specialised and there are few conservation facilities in this country capable of carrying out such work. While *in situ* preservation is the optimum choice, strategies for the conservation of objects and material are required in order to provide appropriate facilities and resources to deal with this aspect of our heritage.

Increased erosion of the coastline will impact on coastal and inter-tidal archaeological sites and a strategy to prioritize sites requiring mitigation or adaptive measures will be needed. (see Recommendation 20)

RECOMMENDATION ACTIONS

49. Ensure a sufficient level of resources to continue the work of the Underwater Archaeological Unit in compiling archaeological data, publishing, extending and updating the inventory of shipwrecks (e.g., in accordance with INSS findings), so that appropriate advice can be provided to local, port and harbour authorities in respect of planning, development and the Foreshore Act;
50. Develop archaeological expertise within DCMNR as in the case of the Forest Service;



51. Develop educational material for sports divers, fishermen and the general public about the value of Ireland's underwater archaeological heritage and related protective measures;
52. Build upon work carried out in the Shannon Estuary and Strangford Lough and increase resources for research in intertidal areas and other neglected aspects of our maritime industrial and vernacular heritage and record the findings in the heretofore terrestrial Record of Monuments and Places;
53. Draw up plans to manage the impacts of increased erosion on archaeological sites in the context of a national integrated coastal management strategy; and
54. Encourage appropriate training and support of underwater archaeologists through bursaries and other means.

2.4.2 Built and vernacular maritime heritage

SCOPE AND RELEVANCE

There is an abundance of important structural heritage around the coast. Larger elements such as the principal harbours are extensively used and maintained but there are a large number of smaller harbours, piers and boat slips, many of which have been neglected. There are also lighthouses, coastguards buildings and military buildings and many vernacular features which describe a way of life which is now largely gone. This includes, for example, kelp kilns, kelp drying walls, curragh pens, fishing weirs and stone emplaced for seaweed growing.

CURRENT STATUS

Vernacular maritime features are vulnerable as their original use is long gone and their value unrecognised. Many are disappearing before proper records can be made. Many smaller harbours, piers and slips are not being maintained. Irish Lights are endeavouring to hand over redundant lighthouses to the Landmark Trust and military buildings have largely survived because of the superior construction used. Cultural aspects are also important; before long none of the generation which understands their significance will be around to provide anecdotal information. The Heritage Council has started to collate information on Ireland's maritime heritage, in the first instance by preparing an extensive bibliography of relevant literature (Heritage Council, 2004).

A national inventory of piers, harbours, lighthouses was commenced in 1997, based largely on 19th century Office of Public Works (OPW) records, but has not been completed. The work to date is available to the public.

GOVERNANCE

Historically, the five Royal Harbours, Kingstown, Howth, Ardglass, Dunmore and Donaghadee were transferred to the Office of Public Works when it was set up in 1831 and at the same time the smaller harbours, piers and slips which had been administered by the Commissioners of Fisheries were also transferred. Subsequent Acts were passed, the Fisheries Act 1846 and Relief of Distress Act 1880, and also the Sea Fisheries Act 1883, which established the Fishery Piers and Harbours Commission. These Acts authorised amounts in grant aid and offered loans for building further works and extending and repairing existing works through the second half of the nineteenth century. There was considerable destitution and unemployment at this time particularly in the west of Ireland and promoting fisheries was one way in which the administration sought to address this. Some of the costs were levied on the counties through the Grand Juries, in particular for approach roads. The establishment of the Congested Districts Board in 1891 led to further works.

By the 1890s the Board of Works listed 350 piers and harbours, many of them on the west coast. In some cases the Board collaborated with harbour boards which administered the larger harbours. The Marine Works Act in 1902 authorised further grants. In 1987, when the Department of the Marine was established, the marine division of the Office of Public Works (OPW) was transferred to it. The 1996 Harbour Act placed eight major trading ports – Dublin, the Shannon Estuary & Foynes, Cork, Waterford, New Ross, Drogheda, Galway and Dun Laoghaire - under state companies. Rosslare is administered by CIE and Greenore by a private company.

Coastguard houses, which had also been administered by the OPW, have mostly been sold to private owners. The operational lighthouses are maintained by Irish Lights and some of the disused ones have been handed over to the Landmark Trust, funded by the State through the Heritage Council. The Trust renovates them and converts them to rent out as holiday accommodation. Military buildings, many of them dating back to

the Napoleonic wars in the early 1800s, such as Martello Towers and forts and also a number of signal towers, are within the remit of the Department of Defence and some of them have been sold to private owners.

Archives held by harbour boards, port authorities, and other organisations provide important sources of information on our maritime heritage. Steps should be taken to ensure they are appropriately cared for, and where possible, that access for research purposes is encouraged. Co-ordination between the guardians of maritime archives should also be encouraged.

MANAGEMENT IMPLICATIONS

Sites of industrial and vernacular maritime interest may be (or may have been) overlooked in surveys carried out as part of county archaeological surveys or the National Inventory of Architectural Heritage (NIAH) especially if a site is post-1700 and does not hold architectural significance. Surveys are required to establish the current condition of harbours, piers and slips to assess their significance and suitable protective measures put in place, either through inclusion in the Record of Protected Structures or in the Record of Monuments and Places. These surveys should be carried out by DEHLG through the National Monuments Section and the NIAH. Many maritime sites could assume a role in marine-based tourism and recreation. County heritage plans should also provide measures to assist the protection and promotion of 18-20th century maritime structures, including those of a vernacular nature.

Increased erosion of the coastline will impact on these sites and a strategy to prioritize sites requiring mitigation or adaptive measures will be needed (see Recommendations 19 and 20).

RECOMMENDATION ACTIONS

55. Prepare an inventory of maritime heritage buildings, industrial and vernacular structures and artefacts associated with coastal life including, *inter alia*, harbours, slips and piers not administered by harbour boards or companies. This could be carried out at national and/or county level and findings included as appropriate within the Record of Monuments and Places and National Inventory of Architectural Heritage;

56. Encourage and facilitate collections of folklore and stories associated with maritime vernacular structures and artefacts at both county, local and regional levels;
57. Encourage the care of, and access to, maritime archives held by harbour boards, port authorities and other organisations including heritage organisations;
58. Improve co-ordination and collaboration between marine heritage archives at local, national and international levels; and
59. Raise awareness of the interest and significance of the built and archival aspects of maritime heritage.

2.4.3 Traditional and other boats of heritage value

SCOPE AND RELEVANCE

Over the centuries a rich variety of boats has been used in Ireland both on the sea and inland waters. New vessels have been built periodically based on well-tested traditional designs. There are also considerable numbers of boats that, although not categorized as traditional⁶, have nevertheless played important roles in Ireland's maritime history. Various examples of both traditional and historically important boats survive and are well worth preserving, as are accounts of the building and use of traditional boats by older and experienced members of the boating community. The origin, construction and use of old vessels hold a particular fascination for people of all generations including overseas visitors eager to explore Ireland's cultural background. Thus, they are of considerable value for research, education, recreation and tourism.

⁶ *There is ongoing discussion regarding the definition of a 'traditional' boat.*

CURRENT STATUS

The success of traditional-style boats in terms of performance and suitability of use in small-scale fishing and local transport is evident. Boats have survived for economic, functional, environmental and socio-cultural reasons. Fishermen still evince a preference for indigenous craft, as modern regattas demonstrate, but changing patterns in fishing has led to a decline in their use and official policy in relation to traditional fishing methods has led to the disappearance of many of the smaller types. While a significant number of traditional boats have remained in use, they are steadily disappearing and others are likely to follow. Likewise, the builders and users of traditional boats are diminishing in number; their memories and anecdotes are as important as the boats themselves. As the majority of traditional boats were built of wood, it has to be assumed that their survival in active use for more than c.100 years is unlikely. Sails and other accessories are unlikely to survive as long as this. Wrecks of traditional boats, however, may date back several centuries and can show evidence of much earlier boat types. There has been some movement of working boats into the recreational sector, which will help to preserve them, but many of the larger fishing boats are not suited to such a change in use. Modern safety requirements are an added problem particularly where passengers are involved.

GOVERNANCE

No agency has a specific brief for the conservation or restoration of traditional boats. Nevertheless, various groups of people with a shared interest in a particular type of boat



have come together to restore or otherwise conserve traditional boats e.g., the Galway Hooker Association. Traditional Boats of Ireland has been working for some time on the production of a book on Irish heritage workboats covering some 70 known types, about 12 of which are skin boats. A considerable amount of photography, surveying and recording was carried out for this publication; this material will be stored in the Department of Folklore in UCD as well as on the internet. It would seem appropriate to build on this initiative and to develop a more comprehensive register over time. There is also a recently formed group of enthusiasts of inland heritage boats, the Heritage Boat Association.

The National Museum has a collection of small vernacular boats stored in Daingean and the Ulster Folk and Transport Museum has a collection in Cultra. Private maritime museums around the country have examples of local boats.

MANAGEMENT IMPLICATIONS

In 2003 the Heritage Council completed a survey of the heritage boat sector which exposed the precarious condition of many boats both inland and around the coast and the lack of any co-ordinated effort to rectify this situation. A seminar in November 2004 brought together all the relevant and interested parties to explore the following issues: a) What are the core issues in caring for/using heritage boats? b) How should proper research and recording be carried out? c) Should there be a national maritime/boat museum? and d) How should heritage boat skills, including both construction and usage, be fostered?

There was strong support at the seminar for the idea that heritage boats should as far as possible be preserved afloat and in use as living heritage but, when necessary, examples of original craft need to be conserved ashore enabling possible replicas to be made. The enthusiasm of those attending the seminar would suggest if standardised methodology was established much recording could be achieved at local community level to build on the work being carried out by the Traditional Boats of Ireland project.

RECOMMENDATIONS ACTIONS

60. Record surviving traditional/heritage boats, including technical details, using standardised procedures;

61. Record the recollections, knowledge and anecdotes of traditional boat builders and users as a means of placing the boats in their proper cultural and social context;
62. Establish an archive(s) for the storage and retrieval of documentation gathered on heritage boats, boat builders and users;
63. Where possible examples of heritage boat types should be preserved afloat and in use but in particular cases they may need to be conserved. The principles of the Barcelona Convention on the conservation and restoration of traditional boats should be followed;
64. Promote access to the collection of traditional boats held by national institutions such as the National Museum;
65. Encourage continuity of existing regional and local maritime collections and greater communication and co-ordination between them;
66. Develop courses in traditional boat building and ancillary skills such as caulking and sail making; introduce appropriate grant support schemes within existing education/training systems (e.g., Institutes of Technology) to enable the requisite skills to be passed on to future generations; and
67. Facilitate access to information on heritage boats through a central managed archive and raise awareness of heritage boating traditions at events such as rallies & regattas.

2.4.4 Islands

SCOPE AND RELEVANCE

Many important elements of Ireland's heritage – cultural, historical, archaeological and natural – are found on islands. Island culture and traditions, from the Mesolithic to the present, hold symbolic importance for Irish people as well as visitors from abroad. Islands play a strong role in our folklore, spiritual life, art and literature and some have been of strategic importance (e.g., military, coastguard, lighthouse bases etc.) right up to modern times.

Although islands occur off all Irish coasts, the majority are sited off the western and south-western coasts. With regard to inhabited islands, the sustainability of these communities has become a national issue in recent decades. Uninhabited islands⁷ often contain interesting and culturally important relics of past habitations and some provide sanctuaries and feeding grounds for significant populations of marine mammals and seabirds e.g., the Skelligs.

CURRENT STATUS

At present, the Irish Islands Federation (Comhdháil Oileáin na hÉireann), the LEADER company which represents the interests of populated islands around the Irish coast, has 33 member islands with 1 to 900 inhabitants (>3000 in total). Islands communities (i.e., those not linked to the mainland by causeways) often face sociological problems in relation to transport, access to services, depopulation and changes in traditional activities such as farming and fishing. As demonstrated by the Blasket Islands, the main threat to island cultures and traditions is a decline in population. Similar difficulties exist in many less-developed coastal areas of the mainland.

For some islands, improved ferry services, tourism promotion and incentives for small enterprises have made a significant contribution to the socio-economic welfare of their communities.

GOVERNANCE/REPRESENTATION

There are a number of government and other agencies whose remit includes islands:

The Department of Community Rural and Gaeltacht Affairs has taken on the responsibility for islands although there is a perceived bias towards west coast Gaeltacht islands. Much help has come from this source towards improved transport facilities – quays, harbours and air links.

Local authorities: Local authorities with inhabited islands within their jurisdiction have included specific policies for islands in their county development plans e.g., Cork, Galway. These policies could be strengthened through local area plans.

Comhdháil Oileáin na hÉireann (the Irish Islands Federation) founded in 1993 is based in Inis Oirr. It is the representative body for inhabited off-shore islands and its overall aim is the

⁷ *Uninhabited islands are defined as those that do not have year-round residents.*

social, economic and cultural development of island communities through representation at local, national and EU levels. The federation co-ordinates various activities and cultural events e.g., inter-island football etc. and is currently implementing a waste management strategy. It is also responsible for delivering and administering the area-based National Rural Development Plan with participation and co-operation of the islanders.

Commissioners for Irish Lights: This organisation is responsible for maintaining navigation aids around Ireland's coast which include structures on many offshore islands. While not being directly responsible for the management of islands, CIL activities have a significant impact in regard to island transport, land use and employment – although less so in recent years as a result of lighthouse automation e.g., Bere Island, Skelligs, Rockabill.

MANAGEMENT ISSUES

Islands need specialised management programmes designed to protect, to the extent practical and economically feasible, valued components of their natural and cultural heritage. This requires detailed assessment of heritage features, their relative importance and conservation requirements and, where justified, a combination of initiatives such as training, subsidies, incentives, private-state partnerships and infrastructural improvements designed to protect ecosystems and cultural remains and to ensure sustainable communities.

Depending on the island, management may be either focused e.g., the Management Plan drawn up in 2003 for the Blaskets, Birdwatch Ireland management of the tern site on Rockabill, or non-existent e.g., Skerries.

There is a need for internal (i.e., island-based) co-ordination and for structures that will enable island communities to develop plans and projects aimed at securing a long-term sustainable future for their island e.g., the Bere Island conservation plan. The Minister for Community, Rural and Gaeltacht Affairs (DCRGA) is working to encourage whole island projects such as common approaches to Rural Environment Protection Schemes (REPS).

There is a need for more wide-spread recognition amongst state agencies and services of the practical difficulties of island life. For example, it would be reasonable to explore possibilities for increased support from telecommunication and electricity companies

and other state bodies and programmes.

As demonstrated by Oilean Mór on the Aran Islands, excessive tourism and commercialisation can weaken the cultural heritage and disturb flora and fauna. Without careful management of visitor numbers, and the types and locations of visitor facilities, there is increased pressure on the built heritage as well as unsustainable pressures on water supplies and waste management facilities. Uninhabited islands face similar problems arising from poorly-managed tourism. Threats of vandalism to monuments and increased disturbance to flora, fauna and habitats can also be experienced due to isolation and lack of supervision.

A recent review (Weighell *et al.*, 2000) shows that both in Ireland and the UK there is a wide variety of statutory and non-statutory mechanisms for the protection of coastal areas, including islands, most of which focus on aspects of the natural heritage (e.g., flora, fauna, landscapes). Some of these, such as the UK's Marine Nature Reserve, provide for broadly-based management of the areas designated (see box) and are well-suited to the protection of uninhabited islands e.g., Lundy, Skomer island off the south coast of Wales. Consideration should be given to developing management schemes of this type for the protection of all or part of the more important islands with important heritage functions and components around the Irish coast. The conservation plan carried out on Bere Island with the full participation of the islanders is one example of how to manage heritage on inhabited islands. Other options include designation as Biosphere Reserves or World Heritage Site e.g., North Bull Island, Co Dublin and the Great Skellig, Co Kerry.

**UK'S MARINE NATURE RESERVES (MNRS):
EXTRACT FROM WEIGHELL *ET AL.* (2000)**

MNRs can be protected by bylaws where no alternative protection measures under other legislation are available. They may restrict or prohibit certain activities but cannot interfere with normal rights of passage and functions of the local authority or public utilities, or unnecessarily restrict the earning capacity of individuals. Only three statutory MNRs have been designated in the UK so far, all within the Celtic Seas region: Lundy Island off the north Devon coast; Skomer off the coast of south-west Wales and Strangford Lough off the coast of county Down.

RECOMMENDED ACTIONS

68. Increase efforts to assist inhabited islands in maintaining and increasing population and in providing sustainable activities for young people; in particular to:

- Assist the islands in developing internal governance structures to plan for viable activities on the island, integrated with heritage conservation and enhancement (e.g., Bere Island conservation plan);
- Assist the islands in maintaining, and improving where necessary, access, social and medical services;

69. Ensure the protection of heritage on uninhabited islands; it would be beneficial to develop access strategies to minimise disturbance to heritage sites and structures and to fauna, flora and habitats. Access strategies should include provision of interpretive material and web sites;

70. To protect and enhance heritage on islands it would be beneficial to :

- Develop plans for the management of sites and structures to enhance the heritage e.g., the maintenance of high nature value areas through the continuation of appropriate agricultural practices and the eradication of nuisance species such as rats and rabbits; and
- Develop plans for the management of islands in the light of potential changes in climate, increases in sea level and storm intensity.

2.4.5 Recreation and tourism amenities

SCOPE AND RELEVANCE

Ireland's coasts and inshore waters are host to various recreational pursuits ranging from those of low physical activity, such as picnicking, playing on the beach and seal, whale and dolphin watching to more strenuous sports such as rock climbing, scuba diving, kayaking, sailing and jet skiing. Water-based pursuits are increasing in popularity. The coast also attracts numerous visitors for its scenic attributes and is a favourite setting for leisure activities such as golf, walking, cycling and motor touring.

Clearly, coastal amenities are part of our national heritage – they must be protected for the enjoyment of future generations, as well as their tourism value, and managed in a sustainable way. It is essential to recognize the pressures that recreational activities



may exert on coastal amenities and to regulate change and human activity so that the inherent qualities of the coasts are not damaged or lost.

CURRENT STATUS

Coastal transport corridors and the popularity of coastal areas for housing has greatly inflated the value of coastal lands and there is increasing urbanization of the coasts in proximity to major towns. This has led to inevitable losses of open space, reduced scenic value, increased noise and litter and disturbance of wildlife and habitats. In addition, there is a booming market for holiday homes, rental accommodation and recreational facilities in and around coastal resorts. Conflict arises frequently between different recreational uses and between recreational and other uses. Golf and coastal walking interests at the Old Head of Kinsale could not be reconciled; jet skis and swimmers do not mix well; alteration of dune systems, and heavy traffic through sand dunes, exacerbate erosion. There are also conflicts between recreational boats and commercial shipping.

At present there is no co-ordination between these activities on any scale. In certain areas, local authorities have brought in bylaws restricting certain activities (e.g., jet skis, camping), often for safety reasons. In other cases county development plans and policies provide some guidance. However, in the absence of the promised coastal zone management programmes, there is no effective mechanism for integrated planning and management of marine and coastal areas. This is despite recognition over 30 years ago (Brady, Shipman, Martin and Hyde, 1973) that careful control over coastal land use would be needed to avert serious environmental and socio-economic impacts.



GOVERNANCE

Although there is no legislation nor co-ordination mechanism aimed specifically at regulating marine leisure and tourism, there is a plethora of state agencies with interests and responsibilities in this area. These include:

The Department of Communications, Marine and Natural Resources	The Department of Environment, Heritage and Local Government
The Department of Arts, Sport and Tourism	The Department of Community, Rural and Gaeltacht Affairs
Marine Institute	Fáilte Ireland
Local authorities	Harbour authorities

MANAGEMENT ISSUES

In 1998 the Marine Institute undertook an analysis of the water-based tourism and leisure sector and derived conclusions and recommendations, many of which are still valid today. Key issues identified include:

- Tourism that threatens marine resources is unsustainable;
- Tourism and recreation interests need to be more aware, and understand better, the marine ecosystems they depend on;
- Our understanding of Ireland's marine ecosystems is deficient and should be improved to provide a foundation for sustainable activities;
- Co-ordinated multi-sectoral planning is needed for developments with potential to affect marine ecosystems;
- Pollution is a major threat to marine tourism and recreation amenities;
- There is a lack of research on sustainability indicators; and
- Structures to support conflict resolution and local resources management should be developed.

It is evident that the maritime environment and associated heritage features are of immense social and economic importance in providing recreational opportunities for both Irish residents and visitors alike. There is certainly potential for further development of less-intrusive and damaging tourism products such as traditional and classic boat rallies, seal, cetacean and bird watching, scuba diving, kayaking and sailing, interpretation of coastal geology (e.g., Copper Coast Geopark in Co Waterford) and so forth.

There is, however, a pressing need for a co-ordinated, multi-sectoral approach to the management of all forms of recreation that affect our maritime heritage supported by clearly defined principles, policies and guidelines, by-laws and, where necessary, legislation. Marine tourism development and promotion can no longer be based on inherently unsustainable practices with regard to access, seasonal traffic patterns (by foot or vehicle), noise, disturbance, land and water use and landscape alteration. Local ICM programmes would help develop this approach.

RECOMMENDED ACTIONS

71. Prepare a national strategy for coastal and marine tourism integrating heritage conservation and enhancement. This should include the following elements:
 - An assessment of the potential of maritime heritage as a recreational or tourism resource e.g., traditional and classic boat rallies and regattas;
 - An assessment of the constraints on recreational and tourism activities imposed by necessary heritage protection, and predicted climate change, both in specific areas and nationwide;
 - Measures to integrate recreation activities into conservation management plans for designated areas;
 - Measures to increase co-ordination between tourism development agencies, local authorities and other bodies engaged with promotion and provision of tourism activities.
72. Improve collaboration between different recreation sectors and interest groups e.g., voluntary agreements, sharing of resources, joint codes of practice, self-policing mechanisms etc;

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