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Annex to the

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE
EUROPEAN PARLIAMENT**

Thematic Strategy on the Protection and Conservation of the Marine Environment

and

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

**establishing a Framework for Community Action in the field of Marine Environmental
Policy
(Marine Strategy Directive)**

Impact Assessment

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1. EXECUTIVE SUMMARY

The marine environment is faced with a number of threats including loss or degradation of biodiversity and changes in its structure, loss of habitats, contamination by dangerous substances and nutrients and impacts of climate change.

While measures to control and reduce pressures and impacts on the marine environment do exist, they have been developed in a sector by sector approach resulting in a patchwork of policies, legislation, programmes and actions plans at national, regional, EU and international level, which contribute to the protection of the marine environment. At the EU level, while there are a number of policies affecting the marine environment, there exists no overall, integrated policy for marine protection.

The general picture that emerges from this policy framework is a mixed one. On the positive side, some progress has been made in certain areas, e.g. in reducing nutrient inputs or pollution from hazardous substances in particular heavy metals. However, overall, the state of the marine environment has been deteriorating significantly over the past decades. As a result, Europe's oceans and seas are under threat, in some cases to the extent that their structure and function is being jeopardised.

The conclusion from our assessment is that the current policy framework and institutional arrangements are not delivering a sufficiently high level of protection for the marine environment. We also conclude that a strong, integrated, EU policy on marine protection can contribute significantly to improving the current situation.. Two main options are considered in this Impact Assessment:

Option A - A strictly voluntary approach based on a Communication setting non-binding recommendations, without new legislative measures

Implementation of the Marine Strategy would be based on voluntary political commitment from Member States and regional marine protection organisations. A close alternative to this option would be to couple the Communication with a Recommendation outlining in greater detail steps to be taken to implement the Marine Strategy at regional level. However, as Recommendations have no binding force, the impact of such a scenario would be strictly identical and this possibility is therefore not examined.

Option B - A flexible legal instrument combined with non-binding recommendations of a Communication

This legal instrument would be ambitious in its scope but not overly prescriptive in its tools. It would translate the Communication's approach and general ambition into an operational objective.

The conclusions drawn in the impact assessment can be summarised as follows:

- the costs of option A is not likely to significantly differ from the no additional action scenario in the medium to long-term. While there are important quantification and valuation gaps in assessing the costs of no additional action,

these costs are potentially very high. In addition, benefits to be reaped from this option are very limited;

- under option B, there would be administrative and other policy costs incurred by the set-up and operating of the framework through which the strategy is to be implemented. These costs have been estimated to amount to about €90 million for the initial phase (total amount for a period of about 2 years) and slightly above €70 million, annually, after this period;
- there would also be more significant implementation costs resulting from the programmes of measures devised at regional level. However, it is not possible at this stage to fully anticipate the measures that will emerge from regional Implementation Plans. However, it is foreseen that the legislative instrument will require detailed impact assessment of the programmes of measures is carried out to ensure that environmental objectives are reached at a minimum cost;
- indications regarding likely impacts and costs on key sectors to be affected by implementation plans remain to a large extent theoretical at this stage. Nevertheless, they provide sufficient analysis to inform the decision on the final policy choice. They conclude on the fact that there may be important social and economic costs in the short-term for sectors most dependent on the marine environment and most directly affecting it (e.g. fisheries). Sectors where the environmental regulatory framework is comparatively less developed (e.g. extraction, dredging and to a lesser extent shipping) are also likely to be more affected;
- in summary, in the medium to long term, benefits from the implementation of the marine strategy would include:
 - effective protection the marine environment and to restoring the key ecological services it provides;
 - sustaining the future of marine industries by effectively protecting the resource base on which they depend – in particular fisheries, the fast growing aquaculture sector and the key sector of tourism.
 - reducing considerably health costs of no additional action from pollution of bathing sites and contamination of fish products.
 - generating new economic opportunities from increased research prospects and emerging sectors (ecotourism etc).

In the light of these potential benefits and of the inability of Option A to reduce costs of no-action, the Commission has chosen to proceed along the lines of Option B, i.e. combining a Communication with a legislative instrument in the form of a Framework Directive. Bearing in mind uncertainties about the combined impacts of measures to be introduced under Option B and about their potential costs for key economic sectors, this option is accompanied by a provision on compulsory impact assessments and cost-benefit analyses at regional level.

2. INTRODUCTION

2.1. Purpose of this impact assessment

This impact assessment has been prepared by the Commission services to provide information on the problem that the Community Thematic Strategy for the Protection and Conservation of the Marine Environment is designed to tackle, the options that were considered and their impacts. It takes into account information provided through a broad stakeholder consultation as part of the development of the Thematic Strategy.

2.2. Policy context for the development of the Thematic Strategy

Community mandate: the 6th Environment Action Programme

The 6th Environment Action Programme (6th EAP) requests the development of a Thematic Strategy for the protection and conservation of the European marine environment with the overall aim "to promote sustainable use of the seas and conserve marine ecosystems".

In a Communication entitled "*Towards a Strategy to Protect and Conserve the Marine Environment*"¹ of 2002, the Commission set out its initial analysis and approach to building the Thematic Strategy. It reviewed existing threats and pressures as well as policy responses and gaps in knowledge and set out an action plan and a work programme for the Commission, Member States, Candidate and third countries and all relevant stakeholders to work together in order to define and develop the thematic strategy.

The Environment Council Conclusions of 4 March 2003 welcomed the Commission Communication, endorsed the approach and the outline of its objectives and requested an ambitious marine strategy by May 2005.

The Commission Legislative Work Programme 2005 indicates that the Thematic Strategy on the Marine Environment will be adopted in mid-2005.

The future EU Maritime Policy

In its Communication of 2 March 2005, entitled "*Towards a future Maritime Policy for the Union: a European vision for oceans and seas*", the Commission set out the process leading to the adoption of a Green Paper on a future Maritime Policy, to be adopted in the first half of 2006, as a first step towards an all-embracing EU Maritime Policy. A Maritime Affairs Task Force was established within the Commission to produce the Green Paper and to launch a wide public debate on the subject. The Marine Strategy is a direct contribution to the future EU Maritime Policy and can be seen as the environmental component of an overall policy required to achieve sustainable use of oceans and seas. A more detailed analysis of the contribution of the Marine Strategy to the future EU Maritime Policy is provided in Section 8.6.

¹ COM(2002)539final, 2 October 2002

3. WHAT PROBLEM IS THE MARINE STRATEGY EXPECTED TO TACKLE?

The marine environment is a priceless asset. Indispensable to life itself, it also is a great contributor to economic prosperity and quality of life. The intense pressure to which the marine environment is increasingly subject therefore threatens both the marine environment itself and the economic activities that depend on it. These pressures are becoming increasingly severe and are unlikely to be tackled through the current institutional arrangements, which are inadequately co-ordinated.

3.1. The environmental importance of the marine environment

Oceans provide 99% of the available living space on the planet² and cover 71% of the Earth's surface. The marine environment has high intrinsic value as a global common good. It contains 90% of the biosphere and therefore constitutes the greatest source of biological diversity on the planet. Marine ecosystems conceal a rich and as yet largely unknown biological and mineral potential. The oceans have been estimated to produce more than 35% of the primary production of the planet³.

Estimates of the value of the marine environment vary widely. As many ecological services provided by oceans and seas are not readily apparent, and are not marketed directly, the contribution of the marine environment to society tends to be undervalued. However, a number of estimates are available:

- A British attempt at valuing UK marine ecosystems indicated significant values- e.g. £11,000 million for the physical environment they provide (see Annex 1).
- Robert Costanza *et al.* have estimated the global value of ocean environmental services⁴ to amount to \$20.9 trillion annually – i.e. 63% of the value of global ecosystem services⁵. Based on Costanza's work, annual value for the ecosystem services provided by the EU15 coastal zones alone were estimated at around €2450 billion⁶. To give some context to these figures cumulated GDP for EU25 plus USA has been estimated as € 20,185 billion The estimates made by Constanza and colleagues are obviously controversial, open to significant

² Costanza – Ecological economics 31 (1999) 199-213 - “*The Ecological, Economic and Social Importance of the Oceans*”, quoting Lalli and Persons 1993 – Biological oceanography – an introduction – Butterworth-Heinemann, Oxford.

³ *Idem.*

⁴ Prevention of erosion, climate regulation, natural purifying capacity, biological control, balancing hydrological cycles, accumulation and distribution of solar energy, source of oxygen, carbon dioxide absorption and biodiversity services (e.g. the marine environment is both receptive to and propitious for dozens of fish and waterfowl species and millions of migratory birds to reproduce).

⁵ Costanza, “*The ecological, economic and social importance of the oceans*”, Ecological Economics 31 (2), 1999, pp. 199-213., quoting an article from Costanza et al. published in Nature in 1997 (“*The value of the world's ecosystem services and natural capital* - Nature 387 – pp. 253-260). In this article, Costanza et al. have “*estimated the current economic value of 17 ecosystem services for 16 biomes, based on a synthesis of published studies and a few original calculations. For the entire biosphere the value (most of which is outside the market) was estimated to be in the range of \$16-54 trillion/year, with an average of \$33 million/year.*”

⁶ Firm Crichton Roberts and the Graduate School of environmental studies at the University of Strathclyde (2000) – quoted in Potential Benefits of Marine Spatial Planning to Economic Activity in the UK, Final Report to the Royal Society for the Protection of Birds, GHK, December 2004.

uncertainties and methodological difficulties and can only be taken as one indicator of the economic importance of seas and oceans.

- Coastal waters, which generate 75% of the ecosystem service benefits for Europe's coastal zone, are estimated to have an equivalent value of €18 billion per year⁷.

In light of these figures, protecting the marine environment is not only essential for its own sake but also because it is a fundamental resource base. Informed use, management and protection of the marine environment are crucial to maintain a strong economy.

3.2. Increasing pressures on Europe's marine environment

The following assessment of the main pressures on the marine environment updates and expands the assessment carried out in the Commission Communication "*Towards a strategy to protect and conserve the marine environment*" of 2002, which was based extensively upon the reports of the regional marine conventions, reports from the European Environment Agency (EEA) as well as the information collected and reported in the context of the EU's own policy actions such as the Common Fisheries Policy⁸.

Current pressures on Europe's marine environment put the long-term productivity of our oceans and seas at risk. A recently released report from the UK Department of Environment, Fisheries and Rural Affairs (DEFRA) largely corroborated this analysis⁹.

Commercial fishing is an important driver of changes to marine biological diversity¹⁰. The main concerns are:

- Depletion of commercial fish stocks. Detailed fish stock assessments regularly provided by the International Council on the Exploration of the Seas (ICES)¹¹ indicate that the majority of the most valuable ground fish stocks in EC waters are outside safe biological limits. In the Mediterranean, the Scientific Advisory Council (SAC) of the General Fisheries Commission for the Mediterranean (GFCM) does not assess all Mediterranean fish stocks but among those assessed most are also in a precarious state, especially the most valuable ones. According to the latest report from the Food and Agriculture Organisation of

⁷ European Science Foundation Marine Board, Integrating Marine Science in Europe, 2002 - <http://www.esf.org/publication/146/Marinescience.pdf>

⁸ These reports include; the Fourth Periodic Assessment of the Helsinki Commission (to be published in 2002), the "QSR2000" of the OSPAR Commission (published in 2000), which includes a contribution made by AMAP, the "State and Pressures of the Marine and Coastal Mediterranean Environment" of the EEA and UNEP/MAP (published in 1999), the "Black Sea Pollution Assessment" of the Black Sea Environmental Programme (published by the Black Sea Environmental Programme in 1998) and information taken from the website of the Black Sea Environmental Programme and "Europe's Environment: The Second Assessment", published by the EEA in 1998. Information regarding the impact of fisheries on the main commercial fish stocks was updated taking into account the Commission's Green Paper on the Review of the Common Fisheries Policy.

⁹ Charting Progress, an integrated assessment of the state of UK seas, DEFRA, March 2005.

¹⁰ UN Millennium Ecosystem Assessment, 30 March 2005, p.117.

¹¹ Stock assessments are available at <http://www.ices.dk>

the United Nations (FAO) on the state of world fisheries, the Northeast Atlantic, the Mediterranean Sea and the Black Sea are three of the seven world marine regions with fish stocks in greatest need of recovery¹². In line with the above, the status of EU fish populations has substantially deteriorated over the past thirty years (see Annex 2 for further information). An illustration of this is the downwards evolution of total allowable catches (TACs) as part of the CFP over the years.

- Impact on non target-fishes and by-catch taken in fisheries operations .There are currently no reliable estimates on total discards in Community waters. However, according to reports from ICES and ad hoc studies commissioned by the EC, discarding of dead fish is substantial and may be very high for some fisheries, both in the Northeast Atlantic and in the Mediterranean.
- Significant damage to non-fish species such as cetaceans, seals, birds and turtles mainly as a result of non-selective fishing methods;
- Impact on populations living at the bottom of the sea and on sensitive habitat types¹³ from towed gears such as dredges and bottom trawls;
- Shifts in community structures, notably due to genetic loss due to over-fishing of sub-populations;
- Reduction of the biomass of target and non-target species inducing changes in the food chain web.

The main impacts of aquaculture are through using wild fish populations to produce fishmeal and fish oil for aqua feed; spread of diseases and parasites among fish populations; interactions and competition between escaped farmed species and wild fish populations; nutrient enrichment; uncontrolled spreading of non-indigenous species; chemical pollution and habitat change or destruction. Provided adjustments are made, these impacts can be significantly reduced.

The measures introduced by the reformed Common Fisheries Policy (CFP) – in particular the ecosystem-based approach, long-term approach to the management of stocks, action based on scientific advice and reductions in subsidies and assistance to fishing communities to adjust to a lower level of fishing activity – will, when fully implemented, significantly enhance the prospect of restoring EU fish populations as well as benefit non-target marine species and ecosystems. The plan which the Commission is currently developing in order to meet the objective to restore depleted fish stocks by 2015 agreed at the World Summit on Sustainable Development (2002) will make a further contribution. Proper implementation of the reformed CFP is paramount to making European seas healthier, thus safeguarding their long term productivity.

¹² FAO – State of world fisheries and aquaculture, 7 March 2005.

¹³ E.g. maerl beds, posedonia meadows and deep-sea reefs.

Climate change

According to the International Panel on Climate Change (IPCC), global mean sea level is projected to rise by 9 to 88 cm by 2100 as compared to 2000. Mean sea level rise in the 20th century has been ten times more important than in the past 3000 years. Data on sea tides indicate that the mean sea level has risen by 10 to 20 cm in the 20th century. Since 1950, the surface of sea-ice has diminished by 15% in the Northern Hemisphere¹⁴. As an illustration, the Arctic Ocean has lost nearly 10% of its permanent sea-ice cover every 10 years since 1980¹⁵.

The potential consequences of **climate change** on Europe's marine environment are far-reaching:

- Increased acidification of the marine environment, which may affect certain organisms¹⁶. The carbon dioxide absorption function of oceans may also be undermined. Finally, the impact of pollutants on biota may change as acidity is a crucial factor in influencing chemical processes¹⁷.
- Changes in air and sea water temperatures as well as in ocean currents; and predicted rises in sea level (from melt water from ice caps and warming of sea temperatures) leading to reduced salinity and density of marine waters in certain areas, with attendant impacts on the chemical and biological reactions of the oceans and seas. An illustration is the low salinity tolerance of many marine species, preventing them from living in low salinity or variable salinity environments.
- As a result of these impacts, major species shifts are to be anticipated. The species composition of phytoplankton, at the lowest level of the food web, is already changing and its magnitude has been described as a “*regime shift*”¹⁸. These changes will affect other species. Increased temperatures may disturb the reproductive cycles of species and therefore their distribution. Fish abundance and distribution of marine fish may be affected¹⁹. Evidence already shows that the stock of North Sea cod has seen a decline in the production of young cod in parallel with warming of the North Sea over the past 10 years²⁰.

¹⁴ <http://www.ipcc.ch/>

¹⁵ Le Monde, *L'océan Arctique bientôt navigable*, 27 October 2004.

¹⁶ E.g. organisms whose skeletons or shells contain calcium carbonate (calcerous plankton, coral reefs etc).

¹⁷ Charting Progress, p.24.

¹⁸ Ibid., p. 23. “*There has been increased primary productivity, merging of spring and autumn blooms and a switch in the dominant species. This has been accompanied by the northward movement of plankton species by about 10 degrees of latitude.*”

¹⁹ Sir Alister Hardy Foundation for Ocean Science – Study on Plankton; and MarClim project investigating how sensitive seashore species may be used to track climate impacts, quoted in English Nature's Maritime Strategy, Our Coasts and seas, making space for people, industry and wildlife, February 2005.

²⁰ O'Brien CM, Fox CJ, Planque B & Casey J. Fisheries: climate variability and North Sea cod, *Nature* 2000; 404:142, in Myers RA & Worm B. Rapid worldwide depletion of predatory fish communities, *Nature* 2003, 423: 280-283, in The Environmental Effects of Marine Fisheries, a response to the Royal Commission on Environmental Pollution from the Institute of Biology in association with the Scottish

- Changes in the level of formation of North Atlantic deep water in the Arctic, which constitutes one of the deepest branches of the thermohaline circulation of the world's oceans. This may change the thermohaline circulation and result in a colder climate in Europe.
- Impacts of increased rainfall and fresh-water run-off. These impacts may change the water exchange between the North Sea and the Baltic Sea and thus affect the whole ecosystem of the Baltic Sea.

Eutrophication

Excessive amount of nitrogen and phosphorus - generated notably by agriculture and urban waste water -entering oceans and seas causes eutrophication, upsetting the balance of the marine ecosystem and causing biological, chemical and physical changes in the structure of flora and fauna. In combination with other conditions the excessive nutrients encourage plant growth, particularly micro-algae. These algal blooms can result in the release of substances which are toxic both to man and to other marine life. Upon senescence they will sink to the sea bed where benthic bacteria will exhaust oxygen supplies in causing their decay. This can lead to the seabed being completely anoxic and devoid of much of its life. In 1996-1997 benthic communities in the Gulf of Finland collapsed as a result of oxygen deficiency caused by eutrophication. Finally, eutrophication can also result in spectacular growth of macroscopic algae which is then washed onto the shore where it rots causing nuisance and public health risks. Examples of this type of impact can be observed in the coastal regions of Brittany where the tourist industry in some towns and villages has been blighted as a result.

Eutrophication trends in Europe's seas

Eutrophication is considered to be the most significant cause of the **Black Sea's** environmental decline since the 1960s and has contributed to the proliferation of comb jelly (mnemiopsis).

Eutrophication has also caused marked changes in the **Baltic Sea**. A recently released Swedish study concluded that the marine ecology of the Baltic region had "*crashed*" and was "*locked in*" to permanent eutrophication. While anti-pollution measures – i.e. controlling releases of nitrogen compounds and other nutrients from agricultural run-off, drainage and road traffic – have had a positive impact on inshore waters around Stockholm and in parts of Sweden's west coast, "*in the open sea, especially the Baltic Sea the measures have no discernable impact*"²¹.

In the **Northeast Atlantic** impacts are mainly confined to coastal areas of the eastern part of the North Sea, the Wadden Sea, the German Bight, the Kattegat, and the eastern Skagerrak. Notwithstanding the above progress, the **North Sea** was estimated to be collecting in 1995 four times as much nitrate and eight times as much phosphate as it did in the 20 preceding years²².

Finally, the **Mediterranean** is also affected. The most endangered area is the northern and western coast of the Adriatic Sea.

Association for Marine Science and the Nutrition Society, on behalf of the Biosciences Federation, 2 June 2003.

²¹ <http://www.regeringen.se/sb/d/497/a/39302> and related article in ENDS Environment Daily of 23 February 2005.

²² Michael Weber and Judith Gradwohl's The Wealth of Oceans, 1995 – quoted in The Economist – "*The Sea Survey*", 23 May 1998, p. 5.

Progress has been made in reducing inputs of nutrients. However, in most cases this has not yet resulted in clear reductions in nutrient concentrations in the areas of concern. There are also no reductions in concentrations of chlorophyll-a, an indicator of eutrophication. Inputs in particular of nitrogen from diffuse agricultural sources and untreated urban wastewater remains a problem to be solved.

Oil pollution

Oil can enter the sea from land-based sources including fluvial transport and atmospheric deposition; as a result of shipping accidents and chronic, low-level but often illegal, discharges from ships from losses associated with exploration for oil and gas and even from natural sources.

Chronic, low-level oil pollution from shipping generally results from the deliberate, and illegal, washing of tanks or the flushing of bilge or ballast water. In terms of the total volume of oil released this source of oil pollution is probably more significant than that resulting from accidental spills. However, improvements in ship design, operational practices and monitoring/surveillance procedures have led to considerable improvements in recent years.

Oil pollution is also caused by shipping accidents impacting on habitats and wildlife – e.g. killing seabirds – and leading in some instances to the closure of fisheries. The sinking of the Prestige off the coast of Spain in November 2002 and of the Erika off the coast of France in 1999 which were transporting respectively 77,000 and over 10,000 tonnes of heavy fuels caused serious localised damage to the marine environment and to entire coastal regions and marine-related industries.

Projections on shipping trends point to increased risks in the future despite the introduction of stricter maritime safety regulations. The findings of a conference organised on Maritime Safety organised by the Helsinki Commission on the Protection of the Baltic Sea held 1 March 2005 in Helsinki, Finland, indicate that for the Baltic in the 1990s there was a 20% increase of sea traffic; and a 100% increase of oil transportation. There are about 2,000 ships at sea at any time, accounting for 15% of the world's cargo transportation. Through 2015 another 50% increase is expected, raising considerably the risks of major oil spills in the area²³. Recent bi-lateral agreements between the Russian Federation and their Scandinavian neighbours aim to closely monitor and respond promptly to any emergency situation.

On the positive side, discharges from oil refineries are decreasing. With regard to the offshore industry in the North Sea, total inputs of oil have been reduced substantially since 1985. However, there are emerging risks as drilling platforms extend into new sectors in deeper waters and into waters seasonally affected by ice.

Introduction of non-native species from shipping

Another threat to marine biodiversity from shipping is the transfer and introduction of non-native species and genetically modified or disease-bearing organisms through hulls, anchors and ballast waters. When introduced into an ecosystem, non-

²³ <http://www.helcom.fi>

indigenous species can have a catastrophic effect on indigenous plant and animal communities.

It is estimated that about 7,000 to possibly more than 10,000 different species of marine microbes, plants and animals may be carried globally in ballast water each day²⁴. In Europe, it is estimated that the introduction rate of non-indigenous species was one every week during the period 1998-2000²⁵. See Annex 3 for a detailed account of the growth in the number of marine species introductions.

Pressures on coastal habitats

Coastal habitats have been considerably damaged over the years due to increasing intensity of human activities along the coasts. Increased human activity on the coasts generates marine litter, loss of coastal habitat and associated ecological processes, deterioration of water quality, disturbance of coastal species and breeding grounds, as well as coastal erosion. By way of example, 20% of Europe's coasts are experiencing severe impacts from coastal erosion²⁶.

Contamination of the marine environment with hazardous substances

Various **hazardous substances** reach the marine environment following their discharge from shipping, emission and loss from a number of industrial processes (oil and gas extraction, chemical industry etc) and commercial and domestic uses. In addition to industrial activities, there are strong pollution risks from ammunition and military material (including chemical weapons) disposed at sea. This is particularly problematic in the case of the Baltic Sea.

Given their intrinsic properties of toxicity, persistence, and liability to bioaccumulate, there is evidence that a diverse range of natural and man-made substances have the potential to impair biological processes in aquatic organisms. Some of the more dangerous substances such as polychlorinated biphenyl (PCB) and DDT which are no longer produced or used in the EU continue to be detected in the marine environment. As sediments act as sinks for many pollutants, these chemicals continue to be a public health concern and impede human use of marine resources (e.g. presence of dioxins in Baltic fish). In addition endocrine disrupters associated with decreased human fertility and of fish and other marine species are of increasing concern²⁷. More positively, there are trends of reduced pollution of some hazardous substances, in particular heavy metals.

²⁴ Proceedings of the joint IMO/HELCOM/EU workshop “*Environmental impacts due to the increased density of shipping in the Baltic Sea Area – Copenhagen plus I*” (2003), p. 25.

²⁵ Vector Pathways and the Spread of Exotic Species in the Sea, ICES Cooperative Research Report No 271, March 2005, p.2.

²⁶ <http://europa.eu.int/comm/environment/iczm/home.htm>

²⁷ Research on the effective treatment of endocrine disrupters will be an important element to refine knowledge on the practicality and efficacy of existing and future treatment technologies to reduce the discharge of endocrine disrupters in the environment.

Worrying trends on the spread of hazardous substances in the marine environment

International rules on dumping toxic substances at sea are regularly violated, as illustrated by a recent report from the NGO Oceana which shows that almost 40% of ships flying an EU Member State flag have recently failed to meet international rules on dumping substances at sea²⁸.

A recent study from the World Wild Fund for Nature (WWF) on chemical pollution in the Arctic Ocean shows that pollutants that were never produced in the Arctic are now being detected there, sometimes in higher concentrations than in the countries in which they were made and used²⁹.

Litter pollution

Contamination with **litter** is a general problem in all European seas. Impacts on marine life include the drowning of birds entangled in plastic sheeting, and the death of birds, turtles and cetaceans caused by ingested plastic objects. It is estimated that over 1 million birds and 100,000 marine mammals and sea turtles die each year from entanglement in, or ingestion of, plastics³⁰.

Microbiological pollution

Microbiological pollution still affects a number of EU beaches. This results from deficiencies in implementing the relevant EC legislation³¹. Microbiological pollution is also a problem in non EU areas in the Mediterranean and is very severe in the Black Sea. There are clear linkages between microbiological pollution of the marine environment and human health through contamination by marine phytoplankton biotoxins or by pathogens associated with inadequately treated sewage.

Seabed disturbance and human-induced changes in the composition of sediments

Consequences of dredging include the creation of dredge tracks or depressions on the seabed altering seabed profile, changes in the composition of sediments, effects on benthic biodiversity³², **physical disturbance** and impact on spawning areas. Renewable energy and other ocean-based energy sources can generate turbulence effects on local sedimentation, seabed habitat, seabirds, mammals and marine benthic and pelagic life. Oil and gas extraction can generate physical damage to benthic communities.

Radionuclide discharges

There is continued public concern with regard to **discharges of radionuclides** particularly those arising from nuclear-fuel reprocessing plants. Compared to many other areas of the world, some of Europe's regional seas have received significant

²⁸ http://oceana.org/downloads/report_marpol_eu_chronic_hydrocarbon_contamination.pdf

²⁹ WWF International Arctic Programme, "The tip of the iceberg: Chemical contamination in the Arctic", February 2005.

³⁰ KIMO – 2001 – Impacts of marine debris and oil, economic and social costs to coastal communities, Shetland, KIMO, in DEFRA's Regulatory Impact Assessment on the EU Marine Strategy, 2004, p.F5.

³¹ Urban Waste Water Treatment Directive and Bathing Water Directive.

³² EMSAGG (Bi-annual Bulletin of the European Marine Sand and Gravel Group), Special edition, April 2003.

discharges of nuclear material. There is little data available concerning the impact on marine ecosystems.

Marine noise pollution

Human activities (shipping, dredging, military use, oil and gas extraction etc) can greatly disturb marine mammals, fish and other wildlife through sonar use, underwater explosions and production and other noise generation. An ongoing ICES study on the use of sonar use commissioned by the European Commission points to significant impacts on marine life³³.

3.3. An inadequate institutional framework for the management of the seas

There are a number of barriers to improved protection of the marine environment mainly related to lack of coordination and a piecemeal approach to policy making:

- **At international level:**
 - There is a large number of regional and global strategies, recommendations, conventions, binding agreements and guidelines on the marine environment but there is little articulation between them. Similarly, there are many institutions and agencies dealing with the marine environment but a limited degree of coordination between them and problems in the definition of their mandates³⁴. An overview of a selection of regional and global conventions, agreements and agencies, drawn from the Commission Communication on the Marine Strategy of 2002, is provided in Annex 4.
 - Many international agreements on the marine environment are characterised by poor implementation and lack of enforcement.
 - The lack of coordination between existing commitments and mechanisms hinders the set-up of a coherent system for assessment and monitoring. While there are various instruments at United Nations level e.g. in the framework of the UN Convention on the Law of the Seas (UNCLOS), the United Nations Environment Programme (UNEP), the United Nations Food and Agricultural Organisation (FAO), the Convention on Biological Diversity (CBD) and the International Maritime Organisation (IMO) monitoring remains under-developed and as a consequence our knowledge and understanding of marine ecosystems remains fragmented. The regular process for global reporting and assessment of the state of the marine environment which is being established within the UN system should contribute to better coordination but can only be considered a first step.

³³ Another relevant study was commissioned by the Whale and Dolphin Conservation Society - Mark Simmonds, Sarah Dolman, Lindy Weilgart, Oceans of Noise, A Whale and Dolphin Conservation Society Report, 2005, <http://www.wdcs.org>.

³⁴ For example, while the mandate of IMO is focused on issues related to maritime transport, this organisation also administers several environment-related conventions (e.g. 1972 London Convention on the prevention of marine pollution by dumping of wastes and other matters).

- There remain strong needs for reinforced assistance on capacity building to developing countries on the marine environment - both to develop the knowledge base and to implement appropriate management measures - that are insufficiently addressed.
- **At regional level:**
 - Responsibilities for the management of regional European seas are largely left to various conventions. However, these conventions have few powers to enforce standards. By way of example, the mandate of the Helsinki Commission on the protection of the Baltic Sea (HELCOM) does not foresee the possibility of legally binding commitments from contracting parties. As a result many of the targets set by these regional conventions only express a level of aspiration. Therefore, there are implementation and enforcement gaps³⁵.
 - The mandates of other regional organisations involved in the protection of the marine environment are also problematic. For instance, while Regional Fisheries Organisations (RFOs) cover nature and biodiversity protection in relation to fishing activities, their actual activities are often limited to the conservation of commercial fish stocks. In addition, they often play a role in many areas to complement bilateral or multilateral fisheries arrangements directly between coastal countries.
- **At EU level:**
 - There are a number of policies affecting the marine environment (fisheries, transport, industry, agriculture, environment, regional development, research, external relations) but none of these policies is specifically designed to protect the marine environment in a co-ordinated manner. Human activities impacting the marine environment are addressed in a sector-by-sector manner instead of holistically.
 - Relevant EU environmental measures, with the exception of the Habitats and Birds Directive, do not apply in the open sea. The Common Fisheries Policy is principally concerned with commercial stocks, although since the 2002 reform the wider environmental dimension of fisheries is also increasingly addressed. The EU has limited margin for action on shipping as this sector is largely overseen by the IMO and not adapted to local conditions/situations (with the Law of the Sea Treaty and the IMO, shipping is granted largely free access to the oceans, considerably limiting individual countries' abilities to enact restrictions).

³⁵ RSU (Der Rat von Sachverständigen für Umweltfragen – German Advisory Council on the Environment), “Marine Environment Protection of the North and Baltic Seas”, February 2004: *“Another overarching management issue involves the deficiencies often apparent in implementation of the relatively 'soft' target and action decisions made by the regional protection organisations INC, OSPAR and HELCOM. This is no doubt partly a result of the more political, appellatory nature of those decisions. Supplemental policy instruments would thus appear called for to aid better implementation”*, p 21.

- At **national level**, while measures on certain aspects of marine protection do exist in some Member States there is no harmonised approach to marine environment protection. As marine pollution is by definition a transboundary issue this absence of harmonised approach and common framework considerably hampers the effectiveness of existing marine protection schemes.
- Finally there are significant **gaps in knowledge** that make it difficult to develop informed policy making on protection of the marine environment. Existing assessment and monitoring programmes are neither integrated nor complete³⁶. In addition there are weak links between research needs and research priorities.

This problematic institutional framework, corroborated in a number of studies, is not conducive to effective protection of the marine environment and even contributes to the environmental problem as illustrated by a recent report on marine environment protection in the Baltic and North Sea from the German Advisory Council on the Environment (see box below).

Problematic institutional framework for the protection of the marine environment in the Baltic and the North Sea

“There are neither clear, coordinated quality assurance goals, nor is there a cross-sectoral, coordinated plan of action. Both at EU and at national level, marine environment protection is instead largely dealt with on an incremental basis and, where at all possible, lumped in with existing sectoral policies (fisheries, agriculture, chemicals, water protection policy and so on). A significant contributor to the segmentation of marine protection policy is the distribution of decision-making responsibilities and initiatives among global and regional international bodies, the EU, national governments and their regional entities.”³⁷

3.4. Who is affected?

All users of the seas including the general public are affected by the degradation of the state of the marine environment. All maritime industries are particularly concerned as they are the main drivers of the deterioration of the state of the marine environment as well as its main users.

The degradation of the state of the marine environment directly threatens economic and social benefits derived from the seas – e.g. decreasing harvest for fisheries leading to loss of jobs and associated impacts on people’s livelihoods; losses to aquaculture and tourism due to increased marine pollution; higher tanker accident risks due to increased traffic volumes transport by sea; health problems caused by the poor quality of marine (due to accumulation of hazardous substances in marine food sources; and growth of harmful natural marine micro-organisms resulting from human actions); risks from coastal erosion caused by inappropriate coastal development; and lost research opportunities and applications as a result of marine pollution.

The stakes are high given the economic importance of maritime activities:

³⁶ Charting Progress, p.80 (*“The activities are largely unregulated for their environmental impacts and we have no strategic monitoring of these impacts other than monitoring of commercial stocks”*).

³⁷ RSU, p. 30.

- A Commission study on the economic impact of maritime industries in the EU15 and Norway indicated that the European maritime cluster³⁸ generated a turnover of about €159 billion in 1997 – with a direct value added totalling about €70 billion and total value added €111 billion³⁹ – representing between 3 and 5% of Europe’s GNP. This figure does not include the value of raw materials as for example, oil, gas or fish, nor does it factor in indirect economic benefits arising from other services such as tourism and real estate.
- The total turnover of marine related economic sectors in the UK is estimated to have reached about €98 billion in 1999-2000 and the combined added value of these sectors €55 billion⁴⁰, representing 3 to 4% of Britain’s GDP⁴¹.
- In Portugal, direct and indirect benefits derived from the ocean and coastal areas account for 11% of Portugal’s GDP and 15% of its trade margins⁴².
- Marine related economic sectors in Spain are estimated to generate 10% of GDP⁴³.
- Finally, tourism provides 15% and shipping 2.5% of GDP in Greece, so marine linked aspects account for close to one-fifth of the country’s GDP.

In terms of employment, EU marine-related industries play a significant role. In 1997 they were estimated to employ over 1.5 million persons directly and 2.4 million persons including indirect employment.⁴⁴ This figure applies only to the traditional maritime industries such as ports, transport and fishing and does not include tourism, scientific research and energy. Of course, in some coastal areas and countries, marine-related industries are dominant creating potential distributional hot-spots: for example, in Portugal, they employ about 5% of the total work force⁴⁵ and this figure is exceeded in some coastal towns.

In addition to the above, the social and cultural importance of the marine environment is illustrated by:

- Health benefits:
 - Fisheries and other sea products are a major source of proteins for many people. They provided 2.6 billion people with at least 20% of their

³⁸ Including transport, port-related industry, service industry, ship-building, marine equipment, recreation and tourism, fish producing and processing industry, construction, energy and defence.

³⁹ http://europa.eu.int/comm/enterprise/maritime/maritime_industrial/economic_impact_study.htm

⁴⁰ On the basis of £1= €1.42. Pugh and Skinner, The UK Economy, quoted in Potential benefits of marine spatial planning to economic activity in the U.K., final report to RSPB, December 2004, GHK, p. 4. The figures provide include coastal and land-based activities as well as those using the sea.

⁴¹ UK DEFRA, Safeguarding our seas, 2002, p. 5 – quoting UK Marine Industries World Export market Potential – “A report for the foresight marine panel” – Douglas-Westwood Associates, October 2000.

⁴² Study from Centro de Estudos Aplicados, Universidade Católica Portuguesa, commissioned by the Portuguese government for the development of the Report from the Strategic Ocean Commission (Relatório da Comissão Estratégica dos Oceanos), Lisbon, July 2004, Part I, p. 35

⁴³ The Ocean and future aspects of the European Marine Research Area, Norwegian Research and Innovation Forum, June 2004, p. 62.

⁴⁴ http://europa.eu.int/comm/enterprise/maritime/maritime_industrial/economic_impact_study.htm

⁴⁵ Study from Centro de Estudos Aplicados.

average per capita animal protein intake in 2002⁴⁶. In a large number of poor countries, where this percentage exceeds 25%, the contribution to food security and health is crucial⁴⁷.

- There are considerable health benefits to diets rich in fish. This results in expanding numbers of EU citizens including fish, seafood and other sea products (seaweeds etc) to their diet. Average EU fish consumption per inhabitant and per year was 24.5 kg in 1999, 8.5 kg above world average fish consumption, with Portugal topping the list at 61.1 kg⁴⁸.
- Medicinal and pharmaceutical uses of marine resources.
- Social use values, such as enjoyment of the landscape, recreational activities/leisure and cultural heritage;
- The unifying element it constitutes in the cultures of many coastal countries.⁴⁹

Below is an outline of the economic and social importance of key sectors affected by the degradation of the marine environment.

Fisheries/aquaculture/fish processing

In 2002 the EU produced nearly 7.6 million tonnes of **fisheries products**⁵⁰ and representing 10% of world production, making the EU the third producer in the world behind China and Peru, and a major exporter of fish products. In 2001 the EU exported 5.7 million tonnes of fish products. Total EU fish exports have increased by 45% and their value doubled since 1993⁵¹.

In terms of employment, the latest available figures indicate that nearly 530,000 persons in the EU were working in the fisheries sector in 1997 – including full-time, part time and seasonal workers in the fisheries, fish-processing, aquaculture and annex industries such as commercialisation and naval repair⁵².

Aquaculture is growing rapidly. The share of world fisheries production attributable to aquaculture increased from 25.8 to 29.9% between 1998 and 2002⁵³. Within Europe, the output of marine aquaculture has grown a thousand-fold since 1970⁵⁴, accounting for 17% of total fisheries production in the EU. Aquaculture produced 1.27 million tonnes of fisheries products in 2002 and has increased its share in EU-25 total production from one eighth in 1995 to one sixth in 2002⁵⁵. Aquaculture represents 33% of the total value of fishery production in the EU⁵⁶.

⁴⁶ FAO – The State of the world fisheries and aquaculture, 2004.

⁴⁷ COM(2000)724 – Fisheries and poverty reduction, 8 November 2000.

⁴⁸ La Politique Commune de la Pêche en chiffres, ISBN 92-894-5007-X, European Communities, 2004, p. 23.

⁴⁹ Costanza – Ecological Economics 31 – p. 203.

⁵⁰ http://europa.eu.int/comm/fisheries/maritime/index_en.htm

⁵¹ La Politique Commune de la Pêche en chiffres.

⁵² La Politique Commune de la Pêche en chiffres.

⁵³ FAO, State of world fisheries and aquaculture, 2004.

⁵⁴ Turning the tide: addressing the impact of fisheries on the marine environment, Report from the UK Royal Commission on Environmental Pollution, December 2004, p.123.

⁵⁵ http://europa.eu.int/comm/fisheries/maritime/index_en.htm

⁵⁶ La Politique Commune de la Pêche en chiffres.

The value of fishery products produced by the **fish-processing industry** in the EU is almost twice the value of landings and aquaculture production. Employment in the processing industry represents approximately 35% of employment in the catching sector and in aquaculture⁵⁷, amounting to a €16 billion turnover in 2000 and employing over 100,000 people in 2001⁵⁸. The EU's total production increased by 41% in volume terms and 76% in value terms during the review period 1994 to 1999. Production in 1999 was valued at approximately €12 billion from about 4 million tonnes of product⁵⁹.

Ports/shipping/shipbuilding

98% of world trade by volume - 5.5 billion tonnes - is transported by sea.⁶⁰ The EU is the world's leading region for the **maritime transport industry**. More than 90% of the EU's external trade and some 43% of its domestic trade moves by sea. More than 1 billion tonnes of freight are unloaded and loaded annually in Union ports. Shipping companies owned by EU nationals control one third of the world's fleet, and around 40% of EU trade is carried on vessels controlled by EU interests. The shipping sector – including shipbuilding, ports, fisheries and related services industries employs around 2.5 million people in the EU. According to recent Commission data from October 2004, the European Economic Area (EEA) registered trading fleet totals 10.034 vessels (above 500 g.t.) at 244.3 M dwt, representing 28% of the world fleet tonnage⁶¹. The EU's **shipbuilding** sector represents ca. 15% of the world production in volume and ca. 30% in turnover. Some 135,000 people in the EU are directly employed by shipyards (both commercial and naval shipbuilding as well as repair) and an estimated 350,000 people work for 9,000 companies in the ship-building supply chain. Exports account for more than half of the industry's turnover of €34 billion⁶².

European **ports** showed in 2003 a throughput of 60 million TEU, representing an average 10.5% increase compared to 2002⁶³.

Oil and gas extraction

Thanks to the North Sea, whose reserves belong mainly to the United Kingdom, the Union produced some 158.3 million tonnes of oil in 1997, representing 4.4 % of world output. The gas reserves represent 2% of world reserves, or 20 years' consumption at present rates. 223.2 million tonnes were extracted in 1997, representing 12 % of world production. Most of these reserves are extracted from the North Sea, off shore from the Netherlands (56 %) and the UK (24 %)⁶⁴. Half of Europe's needs in gas and oil are met by the exploitation of hydrocarbon resources in the North Sea, which provides more than 200,000 highly skilled jobs. Annual investment in the area varies between €15 and 20 billion⁶⁵. As an illustration of the importance of the sector, oil and gas extraction in the UK represents 85% of primary energy production, 15% of industrial investment and employs 26,000 people⁶⁶.

⁵⁷ FIG Processing Study – Nautilus Consultants – Study on the impact of FIG measures on the fish processing industry – November 2003 – report to the Commission.

⁵⁸ La Politique Commune de la Pêche en chiffres.

⁵⁹ FIG Processing Study.

⁶⁰ Safeguarding our seas, p. 5.

⁶¹ <http://www.oecd.org/dataoecd/19/60/33949698.pdf>

⁶² http://europa.eu.int/comm/fisheries/maritime/index_en.htm

⁶³ <http://www.oecd.org/dataoecd/19/60/33949698.pdf> - OECD workshop on maritime transport, Paris, 4-5 November 2004 – European Commission, current international shipping market trends – Community maritime policy priorities and legislative initiatives.

⁶⁴ Commission Green Paper “Towards a European strategy for the security of energy supply” http://europa.eu.int/comm/energy_transport/doc-principal/pubfinal_en.pdf

⁶⁵ European Science Foundation Marine Board Position Paper 5, Integrating Marine Science in Europe, 2002, p. 30.

⁶⁶ Safeguarding our seas 2002, p. 45.

Dredging - sand and gravel

The European aggregate marine dredging industry has expanded rapidly over the past forty years and in particular in the 1980s. While there is no comprehensive data on aggregate production in Europe, various figures have been published indicating that the total aggregate market in Europe amounts to 2 to 3 billion tonnes per year.⁶⁷

Tourism and coastal development

The marine environment is the main interface to the world's largest economic sector – tourism. It is estimated that tourism directly employs about 8 million people in the EU, representing roughly 5% of total employment and of GDP, and 30% of total external trade in services. Together with employment and GDP indicated in other sectors, such as transport or distributive trade, these figures amount to over 20 million jobs and to roughly 12% of GDP⁶⁸. The contribution of tourism to the EU's economy should reach €1,200 billion in 2005 and is expected to amount to €2.100 by 2015, i.e. 12.6% of GDP. In terms of employment, tourism related jobs should reach 24.3 million in 2005 and are projected to reach 28.7 million by 2015.⁶⁹

Above half of the EU tourists visit the sea. The Mediterranean region alone is the world's leading leisure tourism destination accounting for 30% of international tourist arrivals and for one fourth of the receipts from international tourism.⁷⁰

Other sectors

Land-based economic activities (e.g. agriculture, chemicals etc), nuclear energy (and reprocessing), wind energy (e.g. off-shore wind farms) and other renewable energy sources (ocean heat pumps, waves, tides and current) and military use of the marine environment are important economic and strategic sectors active in marine areas.

4. COSTS OF INACTION

The costs of inaction are understood as the costs that one would expect to be incurred if use of the European marine environment continues on a business-as-usual and policy-as-usual basis (i.e. no additional action to the policy framework currently in place).

Under a no-action scenario, many of the current impacts on the marine environment are expected to continue and worsen, leading to increased likelihood of nonlinear changes including “*accelerating, abrupt and potentially irreversible changes*” as recently highlighted by the Millennium Ecosystem Assessment. These impacts have and will continue to have important economic and social repercussions. However, quantification and valuation of these costs is still under-developed.

Fisheries hindered by the degradation of marine ecosystems

A number of scientific sources and reports – in particular from ICES – point to the fact the principal cause of the poor state of stocks is overfishing and inappropriate

⁶⁷ David John Harrison, European overview of marine sand and gravel, European marine sand and gravel – shaping the future, EMSAGG Conference, 20-21 February 2003, Delft University, The Netherlands.

⁶⁸ http://europa.eu.int/comm/enterprise/services/tourism/index_en.htm

⁶⁹ <http://www.wttc.org/>

⁷⁰ European Environment Agency, <http://reports.eea.eu.int/92-9157-202-0/en/3.14.pdf>

fishing techniques, highlighting the need for action on fisheries management. A number of measures addressing overfishing and aiming at increased protection of marine habitats and non-target species have been introduced under the EU's dedicated policy instrument - the Common Fisheries Policy as reformed in 2002. The implementation of these measures will make a significant contribution to securing sustainable exploitation of fisheries resources to avoid greater long-term economic damage to fishing communities and to the marine environment. Our baseline scenario therefore assumes that the reformed CFP is going to deliver.

However, measures relating to the management of fisheries foreseen under the reformed CFP will not be sufficient to fully safeguard the resource and the industry as well as populations that depend on it. Also needed are actions addressing other pressures affecting the status of EU fish populations.

In particular, climate change impacts, whose magnitude is such that it is generating variations in species composition, abundance and geographical distribution⁷¹, need to be better understood so as to allow the development of appropriate policy responses.

The contamination of fish and other sea foods from sewage, chemicals and other land based pollutants derived from agricultural, household and industrial sources also needs to be addressed. The negative effects of certain toxic substances (e.g. polychlorinated biphenyl [PCB] and endocrine disruptors) on the reproductive capacity of fish are of particular importance. In addition to constituting a threat to the fishing industry itself, contamination of fish causes grave health problems (as illustrated in the box below) which also come at a significant cost to society and prevent some fish from being marketed.

Health implications of fish and seafood contamination

Recent findings of exposure to mercury at or above accepted safe levels amongst high level consumers of fish and seafood, especially in Mediterranean fishing communities and the Arctic. There is a particular risk from such exposure of children and women of child bearing age⁷².

It is estimated that marine toxins afflict more than 90,000 annually across the globe and are responsible for an estimated 62% of all seafood-related illnesses⁷³.

An additional difficulty is the impact of environmental factors on fish stocks dynamics and on fisheries activities as such. Examples of this include effects of eutrophication on bivalves in coastal areas, the proliferation of toxic algae sticking to fishing gear and making it impossible to use them, and contamination of certain fisheries as mentioned in the preceding paragraph.

Finally, the current environmental status of Europe's seas is used by certain fishermen as a pretext not to share the burden of fishery restrictions on the basis that unless the other elements of the marine ecosystem are improved the chances of

⁷¹ Global warming impacts the distribution of certain planktonic species determining the viability of fish larvae and, ultimately, the breeding sources and the areas of distribution of fish.

⁷² Barregard, L. (2004). Exposure to mercury in the general population of Europe and the Arctic circle in: Dynamics of mercury pollution on regional and global scales. Atmosphere processes and human exposures around the world (eds: Pierone and Mahaffey), Kluwer Academic Publishers.

⁷³ U.S. Commission on Ocean Policy, p. 39.

recovery are minimal. In these circumstances enforcement of legislation becomes difficult and costly.

In these conditions, a 'business as usual' scenario would be likely to contribute to continuing or even aggravating difficulties in implementing and enforcing the reformed CFP, and thus in recovering stocks and prosecuting certain fishing practices and markets. Such developments would have significant negative impacts on an industry that had landings worth €6.2 billion in 2002.

Tourism severely hit by the degradation of marine ecosystems

Continued degradation of the coastal environment is also an important concern. As an illustration, by 2080 estimates suggest that between 13% and 25% of the world's coastal wetlands could be lost due to sea level rise alone⁷⁴. Under a no-action scenario **tourism** would be seriously affected. As the marine environment is the main interface to tourism and tourism is the world's largest economic sector with prospects of further expansion, the potential losses are considerable.

Impacts of degradation of the marine environment on tourism (from GHK Study Commissioned for this impact assessment - being completed)

Studies undertaken for the **Opal Coast in the Artois-Picardie river basin**⁷⁵ in France estimated at between €300 million to €500 million the yearly economic loss that the tourism sector would suffer if the quality of bathing water would deteriorate. These economic losses can be compared with the overall €150 million investments in sewerage and wastewater treatment that have been spent over the last 10 years for obtaining the current bathing water quality.

A study undertaken for **Rhodes Island**⁷⁶ in Greece assessed the overall benefits of avoiding degradation to the coastal environment from an increasing pressure from tourism. Overall, avoiding degradation would lead to benefits (avoided damage) of €15 million per year or 3% of the GDP of the Island.

The high costs of continued pollution from shipping

The present value cost of a no-action scenario on oil spill prevention is estimated by the GHK study commissioned for this Impact Assessment currently being completed to be in excess of €1 billion. By way of example, the cost of the Erika sinking in 1999 was estimated to reach above €800 million⁷⁷, half of which for tourism only. The estimated cost of the Prestige disaster to fishing and tourism only was estimated to reach €5 billion⁷⁸.

While there is no EU cost estimate for transfer and introduction of non-native species through shipping, impacts can be significant. For example, in the U.S. more than \$2

⁷⁴ Safeguarding our seas, p.66.

⁷⁵ Agence de l'Eau Artois-Picardie: Qualité de l'eau, tourisme et activités récréatives: la recherche d'un développement durable, 1997.

⁷⁶ Constantinides, G. 1993: "Costs and benefits of measures for the reduction of degradation of the environment from land based sources of pollution in coastal areas, case study of the Island of Rhodes".

⁷⁷ €915 million according to a study from Mazars & Guérard for Ouest littoral solidaire (in Le Monde, 24 January 2001) and €840M according to the Conseil Economique et Social de la Région Pays de la Loire, 2000.

⁷⁸ World Wild Life Fund, The Prestige: One year on, a continuing disaster, 2003.

million has been spent in California to control and monitor the spread of the Mediterranean Caulerpa Taxifolia algae only; and \$3 million to investigate impacts of the Atlantic cordgrass on the Pacific Ocean⁷⁹. In Australia, efforts to rid Darwin's coast line of a non-indigenous mussel species (Mytilopsis sallei) cost an estimated AU\$2.4 million⁸⁰.

The economic and social impacts of continued pollution from land-based industries

While there have been improvements, evidence suggests that microbiological contaminant of bathing waters remains an issue. A measurable risk of illness remains even on beaches compliant with existing legislation. In aggregate, a substantial number of people will become ill each year after bathing in the sea.

Agriculture and urban waste water remain an important source of pollution of the marine environment notably through excessive amounts of nitrogen and phosphorus causing eutrophication. There are insufficient data on which to project the cost of the no additional action scenario on eutrophication across EU waters as a whole: reports on the costs of eutrophication in marine waters tend to be anecdotal and location specific. However, the evidence suggests that costs can be significant in a local context, especially in the event of an algal bloom in a popular recreational area or where there is shell-fishing farming. By way of example, the severe harmful algal bloom that struck Italy in 1989 cost the coastal aquaculture industry \$10 million and the tourism industry \$11.4 million⁸¹.

Another illustration is a U.S. assessment of the economic impacts of Harmful Algal Blooms (HABs) where such impacts were measurable between 1987-1992, as shown in the table below. In 2004, U.S authorities estimated the cost of these Harmful Algal blooms to reach an average \$49 million per year due to fishing closures, loss of tourism and recreation and increased health costs and monitoring⁸².

⁷⁹ U.S. Commission on Ocean Policy, p. 41.

⁸⁰ ICES, Vector Pathways and the Spread of Exotic Species in the Sea, 2005, p. 7.

⁸¹ Millennium Ecosystem Assessment, 30 March 2005, p. 21.

⁸² Anderson, D.M. et al., Estimated annual economic impacts from harmful algal blooms in the U.S. Technical report WHOI – 2000-11, Woods Hole, MA, Woods Hole Oceanographic Institution, 2000, in U.S. Commission on Ocean Policy, p. 37.

Estimated Annual Economic Impacts from Harmful Algal Blooms (HABs) in the United States, between 1987-1992 period (reported in 2000 dollars)

| | Low | High | Average | % of total |
|---|---------------|---------------|---------------|------------|
| Public health | \$18,493,825 | \$24,912,544 | \$22,202,597 | 45% |
| Commercial fishery | \$13,400,691 | \$25,265,896 | \$18,407,948 | 37% |
| Recreation/tourism | | \$29304357 | \$6,630,415 | 13% |
| Total | \$33,924,471 | \$81,607,104 | \$49,329,845 | 100% |
| 15yr capitalised impacts (discounted at 7%) | \$308 981 162 | \$743 270 485 | \$449 291 987 | |

Source: WHOI, 2000

In conclusion, while valuation remains a challenging exercise for the marine environment, this section demonstrates the magnitude of costs associated with a no-action scenario.

While some may argue that these costs could be tackled based upon improved implementation of existing policy instruments, this would not be sufficient. The problem is that sectoral policies address diverse uses, impacts and major ecosystem components such as fish, habitats or seabirds in isolation. As a result, impacts beyond these policies' specific management areas are not taken into account.

In addition, interpretations of 'good environmental status of the marine environment' or of 'healthy marine ecosystems' vary from one sector to another. While ecosystems will be considered healthy from a chemical perspective when they are un-impacted (i.e. absence of contaminant loading), they will be considered healthy from a fisheries perspective when they can yield maximise fisheries economic and social benefits without compromising the future of the resource⁸³.

Finally, marine ecosystems are not uniform. They differ from one region to another and these specificities are not sufficiently taken into account in the current policy framework, which contributes to deteriorating their status. This highlights the needs for a new, more integrated, approach.

⁸³ See Guidance Document from the International Council on the Exploration of the Seas (ICES) prepared in the framework of the Marine Strategy.

5. WHAT MAIN OBJECTIVES IS THE MARINE STRATEGY EXPECTED TO REACH?

5.1. What is the overall policy objective?

The overall policy objective of the EU Marine Strategy as stated in the 6th Environment Action Programme is *"to promote sustainable use of the seas and conserve marine ecosystems"*. This objective has been translated into the following vision: ensuring that both current and future generations can enjoy and benefit from biologically diverse and dynamic oceans and seas that are safe, clean, healthy and productive. In operational terms, the marine strategy will seek to achieve good environmental status of the marine environment.

A clean and healthy marine environment is the foundation upon which maritime activities depend. The Marine Strategy will therefore bring long-term benefits to the economy and to the communities that depend on maritime activities. In particular, the strategy could contribute to:

- Sustaining the future of the fisheries industry – as harvest would be potentially higher in a healthy eco-system as compared to today's landings
- Reducing health hazards caused by the poor quality of marine water and by accumulation of hazardous substances on marine food sources
- Improving resources for tourism and recreation
- Reducing costs and risks from shipping accidents; and coastal erosion through integrated coastal development
- Providing important research opportunities in areas unaffected by human activities

The principle underpinning Strategy is the ecosystem-based approach. This approach can be defined as the comprehensive integrated management of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.

By way of example, applying the ecosystem-based approach to fisheries would change the focus from the management of single fish stocks to consideration of the effects of fishing those stocks on other components of the wider marine environment.

The ecosystem-based approach is therefore the key to ensuring that the environmental requirements placed on marine-related activities will be founded on the limitations of marine ecosystems. This is a prerequisite for the preservation of the structure and function of marine ecosystems and of their capacity to provide us with goods and services.

5.2. Has account been taken of any previously established objectives?

In preparing this IA, an inventory has been produced covering all current and upcoming Community legislative and policy initiatives that have or would have a

bearing on the marine environment. This is shown in Annex 6. Apart from the Community legislation on preventing marine pollution and the complementary action programme in the field of response to accidental marine pollution at sea, most of the Community legislation that contributes to addressing the protection of the marine environment was not designed specifically for protection of the marine environment in a holistic manner.

In making our assessment of the options available, it has been assumed that existing policy initiatives and legislative measures will be pursued and implemented effectively. It is clear for example that the correct implementation of the urban waste water treatment directive⁸⁴, the nitrates directive⁸⁵ and the Water Framework Directive⁸⁶ will collectively have a significant impact upon the input of nutrients and dangerous substances into our regional seas. However, these pieces of legislation are designed to protect inland freshwaters with objectives and quality standards designed for that purpose. The fact that concentrations of nutrients and dangerous substances are regulated at acceptable levels in our rivers, is no guarantee that the total amount of contamination of our seas, which often act as a residual sink, is not compromising the structure and functioning of marine ecosystems.

This piecemeal approach falls short of the requirements for effective protection of the marine environment. As explained in preceding sections, sectoral policies address ecosystem components as well as pressures and impacts on these ecosystems in isolation. In addition, their objectives in terms of environmental protection differ in the absence of an overarching objective on the desirable state of the marine environment. Finally the diversity and specificities of ecosystems are insufficiently taken into account as management remains overly centralised.

In these conditions, what is needed is an integrated approach to the protection of the marine environment establishing a clear overarching objective to be achieved within a given timeframe. As demonstrated in an ICES study on the application of the ecosystem-based approach to the marine environment carried out in the framework of the Strategy, *“the benefits that result from developing such a[n] [integrated] framework will be larger than the sum of the individual payoffs for each sector.”*

In recognition of the benefits to be reaped from the application of the ecosystem-based approach to the marine environment, all major policy initiatives on oceans and seas developed over the past few years – e.g. in the EU, Portugal, Sweden and the U.K. and outside the EU, Canada, the U.S. and Australia- take the ecosystem-based approach as their starting point and identify regional marine regions as the implementation unit to best reflect ecosystem characteristics.

⁸⁴ Council Directive 91/271/EEC on Urban Waste Water Treatment (OJ L 135, 30. 5. 1991, p. 40) as amended by Directive 98/15/EC of 27 February 1998.

⁸⁵ Council Directive 91/676/EEC of 12 December 1991.

⁸⁶ OJ L 327, 22.12.2000, p.1.

6. WHAT ARE THE MAIN POLICY OPTIONS AVAILABLE TO REACH THE OBJECTIVE?

6.1. What is the basic approach to reach the objective?

The approach is

- To assess whether a specific policy framework would be needed to address the current threats faced by the marine environment.
- If yes, to provide a strategic framework within which measures to address the state of the marine environment would be taken, and identify such measures.

In its Communication of 2002 entitled “*Towards a strategy to protect and conserve the marine environment*”, the Commission concluded on the need for the development of a coherent policy for the protection of the marine environment by moving towards an ecosystem-based approach building upon existing policies and taking into account all the pressures on the marine environment. This approach was supported during the wide stakeholder consultation process through which the strategy has been developed over the past two years.

In the light of the analytical work carried out during the stakeholder process, the above assessment of the current situation and the economic, social and environmental consequences of non action, the Commission is persuaded that further action is needed at the level of the EU in order to ensure the protection of the marine environment. In terms of what has to be done this would include:

- (1) The creation of a framework for co-operation and co-ordinated and coherent action;
- (2) Agreement at the EU level of the overall objectives to be achieved in terms of the protection of the marine environment;
- (3) A consideration of the relationship between the EU and the relevant regional and international conventions and agreements;
- (4) An improved knowledge base on the status of the marine environment, the pressures and the trends. This is in recognition of the significant information and knowledge gaps on the state of the marine environment and on the effectiveness of existing measures to protect it. These information gaps need to be addressed as “*inadequate knowledge of the species present in a given marine community or ecosystem limits understanding of ecosystem function and the prediction of how human activities impact that function*”⁸⁷. More comprehensive scientific information about the marine environment will allow wise policy decisions;
- (5) Improved mechanisms for monitoring and assessment of the marine environment;

⁸⁷ Turning the tide, p.33.

- (6) An agreement on the most appropriate course of action to be taken in European regional seas in order to reach the desired state. In line with the ecosystem-based approach, the development of Marine Strategies at the level of Marine Regions identified as management units for the implementation of the Strategy would seem to be the soundest option. The Marine Regions would be defined on the basis of their hydrological, oceanographic and biogeographic features. Marine Strategies would be devised by Member States for their marine waters within each Marine Region. They would include a detailed framework for informed policy-making (i.e. assessment, characterisation, monitoring programmes, environmental targets) and specific programmes of measures to achieve good environmental status. In order to minimise implementation costs and benefit from existing expertise and experience, regional marine conventions and agreements and other relevant fora would be relied upon in developing action plans where relevant;
- (7) Greater coordination between the various EU policies which impact on the marine environment.
- (8) Increased efforts to be made to ensure the effective implementation of and compliance with, existing legislation.

6.2. Which options have been rejected at an early stage?

No action

The preparation of the Marine Strategy forms part of the Community's agreed 6th Environment Action Programme. However, this option, which is discussed in the problem and costs of no-action chapters above, provides the reference scenario against which to appraise the costs anticipated from the measures proposed under the Marine Strategy.

Tighten up existing legislation

This option would have consisted of tightening up existing legislation on fisheries, shipping, oil and gas, environmental pollution etc and pushing a stronger EU position in the regional seas' conventions and other regional and international organisations. This option was considered carefully and rejected on the following grounds:

- As outlined in preceding sections, the current patchwork of policies, legislation, action plans, programmes at national, EU, regional and global level have to date been ineffective in addressing the threats faced by Europe's seas in an integrated manner. Even if it were substantially more stringently implemented or adjusted, the existing complex web of interacting and overlapping policies would leave significant problems unaddressed. This has been documented in a number of studies⁸⁸.
- This would have been in contradiction with the mandate received from the 6th EAP. Addressing the threats faced by the marine environment requires

⁸⁸ RSU Report: "there is still no plausible strategic, institutional and instrumental basis for integrated marine environment protection policy", p. 20.

developing an integrated approach to policy making in this area. This is the mandate of the Thematic Strategies as defined in the 6th EAP – whereby effective protection of the marine environment should not only focus on remedying the environmental impacts but also on addressing the most prominent environmental stressors. In line with this approach, in its March 2003 Conclusions on the preparation of the Marine Strategy, the Council reminded the Commission of “*the need to take into account all human activities having an impact on the marine environment or linked to the marine environment, which may require adjustments of existing policies*”.

Prescriptive legislative instrument

While the development of the Marine Strategy over the past two years has shown that common principles and objectives are needed in order to ensure consistency and coordinate Member States’ efforts to protect the marine environment, there are diverse conditions and needs in the Community’s marine environment that require different specific solutions. This diversity should be taken into account in the planning and execution of measures to ensure protection and sustainable use of the marine environment at the level of Marine Regions.

A prescriptive and centralised legislative instrument would however result in neglecting this diversity by not allowing Member States to make a number of policy choices for implementation at regional level. Such an approach would be doomed to fail as well as prove to be overly costly.

Moreover, had the Commission decided to go ahead with such an option despite the above shortcomings, it would not have been in the position to do so in the absence of sufficient data and knowledge on the marine environment. All experts point to the gaps in knowledge of the marine environment: understanding of marine biodiversity is too incomplete and fragmentary to make it possible to identify a set of detailed binding targets at EU level.

Based on the above, developing a prescriptive legislation instrument (such as a stringent Directive or a Regulation) would be the wrong avenue.

Purely national approach or loose cooperation through the open method of coordination

A purely national approach cannot be applied to the marine environment given the transboundary nature of the issue. As the marine environment knows no borders, its protection cannot be effectively promoted by Member States acting alone.

Decision

A Decision, which is binding in its entirety upon those to whom it is addressed, would not have been appropriate based on the following grounds:

- 20 out of the 25 Member States (the exceptions being Hungary, Luxembourg, Austria, the Czech Republic and Slovakia) are maritime countries, and future enlargements foreseen will increase this trend (Bulgaria, Romania, Turkey and Croatia are all maritime countries). Moreover, effective protection of the

marine environment also requires the involvement of land-locked countries in a regional sea's catchment area as illustrated by Switzerland's membership of the Oslo and Paris Conventions on the protection of the North East Atlantic (OSPAR) and intensifying dialogue between the Helsinki Commission for the protection of the Baltic Sea (HELCOM) and the Czech Republic, Ukraine and Belarus. In these conditions, targeting a limited number of specific addressees would be erroneous.

- A Decision would not have provided any flexibility in terms of implementation as it is binding in its entirety. This would not have allowed for a regionalised approach.

6.3. Which policy options have been considered?

In the light of the conclusions from Section 6.2, the following two options have been evaluated in greater detail:

- Option A - A strictly voluntary approach based on a Communication setting non-binding recommendations, without new legislative measures

Implementation of the Marine Strategy would be based on voluntary political commitment from Member States and regional marine protection organisations.

The Communication would briefly describe the state of the marine environment, the pressures acting on the marine environment and the need for action. It would:

- Set out an overall vision for the protection of the marine environment
- Describe why any approach to marine protection needs to recognise the differences in the character of the different marine areas in the EU in terms of their physical, chemical and hydrological characteristics, their ecology, the pressures and threats impacting upon the seas and the economic and social conditions of the bordering countries.
- Suggest an ecosystem-based approach to protecting the marine environment.
- Recommend the identification of Marine Regions as being the most appropriate level to prepare Marine Strategies.
- Explain how the EU Marine Strategy will interface with non-EU countries and with the international and regional conventions and commissions which already exist for the protection of European regional seas.

The Communication would explain the interface and articulation between the Strategy and the range of EU policies and actions which already have an impact upon the marine environment. It would describe the projected benefits expected once existing measures are fully implemented.

Finally, the Strategy would look at the application of agreed objectives and principles in adjacent seas outside national jurisdictions and especially the conservation and use

of the deep waters, and would consider the EU footprint in marine areas in other parts of the world.

A close alternative to this option would be to couple the Communication with a Recommendation outlining in greater detail steps to be taken to implement the marine strategy. However, as Recommendations have no binding force, the impact of such a scenario would be strictly identical and this possibility has therefore been rejected for the same reasons.

– Option B - A flexible legal instrument

This legal instrument would be ambitious in its scope but not overly prescriptive in its tools. It would translate the Communication's approach and general ambition into an **operational objective, to be further defined at regional level**. This objective would be to protect, conserve and improve the quality of the marine environment through the **achievement of a desirable environmental status** in European seas within a defined time period. In defining this operational objective, the fact that oceans and seas contain the highest biological variability on earth would be fully taken into account.

In line with the approach, a number of steps would need to be undertaken.

In recognition of the current gaps in knowledge, assessment and monitoring of the marine environment, the Directive would in particular set common principles and objectives and commit to a common monitoring and assessment process.

A Marine Strategy, defined as an integrated framework for the adaptive management of human activities impacting on the marine region, would also be prepared for Member States' marine waters within each Marine Region.

In preparing the Marine Strategies, there would be an obligation to:

- Assess the pressures and threats impacting upon the marine environment and the costs (including environmental costs) of these pressures.
- Develop a monitoring and assessment programme to be carried out in each sea according to general indications given in the Directive but taking full account of the monitoring and assessment programmes which are already in place. The intention would be to ensure policy relevant monitoring through coherence in terms of what is measured, how it is measured, the frequency of monitoring, how the information is stored, rules on access and interoperability in line with broader efforts to streamline environmental monitoring at EU level.

On the basis of the assessment programmes and the monitoring information a draft Marine Strategy for Member States' marine waters with Marine Region would be drawn up. This Strategy would include an identification of the measures needed to achieve the environmental targets within the time frame required by the directive and an assessment of their environmental, social and economic costs and benefits.

The Strategy would distinguish between actions that can be implemented at regional or national levels and measures that can only be implemented at the level of the EU (Common Fisheries Policy, Common Agricultural Policy, marketing and use of

chemicals) or globally (e.g. shipping through the International Maritime Organisation).

- Finally, in order to take into account the particular contexts of certain Marine Regions, the Strategy would identify special situations and areas where it would be impossible for a Member State to achieve the level of ambition of the environmental targets set:

6.4. A context for the assessment of impacts

In the context of the EU Thematic Strategy for the Protection and the Conservation of the Marine Environment and the options considered it becomes clear that:

The rate and scale of changes in the marine environment can vary from a few years to several decades. As a result, benefits from applying a more coherent approach to the protection of the marine environment will only be felt in the medium to long term.

Any meaningful impact assessment of the implementation of the proposed course of action – i.e. development of Marine Strategies – can only be undertaken at regional level. The package of potential measures will greatly differ for each Marine Region and so will their impacts, costs, benefits and cumulated effects. Should option B be retained, the proposed legislative instrument would therefore foresee that each Marine Strategy to be developed as part of the Thematic Strategy shall be underpinned by a detailed cost-benefit analysis of the measures proposed. Economic guidance on the development of Marine Strategies would also be foreseen as part of the implementation process. The Commission would finally consider launching studies during the implementation process to provide guidance on impact assessments of some of the policy measures that may be retained to tackle a given problem in a Marine Region.

7. IMPACTS RELATING TO OPTION A

This option is likely to lead to better co-ordination and therefore improved effectiveness of future regulations. This entails indirect benefits for the three pillars of sustainable development.

7.1. Environmental impacts

The Commission produced a Communication in 2002 which set the general orientations of the Marine Strategy in which a set of objectives and related actions was identified. These objectives and actions were reviewed as part of the preparatory process for the Marine Strategy. Despite improved co-ordination and co-operation between marine protection actors and institutions over the past two years, the conclusions drawn in 2002 as to the need for an integrated approach to marine protection are still valid as the state of the marine environment has not improved.

In this context, while it would primarily promote a new framework for action for more effective protection of the marine environment, a Communication to be produced as the final deliverable of the Marine Strategy would also necessarily be

repeating some of the same general orientations outlined in the Communication of 2002 and in the Council Conclusions of 2003.

Some important indirect benefits for the environment could be expected from this option:

- The Communication may stimulate more consistent and swifter implementation of existing legislation by Member States, resulting in improved protection of the marine environment. However, implementation would also proceed sooner or later in the absence of the Marine Strategy, and existing gaps in coverage of legislation would remain.
- The Communication may also generate more joined-up policy making in the EU on the marine environment, which would in turn contribute to better targeting of future measures.
- Finally, the Communication may contribute to strengthening synergies between EU actions and actions undertaken by regional marine conventions.
- However, the general statement of aspirations and general policy orientations to be included in the Communication would not prove adequate to prevent further loss of biodiversity and deterioration of the marine environment:
- Member States bordering marine regions invited to develop frameworks for protection of the marine environment may well come to different conclusions concerning the approaches, diagnoses and programmes of measures to be set in place, irrespective of the unity of the ecosystem. Member States may well take different and even possibly contradictory routes, and different lengths of time to take appropriate action, resulting in ineffective protection of the marine environment.
- The status of the marine environment would not, or only slightly, improve as compared to the no additional action scenario. As a result, the ocean's capacity to absorb new pressures on the marine environment such as climate change and increased maritime transport would be significantly reduced.

7.2. Economic impacts

Economic impacts would be negligible in the short-term as no binding measures would be foreseen to implement the strategy. Nevertheless, in fostering more consistent and swifter implementation of existing legislation, this option could contribute to reducing disparities in implementation costs between Member States⁸⁹.

- Process-wise, Member States bordering marine regions would be invited to develop frameworks for protection of the marine environment but there would be no guarantee that this would be done in a synergetic manner. Should such frameworks be developed,

⁸⁹ DEFRA, Partial Regulatory Impact Assessment of the EU Marine Strategy, p.20.

- There would be risks of duplication of scientific, administrative and legislative efforts and costs.
- If Member States develop different diagnoses and adopt different measures, marine-related industries in the different Member States will be faced with fluctuations in the costs associated with the implementation of the Marine Strategy.

However, a likely outcome is that no integrated framework would be set up and no implementation plans developed. Should Marine Strategies be developed, it is to be expected that they would be conceived as rhetorical and declaratory, and thus not properly enforced. As a result the plans would not differ substantially from existing recommendations from regional marine conventions. Current discrepancies and lack of co-ordination between existing measures to protect the marine environment would be maintained. Such an outcome would lead to gaps and overlaps, potentially entailing costs for Member States⁹⁰.

This option would inevitably generate significant negative impacts in the medium to long term. By failing to address the deterioration of the marine environment, it would undermine the sustainability of the goods and services flowing from oceans and seas. Likely economic impacts would be of the same magnitude as in the no additional action scenario. Sectors that directly depend on the marine environment (fisheries and tourism) would be particularly severely hit.

7.3. Social impacts

There would be no social impacts in the short term. In the medium to long term, significant negative impacts would be expected as this option is likely to lead to similar effects as the no additional action scenario, with serious threats on jobs in sectors that directly depend on the marine environment (fisheries, tourism etc), and negative impacts on health and associated costs.

7.4. External impacts

The impairment of the marine environment as a result of human activities is a transboundary problem necessitating transboundary solutions. In the case of European seas, this means that in order to implement an effective European Marine Strategy, other nations sharing seas with the EU (such as Russia or Southern and Eastern Mediterranean countries) must work hand in hand with the EU and intergovernmental agreements in this area, and must contribute equally to the formulation and implementation of the Strategy.

7.5. Proportionality and subsidiarity

This option would not raise any difficulties in terms of subsidiarity or proportionality.

⁹⁰ This risk was underlined in the Partial Regulatory Impact Assessment on the EU Marine Strategy which the UK's DEFRA commissioned in 2004 (p. A-11).

The marine environment being by essence transboundary, it requires cooperation and common approaches among Member States and third countries bordering European seas and oceans which would be promoted through a second Communication. However, implementation would be purely voluntary and left at the discretion of Member States. As no legislative action would be foreseen as part of the Strategy, the Community would not be taking “action” in the sense of Article 5 of the EC Treaty. Furthermore, no management measures would be foreseen at EU level. This would guarantee that actions and measures to be developed at regional level would be proportionate to the situation and needs of the different sea areas.

8. IMPACTS OF OPTION RELATING TO OPTION B

8.1. Environmental impacts

In the short term, indirect environmental benefits would be associated with this option including in particular:

- More effective management of Europe’s marine environment.
- Enhanced knowledge through the establishment of an integrated monitoring and assessment framework;
- Further awareness-raising through the diffusion information and knowledge gained and through increased engagement with stakeholders in each step of the process from the characterisation of marine regions onwards;
- Increased political attention to marine ecosystems at Member State level due to the need to transpose the Marine Framework Directive and deliver improved protection of the marine environment.

In the longer term this option would set out the framework through which good ecosystem status of Europe’s marine environment could be achieved. While the impact of the strategy would require some time to become apparent as marine ecosystems are slow to react to reduced pressures, some significant benefits are to be reaped.

Process-wise, the compulsory development of implementation plans at regional level would:

- Generate more joined-up policy-making in the EU on the marine environment, which would in turn contribute to better targeting of future measures and more integrated strategies and legislation (CFP, CAP, etc).
- Ensure strong synergies between EU actions and actions undertaken by regional marine conventions and internationally. Co-operation with regional marine conventions would be optimised: the Marine Strategy would make full use of their expertise to define implementation plans; the binding nature of

these plans for EU Member States would ensure delivery of set objectives, addressing the lack of effectiveness currently affecting marine conventions⁹¹.

- Leverage more integrated policy-making on the protection of the marine environment at EU and global level as implementation plans would foresee recommendations to relevant international organisations.
- Achieve more consistent and swifter implementation of existing legislation by Member States, resulting in improved protection of the marine environment. However, implementation would also proceed sooner or later in the absence of the Marine Strategy.

Substance-wise, it is expected that improved management of Europe's marine environment will lead to reversing the impoverishment of marine ecosystems would significantly increase the inherent value of marine ecosystems and provide better delivery of ecosystem services. Expected ultimate benefits include conservation and enhancement of biological diversity; curbing of decline in fish stocks; reduction of problems associated with non-indigenous species; reduction of pollution from hazardous substances and other pollutants leading to enhancement of the quality of the aquatic and marine ecosystems; reduced eutrophication etc.

Below are indications of anticipated environmental benefits of some of the kinds of measures that may be introduced as part of the implementation of the Strategy.

Examples of environmental benefits

Set-up of Marine Protected Areas⁹²: A recent report outlines the results of a study of 80 marine reserves: in these reserves the biomass of organisms was on average nearly three times higher than in unprotected areas. As regards organisms size and diversity, it was 20 to 30% greater⁹³.

'Clean ship' measures – lowering of sulphur content of marine heavy fuels: a recent study shows that a lowering of the sulphur content of marine heavy fuel oil to 0.5% would reduce emissions of sulphur dioxide from international shipping around Europe by more than three-quarters by 2010⁹⁴. Such a drastic reduction would have significant environmental benefits in terms of reduced acidification and entailed damage to fish communities and water quality.

⁹¹ See Opinion of the European Economic and Social Committee on the Commission Communication towards a strategy to protect and conserve the marine environment (Official Journal of the European Union, C208/16, 3 September 2003), paragraph 3.8.: Marine conventions “*are of considerable value in defining strategies for achieving objectives, in involving different countries etc but lack teeth when it comes to penalising infringements if they are not duly recognised in the specific legislation of each state.*”

⁹² Article 8a on “In-situ Conservation” of the Convention on Biological Diversity (CBD) states that each contracting (i.e. including the EC) “shall establish a system of protected areas or areas where special measures need to be taken to conserve biodiversity”. The CBD defines protected areas (in Article 2 Use of Terms) as: “a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives”. The seventh meeting of the Conference of the Parties (COP7) of the CBD adopted a programme of work on protected areas in order to “to support the establishment and maintenance by 2010 for terrestrial and by 2012 for marine areas of comprehensive, effectively managed and ecologically representative national and regional systems of protected areas [...]” The main decision of COP7 on marine protected areas is COPVII/5, which provides further clarifications as to what is meant by the establishment these areas.

⁹³ Turning the tide, p.187.

⁹⁴ Acidraid.org, Acid News No1, March 2005 – “Profitable to reduce sulphur in fuels”, <http://www.acidrain.org>

8.2. Economic impacts

8.2.1. Administrative and other policy costs

In the short term the establishment of common principles and approaches for the development of the implementation plans will initially impose costs on government.

An in-house attempt at estimating the administrative costs of the strategy was made based upon extrapolating evidence from two marine environment management initiatives:

- The Irish Sea Pilot. Mentioned in previous sections, this is a two year project financed by the UK's DEFRA to test the potential for an ecosystem approach to managing the marine environment at a regional sea scale
- The Report from the U.S. Commission on Ocean Policy⁹⁵ which formed the basis of the U.S. Ocean Strategy developed in 2004. This report includes an annex with detailed costs associated with the recommendations issued by the Commission.

Administrative costs include the following elements for each region:

- Data collection; mapping and monitoring
- Assessment of the environmental status and socio-economic context
- Identification/mapping of important marine areas and features
- Identification of conservation and protection objectives
- Development of and follow-up to programmes of measures
- Engagement with stakeholders and awareness raising (communication strategy etc)

Data from the above initiatives were used to derive estimates for the cost of setting up a marine environment protection implementation framework at EU level, in the 10 Marine Regions and sub-regions proposed as management units for the strategy. While recognising the limits of this exercise and acknowledging that the Irish Sea Pilot is closer to a faithful representation of the European reality than the U.S. Commission Report, what emerges from the analysis is remarkable consistency between the results obtained from the two extrapolations. This makes us believe that the estimate is reliable and that the real administrative burden of the EU proposal is likely to be around €90 million for the initial phase (total amount for a period of about 2 years) and slightly above €70 million, annually, after this period.

- A detailed account of the analysis carried out is provided in Annex 8.

⁹⁵ U.S. Commission on Ocean Policy, An Ocean Blueprint for the 21st century, <http://oceancommission.gov/welcome.html>

8.2.2. *Benefits to be derived from an improved assessment and monitoring system*

The development of coherent and consistent assessment, monitoring and information on the marine environment which the strategy would foresee would bring significant benefits and efficiency gains:

- Current duplications of costs and efforts from government (EU, Member States, regional conventions etc) on assessment and monitoring would be eliminated. At EU level, greater synergies would be developed between data collected under the CFP - through the Data Collection Regulation - and under the Marine Strategy and in devising joint monitoring systems in order to stimulate further mutual supportiveness between environment and fisheries policy.
- This would also generate cost efficiencies for marine-related industries which are all interested in a common, reliable, marine environment information system to plan more efficiently their future investments and identify appropriate development sites⁹⁶.
- The development of an integrated assessment and monitoring system would finally reduce the costs of regulation, planning and decision-making and allow for informed policy-making, and therefore better targeted and less costly measures.
- There would be benefits for scientific research, “*since scientists would be able to conduct research starting from a basis of a much more complete description of the environment in which they work*”⁹⁷.

The embryonic geographical information system developed in the framework of the Irish Sea Pilot Project has evidenced these positive economic impacts of integrated assessment, monitoring and information schemes for the marine environment.

It is estimated that prediction services for maritime conditions, which enhanced assessment and monitoring would partly contribute to providing,⁹⁸ would improve the value of maritime industries and services by a few percents. This is confirmed by other studies pointing to the fact that the benefits of ocean observing and monitoring systems would significantly exceed their costs⁹⁹.

8.2.3. *Impacts of implementation measures*

Framework for analysis

It is not possible to fully anticipate the measures that will emerge from regional implementation plans to be developed as part of the Marine Strategy. Problems and priorities faced by Europe’s different seas and oceans are not uniform as they are

⁹⁶ Potential benefits of marine spatial planning: p. 60.

⁹⁷ Nicholas C. Fleming, Dividends from investing in ocean observations: a European perspective.

⁹⁸ Dividends from investing in ocean observations: a European perspective, p. 2.

⁹⁹ The Economics of Sustained Ocean Observations: Benefits and Rationale for Public Funding, joint publication of the U.S. National Oceanic and Atmospheric Administration and the Office of Naval Research, August 2000.

based upon specific social, economic and environmental contexts and distinct ecological features. Programmes of measures to achieve good environmental status will differ from one sea area to another. So will their cumulative and combined effects on economic and social activities. It is not feasible to provide a detailed assessment of the potential costs incurred by such measures as the cumulative effects of potential measures are difficult to evaluate.

In these conditions, the legislative instrument underpinning the development of Marine Strategies will foresee that a detailed impact assessment of the programmes of measures is carried out to ensure that environmental objectives are reached at a minimum cost.

While it is not possible to quantify the impact of such Strategies, rough indications can be given as to likely impacts on key sectors affected. These indications remain however to a large extent theoretical as the thrust of Marine Strategies is undefined at this stage and will vary from one marine region to the other.

Expected benefits from the implementation phase

The most important benefit is avoiding costs of no-action.

Restrictions on certain marine-related economic activities required to protect marine ecosystems seem to be compensated by long-term gains on regulatory and information efficiencies, eg increased tourism prospects or more productive fisheries¹⁰⁰. An illustration is the Irish Sea Pilot Project carried out in 2004, which shows various examples where better integration of sectoral and environmental policies would have advantages in encouraging sustainable economic development¹⁰¹.

Qualitative benefits – e.g. in terms of organisation and planning - are also to be foreseen through better resource use, improved decision making, clearer identification of priorities and better marine spatial planning,¹⁰² as also illustrated by the Irish Sea Pilot Project¹⁰³.

Expected costs

By identifying programmes of measures, implementation plans will lead to costs to address the threats to the marine environment. The main sectors facing these costs were identified in section 3.

Trade-offs between sectors

All sectors would not be equally affected: direct users of the marine environment (fisheries, aquaculture, tourism) will benefit more significantly in the long term from the measures proposed than those carrying out activities that pose threats to the marine environment (such as shipping). In the short term, the burden of

¹⁰⁰ Potential benefits of marine spatial planning, p.70.

¹⁰¹ Quoted in Potential benefits of marine spatial planning, p. 19.

¹⁰² Potential benefits of marine spatial planning, p. 22.

¹⁰³ Potential benefits of marine spatial planning, p. 22.

implementation will primarily fall on users that most directly damage the marine environment (e.g. fisheries).

Fisheries/aquaculture/fish-processing

Given the rate of depletion of commercial fish, measures or recommendations likely to arise from implementation plans include suggestions to introduce new reductions on fishing capacity by setting capacity limits and restricted licensing; modification of gear types; raising minimum landing sizes; setting by-catch limits and discard bans; developing more stringent environmental impact assessments prior to the use of a new gear or to the start of a new fishery; establishing conservation/marine protected and no-take zones in certain marine areas; eco-labelling for fish.

The above measures relate to fisheries management and are therefore developed and implemented in the framework of the reformed Common Fisheries Policy. Proper implementation of these measures would have a negative economic impact on **fisheries** in the short-term. The Commission estimated that the proposed revisions to the Common Fisheries Policy would require an 8.5% reduction in fishing activities.

Administrative costs of Marine Protected Areas (MPAs)

Estimations of the running costs of a worldwide Marine Protected Areas (MPAs) network covering 20 to 30% of seas, based on a survey of existing MPAs amount to \$5.4 to 7 million/year¹⁰⁴. Based on this survey, the UK estimated the costs of running a national marine network in its waters to reach €13.3 to 19.8 million a year for protecting both the North and Irish seas, as compared to €49.7 million a year for running England and Wales' National Parks¹⁰⁵. One of the limitations of this exercise however is that costs do no partition spending between strictly protected marine reserves and other marine protected areas within which some activities remain possible, which means that cost estimates are open to significant uncertainties and should therefore be considered as indicative.

However, medium and long-term benefits from the implementation of relevant existing and future measures under the reformed Common Fisheries Policy would outweigh these costs.

In addition to the above fisheries management measures, the additional benefit from the Marine Strategy would be in providing healthy marine ecosystems in which other human pressures would be managed within oceans and seas' carrying capacity, thus safeguarding productive populations of commercial fish species and securing the industry and the populations that depend on it. The Marine Strategy and the CFP are therefore fully complementary.

In particular, positive impacts of cleaner marine ecosystems for the industry would include sustainable harvests as a result of cleaner marine ecosystems. The potential benefits of stock recovery would be realised more rapidly under the Strategy:

- Addressing the marine environment in a holistic manner would convince fishing operators that the burden of addressing environmental concerns is equitably shared by all industrial operators, which will restore confidence on

¹⁰⁴ Balmford A. et al. The worldwide costs of marine protected areas, in PNAS early edition, 25 May 2004.
¹⁰⁵ This represents £25-35/km²/year for the North Sea, £240-370km²/year for the Irish compared to £2450/km² for National Parks.

fisheries management and make acceptance and enforcement of fisheries restrictions easier.

- The improvement of the environmental conditions that currently slow down certain biological processes will also contribute to accelerating stock recovery.
- Healthier fish will be harvested as a result of reduced pollution. This will lead to increased marketability of fish and sea products.

As regards **aquaculture**, benefits are to be expected as this is an industry which is highly dependent on environmental quality. In addition, most of the new demand for fish – total world consumption is expected to increase to 179 million tonnes by 2015, up 47 million tonnes from 2015 -, will have to be met by aquaculture, which could therefore account for 39% of all fish production in 2015¹⁰⁶. Provided that aquaculture makes the necessary adjustments to limit its environmental footprint (e.g. prevention of farmed fish escapes etc), a healthier marine environment would greatly foster its further development.

Port/shipping/shipbuilding

Likely measures and recommendations may include fostering generalisation of double-hulls world-wide; more frequent inspections of ships hulls to detect and remove fouling organisms; ‘clean ship’ concept (generating e.g. fuel price premiums etc); routing guidance and restrictions; disposal arrangements at all ports; minimum standards for transport of hazardous cargo; ship recycling measures (‘green’ facilities, ship recycling funds etc); designation of sensitive areas; creation of networks of adequately equipped places of refuge; redesign of ballast water intakes etc.

A number of such measures are already being phased in as part of the Erika and Prestige packages introduced by the Commission. The introduction of complementary measures as part of Marine Strategies would generate additional costs for the shipping sector.

- Some of the proposals would increase inspection and maintenance costs (more frequent inspections); would entail losses of revenue due to a need to spend increased time in port;¹⁰⁷ or would generate fuel price premiums to reduce sulphur emissions etc. However, given the good economic health of the shipping sector, none of these measures is likely to affect the sector substantially as illustrated by the very limited economic effects of the recent introduction by the Commission of maritime safety measures as part of the Erika packages.
- More stringent ship recycling measures could prove to be particularly costly. A recent study estimates that the impact of the accelerated phase out of single hull tankers following the Erika packages and IMO regulations could lead to a

¹⁰⁶ FAO, State of World Fisheries 2004.

¹⁰⁷ DEFRA, Partial Regulatory Impact Assessment of the EU Marine Strategy, p.A-22.

peak volume of scrap in 2010 of up to 16.7 million ldt¹⁰⁸. As demonstrated in this and other studies, green ship recycling - i.e. scrapping performed in full accordance with high environmental and health standards – cannot be performed on a cost-covering or even profit basis for ship-owners. A 1998 report from the U.S. Ship Scrapping Interagency Panel estimated the prices for environmentally sound dismantling of commercial and military vessels to amount to \$100-500 and \$900-1300 respectively¹⁰⁹. By way of example, the construction of a green recycling facility in Eemshaven, the Netherlands – known as the Ecodock Pilot Project - to try to cope with the influx of ships to be scrapped cost €50 million for an annual capacity of 200,000 ldt. In light of the costs, innovative measures would need to be introduced to fund such facilities, such as the set-up of a ship recycling fund¹¹⁰.

- As regards potential competitive disadvantages for EU ship-owners due to unilateral EU action when the IMO is the prime standard-setting regulatory body for the shipping industry, they should not be overestimated given the EU's leadership position in world shipping and the leverage capacity it entails¹¹¹. An illustration of this is concerns initially expressed by EU ship-owners about the adoption of Regulation 1726 on the phasing out of single hull tankers in 2003 which they feared would penalise EU shipping companies through competitive disadvantages. The adoption in December 2003 of revised compromise rules for the phase out of single hull tankers in IMO largely based on the EU regime and thanks to EU efforts contributed to addressing these concerns.

Positive impacts from more stringent shipping regulations are also to be expected:

- The shipbuilding industry is expected to benefit from a strengthening of maritime safety measures, e.g. generalisation of double hulls etc. The Commission reported in its 2003 assessment of the shipbuilding sector that “demand [in shipbuilding] has increased in the segment of product tankers, due to replacement needs stemming from new EU maritime safety legislation”¹¹². Such benefits for the shipbuilding industry would be particularly welcome at a time when this strategic sector is facing structural over-capacities and consequent low profitability of ship-yards in all major shipbuilding regions around the world.
- Measures likely to be introduced would support the promotion of shipping as an environmentally friendly mode of transport. This is of particular importance for the sector as the recognition of the environmental costs of road transport

¹⁰⁸ European Commission, Directorate-General Energy and Transport, Oil tanker phase out and the ship scrapping industry – a study on the implications of the accelerated phase out scheme of single hull tankers proposed by the EU for the world ship scrapping and recycling industry, COWI, June 2004. http://europa.eu.int/comm/transport/maritime/safety/doc/prestige/2004_06_scrapping_study_en.pdf

¹⁰⁹ Report of the Interagency Panel on Ship Scrapping, April 1998.

¹¹⁰ See recommendations from COWI study. See also Ecorys report for Greenpeace, The Ship Recycling Fund, February 2005 <http://www.greenpeaceweb.org/shipbreak/fund.pdf>

¹¹¹ The EEA registered fleet accounts for 26% of the world fleet, representing 41% of the world merchant fleet (European Community Ship-owners' Association – Annual Report 2003-2004).

¹¹² European Commission's Seventh report on the situation in world shipbuilding, 6 May 2003, 232final, p.14.

has raised the importance of maritime transport and of intermodality in the transport chain. Prospects for the development of short sea shipping through “motorways of the sea” as real competitive alternative routes to land transport would greatly benefit from further guarantees on the green record of the sector.

Oil and gas extraction

Implementation plans would be likely to strengthen rules on restrictions on drilling in marine protected areas, environmental impact assessments of drilling, waste management, pipeline standards, more effective planning on well site, decommissioning etc. Additional costs are to be expected from these measures.

However, there would also be important, long-term, benefits:

- The future of the oil and gas sector is based on its ability to access new fields and to install new infrastructure to exploit them. This ability is conditioned by the sector’s ability to demonstrate high levels of environmental performance and integration of environmental concerns. The example of the Irish Sea Pilot Project shows that improved integration of environmental concerns by oil and gas industry would have advantages in encouraging sustainable economic development of the sector¹¹³.
- The recent GHK study on marine spatial planning shows that better marine environment planning could contribute to lowering the costs of production of assessments of the ecological quality and environmental impacts of future developments of the industry. While all new developments require detailed assessments, this process tends to be carried out in an *ad hoc* manner, with duplications of research commissioned by companies into the same geographical areas¹¹⁴. The development of Marine Strategies, which would include detailed assessments of marine regions, could lead to significant cost reductions for the industry.

Dredging – sand and gravel

Likely measures would include restricting areas designated suitable for marine and sand gravel extraction, maximum extraction depth limits, stricter environmental impact assessment coupled with stricter rules on resource evaluation and dredging management, entailing costs for the industry.

However, there are also important benefits to be reaped. In particular, such measures could in particular stimulate the strategic organisation of the sector. A 2004 analysis from the UK’s Office of the Deputy Prime Minister, quoted in the recent GHK study on marine spatial planning¹¹⁵, shows that the development of the UK dredging industry is handicapped by the lack of a strategic approach. In particular the industry has “*no clear overview of the nature and extent of a resource in an area outside the boundaries of an individual licence application*”; nor is it in a position to “*identify*

¹¹³ The potential benefits of marine spatial planning, p. 19.

¹¹⁴ The potential benefits of marine spatial planning, p. 54.

¹¹⁵ Potential benefits of marine spatial planning, p. 58 – study from the Office of the UK’s Deputy Prime Minister - A development plan for marine aggregate extraction in the UK.

preferred areas for potential extraction within a consideration of constraints". In addition, *"applications are dealt with on a case-by-case basis for individual areas of the seabed"*. This reflects a general lack of data on the distribution of exploitable resources and potential constraints on dredging. In these conditions a recent study shows that implementation plans could help in the *"strategic identification of resources for dredging, providing certainty over future locations"*; in providing *"access to a system of information about constraints to the development and location of resources"* and thus to *"reduced conflicts with other stakeholders"*. Given that the UK marine dredging industry is second in scale only to Japan's, the likely economic benefits are potentially significant.

Tourism and coastal development

Potential measures to emerge from the Regional Marine Strategies include improved and more systematic implementation of integrated coastal zone management schemes (ICZM). Costs linked to potential restrictions to coastal development, tourism and recreational activities where they have been identified as particularly detrimental to the marine environment would be expected.

In particular, traditional beach tourism would be affected in the short term. It would have to adapt, adjust and in some cases restructure to ensure that it is not developed at the expense of its resource base, the marine environment, but adjustments would be minimal compared to the potential costs of an unrestrained growth, business as usual, scenario. In addition, tourism trends already show an evolution of the market towards more sophisticated forms of tourism (including ecotourism) which have caused a decrease in traditional mass tourism.

Long-term benefits from more effective and efficient protection of the marine environment can be expected for the tourism industry, given its high degree of dependence on the quality of the marine environment:

- The long-term sustainability of the sector would be ensured through increased resources (reopening of formerly polluted bathing sites etc).
- Positive impacts would be expected for marine ecotourism including recreational boating (dolphin, seal, shark and whale watching etc). Given that ecotourism is estimated to be the fastest growing sector of world tourism with a growth rate ranging anywhere between 10 and 30% per annum representing €12 to 20 billion worldwide, and is reputed to attract high-spending tourists, this has the potential to reap significant benefits¹¹⁶. By way of example, cetacean watching alone is estimated to be growing at 10% a year in the UK¹¹⁷ and to be generating 12% of the west of Scotland's tourism¹¹⁸.

Benefits would also be expected for broader coastal development. A 2000 report of the Commission assessed the socio-economic benefits of Integrated Coastal Zone

¹¹⁶ <http://www.tourism-research.org/sustainable.pdf>, Genuinely Sustainable Marine Ecotourism in the EU Atlantic Area: a Blueprint for Responsible Marketing, p.5.

¹¹⁷ <http://www.tourism-research.org/sustainable.pdf>, from a study from the UK Whale and Dolphin Conservation Society, p.5.

¹¹⁸ Warburton et al., 'Whale watching in West Scotland', DEFRA, 2001.

Management (ICZM)¹¹⁹ in the EU. The study was based on questionnaires to assess the impact of ICZM on different economic sectors. Initiative managers who responded generally reported that initiatives have had a positive impact on their local economies. Worth noting is that:

- A significant proportion of managers considered that ICZM initiatives had been beneficial to the main marine sectors of sea fisheries, ports and shipping, military and defence and fish farming and mineral extraction.
- The study also differentiated between “low level” (involving a relatively low level of activity and commitment) and “high level” (involving a more comprehensive and determined investment) ICZM activities and compared their respective costs and benefits. The net annual economic benefits generated by ICZM initiatives were estimated at between €127 million in the case of “low level” initiatives and €660 million for high level initiatives. The ratio of benefits to costs was estimated at 13.6 in the low level scenario, suggesting that additional investments in ICZM would bring substantial net benefits in each case¹²⁰.

Research

Increased knowledge of marine biochemical processes provides a wide range of opportunities, notably for the development of biotechnology. Potential applications offered by the screening of marine species include “*medicine, pharmacology, food production and agrochemistry, industrial innovation, environmental remediation, cosmetics and fundamental scientific understanding.*”¹²¹ These research opportunities are much greater in areas unaffected by human activities.

By way of example, Japan invests close to \$1 billion per year on marine bioprospecting, 80% from private sector. Substances isolated from marine organisms are used in cosmetics, ceramics, food, pigments, surgical materials, antiviral and anticancer drugs now on the market¹²². The possible health market for marine bacteria only has been estimated at €1 billion. In the food sector, the turnover of the nutraceuticals’ dietary supplements market was approximately €30 billion in 2000 and is expected to continue to increase substantially.¹²³

An increased focus on the protection of the marine environment will promote basic research on the structure and functioning of marine ecosystems. Indeed an improved knowledge base will be indispensable for guiding the development of policy actions and remediation measures. Applied research on the development of tools for monitoring, detection (algal blooms, oil spills etc), enforcement and control will also

¹¹⁹ The potential benefits of marine spatial planning, p. 22 – quoting a Report of the European Commission by Fern Crichton Roberts and the Graduate School of Environmental Studies at the University of Strathclyde (2000).

¹²⁰ The potential benefits of marine spatial planning, p. 23-24.

¹²¹ European Science Foundation Marine Board Position Paper 5 – Integrating Marine Science in Europe, November 2002, p.100.

¹²² U.S. Commission on Ocean Policy.

¹²³ The Ocean and future aspects of the European Marine Research Area, Norwegian Research and Innovation Forum, June 2004, Speech from Wiktor Sorensen, Executive Director, NORUT Group, Tromso, Norway.

be encouraged as will cleaner, more environmentally friendly technologies and production processes related to commercial fishing and aquaculture.

8.3. Social impacts

Number of jobs

The most significant benefit would be in securing employment in marine-related industries which would be considerably threatened under a no additional action scenario or a non binding approach because of their dependency on the marine environment.

However, in the short-term Marine Strategies are likely to have negative social effects such as increased unemployment in some sectors, eg fisheries and unsustainable tourism. . These impacts would be important. To give an order of comparison, Commission projections on effects of the CFP reform on employment pointed to losses ranging from 4,000 to 7,000 jobs/year .However, the fisheries sector is already steadily losing jobs each year – 8.000 jobs/year were lost in the last decade¹²⁴-In these conditions and also bearing in mind that the fish processing industry will not be strongly affected (as it works essentially from imported fish), negative short-term effects of implementing the Strategy would be a small price to pay to secure a future for the industry.

However, important shifts from activities degrading or depleting the marine environment to activities likely to benefit from increased quality of the marine environment – such as ecotourism or management of marine protected areas – are to be anticipated.

In the long term, it is expected that sustainable employment in marine-related industries would outweigh these short-term negative effects.

Social inclusion and cohesion

The sustainability of maritime activities (e.g. fisheries, tourism etc) and the emergence of new activities and job opportunities deriving from improved protection of the marine environment (e.g. marine ecotourism, administration and management of marine protected areas etc) and attendant benefits are essential for the long term development of EU peripheral maritime regions whose remoteness from key decision centres and relative isolation currently put at a social and economic disadvantage. Improved protection of the marine environment could therefore contribute to strengthening the territorial cohesion of the EU by providing long term growth prospects for these regions.

In addition, Marine Strategies, in providing a detailed roadmap to reaching good environmental status of the marine environment and therefore to better governing uses of the seas, may help to guide alternative sources of economic development linked to the marine environment to provide new employment opportunities for those leaving industries affected by restrictions in the short-term, e.g. fisheries.

¹²⁴ COM(2002)600final.

Impact on governance and participation

The development of Marine Strategies for the different Marine Regions would contribute to facilitating citizen and stakeholder involvement at all stages of the process – development, implementation and review of the Strategies.

Impact on public and work health and safety

Reduced incidence of ill-health is expected (from cleaner beaches and increased water quality as well as from a decrease of hazardous substances contained in marine food sources) combined with increased quality of life (aesthetics of sea areas etc).

8.4. External impacts

The Marine Strategy is aimed primarily at those areas of the Arctic Sea, the North East Atlantic, the Baltic Sea, the Mediterranean Sea and the Black Sea which are under the jurisdiction of the EU Member States and Candidate Countries.

However, as the marine environment knows no borders, the Strategy is also aimed at non-EU countries bordering EU seas and at the relevant international organisations through which EU and non-EU countries cooperate. A list of existing regional marine conventions is provided in Annex 4.

Finally, the Strategy will also address through the relevant international organisations the adjacent seas outside national jurisdictions and especially the conservation and use of the deep waters, key to effective protection of the marine environment. It will address the EU footprint in marine areas in other parts of the world by informing the conclusion of fisheries agreements with third countries and by providing a strong foundation upon the EU will advance the marine agenda at global level, based upon the principle that sustainable marine management can make an important contribution to food security and poverty eradication.

8.5. Subsidiarity and proportionality

This option would be fully consistent with the subsidiarity and proportionality principles.

The marine environment does not accord with existing geo-political boundaries. It is by essence transboundary and therefore requires cooperation and common approaches among Member States and third countries bordering European seas and oceans. In these conditions, a purely national approach cannot be applied to the marine environment. In line with Article 5 of the EC Treaty, *“the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community.”*

The proposed legislative instrument would take the form of a Directive. This approach would be a reflection of the need to address shared challenges and to establish common principles and approaches at EU level; while recognising that the detailed objectives and the appropriate means to achieve them will vary from region to region. The diversity of the marine environment around Europe would be properly reflected in the way the policy would be implemented: implementation would be

decentralised to the level of marine ecosystems to take into account their specificities and particular contexts to tailor action to regional needs.

This option would not go beyond what is needed to achieve its objectives. No specific management measures would be defined at EU level. This would only happen at the regional level to ensure that action is proportionate to the needs of each Marine Region.

8.6. Synergies with other Community policies

Future EU Maritime Policy

The Marine Strategy would be strongly synergetic with the future EU Maritime Policy in preparation. The latter will respond to “*the particular need for an all-embracing maritime policy aimed at developing a thriving maritime economy and the full potential of sea-based activity in an environmentally sustainable manner*” stressed in the Strategic Objectives of the Commission for 2005-2009. In its Communication of 2 March 2005 “*Towards a future EU Maritime Policy*”, the Commission underscored that “*the effective protection of the resource base is a precondition for achieving sustainable wealth and generating employment from Europe’s oceans and seas*” which the future EU maritime policy will seek. The two processes are fully complementary and intertwined.

The Strategy would make a valuable contribution to the future EU Maritime Policy by setting out the course of action required to ensure preservation of the functional integrity of the marine environment on which the sustainable wealth, productivity and employment opportunities derived from oceans and seas depend. In its conclusions of 20 December 2004 the Environment Council stressed “*the need for synergy between the thematic strategy for the protection and conservation of the marine environment and the Green Paper on Maritime Affairs, and the need to more fully address the importance of a strong integration and coherence of policies relevant to the marine environment, required at all levels of management and for all programmes and activities impacting on the marine environment.*”

The Marine Strategy would provide the framework for delivering on the environmental pillar of sustainable development by through decisions to safeguard the resource base for marine-related human activities. It would also provide the appropriate management unit – Marine Regions - for marine planning and decisions.

However, it would not bring about the overall governance framework through which all uses and users of the oceans and seas can be regulated. Such regulation is essential as there are presently conflicting and competing uses of ocean resources and space that are managed through *ad hoc* arrangements, which puts the long term productivity of oceans at risk. The comprehensive approach and governance for ocean management which is required cannot be developed through the Marine Strategy alone as this is not only an environmental issue and would go beyond the mandate of the 6th Environment Action Programme.

In addition to the framework for effective protection and conservation of the marine environment which this option would provide, the more comprehensive approach of the Maritime Policy would need to devise strategic objectives and principles for the

overall management and use of the seas to integrate the demands of different sectors, address the issue of competing uses and their interactions and develop more rigorous marine spatial planning. As documented in a recent study¹²⁵, the fully-fledged marine spatial planning that a comprehensive approach to maritime policy would bring about could contribute to:

- Optimising the use of ocean and sea areas by stimulating resource productivity and “*economic and human activities to take place where they bring most value and do not devalue other activities and the overall sustainability of ecosystems on which these activities are based.*”
- More effectively managing the increasing number and scale of developments in marine related industries, hence facilitating sustainable growth of marine industries.
- “*Providing greater clarity of policy and decision-making, more confidence in regulatory processes and more certainty about what changes will be acceptable, promoted or resisted in different areas of the marine environment for the benefit of developers, operators, users and protectors of the sea’s resources.*”¹²⁶ This would allow for more predictability of future investments of marine industries.

The Marine Strategy, through the implementation of Marine Strategies, could help guide future decisions on overall planning, management and developments of marine activities. In conclusion, the Marine Strategy can make an important contribution to the future EU Maritime Policy’s objective of realising the full economic potential of seas and oceans and safeguarding their long term productivity through sustainable use of the marine resource base.

Sectoral policies

The Marine Strategy would provide an integrated framework for analysing relevant Community policies’ contributions to protection of the marine environment and impacts on the marine environment – e.g. fisheries, transport, energy, regional policy, research, agriculture, employment and health.

As outlined in previous sections, under the current Community policy framework, while these policies affect the marine environment, they are not specifically designed to protect the marine environment in a holistic manner. As a result, human activities impacting the marine environment are addressed in a sector-by-sector manner instead of holistically.

The Marine Strategy would consider in an integrated manner the contributions of marine-related policies to the protection of the marine environment. As a result, these policies could become more mutually supportive and more effective in protecting the marine resource base on which the future of marine-related activities depend.

¹²⁵ The potential benefits of marine spatial planning.

¹²⁶ The potential benefits of marine spatial planning, p.22.

Of particular importance is the link with research policy given the current gap in knowledge of marine ecosystems hampering informed policy-making. Indeed, the objectives of the strategy will only be achievable if backed by a strong, comprehensive and strategic marine research agenda. Marine research efforts should be increased to underpin and support the sustainable use of marine resources, the sustainable management of the marine environment, and better understanding of ocean dynamics. This requires that novel science, integrated over different research disciplines –including socio-economic research- be developed to complement the traditional marine research agenda. In order to support the implementation of the Strategy, research will have to combine present knowledge about interactions and ecosystem structure and functions with scenario modelling based upon different types of risk assessments. While supporting implementation at the regional level, research will also have to address global pressures such as climate change and the effects of growth trends in other parts of world on the marine environment. Forecasting the future state of the marine environment under different assumptions of human impacts including a possible climate changes should be given high priority.

The 7th Framework Programme for Community Research has identified marine science and technology as one of the priority areas cutting across research themes and therefore provides the framework through which the marine science knowledge base can be improved. For each theme the framework will also include research needs to underpin the formulation, implementation and assessment of EU policies such as the Marine Strategy and the CFP. This is fully synergetic with the future EU Maritime Policy in the framework of which marine research has been identified as a priority: reference to excellence in marine scientific research, technology and innovation is specifically mentioned in the Communication to the Commission “*Towards a future Maritime Policy for the Union: A European vision for the oceans and seas*” of 2 March 2005.

External policies

The Strategy will be instrumental to boost EU delivery on relevant international commitments. It will also strongly benefit from these efforts to achieve its own objectives. The principal commitments at international level are as follows:

- The **Johannesburg Plan of Implementation** adopted at the World Summit on Sustainable Development held in September 2002 encouraged the application of the ecosystem approach to the establishment of marine protected areas by 2012. It also included a commitment to maintain or restore fish stocks to levels that can produce the maximum sustainable yield where possible not later than 2015. The Strategy will complement ongoing efforts under the Common Fisheries Policy to reach this objective to be outlined in a forthcoming Communication
- In the context of the **Convention on Biological Diversity** the Community has taken a strong position on the creation of a global network of marine protected areas by 2012. Decision VII/28 of the seventh Conference of the Parties to the Convention on Biological Diversity (CBD/COP7) held in Kuala Lumpur, Malaysia, 9-27 February 2004, adopted a programme of work on protected areas with the objective of the establishment and maintenance of ecologically representative national and regional systems of marine protected areas by 2012.

9. HOW TO MONITOR AND EVALUATE THE RESULTS AND IMPACTS OF THE MARINE STRATEGY AS IT IS BEING IMPLEMENTED

9.1. How will the strategy be implemented

The Strategy would be implemented through Marine Strategies to be developed for each Marine Region. Each Strategy would establish an integrated framework for achievement of environmental objectives. Under Option A, the development of Strategies would be purely voluntary. Under Option B, the development of Strategies would be binding. A detailed outline of the implementation processes foreseen under Options A and B is provided in preceding sections.

9.2. How will the strategy be monitored and reviewed?

An assessment of the current status of the region and of the environmental impact of human activities including would serve as the foundation for the development of Marine Strategies.

On this basis Member States would be required to establish monitoring programmes to review the status of marine ecosystems and the achievement of regional environmental quality objectives selected through suitable indicators. The programmes would:

- Be made operational at the latest four years after the date of entry into force of the legal instrument supporting the marine strategy.
- Be aggregated on the basis of Marine Regions.
- Be subject, where appropriate, to common technical specifications and standardised methods for monitoring at Community level to allow comparability of information.
- Build upon complement relevant existing monitoring programmes developed at EU and regional level to ensure consistency between these programmes and avoid duplication of efforts. In particular, synergies would be developed with monitoring efforts under the Common Fisheries Policy (e.g. Fisheries Data Collection Regulation).
- Make reporting obligations deriving from these monitoring programmes fully compatible with the Commission's proposal for a Directive establishing an infrastructure for spatial information in the Community (INSPIRE) of 2004.

As regards review mechanisms, Marine Strategies and monitoring and assessment programmes would be regularly when needed and in any case every five years after the presentation of the first Plan. This is in line with the adaptive management principle which is at the centre of the ecosystem-based approach.

10. STAKEHOLDER CONSULTATION

10.1. Which interested parties were consulted, when in the process and for what purpose?

The Strategy has been prepared with the help of an extensive stakeholder consultation process from 2002 to 2004 including all EU Member States and candidate countries, key European third countries sharing oceans and seas with the Union, 16 international commissions and conventions, and 21 key industry and civil society organisations, including notably the European Anglers Alliance, FORATOM (European Atomic Forum), KIMO International (Local Authorities International Environmental Organisation), ICES (International Council on the Exploration of the Seas), WWF (World Wildlife Fund for Nature), IFAW (International Fund for Animal Welfare), OGP (International Association of Oil and Gas Producers), Greenpeace, World Nuclear Association Bowater House and EEAC (European Environmental Advisory Councils).

The process was kicked off at the Stakeholder Conference held in Køge, Denmark, on 4-6 December 2002, which supported the objectives, actions and timetables the Commission had proposed in its Communication “*Towards a Strategy to Protect and Conserve the Marine Environment*”.

Further to the Køge Conference four *ad hoc* working groups involving all key stakeholder constituencies were set up to discuss key aspects of the work that respectively dealt with:

- Ecosystem approach to management of human activities
- European marine monitoring and assessment
- Hazardous substances
- Strategic goals and objectives

These working groups met regularly since 2003:

- The monitoring and assessment working group met three times (October 2003, February and June 2004, February and May 2005).
- The ecosystem approach working group met four times during the first half of (last meeting held in May 2004)
- The hazardous substances working group held two meetings (November 2003, June 2004) and a further meeting is being planned.
- The Strategic goals and objectives working group met in February, May and June 2004; and in April 2005.

10.2. What were the results of the consultation?

All working groups set up as part of the Strategy delivered contributions to a closing stakeholder conference held in Rotterdam, Netherlands, on 10-12 November 2004,

from which a wide consensus emerged on the analysis of the pressures and in favour of the approach taken for the strategy.

Building upon the results of previous discussions with stakeholders, a final internet-based consultation took place from 15 March to 9 May 2005 to elicit relevant opinions from stakeholders on the specific measures being considered for inclusion in the Thematic Strategy – in particular the possibility of a legal framework. The text of this internet consultation is available at http://europa.eu.int/comm/environment/water/consult_marine.htm.

A total of 133 replies were received, half of which originating from organisations and institutions (including Member States), the other half from individuals. About 75% of replies received originated from organisations or individuals not involved in the prior stages of consultation. While the replies received originated from 22 EU Member States and third countries, half of the replies originated from residents of 3 Member States – UK, Belgium and Netherlands. A detailed account of the results of the consultation is available at http://europa.eu.int/comm/environment/water/pdf/consultation_marine.pdf.

The main conclusion that can be drawn from this consultation is that the approach proposed by the Commission was broadly endorsed. The need for strong EU action was underscored by a majority of respondents. More specifically:

- The objectives identified for the Strategy were considered of ‘high’ importance by a large majority of respondents;
- There was strong support for the dual EU/regional approach proposed for the Strategy; as well as for the setting-up of Marine Regions as management units for implementation;
- There was strong support for the elements upon which Marine Strategies (referred to as Implementation Plans in the consultation document) should be built, albeit to a lesser extent for the need to produce cost-benefit analyses of measures introduced;
- There was strong support for the production of co-ordinated Marine Strategies between Member States, and also involving third countries concerned; as well as for using existing structures stemming from international agreements for developing and implementing Marine Strategies;
- There was strong support for the proposed methodology on monitoring.

Worth mentioning is that support was generally even stronger from those respondents that had been actively involved in the stakeholder consultation over the past three years.

Replies to the last question – regarding timetable for implementation – were the only ones to be more mixed. While a large number of respondents argued that the timeframe for achieving good environmental status of the marine environment was too lengthy, other respondents argued that the proposed deadlines were too ambitious and a third category of respondents even questioned the very idea of proposing

precise deadlines prior to the completion of a clear assessment of the state of the marine environment. In addition, a number of specific comments were made in relation to possible adjustments to the timeframe in particular to take into account other existing processes (Water Framework Directive, international targets etc).

The proposed timetable is now that the assessment and characterisation process be completed within 4 years after the entry into force of a possible Directive; and that the monitoring system be developed within 6 years. As regards completion of programmes of measures, the target date is 2016. Finally, the target date for achieving good environmental status is 2021. In addition to being coherent with the thrust of replies received – by committing to an earlier final deadline (2021 means that Member States will have at most 15 rather than 20 years to achieve good environmental status) while adjusting intermediate deadlines to ensure that measures are based upon a thorough analysis of the state of the marine environment, this proposal will also stimulate better regulation. Indeed, the date by which good environmental status is to be reached – 2021- will coincide with the date of the first review of River Basin Management Plans under the EU Water Framework Directive. This will allow for synergies on the further implementation of two closely intertwined pieces of legislation.

11. COMMISSION DECISION AND JUSTIFICATION

11.1. What is the final policy choice and why?

The final decision is based on the balance between costs of action and costs of no additional action. This IA shows that option A (voluntary approach, no binding mechanism) is not likely to significantly differ from the no-action scenario in the medium to long-term. While there are important quantification and valuation gaps in assessing the costs of no-action, these costs are potentially very high as demonstrated in section 4.

As explained in this IA, costs of action under option A would not be compulsory and therefore less likely to be incurred. Short-term benefits would be reaped – e.g. fostering more joined-up policy-making etc. However, these benefits would be offset by medium and long term costs largely similar to those generated by a no-action scenario. Indeed, option A would be unable to substantially reduce costs of no-action: the voluntary arrangement it would foresee would allow Member States to unilaterally lower the level of protection they consider is appropriate, hence jeopardising other efforts to achieve good environmental status of the marine environment.

Under option B (legislative framework), there would be administrative costs incurred by the set-up and operating of the framework through which the strategy is to be implemented. These costs have been estimated to amount to around €90 million for the initial phase (total amount for a period of about 2 years) and slightly above €70 million, annually, after this period.

There would also be far more significant implementation costs resulting from the programmes of measures devised at regional level. As shown in this IA, it is not possible at this stage to fully anticipate the measures that will emerge from Regional

Marine Strategies. In these conditions, it is foreseen that the legislative instrument underpinning the development of implementation plans will foresee that a detailed impact assessment of the programmes of measures is carried out to ensure that environmental objectives are reached at a minimum cost. However, this IA provides indications as to likely impacts and costs on key sectors to be affected by 1 Marine Strategies.

While these indications remain to a large extent theoretical at this stage, they provide sufficient analysis to inform the decision on the final policy choice. They conclude on the fact that there may be important social and economic costs in the short-term for sectors most dependent on the marine environment and most directly affecting it (e.g. fisheries). Sectors where the environmental regulatory framework is comparatively less developed (e.g. extraction, dredging and to a lesser extent shipping) are also likely to be more affected.

However, in summary, in the medium to long term, benefits from the implementation of the Marine Strategy include:

- Effective protection the marine environment and to restoring the key ecological services it provides.
- Sustaining the future of marine industries by effectively protecting the resource base on which they depend – in particular fisheries, the fast growing aquaculture sector and the key sector of tourism.
- Reducing considerably health costs of no additional action from pollution of bathing sites and contamination of fish products.
- Generating new economic opportunities from increased research prospects and emerging sectors (ecotourism etc).

In light of these potential benefits and of the inability of Option A to reduce costs of no additional action, the final decision is Option B, i.e. combining a Communication with a legislative instrument in the form of a Framework Directive. Bearing in mind uncertainties about the combined impacts of measures to be introduced under Option B and about their potential costs for key economic sectors, this option is accompanied by a provision on compulsory impact assessments and cost-benefit analyses at regional level.

11.2. Why was a more/less ambitious option not chosen?

Option A was a less ambitious option, restricting the Marine Strategy to a Communication, and leaving it to Member States to decide when and how to develop Marine Strategies. This option was ruled out because it is clear from the analysis carried out that it would not provide sufficient guarantees in terms of delivering on the objectives of the marine strategy and in avoiding costs of no-action.

The chosen option could have been more ambitious in setting down specific management measures. This was not done for three reasons highlighted in this IA: firstly, this would be doomed to fail as specific management measures cannot be identical for all Marine Regions given differences between them; secondly this

would prove to be overly costly; thirdly, this would not be feasible due to significant data and knowledge gaps at present.

11.3. Which are the trade-offs associated to the chosen option?

The main trade-off associated to the chosen option relates to short-term costs that may be associated with the implementation phase vs. long term gains. While impacts resulting from Marine Strategies to be developed as part of the chosen option cannot be fully assessed at this stage, it is clear that costs are to be anticipated from some management measures in terms of restrictions to certain economic activities. This IA concludes that long term gains to be derived from improved protection of the marine environment will offset potentially short-term economic and employment losses.

11.4. In the case of poor data or knowledge at present, why is a decision to be taken now rather than be put off until better information is available?

While data and knowledge on the marine environment and on different impacts on it from human-induced pressures are underdeveloped, the diagnosis on the state of marine ecosystem established in this IA clearly points to continued degradation and a worsening of the situation under a no additional action scenario. This provides sufficient information to justify action.

The course of action proposed takes fully into account the insufficient knowledge-base which characterises the marine environment. It will actually allow for bridging the current knowledge gap by promoting an integrated assessment and monitoring scheme which will enable informed policy-making.

11.5. Have any accompanying measures to maximise positive and minimise negative impacts?

As it is impossible to anticipate the detailed costs of Marine Strategies to be developed at the level of Marine Regions, the Strategy foresees that detailed impact assessments of programmes of measures proposed at regional level, as well as cost-benefit analyses, should be carried out prior to implementation. This is aimed at minimising potentially negative economic and social impacts.

Moreover, the legal proposal will foresee special situations and areas where it would be impossible for a Member State to achieve the level of ambition of the environmental targets set in the framework of the Directive, in order to take into account the particular contexts of certain Marine Regions.

Annex 1- Goods and services provided by the UK marine environment

| Good or service | Value or description |
|---|--|
| Monetary values available | |
| Food provision and employment | Value of landings sea fishing industry £546,3 million |
| Recreation and tourism | Net output = £11,770 million Consumer surplus = £504 million |
| Disturbance prevention (flood and storm protection) | Disturbance prevention by wetlands - £2,616 million No values available for other marine environments |
| Nutrient cycling Available for other nutrients | Nitrogen and phosphorous recycling: £0.10 to 0.28 per m ³ . No values |
| Gas and climate regulation | £16 to £164 per tonne of carbon stored by the marine environment. No values available for other gas regulation. |
| Bioremediation of waste | Bioremediation of wetlands - £1096.81 to £1236.54 per acre No values available for other marine environments |
| Raw materials | Oil, gas and aggregates net output - £14,879 million No values available for other raw materials |
| Physical environment (a space to work in) | Net output - £11,000 million |
| Information service | The marine environment provides an insight into environmental resilience, stress and a long term environmental record Education, training and research funding - £83 million Natural technologies can provide the key to improvements, eg marine microbes can convert sugar into electricity and may be a valuable method of producing batteries. No values available for natural technologies. |
| Non-use value: bequest value and existence value | Annual non-use value of sea mammals- £474 million to £1,149 million |
| No monetary value available | |
| Genetic resources | Genetic diversity held in the marine environment holds significant value eg to enable cross-breeding and genetic engineering to improve existing commercial species and for medical purposes. Tropical rainforests have been valued at £0.01 to £19.38 per ha based on their genetic diversity |
| Medicinal resources | There is much exploratory research being undertaken in this area, and the value is potentially huge, eg shark derived material can be applied to inhibit cancerous tumour cells |
| Cultural values | There is value associated with the marine environment eg the unique culture of fishing communities, art, music, links to religion |
| Option use (the value associated with keeping options open) | There is value associated with maintaining a healthy marine environment, eg for every species we lose, we may lose a potential medical cure. Even though we may not use every marine species in the future, there is value in maintaining them, so that we have the option to use them |
| Habitat (refugium and nursery) | A healthy habitat is a prerequisite for the provision of all goods and services; without this fundamental base the ecosystem would cease to function |
| Biological control | Ecosystems have innate interactions and feedback mechanisms, leading to varying levels of stability within the community. Even small changes in the food web can significantly affect the resistance and resilience of an ecosystem to perturbations |
| Glue value | The sum of the values of individual functions is likely to be less than the value of the entire environment, owing to the primary life support function, and the contribution of specific environmental assets to maintaining healthy and functional ecosystems |

Source: Turning the tide, p. 91.

Annex 2

Trend in the proportion of catches from Atlantic fish stocks under EC management considered to be outside safe biological limits

The graph shows the trend in percentage of fish catches in Atlantic waters taken from stocks that are considered to be outside safe biological limits¹²⁷ between 1994 and 2002, referred to the total catches made on all stocks under the management responsibility of the EU.

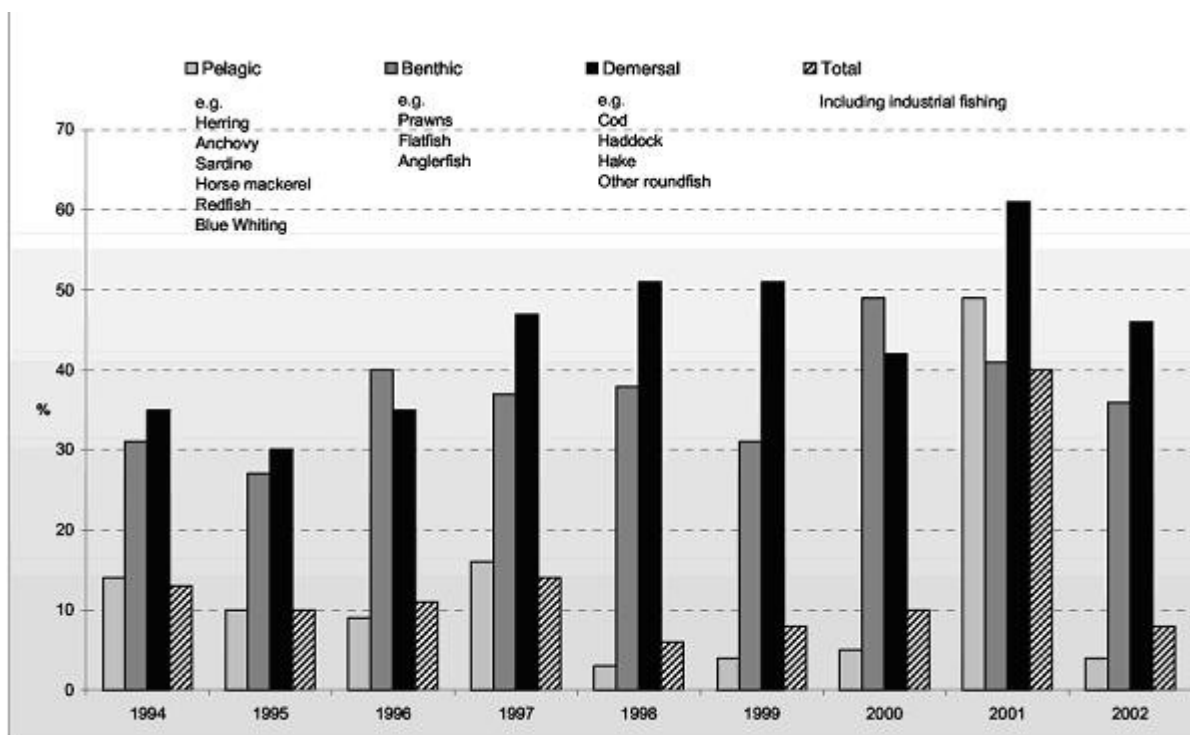
The graph covers the total catch and three different ecological categories of fish: pelagic, benthic and demersal stocks. The remainder of the catch is taken from “industrial stocks”, i.e. fish which are caught for purposes other than human consumption, and that makes up to about 30% of the total catch; these stocks were considered within safe biological limits for the whole period.

On average, 37% and 44% of catches taken from benthic and demersal stocks respectively were from stocks below safe biological limits. The overall trend is for an increase in the proportion from stocks below safe biological limits, although the value for 2002 may indicate a change in this trend. Whilst demersal and benthic stocks together constitute just 15% of the total catch, they are the most important in economic terms.

Catches of Pelagic fish account for about 60% of total catches in EU waters. 13% of these on Pelagic catches, on average, were from stocks outside safe biological limits. In 2001, the stock of blue whiting was considered to be outside of safe biological limits. Since the catches of this species are very large, this had a big impact on the indicator for that year, explaining the jump in the indicator for both Pelagics and the total catch in 2001¹²⁸.

127 Stocks are considered to be within safe biological limits if the fishing pressure (catches) and other causes of mortality (predation etc) do not exceed the rate of recruitment and growth of the stock. If this does occur, then the spawning stock biomass will fall below what are considered “safe” limits.

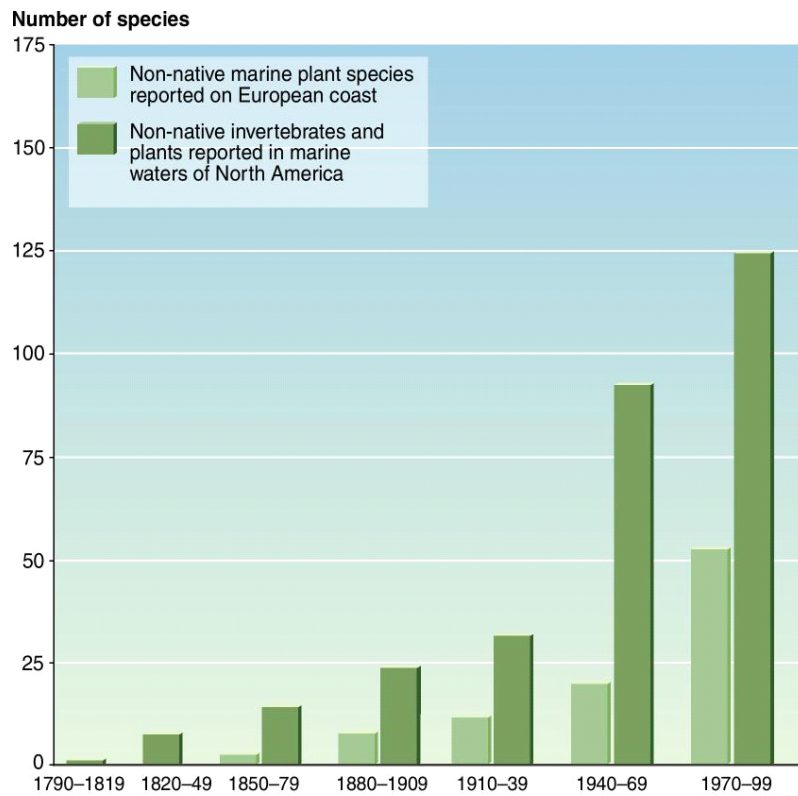
128 Blue whiting can be classified as both Pelagic and Demersal. ICES classifies the species as Pelagic because most catches of the species are from Pelagic waters (i.e. open waters).



Source: International Council for the Exploration of the Sea, ICES (2002); European Commission, DG Fisheries (2004); Eurostat (2004)

From Environment Policy Review 2004 (27.1.2005, SEC(2005) 97 – Commission Staff Working Paper - Annex to the Communication from the Commission to the Council and the European Parliament on the 2004 environmental Policy Review EU Environmental Policy in 2004: developments, new evidence and outlook for 2005 {COM(2005)17 final}

Annex 3 – Growth in number of marine species introductions in North America and Europe – Millennium Ecosystem Assessment (March 2005)



Annex 4 - Overview of a selection of regional and global conventions, agreements and agencies

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|--|---|-----------------------------|
| <u>General</u> | | | |
| <u>Convention for the Protection of Marine Environment of the North East Atlantic (OSPAR)</u> | <u>Taking of all possible steps to prevent and eliminate pollution and the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected.</u> | <u>Belgium, Denmark, European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom</u> | <u>www.OSPAR.org</u> |
| <u>Convention for the Protection of the Marine Environment of the Baltic Sea (HELCOM)</u> | <u>Adoption of appropriate legislative, administrative or other relevant measures to prevent and eliminate pollution in order to promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance. The Baltic Sea Joint Comprehensive Environmental Action Programme (JCP) focuses on investment activities in relation to particular polluted sites (Hot Spots) in the catchment area.</u> | <u>Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden and the European Community</u> | <u>www.HELCOM.fi</u> |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|---|---|---|---|
| <u>Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (BARCOM)</u> | <u>Taking of concerted actions to prevent and eliminate marine pollution and sustainable management of the Mediterranean</u> | <u>20 Mediterranean countries, including France, Greece Italy and Spain and the European Union</u> | www.unepmap.org |
| <u>Convention for the Protection of the Black Sea against Pollution</u> | <u>Taking of all necessary measures consistent with international law and in accordance with the provisions of this Convention to prevent, reduce and control pollution thereof in order to protect and preserve the marine environment of the Black Sea.</u> | <u>Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine</u> | http://www.blacksea-environment.org |
| <u>Arctic Council</u> | <u>Forum to provide a mechanism to address the common concerns and challenges faced by the Arctic governments and the people of the Arctic.</u> | <u>Canada, Denmark-Greenland-Faroe Islands, Finland, Iceland, Norway, Russian Federation, Sweden, USA</u> | www.arctic-council.org |
| <u>UN Law of the Sea (UNCLOS)</u> | <u>Governance of all aspects of the ocean space</u> | <u>Global agreement</u> | |
| <u>Hazardous Substances</u> | | | |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|---|---|--|
| <u>Convention on the Prevention of Marine Pollution by Dumping Wastes and other Matters (LC)</u> | <u>Control of all sources of marine pollution by dumping of wastes.</u> | <u>Global agreement</u> | <u>administered by IMO</u> |
| <u>Stockholm Convention on Persistent Organic Pollutants (POPs)</u> | <u>Setting out control measures covering the production, import, export, disposal, and use of POPs (not yet in force).</u> | <u>Global agreement</u> | <u>http://irptc.unep.ch/pops</u> |
| <u>Rotterdam Convention on Prior Informed Consent for certain Hazardous Chemicals in International Trade</u> | <u>Promoting shared responsibility between exporting and importing countries in protecting human health and the environment from the harmful effects of certain hazardous chemicals being traded internationally.</u> | <u>Global agreement</u> | <u>http://irptc.unep.ch/pic/</u> |
| <u>Radioactive Substances</u> | | | |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|---|--|---|----------------------|
| <u>International Atomic Energy Agency and European Commission (DG TREN)</u> | <u>develops, inter alia, nuclear safety standards and, based on these standards, promotes the achievement and maintenance of high levels of safety in applications of nuclear energy, as well as the protection of human health and the environment against ionising radiation</u> | <u>Global organisation</u> | <u>www.iaea.org</u> |
| <u>Fisheries Management</u> | | | |
| <u>International Baltic Sea Fisheries Commission (IBSFC)</u> | <u>Co-operation with a view to preserving and increasing the living resources of the Baltic Sea and the Belts and obtaining the optimum yield, and, in particular to expanding and co-ordinating studies towards these ends.</u> | <u>Estonia, the European Union, Latvia, Lithuania, Poland and the Russian Federation</u> | <u>www.ibsfc.org</u> |
| <u>North East Atlantic Fisheries Convention (NEAFC)</u> | <u>Promotion of the conservation and optimum utilisation of the fishery resources of the Northeast Atlantic area within a framework appropriate to the regime of extended coastal state jurisdiction over fisheries, and accordingly to encourage international co-operation and consultation with respect to these resources.</u> | <u>Bulgaria, Cuba, Denmark (in respect of the Faroe Islands and Greenland), European Union, Iceland, Norway, Poland, and the Russian Federation</u> | <u>www.neafc.org</u> |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|--|--|--|
| <u>North Atlantic Salmon Conservation Organisation (NASCO)</u> | <u>Contribute through consultation and co-operation to the conservation, restoration, enhancement and rational management of salmon stocks taking into account the best scientific evidence available to it</u> | <u>Canada, Denmark (in respect of the Faroe Islands and Greenland), European Union, Iceland, Norway, Russian Federation, USA</u> | www.nasco.org.uk |
| <u>International Commission for the Protection of Atlantic Tunas (ICCAT)</u> | <u>Responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas</u> | <u>32 countries, including the European Union</u> | www.iccat.es |
| <u>Food and Agriculture Organisation (FAO)</u> | <u>Lead Agency for agriculture, forestry, fisheries and rural development</u> <u>FAO Code of Conduct for Responsible Fisheries</u> | <u>Global organisation</u> | www.fao.org |
| <u>Agreement for the Implementation of UNCLOS relating to the conservation and management of straddling stocks</u> | <u>Providing principles for the conservation and management of those fish stocks and establishing that such management must be based on the precautionary approach and the best available scientific information</u> | <u>Global agreement</u> | www.un.org/depts/los/index.htm |
| <u>Nature Conservation</u> | | | |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|--|--|--|
| <u>Agreement on the conservation of small cetaceans of the Baltic and the North Seas (ASCOBANS)</u> | <u>Regional Agreement under CMS (see below) with a conservation and management plan stipulating measures regarding, inter alia, (a) prevention of pollution, (b) fishing practices, (c) regulation of activities affecting food resources, (d) prevention of disturbances, (e) conduct surveys and research, and (f) enforce legislation that prohibits the intentional taking and killing of small cetaceans.</u> | <u>Belgium, Denmark, Finland, Germany, the Netherlands, Poland, Sweden, United Kingdom</u> | www.ascobans.org |
| <u>Agreement on the conservation of cetaceans in the Black and Mediterranean Seas and contiguous areas of the North East Atlantic (ACCOBAMS)</u> | <u>Regional Agreement under CMS (see below), inter alia, providing for the protection of dolphins, porpoises and other whales, and establishing a network of protected areas important for their feeding, breeding and calving.</u> | <u>Albania, Bulgaria, Croatia, Spain, Georgia, Malta, Morocco, Monaco, Romania and Tunisia. The first meeting of parties was also attended by: Bosnia-Herzegovina, Egypt, France, United Kingdom, Greece, the Libyan Arab Jamahiriya, Lebanon, Portugal, Turkey, the Ukraine and the European Union.</u> | www.accobams.mc |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|--|--|---|
| <u>Convention for the protection of the environment through criminal law (Council of Europe)</u> | <u>European Convention establishing as criminal offences a number of acts committed intentionally or through negligence where they cause or are likely to cause lasting damage notably to the quality of the water, or result in the death of or serious injury to any person. It defines the concept of criminal liability of natural and legal persons, specifies the measures to be adopted by States and enable them to confiscate property and define the powers available to the authorities, and provides for international co-operation.</u> | <u>Contracting States of the Council of Europe</u> | http://conventions.coe.int/Treaty/EN/CadreListeTraites.htm |
| <u>Trilateral Co-operation on the Protection of the Wadden Sea (CWSS)</u> | <u>Co-operation on the protection and conservation of the Wadden Sea covering management, monitoring and research, as well as political matters</u> | <u>Denmark, Germany, the Netherlands</u> | http://cwss.www.de |
| <u>Convention on Biological Diversity (CBD)</u> | <u>Conservation of biological diversity.</u> <u>Jakarta Mandate: Protection of marine and coastal diversity</u> | <u>Global agreement</u> | |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|---|---|--|
| <u>Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)</u> | <u>Conservation of migratory species (avian, marine and terrestrial)</u> | <u>Global agreement</u> | www.wcmc.org.uk/cms |
| <u>Convention on the Conservation of Wildlife and Natural Habitats in Europe (Bern Convention)</u> | <u>Conservation of wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation.</u> | <u>Global agreement</u> | www.nature.coe.int/english/cadres/berne |
| <u>Shipping</u> | | | |
| <u>International Maritime Organisation (IMO)</u> | <u>Specialised agency of the United Nations, which is responsible for measures to improve the safety of international shipping and to prevent the pollution of ships. It also is involved in legal matters, including liability and compensation issues and the facilitation of international maritime traffic.</u> | <u>Global organisation</u> | www.imo.org |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|---|--|---|--|
| <u>Convention for the Prevention of Pollution from Ships (MARPOL 73/78)</u> | <u>Prevention and minimisation of pollution from ships from operational and accidental causes</u> | <u>Global agreement</u> | <u>administered by IMO (see above)</u> |
| <u>Paris Memorandum on Port State Control (Paris MOU)</u> | <u>Elimination of the operation of sub-standard ships through a harmonised system of port State control</u> | <u>Global agreement</u> | www.parismou.org |
| <u>International Convention on the Control of Harmful Anti-fouling Systems on Ships</u> | <u>Prohibition of the use of harmful organotins in anti-fouling paints used on ships and will establish a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems (not yet in force)</u> | <u>Global agreement</u> | <u>administered by IMO (see below)</u> |
| <u>Combating Marine Pollution</u> | | | |
| <u>Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances (Bonn Agreement)</u> | <u>International agreement by North Sea coastal states, together with the EC to offer mutual assistance and co-operation in combating pollution and execute surveillance as an aid to detecting and combating pollution and to prevent violations of anti-pollution regulations.</u> | <u>Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden, the United Kingdom, European Union. Ireland is in the process of becoming Contracting Party.</u> | www.bonnagreemen t.org |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|--|--|---|--|
| <u>Agreement for Co-operation in Dealing with Pollution due to Hydrocarbons or Other Harmful Substances (Lisbon Agreement)</u> | <u>Co-operation for the protection of the coast and waters of the North-East Atlantic on taking appropriate measures in order to prepare to face marine pollution incidents by oil or other harmful substances (not yet in force).</u> | <u>France, Portugal and Spain</u> | |
| <u>Assessment & Monitoring</u> | | | |
| <u>European Environment Agency (EEA)</u> | <u>Support sustainable development and help achieve significant and measurable improvement in Europe's environment through the provision of timely, targeted, relevant and reliable information to policy making agents and the public</u> | <u>Austria, Belgium, Bulgaria, Czech Republic, Estonia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Liechtenstein, Luxembourg, Macedonia, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom</u> | www.eea.eu.int |

| <u>Name</u> | <u>Main objective/task</u> | <u>Contracting Parties / Membership</u> | <u>Website</u> |
|---|---|---|--|
| <u>Convention for the International Council for the Exploration of the Sea (ICES)</u> | <u>Forum for the promotion, co-ordination, and dissemination of research on the physical, chemical, and biological systems in the North Atlantic and advice on human impact on its environment, in particular fisheries effects in the Northeast Atlantic. Facilitation of data and information exchange through publications and meetings. Functioning as a marine data centre for oceanographic, environmental, and fisheries data.</u> | <u>Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Latvia, Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, United Kingdom, United States</u> | www.ices.dk |
| <u>Arctic Monitoring and Assessment Programme (AMAP)</u> | <u>Provision of reliable and sufficient information on the status of, and threats to, the Arctic environment, and providing scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants. (see also Arctic Council)</u> | <u>Canada, Denmark (Greenland and Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, USA</u> | www.amap.no |
| <u>Other</u> | | | |
| <u>International Conferences on the Protection of the North Sea (NSC)</u> | <u>Periodic ministerial conferences for a broad and comprehensive assessment of the measures needed to protect the North Sea environment.</u> | <u>Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden, the United Kingdom, European Union</u> | www.dep.no/md/nsc |

Annex 5 - Inventory of all current and upcoming Community legislative and policy initiatives that have or would have a bearing on the marine environment

| Threat/Pressure | EU Legislation, policy or programme |
|---|--|
| Biodiversity Decline/ Habitat Destruction | A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development (SDS), Directive on the conservation of natural habitats and of wild fauna and flora (92/43, Habitats Directive), Directive on the conservation of wild birds (79/409, Birds Directive), Council Regulation establishing a Community system for fisheries and aquaculture (No 3760/92 of 20 December 1992, CFP), Agricultural Policy (CAP), Directive establishing a framework for Community action in the field of water policy (2000/60, WFD), draft Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (ICZM); proposed Directive amending the Recreational Craft Directive 94/25 to include noise and exhaust emission limits for engines used in recreational craft |
| Hazardous Substances | Directive on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (67/548) and related legislation, Directive 76/769 relating to restrictions on the marketing and use of certain dangerous substances and preparations, Directive concerning the placing of plant protection products on the market (91/414), Directive concerning the placing of biocidal products on the market (98/8), Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (76/464, plus daughter directives), Directive concerning integrated pollution prevention and control (96/61, IPPC), WFD, Chemicals Policy, emissions legislation especially national emission ceilings |
| Eutrophication | Council Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676, Nitrates Directive), Council Directive concerning urban waste-water treatment (91/271, UWWT), WFD, CAP, emissions legislation/national emission ceilings |
| Chronic Oil Pollution | Directive on port reception facilities for ship-generated waste and cargo residues (2000/59), Community Framework for cooperation in the field of accidental or deliberate marine pollution |
| Radionuclides | Basic safety standards established under the Euratom Treaty establishing the European Atomic Energy Community |
| Health and Environment | Directive concerning the quality of bathing water (76/160), UWWT, Directive 91/492 on shellfish, Directive 91/493 on fish and fishery products and Directive 96/23 on monitoring of residues in food (Food Safety Framework), Directive laying down the health conditions for the production and the placing on the market of live bivalve molluscs (91/492), Commission Strategy with regard to Dioxins, Furans and PCB; proposed Directive amending the Recreational Craft Directive 94/25 to include noise and exhaust emission limits for engines used in recreational craft (COM (2000) 639); Proposal for a directive on the Protection of the Environment through Criminal Law (COM (2001) 139) |

| Threat/Pressure | EU Legislation, policy or programme |
|---|--|
| Maritime Transport (limited to measures most directly linked to the protection of the marine environment) | Directive 93/75 concerning minimum requirements for vessels carrying dangerous or polluting goods; Directive 94/57 on common rules and standards for ship inspection and survey organisations, Directive 95/21 concerning Port State Control; Directive 2000/59 on port reception facilities for ship-generated waste and cargo residues; Directive 2001/25 on the minimum level of training of seafarers; Regulation 417/2002 on the accelerated phasing-in of double hull or equivalent design requirements for single hull oil tankers; |

Annex 7 – Administrative and other policy costs of the Marine Strategy

1. Introduction

This is an attempt at estimating the costs of planning, setting up the administrative framework and monitoring which will be incurred by all parties involved in the development of the Marine Strategies required by the Marine Strategy. The tasks to which we refer are not purely administrative tasks but we adopt this terminology for ease of use.

The analysis is based on already existing material. To our knowledge, there is very little material available to support an estimate of the administrative costs of the Marine Strategy. The UK partial Regulatory Impact Assessment of the EU Marine Strategy considers the costs of the implementation of certain measures (like additional measures to reduce discharges containing radionuclides) but not the costs of the planning effort needed to identify the targets, limits and the package of measures needed.

We will come up with a rough but consistent estimation of the costs of the planning phase of the Marine Strategy. We will basically extrapolate evidence provided by two studies:

- *The Irish Sea Pilot*, a two year project financed by the UK DEFRA, set up to test the potential for an ecosystem approach to managing the marine environment at a regional sea scale.
- *An Ocean Blueprint for the 21st Century*, a report by the US Commission on Ocean Policy addressing the implementation of a comprehensive US national ocean policy. It presents an annex with detailed costs associated with the recommendations issued by the Commission.

2. Extrapolating from the Irish Sea Pilot

The study identifies some main tasks involved in marine environment management: developing and implementing a communications strategy, collating and mapping data using GIS analysis, developing a marine landscape classification, test draft criteria for identification of nationally important features and areas, developing nature conservation objectives, review existing legislation against these objectives and assessing the potential contribution of the framework to sustainable development.

Based on the experience of the pilot project, an estimation of the cost of implementing this approach in a moderately complex area was made:

| <i>Task</i> | GBP | euro | % |
|--|----------------|----------------|-------------|
| engagement of regional sea governments and stakeholders | 65000 | 92300 | 3% |
| develop and implement a communication strategy | 235000 | 333700 | 12% |
| data collection and mapping | 230000 | 326600 | 12% |
| assess socio-economic context of the regional sea | 100000 | 142000 | 5% |
| marine landscapes: identify, map, assess, characterise... | 135000 | 191700 | 7% |
| nationally important marine areas: identify, network, map,,, | 110000 | 156200 | 6% |
| nationally important marine features: identify, map,,, | 85000 | 120700 | 4% |
| conservation objectives: identify and agree with stakeholders | 80000 | 113600 | 4% |
| develop zoning plan and management measures, consult stakeholders,,, | 230000 | 326600 | 12% |
| Total cost of setting up this framework | 1270000 | 1803400 | |
| Development of a marine spatial planning system | 750000 | 1065000 | 36% |
| Total cost of the framework plus the planning system | 2020000 | 2868400 | 100% |

GBP/euro = 0.7 (16/3/2005)

It seems defensible to assume that the EU Marine Strategy's requirements broadly correspond to the tasks defined for the development of the Irish Sea Strategy, excluding the development of a spatial planning system, which would go beyond its mandate.

The one-off costs of setting up the framework for the management of this sea region would therefore amount to €1.8 million. We could reasonably expect this work to be delivered in two years time (which is compatible with indications provided by the study).

Based on the ICES response to the European Commission's request for advice on the appropriate eco-regions, we can assume that the Irish Sea (58,000 km², integrally under Irish and British jurisdiction) roughly corresponds to one fifth of an average Marine Region, as defined in our proposal. By way of example, the surfaces of the North Sea and Baltic Sea, which have been identified as Marine Regions and sub-regions under the Marine Strategy are respectively 575,000 km² and 370,000 km². The Mediterranean Sea, which the Strategy suggests splitting into four marine sub-regions, covers 2.51 million km².

This implies that the costs for an average sea region (or the average cost per region) would amount to € 9 million.

ICES has proposed 13 Marine Regions for the implementation of the Strategy. However, some of these regions fall outside EU jurisdiction (e.g. Barents Sea, Faroe Islands, Greenland and Iceland Seas) and would therefore not be covered. The Strategy would establish 3 Marine Regions - Mediterranean, Baltic Sea and Northeast Atlantic- in a first phase, 4 –former 3 plus the Black Sea- after the enlargement to Bulgaria and Romania. The Strategy would also suggest that the Northeast Atlantic and the Mediterranean be each divided into 4 sub-regions. On this basis the Strategy would cover 10 Marine Regions in total. However, legal obligations to be derived from the Strategy would only cover the marine waters under sovereignty or jurisdiction of EU Member States within these regions.

This implies an estimate of € 90 million for setting up the proposed framework for the management of all regional seas.

So far we have considered one-off costs of setting up this administrative framework. The study provides no estimation of recurrent (annual) costs after the initial set up phase is completed. With the objective of estimating these recurrent costs we will use the proportion (relative to set up costs) calculated by the US Commission on Ocean Policy (see point 3). The US Commission calculated first year costs of € 21m and an annual recurrent cost of € 91m, from the second year. In other words, the full set up would take 2 years and would cost €112 m, while €91 m would be necessary to keep it running from year 3.

Applying this same proportion (91/112) to our estimate derived from the Irish Sea data, we obtain a recurrent annual cost of about €73 m against €90m for setting up the framework.

These estimates are clearly to be considered upper limits, as the Irish Sea study assumes no previous work is done (for example identification and mapping of marine landscapes and nationally important areas). That is never the case in European sea regions identified under the Marine Strategy, where work is already advanced and where there are regional institutions already in place performing related tasks. In addition, while the Strategy suggests the identification of 8 sub-regions within the Mediterranean and the Northeast Atlantic Regions, Member States may not retain these sub-regions and choose to work within the two wider regions instead.

For these reasons, a realistic value for the setting up costs is likely to be below the € 90m we have estimated above. The annual cost of € 73m roughly corresponds to 973 *full time equivalent* people working on the policy per year (assuming € 75 000 per person, which would include overhead costs and meeting costs, etc) or around 97 additional people per region.

3. Extrapolating from the US Commission on Ocean Policy's final report (2004)

Appendix G of the report provides detailed costs estimates associated with the recommendations of the U.S. Commission on Ocean Policy. Among the cost items presented, several relate to organisational and planning issues comparable to the tasks to be undertaken for compliance with the EU Marine Strategy requirements for regional conservation and management plans. The U.S. and American realities are not necessarily equivalent but the U.S. figures prove useful to cross-check the estimates made in the previous section.

We have selected the following items, broadly covering the range of tasks we are interested in costing:

| <i>Recommendation</i> | <i>1st year costs in USD (whole US)</i> | <i>1st year costs in USD (per region)</i> | <i>Ongoing annual costs in USD (whole US)</i> | <i>Ongoing annual costs in USD (per region)</i> |
|---|--|--|---|---|
| 1. Advancing a Regional Approach | | | | |
| 1.1 Design and apply a regional ocean council process | 3.000.000 | 250.000 | 12.000.000 | 1.000.000 |
| 1.2 Establish regional ocean information programs | 9.000.000 | 750.000 | 36.000.000 | 3.000.000 |
| 1.3 Conduct regional ecosystem assessments (\$ 0,25m per assessment on a 4 year rotation among regions) | 750.000 | 62.500 | 750.000 | 62.500 |
| 2. Coordinating Management in Federal Waters | | | | |
| Create a coordinated offshore management regime | 900.000 | 75.000 | 1.800.000 | 150.000 |
| 3. Creating a National Monitoring Network | | | | |
| Develop a national monitoring network | 10.000.000 | 833.333 | 60.000.000 | 5.000.000 |
| 4. Modernizing Ocean Data and Information Systems | | | | |
| 4.1 Create Ocean.IT (small staff and budget) | 1.000.000 | 83.333 | 3.000.000 | 250.000 |
| 4.2 Establish a NOAA/Navy ocean and coastal information management and communication partnership | 5.000.000 | 416.667 | 20.000.000 | 1.666.667 |
| 4.3 Improve access to ocean and coastal data by creating software for data discovery and transport | 8.000.000 | 666.667 | 1.000.000 | 83.333 |
| TOTAL | 37.650.000 | 3.137.500 | 134.550.000 | 11.212.500 |

USD/€ = 1.33 (16/3/2005)

The sum of the selected costs, converted into euro, amounts to about € 2.4 million in the first year and € 8.4 million of running costs, per sea region.

Twelve regions were assumed in the U.S. based on *large marine ecosystems*, the same concept behind ICES advice for Europe. While most U.S. large marine ecosystems (e.g. Pacific Region, Gulf of Alaska, Gulf of Mexico) are larger than average Marine Regions established under the Marine Strategy, the comparison holds roughly. However, the extrapolation is a result a slight overestimate of likely costs incurred at EU level.

Adjusting the U.S. data to the European case

Concerning recommendation 1.1, the EU proposal does not aim at designing a brand new regional council system but will instead rely as much as possible on institutional arrangements already in place – in particular regional seas conventions (Helcom for the Baltic Sea, the Bucharest Convention for the Black Sea, OSPAR for the North-East Atlantic and the Barcelona Convention for the Mediterranean) and where relevant other organisations (e.g. regional fisheries conventions etc). We take 50% of the cost estimate as more realistic for our case.

Recommendation 2 makes no sense to us as an independent item and will feed into recommendation 3.

In the case of recommendation 4, the level of ambition of our proposal and what is already in place makes us think that 50% of the estimate is closer to reality (as for instance data transport included under the U.S. proposal could not be covered comprehensively under the Marine Strategy).

The outcome of these assumptions is as follows:

| <i>US Recommendations adjusted to Europe (per region)</i> | <i>1st year costs</i> | | <i>Ongoing annual costs</i> | |
|--|----------------------------------|------------------|-----------------------------|------------------|
| | <i>USD</i> | <i>€</i> | <i>USD</i> | <i>€</i> |
| 1. Advancing a Regional Approach | | | | |
| 1.1 Design and apply a regional institutional set up | 125.000 | 93.985 | 500.000 | 375.940 |
| 1.2 Establish regional ocean information programs | 750.000 | 563.910 | 3.000.000 | 2.255.639 |
| 1.3 Conduct regional ecosystem assessments (every 4 years) | 62.500 | 46.992 | 62.500 | 46.992 |
| 3. Creating a Monitoring Network | | | | 0 |
| Develop a monitoring network | 908.333 | 682.957 | 5.150.000 | 3.872.180 |
| 4. Modernizing Ocean Data and Information Systems | 583.333 | 438.596 | 1.000.000 | 751.880 |
| TOTAL | 2.429.167 | 1.826.441 | 9.712.500 | 6.926.692 |

USD/€ = 1.33 (16/3/2005)

According to these estimates and assumptions, the first year costs, per region, would amount to € 1.8 m while the annual running costs per region would amount to € 6.9 m. Applying this to the 10 marine regions and sub-regions identified for the Strategy we reach an amount of € 18 m to be spent during the first year plus € 69 m of annual running costs. In other words, the set up phase, to be completed in 2 years, would cost €87m while recurrent costs would be € 69 m a year.

4. Conclusion

We have used data from two distinct sources to derive rough estimates for the cost of setting up a marine environment management framework. We recognise that the Irish Sea experience is closer to a faithful representation of the European reality than the US study. While assuming the limits of this analysis, we acknowledge that there is a remarkable consistency between the results obtained by the two distinct extrapolations. This makes us believe that the estimate is reliable and that the real administrative burden of the EU proposal is likely to be around 90€ m for the implementation phase (total amount for a period of about 2 years) and slightly above € 70 m, annually, after that period.