Baltic Sea Environment Proceedings No. 105

Planning and management of Baltic Sea Protected Areas: guidelines and tools

Helsinki Commission

Baltic Marine Environment Protection Commission

Baltic Sea Environment Proceedings No. 105

Planning and management of Baltic Sea Protected Areas: guidelines and tools

Helsinki Commission
Baltic Marine Environment Protection Commission

For bibliographic purposes this document should be cited as:
HELCOM 2006
Planning and management of Baltic Sea Protected Areas: guidelines and tools
Balt. Sea Environ. Proc. No. 105

Language revision: Janet Pawlak, Denmark
Design and layout: Bitdesign, Vantaa, Finland
Cover photo: Utö island, The Archipelago Sea, Finland
(Photo: BioGeo project and Metsähallitus 2003)

ISSN 0357-2994

Contents

Executive summary 5

Introduction 7

SECTION 1: Practical guidance for establishing management plans for HELCOM BSPAs 8

1. Outline for HELCOM and OSPAR MPA management plans 9
2. Annotated description of HELCOM BSPA management plan components 10

SECTION 2: Manual and tools for BSPA planning and management 16

Part 1: Introduction to MPAs 17

1. What is an MPA? 17
2. Why an MPA? 17
3. BSPA network 18

Part 2: Planning tools 20

1. Choosing MPA categories 20
2. Legal framework for BSPAs 21
3. The wider context: Ecosystem Approach and ICZM 24
4. Defining boundaries 26
5. Developing conservation goals and objectives for BSPAs 28

Part 3: Management tools 32

1. Establishing the management framework 32
2. Meeting information needs 39
3. Threat analysis 40
4. Choosing management measures 44
5. Zoning 49
6. Surveillance and enforcement in BSPAs 51
7. Public awareness and education 52
8. Research and monitoring in BSPAs 56
9. Administration of the BSPAs 60
10. Preparation of a management plan 61

Part 4: Management effectiveness evaluation 63

1. **Evaluating management effectiveness by applying quantitative indicators** 63
2. **Toolbox of quantitative indicators** 64

References 70

Attachments 74

Attachment 1: International laws and conventions 74

Attachment 2: Human activities table 76

Attachment 3: Sensitivity assessment rationales for habitats and species 78

Attachment 4: An example of a general "sensitivity-to-impact" matrix 80

Attachment 5: An example of a site-specific "vulnerability-to-impact" matrix 81

Attachment 6: An example of a table combining impacts of human activities on conservation features with management issues 82

Attachment 7: Activities to be regulated and regulation options according to HELCOM BSPA management guidelines 83

Executive summary

The main purpose of this document is to facilitate the planning and management of those Baltic Sea Protected Areas (BSPAs) still lacking proper management and/or expertise to implement them effectively by providing practical guidance and tools. The provisions of the Natura 2000 network sites have been acknowledged, when considered relevant, but the guidance has otherwise been kept on a more general level. The additional value of these guidelines lies in the comprehensive set of literature references and other complementary tools, which can be used to support BSPA management work in accordance with the upcoming marine Natura 2000 guidelines.

The guidelines have been constructed by following the chain of actions of the management planning and implementation process. Planners and managers are not necessarily the same people and tools have been provided for both groups. Drafting a written management plan is considered one of the most important management tools, and the practical guidance on establishing such a plan has been developed jointly and adopted by both HELCOM and the OSPAR Commission, in the spirit of the Joint Work programme. Therefore, it has been placed at the very beginning of the document (Section 1).

In Section 2, additional guidance on the ongoing planning and management work that takes place in the background, either with or without a printed management plan, has been provided. Stakeholder involvement from the very beginning of BSPA planning, has been especially encouraged. BSPAs may lose their long-term benefits if the entire coastal zone fails to be managed in an integrated way, which should also include stopping land-based eutrophication and pollution. Management on a wider scale is also needed to avoid overexploitation and destruction of marine species and their habitats. An important part of this management process is threat and conflict analysis. Zoning could be one management tool to separate conflicting interests within protected areas. Therefore, guidance is provided on both.

Raising public awareness is an issue of a high priority. Education of the public to acknowledge the value of our joint natural heritage and therefore act in a way that prevents ongoing degradation may be one of the most crucial benefits of MPAs. Research and monitoring are important to increase our understanding of marine ecosystems and enable an evaluation of management effectiveness. However, research is time consuming, and therefore a balance is required so that action may be taken using the best available scientific knowledge: the Baltic Sea needs urgent action.

Background

At the 2003 Joint Ministerial Meeting between the Helsinki Commission, the governing body of the Helsinki Convention, and the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic, the two commissions stated their commitment to taking action in the development of programmes and measures for the protection of species and habitats which are identified as threatened, declining, or in need of protection. Marine protected areas were cited as an important tool in this work.

As a result of the joint meeting, HELCOM and the OSPAR Commission adopted a joint work programme to guarantee that the work will be carried out consistently across their maritime areas. The objective is that by 2010 an ecologically coherent network of well-managed marine protected areas will have been achieved and be maintained in both the North East Atlantic and the Baltic Sea.

The first 62 Baltic Sea Protected Areas were proposed to HELCOM already in 1994 as a part of HELCOM Recommendation 15/5, on a system of coastal and marine Baltic Sea Protected Areas. Currently the HELCOM BSPA database includes information on 97 sites, of which the majority are Natura 2000 sites protected under the EC Habitats and Birds Directives.

As 2004 was the 10th year after the first BSPA proposals, an assessment of the current status of the network, in terms of its goal as “an ecologically coherent network of well-managed marine protected areas”, was deemed necessary .It also became evident that practical guidance for the management of BSPAs, as well as for evaluating the effectiveness of existing management, was needed to achieve this goal. An EC-funded HELCOM Project, “Implementation of the Joint HELCOM/OSPAR Work Programme on Marine Protected areas (HELCOM-BSPA)”, was launched in 2004 to conduct this work. These guidelines are one of the results.

Introduction

The purpose and scope of this guidance document

The purpose of this document is to provide practical guidance and tools for applying the HELCOM management guidelines in the Baltic Sea Protected Area (BSPA) network. It poses no obligations to Contracting Parties. Instead, the main goal is to facilitate the planning and management of those Baltic Sea Protected Areas still lacking proper management and/or expertise to implement them effectively. The managers of implemented sites can begin to plan how the effectiveness of chosen management measures could be evaluated and improved, a process that can also be conducted on a wider national or regional level.

Since March 2003, the EC Marine Expert Group has been working to "develop a common understanding of the provisions of Natura 2000 relating to the marine environment in order to facilitate the designation and future management of these areas". The provisions of the Natura 2000 network have been acknowledged when considered relevant, but the guidance has otherwise been kept on a more general level. BSPA designation criteria have not been discussed, nor is the guidance directed towards any particular species or habitats. The additional value of these guidelines lies in the comprehensive set of literature references and other complementary tools. Therefore, it is hoped that they may be used to support BSPA management work in accordance with the upcoming marine Natura 2000 guidelines, and that together they will give a comprehensive set of tools for all BSPAs.

The intention has been to provide advice that can be applied by all HELCOM Contracting Parties. Where appropriate, each country could either adjust the guidance or use the given guidance in a way that acknowledges the biophysical features as well as the administrative, socio-economic, and cultural characteristics of their national BSPAs.

The structure of the document

The guidelines have been constructed by following the chain of actions used during the management planning and implementation process. Planners and managers are not necessarily the same people and tools have been provided for both groups. Drafting a written management plan is considered one of the most important management tools, and the practical guidance for doing this has been developed jointly and adopted by both HELCOM and the OSPAR Commission. Therefore, it has been placed at the very beginning of the document (Section 1).

In Section 2, additional guidance has been provided on the ongoing planning and management work, with or without a printed management plan. After a few words on the purpose, wider context and classification of Marine Protected Areas (MPAs), the guidance concentrates on the first steps of MPA planning: establishing the legal framework, and defining the boundaries and objectives of BSPAs. The description of management tools includes chapters on building partnerships, meeting information requirements, analyzing threats and conflicts, choosing and implementing management measures, and designing monitoring and research plans. Finally, an indicator-based system is introduced for evaluating the management effectiveness in BSPAs.

Many of these processes will be started and carried out simultaneously. Therefore, the order of the chapters in this document should not be interpreted as a fixed succession. When appropriate, the links between different topics have been indicated and respective page numbers given. All the chapters contain some background information, but concentrate on practical tools, tips and useful references and, in some cases, examples and experiences.

Almost all referenced documents are currently available on the internet. The homepages of the relevant publishing houses or organizations have also been provided, where possible, as the direct links to documents may change over time.

SECTION 1: Practical guidance for establishing management plans for HELCOM BSPAs[1]

Management plans are valuable tools to help achieve the objectives of the HELCOM network of marine protected areas. The following provides guidance on the outline structure of a management plan for a BSPA, based on the World Conservation Union (IUCN) model[2]. The outline has been adapted for the requirements of HELCOM and OSPAR maritime areas in collaboration with the OSPAR Commission, and consequently harmonized with the outline structure presented in the "Guidelines for the Management of Marine Protected Areas in the OSPAR Maritime Area".

1. The outline is intended to be used as a checklist for all possible information that could or should be included in management plans for HELCOM BSPAs.
2. Proper management is required for all sites. Where management plans are used, these should be customized for the site. The final structure and content of the plan depends on the country, site, responsible agency and available information, and therefore not all the information provided below may be necessary for each plan. Guidance on information that could or should be included under each heading or subheading is provided ("Annotated description of HELCOM BSPA management plan components".)
3. The Natura 2000 and EMERALD networks are of great value to the establishment of the Joint OSPAR and HELCOM network of marine protected areas. EU Member States are obliged to implement these regulations in Habitats and Birds Directives by nominating and managing, *inter alia,* marine protected areas within the Natura 2000 network. Where Natura 2000 sites are also reported as HELCOM BSPAs, Contracting Parties should be under no obligation to take any further action. Where management plans for Natura 2000 sites exist, they will be sufficient.
4. Chapter headings written in regular font are recommended for all plans, while information under the *headings written in italics* is only needed if it exists and/or is of relevance to the site in question.

1 Only applicable to MPAs under national jurisdiction (Territorial Sea, EEZ of equivalent)

2 R.V. Salm, John Clark, and Erkki Siirilä (2000). Marine and Coastal Protected Areas: A guide for planners and managers. IUCN. Washington DC. xxi+ 371pp.
Kelleher, G. (1999). Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.

1. Outline for HELCOM and OSPAR MPA management plans

Title

Table of contents

1. Executive Summary

2. Introduction
   - 2.1. Purpose and scope of the plan
   - 2.2. Legislative authority for the plan (national and international)

3. Description of the site and its features
   - 3.1. Regional setting: location, access
   - 3.2. Conservation values of the site
   - 3.3. Features
     - 3.3.1. Physical
     - 3.3.2. Biological
     - 3.3.3. Cultural
   - 3.4. Existing uses
     - 3.4.1. Recreational
     - 3.4.2. Commercial
     - 3.4.3. Research and education
     - 3.4.4. Traditional uses
   - 3.5. Existing legal and management framework
   - 3.6. Threat and conflict analysis
   - 3.7. Existing gaps in knowledge

4. Management
   - 4.1. Goals and objectives (general and specific)
     - 4.1.1. General goals and objectives
     - 4.1.2. Specific goals and objectives
   - 4.2. Management tactics
     - *4.2.1. Advisory committees*
     - *4.2.2. Interagency agreements or arrangements with private organizations, institutions or individuals*
     - *4.2.3. Boundaries*
     - *4.2.4. Zoning plan*
     - *4.2.5. Regulations*
     - *4.2.6. Natural resources*
     - *4.2.7. Social, cultural and resource studies plan*
     - *4.2.8. Education and public awareness*
   - *4.3. Administration*
     - *4.3.1. Staffing*
     - *4.3.2. Training*
     - *4.3.3. Facilities and equipment*
     - *4.3.4. Budget and business plan*
   - 4.4. Surveillance and enforcement
   - 4.5. Monitoring and evaluation of plan effectiveness
   - 4.6. Timetable for implementation

5. Appendices

6. References and information sources

2. Annotated description of HELCOM BSPA management plan components

Title

Format the title page and the table of contents according to the standards of your country and/or agency. Nevertheless, the minimum requirements include:

- The name of the area subject to the plan and its status;
- The words MANAGEMENT PLAN;
- The name of the authority/authorities responsible for implementing the plan;
- The date when the plan was prepared, and the expected date for review.

Table of contents

List the headings and sub-headings (optional) against page numbers.

1. Executive summary

Cover the essential issues and necessary decisions, including:

- Reasons why the plan was prepared (conservation objectives);
- The period of time to which it applies and revision schedules, if any;
- Any special conditions controlling its preparation, including the legislative basis and authority for plan development;
- The principal provisions of the plan;
- The estimated budget;
- Acknowledgements.

2. Introduction

2.1 Purpose and scope of the plan

Introduce the general long-term vision of the plan, describing the desired ecological and socio-economic state of the site. The vision will set the general long-term goals and objectives for the management, reflecting the purpose(s) for which the area is protected and including its role in a larger network.

2.2 Legislative authority for the plan (national and international)

Introduce the general legislative framework for the site and the associated legislative authorities that hold legal power over individual aspects of management (including fisheries).

3. Description of the site and its features

Provide relevant information in the following categories. For detailed information, use attachments and maps.

3.1 Regional setting: location, access

Provide the name of area and location, including:

- Location: state, district, municipality etc. and/or sea regime, (e.g. EEZ of Finland);
- Marine/terrestrial boundaries (coordinates of the series of points that describe the borders of the area - position of central point and approximate radius as a minimum.) Further relevant information (e.g., a map with boundaries, a grid in an appropriate scale and any explanatory information) in an appendix;
- Surface area: square kilometres, hectares or other appropriate units;
- Geographical description of regional setting and accessibility, e.g., the regional land and sea surroundings and access routes to and through the area;
- Character and use of adjacent areas, e.g., other protected areas.

3.2 Conservation values of the site

- Indicate the area's degree on naturalness, rarity, aesthetic values, and the degree of habitat representativeness;
- Indicate the type of information used to assess this status.

3.3 Features

From the following physical, biological and cultural features, introduce data pertinent to the management of the site, as appropriate, and according to what is available. The rest may be considered voluntary.

3.3.1 Physical

- Geology: e.g., evolution, ongoing processes, erosion, accumulation /deposition;
- Geomorphology: coastal and marine landscapes, sediment types and qualities;
- Bathymetry: a bathymetric map at the best available scale illustrating submarine structures (sills, banks, reefs, flats, trenches and canyons); where possible, refer to bathymetric GIS datasets (DEM, depth contours);
- Physical (oceanographic) parameters: e.g. figures on climate and meteorology including water temperature and ice conditions, currents, water level changes/tidal regime, salinity, freshwater input, stratification and transparency;
- Water and sediment quality (chemical parameters), e.g., oxygen levels, nutrients, pollutants and contaminants.

3.3.2 Biological

- Biogeographic region and/or features;
- Description of habitats/biotopes; habitat/biotope maps indicating which classification and, when appropriate, which hierarchical level of classification was used may be included as appendices;
- Important biocoenoses (associated plant/animal communities);
- Flora: dominant marine, coastal, and estuarine plants and, where available, phytoplankton; when possible, a summary of the plant community and related environmental factors, such as the depth of occurrence, together with any botanical features that may have special interest. Coverage of the area. Plant species identified in the area could be listed in an appendix;
- Fauna: dominant marine, coastal or estuarine fauna, with an account of their ecological relationships and spatial coverage, if known. Full information on mammals, reptiles, amphibians, fish, birds, invertebrates and zooplankton may be listed in an appendix, as appropriate;
- Species covered by the national and international red lists, for example, the HELCOM/OSPAR lists and the annexes of the Habitats and Birds Directives;
- Indigenous animals and plants;
- Migratory animals that periodically or occasionally visit the area; where known, major migration routes and important areas (reproduction zones, areas of juvenile maturation, resting areas, feeding areas, etc.) along the migration routes.

3.3.3 Cultural

- Archaeological information on the peoples who used the area in prehistoric times and/or information giving clues to species that were formerly found in the area;
- Species hunted/collected in historical times; techniques for managing them, if any;
- Areas of religious/cultural significance;
- Historical relics, such as submerged wrecks or other submerged structures of historic interest;
- Written or otherwise documented history.

3.4 Existing uses

Concentrate on a summary of present uses as described in the sub-chapters. Please provide in this context information on past types of uses and their levels.. Indicate clearly who the users are, where they conduct their activities, at what times of the year, for how long, what the social and economic importance of their use is and what the known or likely impacts on natural features are. Describe, as appropriate:

- Recent developments and ongoing activities;
- Future demand;
- Uses and activities on land or outside the site, which may affect it.

3.4.1 Recreational

- Recreational values and forms of use;
- Strategies, if any, for developing recreational activities following the principles of sustainable use.

3.4.2 Commercial

- Types of commercial uses and activities;
- Estimates of the commercial value of these activities;
- Future developments.

3.4.3 Research and education

- Ongoing and proposed research projects and programmes, for example, on biological and socioeconomic issues;
- Ongoing and proposed educational programmes and activities, whether general or specific, and indicating target groups and users.

3.4.4 Traditional uses

- Ongoing traditional user rights, uses and management practices;
- Their importance and impacts on the site, including conflicts with conservation, if any;
- Future development/demand for traditional uses.

3.5 Existing legal and management framework

Describe the following, depending on the information available and the legal status of the site:

- Legal status (according to national jurisdiction, e.g., marine protected area/national park/protected seascape or other);
- IUCN management category/categories;
- National and international laws and regulations relevant to the site;
- Relevant legislative and enforcement authorities;
- Non-legal, voluntary-based management frameworks;
- Traditional management practices;
- Stakeholders in the area and other interested parties, such as NGOs, local communities etc.

3.6 Threat and conflict analysis

Scrutinize the human activities and actual or potential stress factors in the area, in order to assess their impacts on biodiversity and natural features (habitats and species) within or close to the BSPA boundaries, but also more distant regional influences, when appropriate. A site-specific matrix could be used to list the impacts of human activities against species/habitat sensitivity. These activities include, among others:

- Sources of external or internal pollution and/or eutrophication;
- Biological threats, such as the invasion of alien species;
- Exploitation of living and non-living natural resources;
- Maintenance or capital dredging and/or dumping activities:
- Coastal development and land usage plans and projects;
- Bottom trawling.

Address also historic, current and potential future conflicts between uses or user groups specific to the area.

3.7 Existing gaps in knowledge

Identify any major gaps in information, for example, concerning

- The state of the environment and of the flora and fauna, biological interactions and ecosystem functions;
- Their interactions with outside areas relevant to conservation;
- Conflicts between human activities and conservation objectives;
- Socioeconomic studies and user surveys.

4. Management

4.1 Goals and objectives (general and specific)

4.1.1 General goals and objectives

- State clearly the general conservation goals for the protected area, or if the area is to be subdivided, for each zone or subdivision of the site;
- Describe the long-term ideal situation, identifying desired conditions rather than specific actions, e.g., protecting and maintaining the integrity and natural quality of the biotope, habitats, species and the ecosystem functions.

4.1.2 Specific goals and objectives

- Name any individual interest features for conservation and give reasons for their need of protection;
- Formulate a favourable conservation status for each interest feature;
- Describe short- and long-term measurable steps towards attaining this favourable status for each feature, if necessary (e.g. implementing a specific programme to protect the *Zostera* field from damage, or restoration procedures);
- Give time frames for each objective.

4.2 Management tactics

Describe any arrangements and plans for managing the area and its conservation features, for dealing with current or future threats to conservation features and for conflicts between interest groups, including all relevant subheadings below.

4.2.1 Advisory committees

Describe the purpose, numbers, composition, and life span of appropriate advisory committees established, e.g., for periodic consultation, evaluation of the effectiveness of management, the review process, the approval of work plans, or the authorization of budgets.

4.2.2 Interagency agreements or arrangements with private organizations, institutions or individuals

Describe any policies and plans for interagency agreements, as well as the responsibilities of individual agencies, private organizations, institutions or individuals involved in the implementation and management of the site, including ongoing traditional management practices, if any.

4.2.3 Boundaries

- *Describe the demarcation and/or regulation of marine/terrestrial boundaries, e.g., nautical signs or fences, if any;*
- *Give the reasons for the boundaries and their placement.*

4.2.4 Zoning plan

Provide information on the zoning system and categories in use, if any (e.g., core zones/sanctuaries, use zones, buffer zones, development areas, areas of impact, or natural resource units) and the implications for management, including:

- *The reason/reasons for which a particular area has been given a zone classification;*
- *Management policies for different zones/units.*

4.2.5 Regulations

In case they are needed and/or exist, clearly indicate the legal regulations and/or any voluntary agreements/restrictions on the uses of the area or components zones, as appropriate:

- *Use/uses which are not permitted;*
- *Temporal or spatial regulation of activities, including zoning and seasonal closures;*
- *Permanent restrictions;*
- *New measures/legislation required to enforce the regulations, including, e.g., European fisheries regulations.*

4.2.6 Natural resources

Describe:

- *Instruments for managing any commercial exploitation of natural resources in the area or exploitation outside the area affecting the site (e.g., exploration of minerals, sand, gravel, oil and gas, wind energy);*
- *Requirements for sustainable land use activities.*

4.2.7 Social, cultural and natural resource studies plan

Indicate any plans to conduct further studies needed in accordance with management information priorities, for example:

- *Environmental impact assessments (in a SEA and spatial planning context);*
- *Relations or interactions between animal/plant populations and their threat factors;*
- *Dependence of the local population on natural resources;*
- *Effects of tourism and recreational uses of the area;*
- *Necessary measures to prevent deterioration;*
- *Literature studies including previous ecological changes;*
- *Socioeconomic effects.*

4.2.8 Education and public awareness

Describe any ongoing or planned public education and awareness programmes designed to promote protection, sustainable use, public understanding and enjoyment of the area, including:

- *Plans for general education and awareness programmes, such as mass media, exhibits, tours, training workshops, promotional items, or informal recreational activities with an educational focus;*
- *Plans for specific education programmes aimed at target audiences, such as politicians, tourism operators, fishermen, wind farm planners, etc.;*
- *Production and dissemination of reports on management activities and successes;*
- *Programmes and co-operative arrangements with educational institutions, public associations, and communities.*

4.3 Administration

4.3.1 Staffing

- *Provide the name and address of the responsible management authority, and of other relevant bodies, if necessary;*
- *Refer to the respective legal act, if any;*
- *Indicate the current and future staffing needs and major functions, as well as volunteers, consultants, and research institutions.*

4.3.2 Training

Describe the training requirements, plans, arrangements, and costs of training current and future staff.

4.3.3 Facilities and equipment

Describe the existing/required equipment and facilities, including their purposes and usage.

4.3.4 Budget and business plan

Evaluate the actual and anticipated annual investments and costs including:

- *Capital costs (such as one-off costs for buildings, office and field equipment, the recruitment of personnel, purchase/rental of land);*
- *Recurring expenses of running an MPA (wages, insurance, services and utilities, etc.);*
- *Research and monitoring costs;*
- *Possible sources of funds, if needed;*
- *Plans for local fund-raising, if any.*

4.4 Surveillance and enforcement

Describe the enforcement approach and policy, including:

- Arrangements to be made for monitoring and/or controlling compliance with the regulations;
- Possibilities of using this type of surveillance for other purposes (see, e.g., the paragraph on monitoring, below);
- Enforcement tools (e.g., warnings, penalties and fines).

4.5 Monitoring and plan effectiveness

Describe any biological, environmental and/or usage monitoring programmes proposed for the site, and provide guidance on how they are to be used in reviewing the management plan. It may also be necessary to develop other monitoring programmes to be initiated during the lifespan of the current plan. Some of the results from monitoring may eventually be included in the appendices, such as:

- Research and monitoring programmes on the biological/ecological status;
- Plans and guidance for evaluating the effectiveness of the management in meeting the goals and objectives of the MPA;
- Plans for monitoring the usage of the site, such as surveillance proposed to assess movement/activities of people, vessels, and aircraft within and through the area;
- Indicators used in the evaluation of effectiveness of the management, reasons for their selection, and sources of information used, such as existing monitoring programmes and/or specifically designed surveys.

4.6 Timetable for implementation

- If defined, give a timetable for the implementation of the current plan and its expected lifespan;
- If necessary, give reasons for the lack of a timetable.

5. Appendices

Appendix 1: Boundary and area description

This shall provide the legal description of the area and should include at least:

- A numeration with all legally relevant coordinates of the borderline;
- Further descriptions of the borderline, such as "from point 1 to point 23, the line follows the border of the Territorial Sea";
- Grid and other relevant information;
- Open legal questions or problems in relation to boundaries.

Appendix 2: Legislation

All legislation and regulations relating to the area, and their interactions, should be noted and explained. Where feasible, the legislation that prevails in the event of conflict between the provisions of different enactments should be identified. Implications for the protective status of the area should be identified.

Appendix 3: Habitats

A detailed description of the biotopes/habitats of the protected area should be given, particularly of those that are the objectives of protection, indicating the system used for habitat classification and the reasons for conservation/restoration (HELCOM/OSPAR lists or annexes of Habitats/Birds Directives). Information on coherence of the biotopes to other similar biotopes should also be provided.

Appendix 4: Plant species

The preparation of a comprehensive list of plant species should be attempted for the first management plan. As the process continues over the years, it is quite possible that new plant species will be discovered in the area. Plant names should be listed in broad taxonomic groups, with scientific and common names where possible.

Appendix 5: Animal species

Animal species should be listed in broad taxonomic groups: e.g. mammals, reptiles, amphibians, fish, birds, and invertebrate phyla. Their common and scientific names should be provided where possible.

Appendix 6: Nomination proforma
The nomination proforma may be included as an appendix, especially if it already includes the information on plant and animal species, habitats, and biotopes under protection. In that case, the proforma can substitute Appendices 3 and 5, above.

Appendix 7: Special Features
This section could describe unusual or outstanding features of the area and could range from whale stranding, waterspouts, and oil slicks to spiritual revelations and cultural beliefs.

Appendix 8: Past, present, and potential use
This section should attempt to provide more detail on uses of the area, identify its key user groups, and assess its social and economic significance.
Appendix 9: Risk analysis

Appendix 9: Risk analysis
An assessment of the possible risks involved in carrying out the management plan could be included as an appendix. Such an assessment may reduce the associated level of risk through improved forward planning and also make the timetable for carrying out the management more realistic.

Maps
Where practicable, the use of overlay presentation is recommended to illustrate the associations between such factors as topography, biological communities, and major uses. Attached maps can include, e.g.:

- The regional setting: location, boundaries, and access;
- Land/water tenures and associated jurisdiction;
- Land topography and seabed bathymetry;
- Geology;
- Biology;
- Dominant habitats/biotopes;
- Major uses, user conflicts, and threatened resources;
- Zoning.

6. References and information sources

In addition to the bibliography used to compile the plan, list information sources from outside the regular information base of the manager, such as governmental and non-governmental organizations, user groups, individuals, consultants, or research institutes that have been or will be consulted, and Environmental Impact Assessment reports.

SECTION 2: Manual and tools for BSPA planning and management

Acronyms

ASCOBANS	The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
BDC	Convention on Biological Diversity
Birds Directive	Directive 79/409/EEC on the conservation of wild birds. Aims to protect bird species within the EU through the conservation of birds and important habitats for birds.
BSPA	Baltic Sea Protected Area
CFP	Common Fisheries Policy (of the European Union)
EA	Ecosystem Approach
EC	European Community
EcoO	Ecological Objective
EEZ	Exclusive Economic Zone
EU	European Union
HELCOM HABITAT	HELCOM Nature Protection and Biodiversity Group
Habitats Directive	Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. Aims to promote the maintenance of biodiversity through the conservation of important, rare or threatened habitats and the habitats of certain species.
HELCOM	Helsinki Commission
ICES	International Council for the Exploration of the Sea
ICZM	Integrated Coastal Zone Management
IMO	International Maritime Organization
IUCN	The World Conservation Union
MARPOL	The International Convention for the Prevention of Pollution from Ships, IMO 1973
MEE	Management Effectiveness Evaluation
MPA	Marine Protected Area
NGO	Non-Governmental Organization
OSPAR MASH	OSPAR Working Group on Marine Protected Areas, Species and Habitats
UNCLOS	United Nations Law of the Sea

PART 1: Introduction to MPAs

1. What is an MPA?

According to the well-established World Conservation Union (IUCN) definition, Marine Protected Areas (MPAs) are “Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment” (IUCN 1994).

This definition arises from the general objective of many MPAs to protect and restore certain marine habitats or species from degradation, which is also the main aim of the BSPA network. The IUCN stresses the importance of supporting productivity and other life-supporting processes in the sea. In addition, MPAs can support fisheries, help to restore and maintain water quality, preserve genetic diversity, and protect cultural features such as wrecks, lighthouses, and jetties.

Is any managed area a protected area?

In the broadest sense, MPAs can also be seen as “**any habitat in which human activity is managed**” (Palumbi 2002), thus offering protection to some level. However, managing human activities does not necessarily refer to management directly appointed to improve the quality of the environment or of its specific features. The more correct term would perhaps then be Marine Managed Area (MMA). MPAs then represent a subcategory of MMAs.

Is only a strictly protected area a protected area?

At the other end of the spectrum lies a strictly regulated, closed marine area in which only some scientific research can be conducted and “**no extractive use nor any habitat destruction is allowed**” (Palumbi 2002). In other words, people should be kept out. This is not and will not be the major aim of modern MPAs, as the benefits of zoning are so encouraging. Strict reserves and strictly regulated zones of MPAs do exist and should exist in marine and coastal areas, but they form only one category of MPA.

2. Why an MPA?

Fishing and aquaculture, tourism, coastal development, marine traffic and transport, exploitation of natural resources, climate change, eutrophication, and pollution by hazardous substances all place additional pressure on ecosystem productivity and biodiversity of the Baltic Sea by changing and destroying the very processes and resources on which these activities depend. In addition, the development of modern technology has facilitated the access to and usage of marine habitats and natural resources.

In aquatic environments, natural boundaries are few compared to terrestrial biotopes, and even when they do exist, they are difficult to find and determine from the surface. Due to the highly connected nature of the aquatic environment, nutrients, pollutants, and forcing factors, such as currents, are effectively transmitted. Many marine organisms move freely in the water, either migrating actively or being transported passively. Therefore, the question arises: why set up MPAs? What can be achieved by protecting certain areas of the sea, and how should it be done?

MPAs help to maintain biodiversity and ecological processes

The power of MPAs lies in the protection of representative samples of marine biodiversity and of associated ecosystems, habitats and species, including critical sites for species reproduction and growth. In doing so, they also help to maintain the essential life-supporting processes in the sea, such as photosynthesis and productivity, maintenance of food chains, and degradation of pollutants. Protecting some sites with minimal direct human impact means that they are likely to recover more easily from other pressure stress factors, such as eutrophication, sedimentation, and increased temperature by global warming (Commonwealth of Australia 2003).

MPAs can help to support fisheries

In some cases, MPAs have proven to be one of the best single means to support fisheries. Protecting the coastal habitats for critical life-stages and other vital functions, such as nursery grounds, feeding and spawning grounds, essential to fish reproduction and growth can be extremely

important in supporting fish stock management. These habitats also provide refuge for exploited species and dispersion centres for the supply of larvae (the "spill-over effect") (Gell & Roberts 2003). In particular, the importance of "no-take"–areas, in which no fishing or other seafood harvesting is allowed, has been identified in many recent technical reviews on existing MPAs (Commonwealth of Australia 2003). If MPAs are carefully designed, they may benefit sedentary as well as migratory species, both directly by protecting critical habitats and indirectly by affecting their behaviour (Gell & Roberts 2003, Roberts & Sargant 2002). Fisheries management, however, is outside the scope of HELCOM policies and, consequently, no further guidance on the subject is given in these guidelines.

Socio-economic and cultural benefits

By protecting fisheries, MPAs can improve socio-economic outcomes for local communities. Perhaps even more importantly in the Baltic Sea Region, MPAs can contribute to local economies by raising the profile of the area for marine tourism and recreation. Although tourism may represent a threat to marine biota, it can be sustainable when properly managed. However, when livelihoods are at stake, careful consideration of the rights of e.g. professional fishermen as well as long-term socio-economic effects of MPAs is needed.

Besides benefiting tourism, MPAs can help to raise public awareness of, and support for, marine conservation issues among both tourists as well as locals. They can fulfil recreational, aesthetic, and cultural needs of local people as well as visitors. In addition, MPAs protect archaeological sites, shipwrecks, and marine landscapes of great cultural importance. MPAs can also act as scientific reference sites, which are important in long-term studies, and offer education or training opportunities for schools and universities.

Salm *et al.(* 2000), Palumbi (2002) & Commonwealth of Australia (2003).

MPAs in promoting the development of coastal zone management

Managing MPAs means managing human activities, and therefore MPAs are one important tool in protecting the marine environment and biodiversity against the strong human impacts on the Baltic Sea Region. The establishment of MPAs can facilitate the launching of a management framework over a broad range of human activities of can be embedded in large-scale marine spatial planning initiatives. They create an opportunity to bring all the relevant sectors and stakeholders of the coastal zone together. Thus, MPAs can serve as demonstration models for integrating management priorities with multiple stakeholders' needs (Villa *et al.* 2002). Zoning is one example of implementing this in practise. When successful, MPA processes can also build a basis for other nature conservation initiatives in the future.

3. BSPA network

Providing site selection and designation principles is not the purpose of this document. Therefore they are only briefly introduced in the box below, with the reminder that conservation of biodiversity remains the main goal of the HELCOM network. This goal is also the basis for management planning and effectiveness evaluation.

In a BSPA, particular protection should be given to the species, natural habitats, and nature types of the marine and coastal ecosystems of the Baltic Sea Area to conserve biological and genetic diversity and to protect ecological processes.
Objects of protection are:

- Areas with high biodiversity
- Habitats of endemic, rare or threatened species and communities of fauna and flora,
- Habitats of migratory species,
- Rare, unique, or representative geological or geomorphological structures or processes.

A BSPA should be a representative ecological functional entity for a Baltic Sea Region or Sub-Region (see attachment to document EC NAT 3/7) or for a Baltic Sea State. The minimum size of a BSPA should preferably be 1000 ha for terrestrial parts and/or 3000 ha for marine/lagoon parts. Buffer zones of an appropriate width are recommended for all BSPAs.

BSPA designation guidelines (Helsinki Commission 2003a)

An MPA must be large enough to encompass the critical areas it aims to protect, but be small enough to enable enforcement (Salm *et al.* 2000). On a local scale, this can mean a network of

small, strictly protected areas or a large, multiple-use area. The optimal size of an MPA has been object for debate, reviewed by e.g. by Halpern (2003) and will not be discussed further in the scope of this document.

All sizes may be needed in an ecologically coherent network, although some results suggest that larger reserves may be necessary to meet the goals set for marine reserves on a large scale (Halpern 2003). The effectiveness of individual areas depends on the primary purpose and goals of the site in question, as well as on the evaluation criteria (e.g. cost-effectiveness) (Hastings & Botsford 2003).

Whether large or small, remotely situated, individual MPAs can probably not protect biodiversity and vital functions effectively in the Baltic Sea. Only an "ecologically coherent" network of MPAs, a term that still needs more detailed and measurable definition, can help to maintain habitats and species in the long run. This assumption is the basis for the HELCOM work on MPAs, where priority is placed on the establishment of a coherent and well-managed network of marine protected areas.

3.1. Useful references

Publication	Topic	URL (direct link to document, if any) and/or to publisher
Commonwealth of Australia 2003. The benefits of marine protected areas. Commonwealth of Australia brochure. 24 pp.	Benefits of MPAs	http://www.deh.gov.au/coasts/mpa/wpc/benefits/pubs/benefits-mpas.pdf
Palumbi, S. R. 2002. Marine Reserves: a tool for ecosystem management and Conservation. Arlington, US, Pew Oceans Commission.	MPAs as conservation tools	http://www.pewtrusts.com/pdf/pew_oceans_marine_reserves.pdf http://www.pewtrusts.com/
Jameson, S.C., Tupper, M.H. & Ridley, J.M. 2002. 2002:.The three screen doors: *Can* marine "protected" areas be effective? Marine Pollution Bulletin 44: 1177–1183.	Effectiveness of MPAs as conservation tools	http://www.icriforum.org/docs/Jameson_et_al_2002_MPB.pdf
Day, J.C. & Roff, J.C. 2000. Planning for Representative Marine Protected Areas: A framework for Canada's Oceans. Oceans. Report prepared for World Wildlife Fund Canada, Toronto.	MPA networks	http://www.wwf.ca/NewsAndFacts/Supplemental/marinemain.pdf www.wwf.ca
Bull, K.S.E. & Laffoley, D.d'A. 2003. Networks of Marine Protected Areas in the Maritime Environment. A report for the Review of Marine Nature Conservation and the Marine Stewardship process on a stakeholder workshop held in London on 19 June 2003. Peterborough: *English Nature Research Reports*, No 537, 35 pp.	MPA networks	http://www.english-nature.org.uk/pubs/publication/PDF/537.pdf http://www.english-nature.org.uk/
Gell, F. R. & Roberts, C.M. 2003:.The Fishery Effects of Marine Reserves and Fishery Closures. WWF-US, 1250 24th Street, NW, Washington, DC 20037, USA.	Fishery benefits of MPAs	http://www.worldwildlife.org/oceans/pdfs/fishery_effects.pdf http://www.worldwildlife.org/
Fujita, R. 2001. Why marine reserves? Environmental Defence, 5655 College Avenue, Oakland, California USA 94618,	Fisheries benefits, review	http://www.environmentaldefense.org/documents/1993_whyreserves.pdf
Roberts, C. M. & Sargant, H. 2002. Fishery benefits of fully protected marine reserves: why habitat and behaviour are important, Natural Resources Modelling 15(4) 487-507.	Fishery benefits of MPAs	http://www.fisheries.ubc.ca/ru/feru/publications/V15N4/robe.pdf
Hastings. A. & Botsford, L. 2003:.Comparing designs of marine reserves for fisheries and for biodiversity. Ecological Applications 13(1) Supplement S65-S70.	Comparing MPA designs	http://www.esajournals.org/ECAP/i1051-0761-013-01-0065.pdf
Marine Protected Areas of the United States 2005. What Is an MPA? - Case Studies. Internet resource.	MPA case studies	http://www.mpa.gov/what_is_an_mpa/case_studies.html
Halpern, B.S. 2003. The impact of marine reserves: Do reserves work and does reserve size matter? Ecological Applications 13(1)Supplement:S117-S137.	Reserve size	http://www.nceas.ucsb.edu/~halpern/pdf/Halpern_EA_2003.pdf

1. Choosing MPA categories

In the recently updated IUCN global classification system for protected areas (IUCN 1994), categories I–V are recommended for BSPAs due to their strong focus on ecological criteria. Furthermore, application of the following international protection categories may be considered in a similar way as a national implementation for the protection of a BSPA:

- Biosphere Reserve;
- SCI/SAC (EC-Habitats Directive);
- SPA (EU-Birds Directive).

1.1. IUCN categories

Category Ia Protected area managed mainly for science (Strict Nature Reserve)
Category Ib Protected area managed mainly for wilderness protection (Wilderness Area)
Category II Protected area managed mainly for ecosystem protection and recreation (National Park)
Category III Protected area managed mainly for conservation of specific natural features (Natural Monument)
Category IV Protected area managed mainly for conservation through management intervention (Habitat/Species Management Area)
Category V Protected area managed mainly for landscape/seascape conservation and recreation (Protected Landscape/Seascape)
Category VI Protected area managed mainly for the sustainable use of natural ecosystems (Managed Resource Protected Area).
(IUCN 1994)

Categories should be assigned based on the primary management objective, as contained in the legal definition on which it was established. Guidance for choosing the right category on the basis of management objectives is given in Table 1. Consequently, when assigning a site to a category, national legislation will need to be examined to identify the primary objective for which the area is to be managed. In addition, customary agreements or the declared objectives of a non-governmental organization can be an option. Assignment to a category is not a statement of management effectiveness; the category is an indication of what the site is intended to be, and not of how it is run (IUCN 1994).

Examples: If scientific research were the primary objective for the site (in addition to the preservation of species and genetic diversity), the only option would be category Ia. Secondarily, the MPA may then also serve for wilderness protection and maintenance of environmental services, but it is impossible that it can support tourism and recreation, education, or any use of natural resources. If these are primary objectives for the site, other categories should be considered, such as II or III, which allow the site to be used for educational purposes and the protection of cultural features, while still protecting species and genetic diversity, as well as supporting some scientific research.

The development of goals and objectives is introduced in PART 2, Chapter 5; “Developing conservation goals and objectives for BSPAs” (page 28).

Table 1.
IUCN Protected area categories and management objectives (IUCN 1994).

	Protected area category						
Management Objective	**Ia**	**Ib**	**II**	**III**	**IV**	**V**	**VI**
Scientific research	1	3	2	2	2	2	3
Wilderness protection	2	1	2	3	3	–	2
Preservation of species and genetic diversity	1	2	1	1	1	2	1
Maintenance of environmental services	2	1	1	–	1	2	1
Protection of specific natural/cultural features	–	–	2	1	3	1	1
Tourism and recreation	–	2	1	1	3	1	3
Education	–	–	2	2	2	2	3
Sustainable use of resources from natural ecosystems	–	3	3	1	2	2	1
Maintenance of cultural/traditional attributes	–	–	–	–	–	1	2
Key: 1 = Primary objective 2 = Secondary objective; 3 = Potentially applicable objective – = Not applicable							

1.2. Useful references

Publication	Topic	URL (direct link to document, if any) and/or to publisher
IUCN 1994: Guidelines for protected area management categories. IUCN, Cambridge, UK. 94 pp.	MPA categories	http://www.iucn.org/themes/wcpa/pubs/pdfs/pacategories.pdf www.iucn.org

2. Legal framework for BSPAs

Existing legal and administrative structures pertaining to the area and constraints already put on the area must be clarified, e.g., existing frameworks for coastal fisheries, marine transportation and other relevant controls on present use of the area.

BSPA management guidelines (Helsinki Commission 2003 b)

2.1. Legal instruments in marine conservation

In some countries, for instance Germany, a management plan alone is not a legally binding document. Therefore, the Contracting Parties should prepare and substantiate the establishment of MPAs to the extent possible using legal instruments. Legal instruments are general valid acts and include laws, executive decrees, and administrative decisions. Enforcement measures cannot be implemented without a legal text that recognizes the authority of the MPA manager. Sometimes legislation regulating uses inside and outside the area is both adequate and the only available means (Salm *et al.* 2000, OSPAR Commission 2004).

Modern protected areas were first established on land many MPAs have been established under fisheries and forestry laws that may not address take the specific characteristics and needs of MPAs. Revising old laws or drafting new ones is also a national political question these time-consuming processes are beyond the scope of the manager's daily responsibilities. MPA planners and managers can however take initiatives in addressing legislative gaps. Meanwhile, the existing legislation has to be used. Whatever the chosen approach, following options remain, according to Agardy (1997), Kelleher (1999) and Salm *et al.* (2000):

- Using international legislation, or customary/soft laws (treaties, conventions, etc.) to designate and integrate MPAs in regional and global networks, such as the BSPA and OSPAR MPA networks supported by the Helsinki and OSPAR Conventions;
- Using existing terrestrial protected area legislation;
- Adapting other existing legislation, such as forest, fisheries or tourism laws, to authorize the BSPA;
- Developing specific national MPA legislation (with linkages to integrated coastal zone management schemes, where possible); in all but one Baltic Sea riparian states

2.2. Legal "diagnosis" for a BSPA

To define the need for legislation and information on which a BSPA should be based, the following diagnosis proposed by IUCN (Salm *et al*. 2000) may be done:

- What is the objective of the MPA to be created?
- How urgent are the protection measures to be taken?
- To whom does the area to be protected belong?
- Who are the stakeholders/users of the resources in the area to be protected?
- How do they feel about the need to protect the area and to restrict uses?
- How can they be involved in this process?
- What laws are already in place? (e.g., forestry, fisheries or tourism)
- What institutions are already in place? (governmental, traditional or non-governmental)
- How can the existing laws and institutions be used, i.e., what regulations and what type of enforcement may be used?

2.3. Contents of the legal act

The law should include a sufficiently detailed statement specifying clear objectives and the means for their achievement, thus protecting management from unreasonable pressures. However, details should be carefully considered to avoid undue limitations on management flexibility. When establishing an MPA, the issues listed below should be supported in either umbrella or site-specific legislation. According to Kelleher (1999), Salm *et al*. (2000) and the OSPAR Commission (2004), the following aspects could or should be covered by the legal act:

Purpose of Protection

The legal act should include an explanation of the reasons for protection of the area. This provides a clear and simple source of information for all potentially affected persons concerning the purpose of protection. In addition to the description of the most important characteristics of the area, it is also useful to declare the species and habitats in need of protection. The explanation should include the essential information, but should not be too detailed and should not give final conclusions. Concrete terms should instead be described within the general section of the management plan.

Conservation aims

To create comparability between the Natura 2000 areas and the envisaged HELCOM network, it is useful to integrate the conservation aims into the legal act. This provides decision factors (criteria of assessment) that can be applied in determining whether the uses in and around the site are compatible with the purposes of protection. It should be emphasized that this declaration only represents conclusions based on the current extent of understanding of the area, and that further conservation aims and specifications should be part of a general management plan. If zoning is used, a zoning plan addressing the aims for different zones can be integrated in an annex to the legal act.

Regulation of uses

Relevant uses in and around the area which may negatively affect the area should be regulated in the legal act. The regulation depends on the purpose of protection and the conservation aims. Before regulations are integrated in the legal act, it is necessary to know the current uses of the area and which of these uses affect the purposes of protection and the conservation aims. Regulations may consist of prohibitions, imposition of conditions or spatial, temporal, and quantitative limitations, as well as measures of compensation.

If zoning is used, it may be necessary to establish zone-specific regulations and execute these regulations in a Zoning Regulation Plan, or to integrate the various regulations in the existing zoning plan. In both cases, it is necessary to enact the regulations as a part of the legal act. Regulation is directly linked to enforcement, and practical aspects are discussed in PART 3, Chapter 6: Surveillance and enforcement in BSPAs (page 51).

Authority

In addition to regulations and prohibitions, it would be helpful to integrate an authorization in the legal act. This should declare that the appropriate authority may give orders to users, especially when such orders are necessary to achieve the conservation aims of the site. In addition, the authorization to establish a management plan shall be included in the legal act. Relationships with other national authorities, such as those responsible for coastal and fisheries management, as well as procedures for coordination and conflict resolution, such as ICZM, should be specified, where appropriate.

Measures for care, recovery and research

The legal framework should include authorizations for the execution of measures for care and recovery, as well as for carrying out scientific research and monitoring.

Advisory and consultation processes, public participation

Relationships with other national authorities, such as those responsible for coastal and fisheries management, as well as procedures for coordination and conflict resolution, such as ICZM, should be specified, where appropriate. In addition, any public participation should be supported in the legal act, if not already a legal requirement, as for the Natura 2000 network.

Delineation of boundaries

Whether operating on land or at sea, boundary mapping requires appropriate interpretation of the relevant laws and their spatial context. To do this, the legal description of the boundaries must be clearly written, unambiguous, and preferably included in the legal act. This should avoid confusion caused by shifting boundaries.

Management plan

The authorization to establish a management plan should be included in the legal act.

(Kelleher 1999, Salm *et al*. 2000, OSPAR Commission 2004).

2.4. Using international laws and agreements

Adoption

Management of the sea, and conservation of biodiversity in general, has an international dimension, which allows countries to use relevant international agreements and laws as support. International laws provide the aims, but they must be translated into national laws. Only after this can they be successfully enforced by national administrative authorities and courts. The constitutions of states provide different juridical techniques to implement international laws. (Czybulka & Kersandt 2000). Briefly, the adoption:

- May be automatic/general, resulting in immediate national applicability; or
- May require special transformation by passing a special national law.

(Czybulka & Kersandt 2000).

Sources

- International conventions, either general or particular, establishing rules recognized by Contracting Parties; a list is provided in "Useful references";
- International custom as evidence of a general practice, accepted by law;
- General principles of law recognized by civilized nations.

(Czybulka & Kersandt 2000).

International environmental custom or "customary law"

The environmental customary international law is a primary source of non-codified international environmental law. It's emergence requires two constitutive elements:

- A constant general practice;
- A respective acceptance of the practice as binding law (opinio iuris et necessitatis).

Therefore, a common international practice of states is required and, by the conviction of the states, it postulates immediate obligations. In addition, international treaties contribute to the emergence of international custom, providing it with a legally binding effect. However, particularly in international environmental law, a differentiation into "principles" and "rules" is required. "Rules" contain a binding commitment, whereas "principles" allow a relatively wide scope for performance. The latter need to be completed by the application of law and legislation. They do not comprise concrete rights or duties, but serve as grounds for interpretation and application of specific international rules (Czybulka & Kersandt 2000).

International "Soft law"

These are rules of conduct for international practice, which are not legally binding in principle but nonetheless have some legal effect. The term "soft law" refers to the statements and documents of intergovernmental and non-governmental organizations that do not have treaty status. The transition from international "soft law" to international custom is very often fluid (Thiel & Koslow 2001).

The relevant international laws and conventions and their respective URLs can be found in Attachment 1: "International laws and conventions" (page 74).
(Czybulka & Kersandt 2000)

2.5. MPAs in Exclusive Economic Zones

As territorial seas and EEZs fall partly under national jurisdiction, legal acts can be set up by coastal states. Many international customary and "soft laws" are useful particularly outside territorial waters. The applicability of the Habitat and Bird Directives in EEZs remains to be clarified. The regulation of activities in EEZs may require regional and international co-operation, for which the HELCOM and OSPAR conventions, as well as the EC Directives, can provide an umbrella. MPA establishment in EEZs is an issue that has received increasing attention in recent years and will continue to do so in the years to come.

2.6. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Czybulka, D. & Kersandt, P. 2000:. Legal regulations, legal instruments and competent authorities with Relevance for Marine Protected Areas (MPAs) in the Exclusive Economic Zone (EEZ) and the High Seas of the OSPAR maritime area. German Federal Agency for Nature Conservation, Bonn, Germany. 84 pp. – Bfn-Skripten 22.	Legal issues in EEZs	http://www.bfn.de
European Commission 2000. Managing Natura 2000 sites the provisions of article 6 of the 'Habitats' directive 92/43/EEC. Luxembourg: Office for Official Publications of the European Communities 2000 — 69 pp.— 21 x 29.7 cm.	Interpretation of Article 6 of the "Habitats" directive	http://europa.eu.int/comm/environment/nature/nature_conservation/eu_nature_legislation/specific_articles/art6/pdf/art6_en.pdf http://europa.eu.int/comm/environment/nature/
Ritterhoff, J., Gubbay, S., & Zucco, C. (eds.) 2004. Marine Protected Areas and Fisheries. Proceedings of the International Expert workshop held at the International Academy for Nature Conservation, Isle of Vilm, Germany 28 June - 2 July, 2004. German Federal Agency for Nature Conservation, Bonn, Germany. 177 pp. – Bfn-Skripten 122.	Fisheries management, legal issues, Natura 2000 provisions	www.dnl-online.de (database)
Kimball. L.A. 2001: International Ocean Governance: Using International Law and Organizations to Manage Marine Resources Sustainably. IUCN, Gland, Switzerland and Cambridge, UK. xii + 124 pp.	International law	http://www.iucn.org/themes/marine/pdf/IUCN%20book.pdf http://www.iucn.org/

3. The wider context: Ecosystem Approach and ICZM

3.1. Short introduction to the Ecosystem Approach

HELCOM framework

The ecosystem approach can be defined as "the comprehensive integrated management of human activities based on the 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 marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity".

(Helsinki Commission & OSPAR Commission 2003)

At the Joint OSPAR and HELCOM Ministerial Meeting in June 2003, the two Commissions agreed that the ecosystem approach and setting of ecological objectives (EcoOs), currently being developed by HELCOM, are the keys to improving the protection of the North-East Atlantic and the Baltic Sea. As a result, at this meeting the Commissions adopted the joint statement "Towards an Ecosystem Approach to the Management of Human Activities". This statement defines the Ecosystem Approach (EA) and lists the aims that the two Commissions will pursue regarding the EA (Helsinki Commission & OSPAR Commission 2003)

Ecosystem Approach and BSPA management

Although the HELCOM/OSPAR approach highlights the role of science, humans are a part of the marine ecosystems as well, and consequently these ecosystems also have social, cultural, economic, and historical dimensions. Local and regional cultural, political, and organizational values modify this role of science, and these values cannot be provided to managers and policy makers by scientific information alone. In addition, ecosystems are mosaics of privately held and "publicly" managed land, and these relationships will shape the development of ecosystem management and planning.

Challenges and solutions

Defining ecosystem boundaries, understanding natural disturbances and anthropogenic threats, and the intergovernmental and multi-jurisdictional character of the management regime can also pose challenges to an ecosystem-based planning (McGinnis & Hastings). Therefore, stakeholder involvement, promotion of compatible uses, and education can all be seen as ecosystem-based planning components in addition to research, protection through set-asides, development of a management plan, ecosystem restoration, and the use of existing state/regional programmes (Yaffee *et al.* 1996). The challenges and solutions might lie in interagency, and agency-to-public, coordination and communication (McGinnis & Hastings).

3.2. Short introduction to Integrated Coastal Zone Management (ICZM)

Integrated Coastal Zone Management (ICZM) is the integrated planning and management of coastal resources and environments in a manner that is based on the physical, socio-economic, and political interconnections both within and among the dynamic coastal systems, which, when aggregated together, define a coastal zone.

HELCOM framework

"…the Contracting Parties, in accordance with the European Union's ICZM recommendation and the forthcoming European Marine Strategy, to develop a national strategy or, where appropriate, several strategies, to implement the principles for integrated management of human activities of the coastal areas and extend these principles to include marine offshore areas and also follow the ecosystem approach to the management of human activities, as defined by HELCOM and OSPAR."

HELCOM Recommendation 24/10 (Helsinki Commission 2003c).

The measures that each Contracting Party is recommended to take in order to implement ICZM can be found in HELCOM Recommendation 24/10. Briefly, they include the following:

- Identifying laws and regulations of relevance to the use and protection of marine areas, and the authorities responsible for their implementation;

- Developing criteria and guidelines for integrating the management of human activities by sector authorities;
- Identifying stakeholders with interests in marine areas;
- Identifying conflicting interests;
- Improving assessments of the status of biodiversity and impacts of human activities on marine areas;
- Developing overall management plans for human activities in marine areas;
- Identifying the management issues in offshore areas, identifying relevant data gaps, and addressing gaps with inventories, and maps of biodiversity and the use of natural resources.

ICZM and BSPA management

"The environment of a BSPA should be to a large extent free of pollution. If polluted, activities should be started as soon as possible to distinctly improve the environmental situation through, e.g., technical measures, such as sewage treatment plants etc. Integrated Coastal Management Plans may help to meet these requirements."

BSPA Management guidelines 2003 (Helsinki Commission 2003b).

MPAs are powerful management and biodiversity conservation tools. However they cannot solve problems such as pollution, climate change, and overfishing that originate outside reserve boundaries (Lubchenco *et al.* 2003). The ecosystem approach highlights the need to systematically combine and coordinate existing policy instruments, which currently mainly operate independently. ICZM is a tool directly for management to ensure that these requirements are fulfilled (Salm *et al.* 2000).

Between 2001 and 2005, Finland and Sweden worked out guidelines and tools for the integrated management of the Bothnian Bay in the "Bothnian Bay Life Project". Despite regional contacts and joint projects, there was a lack of communication and of an integrated monitoring system between the countries. Issues such as coastal exploitation, protected areas, and land use in the catchment areas were registered separately. Therefore, to obtain an overview of the status of the environment and improve information exchange, the Environmental Information Database and BAT Information Exchange System were established. In addition, the Bothnian Bay Water Quality and Eutrophication Model was developed for expert use for management purposes. Dissemination of results and participation were guiding principles throughout the whole project, making the integrated approach efforts also useful tools for raising public awareness (Laine 2005).

3.3. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
ICES 2004. Report of the Thirteenth ICES Dialogue meeting: Advancing scientific advice for an ecosystem approach to management: collaboration amongst managers, scientists, and other stakeholders. ICES Cooperative Research Report, No. 267. 59 pp.	Ecosystem approach: scientific advice	http://www.ices.dk/pubs/crr/crr267/crr267.pdf http://www.ices.dk/indexfla.asp
Helsinki Commission & OSPAR Commission 2003. Statement on the Ecosystem Approach to Human Activities. A paper prepared for the First Joint Ministerial Meeting of the Helsinki and OSPAR Commissions (JMM) in Bremen, Germany.	Ecosystem approach	http://www.helcom.fi/stc/files/BremenDocs/JointEcosystemApproach.pdf www.helcom.fi
ICES 2005. Guidance on the Application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment, ICES Cooperative Research Report, No. 273. 22pp.	Ecosystem approach application guidance	http://www.ices.dk/pubs/crr/crr273/crr273.pdf http://www.ices.dk/
Ward, T. & Hegerl, E. 2003. Marine Protected Areas in Ecosystem-based Management of Fisheries. A report for the Department of the Environment and Heritage. Commonwealth of Australia. 77 pp.	Ecosystem approach, MPAs and fisheries	http://www.deh.gov.au/coasts/mpa/wpc/pubs/mpas-management-fisheries.pdf
Secretariat of the Convention on Biological Diversity (2004) The Ecosystem Approach, (CBD Guidelines) Montreal: Secretariat of the Convention on Biological Diversity 50 p.	Ecosystem approach guidelines	http://www.biodiv.org/doc/publications/ea-text-en.pdf http://www.biodiv.org
McGinnis, M.V. & Hastings, S.P. An Ecosystem Management Approach for the Santa Barbara Channel Islands. National Marine Sanctuaries Library. An internet resource.	Ecosystem management approach, case study	http://sanctuaries.noaa.gov/library/alldocs.html

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Helsinki Commission 2003c. HELCOM Recommendation 24/10	ICZM	http://www.helcom.fi/Recommendations/en_GB/rec24_10/ www.helcom.fi
GESAMP (IMO/FAO/UNESCO-OC/WMO/WHO/IAEA/UN/UNEP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). 1996. The contributions of science to coastal zone management. Rep. Stud. GESAMP,(61):66 p.	Coastal zone management and science	http://gesamp.imo.org/no61/w1639e00.pdf http://gesamp.imo.org
Pickaver, A. (ed.) 2002: Integrated Coastal Zone Management in the Baltic States. State of the Art Report. Background for Coastal Planning and Management in the Baltic Sea Region, as part of the second HELCOM-HABITAT meeting. December 2001, August, 2002. EUCC – The Coastal Union. 77 pp.	ICZM in the Baltic	http://www.helcom.fi/stc/files/Publications/OtherPublications/ICZMdocumentCompilation.pdf http://www.helocm.fi
Poitras, J., Bowen, R. 6 J. Wiggin 2003. Challenges to the use of consensus building in integrated coastal management. Ocean & Coastal Management 46(5): 391-405.	ICZM and consensus building	

4. Defining boundaries

Defining boundaries is one the most important steps in setting up an MPA as the boundaries have profound effects on the management of a BSPA. Boundaries define the group of stakeholders, and may therefore cause objections due to conflicting uses and interests. They determine who and what belongs on either side, and may provide advantages or disadvantages, rewards or penalties, permissions or restrictions, and power or powerlessness to either party (Villa *et al.* 2002).

Boundaries in the three-dimensional, continuous aquatic environment can be difficult to define. In practice, the seaward extent of the MPA can legally be limited to the territorial waters, if the national legislation does not provide tools to protect areas in EEZs. Distances of landmarks from the coastline, as well as latitudes and longitudes may be used to set boundaries. Vertical boundary setting is also worth considering: subsoils, air space above the site, all the waters in the area, as well as the seabed can be included. However, the identification of appropriate ecological boundaries based on ecological reasoning is strongly recommended (Salm *et al.*2000).

The boundary setting includes two important steps:

1) Legal establishment of boundaries;
2) Transformation of the legal description to digital boundaries.

4.1. Tips for drafting the legal boundary description

Whether operating on land or at sea, boundary mapping requires appropriate interpretation of the relevant laws and their spatial context. Unlike their land counterparts, marine boundaries have no physical evidence to mark them. The result can be confusion, disagreement, and conflicting versions of boundaries. In order to avoid this, Canessa *et al*. (2003) & Stein (2003) have provided several tips:

Write clearly, concisely, and unambiguously

In order for the legal/authoritative description to be translated into a digital boundary, it must be clearly and concisely written. A surveyor, technician, GIS specialist or cartographer must be able to take the description from the legal document and place it on the ground or on a map. This also allows the boundaries to be defended and enforced. In practice, this means avoiding ambiguous language, such as “the general contour of the coast” or “slightly off from point X”, and using references that can be mapped.

Reference fixed features

It is recommended to reference fixed features that will not move over time, for example, natural features such as a rocky headland. Referencing features that are ambulatory, i.e., have a tendency to move, results in obsolete boundaries. A sandy point is a good example of a feature to be avoided. In addition, groins, jetties, and other seemingly fixed features may be moved or demolished. Clear nodes that are defined by accurate coordinates and that can be used to draw the boundaries

quickly in any situation and by anybody, should be given.

Review your boundary prior to publication

This must be done with mapping, legal and enforcement staff, and other key staff members. In order for these people to protect natural resources, they need to know how to map, defend, and enforce the entire area of the MPA. (Canessa *et al*. 2003, Stein 2003)

4.2. Tips for developing the digital boundaries

Tips by Stein (2003) include the following:

Use the official source for boundary information

For example, if a legal description for an MPA boundary indicates the three-mile jurisdictional boundary as the outer limit; make sure you obtain the "official" three-mile jurisdictional boundary. Referencing other boundaries of questionable sources may render the boundaries unenforceable.

Use the most detailed chart or map available

This applies when making a boundary from a hard copy document. It allows the greatest resolution and most information to be captured and ensures the highest level of accuracy. GIS systems can display the data at any scale, which may result in the data becoming scaleless. Accuracy is a function of the scale at which the map was created; thus, the more detailed the scale, the more accurate the digital boundaries. Accuracy will however be compromised at a threshold scale.

Develop a standard operating procedure within your organization

A Standard Operating Procedure (SOP) is a set of written instructions that document a routine or repetitive activity in an organization. The development and use of SOPs are an integral part of a successful quality control system and should be considered for mapping or other spatial data such as boundary information. They provide individuals with the information to perform a job properly, and facilitate consistency in the quality and integrity of the products. At the least, develop minimum mapping specifications.

Share your boundary data

This can be done through a data clearinghouse or through the internet. All the appropriate authorities must be informed of the existence of new or modified boundaries and the location of this information. Marine resource users, managers, and law enforcement staff must utilize the same current and most accurate boundary information. In order for everybody to follow the same rules, the boundary and zoning data must be up-to-date.

Make the boundaries visible for everyone

It must be made easy for any citizen to acknowledge the MPA borders, when visiting the area or its surroundings. Hence, the MPA boundaries should be shown on regular maps and nautical charts, and should be indicated, for example, by buoys for marking at least some of the aquatic boundaries.

4.3. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Stein, D. 2003. MPA perspective: Tips for developing marine boundaries. MPA news 4(7):5.	Practical tips	http://depts.washington.edu/mpanews/MPA38.htm http://depts.washington.edu/mpanews/MPA38.pdf
Hulin, A.C., Fowler, C. & Tartt, M. 2005. The Creation of Digital Representations of National Marine Sanctuary Boundaries. An expert paper. An internet resource.	Digital boundaries	http://gis.esri.com/library/userconf/proc01/professional/papers/pap978/p978.htm

5. Developing conservation goals and objectives for BSPAs

…"in a BSPA, particular protection should be given to the species and natural habitats and nature types of the marine and coastal ecosystems of the Baltic Sea Area to conserve biological and genetic diversity and to protect ecological processes".

General aim of management: Baltic Sea Protected Areas have been chosen as examples of typical biotopes of ecological significance occurring in each of the Baltic Sea sub-regions. The general aim of management of these areas is to ensure the conservation and/or restoration of a representative set of biotopes and habitats in order to preserve biodiversity and sustainable use of natural resources where appropriate.

Specific aims of management: To reach the general aim in an area, it is necessary to focus on a number of specific aims, depending on the conservation needs of the area. Zoning could be a useful tool to reach the specific aims. Elements in need of specific protection within a BSPA must be described comprehensively.

BSPA designation and management guidelines (Helsinki Commission 2003a & 2003b).

The development of conservation goals and objectives at any level, whether international, national or site-specific, is a challenging task. It requires expertise and a fundamental understanding of the social and political contexts, as well as the specific biophysical features of each site. The purpose of this guidance is to focus on the design of meaningful and practical site-specific objectives. Much work in this field has been done in the Natura 2000 network, and the principles of the Natura approach may therefore also be useful in other BSPAs.

5.1. Why develop objectives?

Conservation objectives are the starting point for all management

The operations causing damage or disturbance to the conservation objectives are to be identified and management options decided based on the objectives.

The effectiveness of the MPA is measured against objectives

An MPA must have clearly defined objectives against which its performance is regularly compared. Without clear objectives, or with vague, restrictive objectives, there is no foundation for the assessment of whether the selected management measures are meeting the conservation goals of the site.

Objectives determine the group of stakeholders

Without clear objectives, it becomes impossible to decide which stakeholders groups are relevant for the site in question.

Clearly defined objectives facilitate communication

Persons taking part in the management process will repeatedly question the goals and objectives of an MPA. Therefore, it is very important that the objectives are well-founded and defined. (Kelleher 1999, Dahl-Tacconi 2002).

5.2. What are the "goals" and "objectives" of BSPAs?

Goals or general aims

Goals, or "general aims", reflect the purpose(s) for which the area is protected and the long-term ideal terms, identifying desired conditions rather than specific actions. The general aims of BSPA management promote the conservation and restoration of the sites, and should be supported by the specific aims (Helsinki Commission 2003a & 2003b). In areas belonging to the Natura 2000 network, this often means obtaining a "Favourable conservation status". For the habitats listed in Annex I of the Directive, it means that conditions have been established which will ensure that:

- The extent and range of the habitat will be maintained or increased over time;
- The populations of the consistent species of the habitat will be maintained over time.

For species listed in Annex II, it means that conditions have been established which will ensure that populations of the constituent species of the habitat will be maintained over time (EN *et al.* 2001a, 2001b, 2001c).

Objectives or specific aims

Objectives or specific aims represent site-specific, short-term, measurable steps towards attaining the defined goals (e.g., implementing a specific programme to protect the *Zostera* field from damage) (Helsinki Commission 2003a & 2003b). The objectives help to identify management needs and measures, as well as provide the standard against which the success or failure of the management can be measured, i.e., the management effectiveness (EN *et al.* 2001a, 2001b, 2001c).

5.3. A step-by-step approach to developing objectives

One starting point would be to consider whether the primary goals are to maintain or to restore the status of the feature/features. The objectives then should reflect the concrete target or target values and the steps to be taken to achieve the goals of the site. This can be done using the following six steps.

I Identifying interest features;
II Identifying sub-features;
III Identifying attributes;
IV Identifying targets for attributes;
V Identifying the relevant operations causing damage or disturbance;
VI Identifying the management measures for these operations.

(EN *et a.* 2001a, 2001b, 2001c)

Identifying interest features

The interest features are the biotopes, habitats and/or species in need of protection, as listed in the EC Directives and in the HELCOM/OSPAR lists of endangered or threatened habitats and species. The conservation objectives should be set for interest features, instead of the site itself, to concentrate on the conservation needs of the features and to allow aggregation of the results of monitoring the conditions of the feature across the range of sites that have been selected for that particular feature (EN *et al.* 2001a, 2001b, 2001c).

Identifying sub-features

Sub-features are important ecological components of the features (for example, kelp beds, seagrass beds, individual estuaries). These should be mapped, as mapped information can be incorporated into the formal advice on conservation objectives that is presented to the relevant regulatory authorities (EN *et al* 2001a, 2001b, 2001c).

Identifying attributes

Attributes are characteristics of the features or subfeatures which are considered biologically/ecologically important in achieving the goals for the site. They must be measurable characteristics, and be reliable indicators of the condition of the feature. Larger complex features should be divided into sub-features (see above) to facilitate the process, as different features have different sensitivities. The process must rely on understanding the sensitivity and vulnerability of the features and sub-features, as well as their distribution (EN *et al.* 2001a, 2001b, 2001c). Details on the assessments are given in PART 3, Chapter 3: “Threat analysis” (page 40).

For habitats, attributes may include the

- Extent of the feature;
- Diversity of the constituent communities/ biotopes;
- Distribution of constituent communities/ biotopes;
- Species composition of constituent communities/biotopes;
- Important topographic features, e.g., bathymetry;
- Water temperature;
- Turbidity;
- Nutrients;
- Sediment character.

For species, attributes may include the

- Extent of habitat critical for supporting the population of the species;
- Freedom from disturbance;
- Population size;
- Productivity of the population;
- Food availability;
- Water quality parameters;
- Identifying targets for attributes

The attributes and targets must reflect the various elements of the desired conditions for the chosen features, i.e., habitats and species. For example, the

- Extent and structure of the habitat, vital processes and functions, physical processes affecting the habitat, and presence, viability and abundance of characteristic or key species/habitats, quality of substrates;
- Viability, abundance, population dynamics, productivity rates, age and size distributions, distribution ranges and patterns, and supporting habitats/species, and supporting/affecting physical processes.

(EN *et al.* 2001a, 2001b & 2001c).

The target value is that which is considered necessary to achieve if the feature is to reach or maintain the "favourable status" for which it was selected or was intended to achieve. This process requires scientific understanding of the features to be protected, as well as some value judgments. However, the setting of values is an inexact science and limitations must be acknowledged. Knowledge of the attributes selected may, for example, be based on only a single survey. In addition, understanding of natural fluctuations and relationships between attributes (e.g., the values of various water chemistry parameters) may be limited.

Targets may be absolute, e.g., values that must be achieved, or flexible, covering a range of natural fluctuations. Therefore, the starting point for the target value can be the value of the attribute at the time of selection. If the site has been selected with a view to restoring , a value can be set that represents enhancement. An experimental approach should be adopted to learn from experience and adapt future management accordingly Concrete target values for water quality or populations may also be set. This should be done for the different zones and sub-features of the site, for example, beach dunes, lagoons, underwater nature, fields, forests, etc. EN *et al.* (2001a, 2001b, 2001c). Examples of setting targets are given in Table 2.

Table 2.
Examples of targets for "favourable conservation status" (EN *et al.* 2001c).

Characteristics which comprise conservation status	**'Targets' equating to favourable conservation status**
Habitats	
natural range and areas covered within that range	stable or increasing
structure and functions necessary for long-term maintenance	exist and are likely to continue to exist
conservation status of typical species	favourable as defined below
Species	
population dynamics	species is maintaining itself on a long-term basis as a viable component of its natural habitats
natural range	is neither being reduced nor is likely to be reduced in the foreseeable future
supporting habitat	is, and will probably continue to be, sufficiently large [and, by implication, of appropriate quality] to maintain the populations on a long-term basis

Identifying operations

The topic of identifying activities threatening the features/subfeatures under protection is further expanded upon in PART 3, Chapter 3: "Threat analysis" (page 40) and in Attachment 2, "Human activities table" (page 76). Briefly,

- Identification of threatening activities/operations must be carried out separately for each feature or sub-feature;
- The nature of the link between the activity/operation and each feature should be established and recorded;
- The sensitivity of each feature to the effects of each activity/operation must be assessed (it does not vary greatly between sites);
- The vulnerability of a feature is site-specific: it not only depends on the inherent sensitivity of the feature to the effects of the operation, but also on the degree to which it is exposed.

Identifying management measures and concrete steps

Management options are introduced in detail in the corresponding PART 3, Chapter 4: "Choosing management measures" (page 44) and in the subsequent Chapters 5-7 (pages 58-66). Within each country and for each site, realistic and effective measures should be decided upon for each case. The first steps in the management may, for example, be:

- Establishing advisory committees (PART 3, Chapter 1: "Establishing the management framework", page 32);
- Preparing a zoning plan (PART 3, Chapter 5: "Zoning", page 49);
- Establishing a specific programme for protecting species (PART 3, Chapter 4: "Choosing Management measures", page 44);
- Establishing general and specific awareness programmes (PART 3, Chapter 7: "Public awareness and education", page 52).

5.4. Useful references

Publication	Topic	URL (direct link to document, if any) and/or to publisher
EN, SNH, EHS(DOE(NI)), CCW, JNCC, SAMS 2001c. Guidelines for developing conservation objectives for Marine SACs - Learning from the UK Marine SACs Project 1996-2001. Peterborough, English Nature.	Developing objectives for Marine SACs	http://www.ukmarinesac.org.uk/publications-launch-pdf.php?file=conservation_obj&filesize=250 http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Includes a chapter setting conservation objectives	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Includes a chapter setting conservation objectives	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
Laffoley, D.d'A., Vincent, M., Connor, D.W., Hill, M., & Breen, J. 2002. Strategic goals and objectives for marine nature conservation, and associated indicators. Prepared for the Review of Marine Nature Conservation by English Nature and the Joint Nature Conservation Committee. Peterborough: English Nature Research Report, No 482. 23 pp.	Strategic goals for marine conservation in general	

PART 3: Management tools

1. Establishing the management framework

1.1. Why partnerships?

"Community-based management", "joint management", "partnership", "collaborative management", and "co-management": Whichever the title, in many cases building partnerships is just as important to successful management as knowledge, scientific aspects, and legal imperatives (Kelleher 1999, Salm *et al.* 2000). It can also be the most difficult and time-consuming part of the management planning.

Partnerships with relevant authorities, as well as stakeholders, may have legal reasons, but they are also strongly recommended for practical reasons. Many experiences worldwide have shown that stakeholder involvement in management decisions usually builds up trust and confidence between the parties, which in turn facilitates the implementation of management and strengthens both public support and commitment (EN *et al.* 2001a).

For example, effective dialogue has almost invariably been shown to increase the level of acceptance and support for Natura 2000 sites. Participation by different groups creates in each a sense of pride and "ownership" of the site, ensuring continuity, and creating new socio-economic opportunities and partnerships (European Commission 2004b). Communicating with policy developers and government bodies leads to better integration of policies, encourages a coordinated approach to land use policies, highlights areas of mutual interest, and helps in strategic planning (European Commission 2004b).

1.2. Top-down and bottom-up management

Two extremes of management exist: "top-down" management, referring to a system where full control belongs to the agency in charge; and "bottom-up" management, where there is strong management involvement, even up to full control, by the local community. The spectrum between these two extremes offers numerous options, and success often lies in finding the best balance between these two approaches. Without the involvement of local people, protection often fails, but without government involvement, the MPA can lose its protection status (Kelleher 1999). Co-management may not be possible for some sectors, for example, while tourism access may be co-managed, control over navigation rights must remain with a government authority. In general, the stakeholder activities should be supported by legislation (Salm *et al.* 2000), but in some cases even voluntary agreements and regulations can be appropriate, for example, for privately owned lands, which constitute a great proportion of the Baltic Sea coastline in some riparian countries, such as in Finland.

1.3. Examples of different approaches

The type of participation adopted for a site has a profound impact on the management scheme process, especially the management structures and the decision-making processes. The structure should be considered and planned in advance, with the involvement of the relevant authorities and stakeholders. What is achievable will depend to an extent on the local political culture, and in particular on the willingness of relevant authorities

Table 3. Different levels of participatory activities and examples of techniques (EN *et al.* 2001a)

Level of activity	Examples of techniques	Objective
Information-sharing activities	Newsletters, websites, leaflets, videos, public displays, slide shows. Additional info in PART 3, Chapter 7: "Public awareness and education" (page 52).	To disseminate information in the activities, presentations, media briefings
Consultative activities	Management group consisting of relevant authorities consulting with stakeholders through surveys, focus groups, public meetings, face-to-face briefings with key individuals/organizations	To encourage a two-way exchange of information
Collaborative activities	Creating hierarchical management groups whereby relevant authorities collaborate with stakeholders through topic groups to scope problems and solutions; running site-based events	To engage the knowledge and resources of stakeholders
Empowerment activities	Creating flat management groups combining relevant authorities and stakeholders by co-opting individuals from relevant authorities and stakeholder groups; devolving and budgets and resources	To share power and responsibility for the decisions being made and their outcomes

to share responsibility in decision-making. It will also depend on the opportunities, or lack thereof, for relevant authorities and other stakeholders to identify common goals (EN *et al.* 2001a). Examples are given in Table 3.

1.4. Statutory management: working with relevant authorities

Some impacts may arise outside the boundaries of the site and beyond the geographical area within which the local relevant authorities' powers apply. Management schemes must identify the impacts on features originating outside the sites and develop appropriate management measures, where possible. In addition, fisheries and shipping policies have international dimensions in the Baltic Sea and cannot be regulated directly. This may necessitate the involvement of relevant authorities and other bodies in adjacent areas. These bodies need to be involved alongside the relevant local authorities in the development of the scheme. For Natura 2000 sites, relevant authorities should be consulted regarding the activities threatening the sites (see "Operations Advice", discussed later in this chapter).

Relevant and competent authorities are those that can exercise their existing functions to secure compliance with the conservation features, and in the Natura 2000 network, have a duty under the Habitats Regulations to do so. Generally, relevant authorities have sufficient legal instruments to manage potential impacts identified through the management schemes. However, there are certain potential impacts from some on-going activities, for example military or aviation activities, that are within the jurisdiction of other competent authorities. In such cases, it is important that the respective competent national authorities are targeted and kept involved in the development of the management scheme, particularly regarding those areas over which they have control. When interests are overlapping, each relevant authority should consider the measures devised by another relevant authority (EN *et al,* 2001a).

In addition to operating with relevant authorities, it is important to identify other stakeholder groups and their concerns. These may be mapped, for example, by participatory surveys (Salm *et al.* 2000). The number of potential stakeholders and the extent to which they can be, or want to be, included in the MPA management may differ greatly from country to country, from site to site, and from countryside to urban MPAs.

1.5. Potential relevant authority and stakeholder groups

Collaboration requires networking and forging linkages, for example, with

- environmental and/or nature conservation agencies at state/regional/local levels;
- tourism authorities;
- fisheries agencies/committees;
- shipping authorities;
- local law enforcement officers;
- community leaders and other local politicians;
- port, harbour, and navigation/lighthouse authorities/committees;
- land drainage authorities;
- local people, e.g., landowners, fishermen;
- private businesses and industries;
- water and energy companies;
- NGOs;
- Scientists.

Authorities

Environmental agencies

If not already entirely or partly responsible for the management scheme of the MPA, regional/local environmental agencies should be coordinated to distribute, collect, and report, e.g., relevant monitoring results concerning the MPA.

Fisheries authorities

In the European Union, fisheries policy has an international dimension as EU legislation regulates the allowable takes, not national governments. BSPAs and their management must be integrated into national fisheries policies, but this complex discussion cannot be dealt with in this document.

Shipping authorities

Shipping is another issue with an international dimension, thus requiring international cooperation. Relevant authorities should be informed and consulted regarding the BSPAs, if shipping activities have a considerable effect on the site. Routing and maintenance/navigational dredging activities in national territories may be negotiated with relevant authorities, and managers should be prepared for catastrophic events such as oil spills.

Tourism authorities

Tourism can pose threats to conservation features, but when managed in a sustainable way, it can benefit the conservation efforts by raising public awareness and support. It may also bring great commercial value to a protected area in a location that is easily reached and has tourist

attractions (such as archaeological interests, scenic coastal and marine landscapes, diving or bird watching opportunities). Tourism may create job opportunities and raise the profile of the community. The establishment of an MPA is also a good opportunity to encourage the tourism industry to develop and adopt codes of environmental practice.

Law and enforcement officers
Law and enforcement officers, such as local police, and coast guard can help to establish and enforce the legal basis and regulations for MPAs and share surveillance responsibility, where needed. Officers should be aware of the existing regulations and penalties, and their role in the MPA management must be clearly defined. Law officers can also take initiatives in establishing new marine conservation or site-specific legislation, when it is considered necessary.

Community leaders and other local authorities
Trusted community leaders, workers and local authorities, such as city council or environmental board members and chairpersons, can be helpful partners. They often have intimate knowledge of local political cultures and natural resources, and can therefore reduce conflicts and act as a conduit in communicating the advantages of the site, thus affecting public opinion.

Other
Harbour, navigation and lighthouse, land drainage, and military authorities/committees are examples of other authorities that may be relevant to BSPA management.

Stakeholders

Local people
People relying on the marine environment for their livelihoods, using it for recreation and free time, or simply living near the coast have a great deal of information that can increase understanding of marine and coastal ecosystems. The costs of enforcement can be reduced and management responsibilities can be shared with local people. Trust between managers and locals results in greater commitment to implementation of measures, and future conflicts are more likely to be avoided. In addition, public awareness of conservation issues increases and integration of conservation efforts with social, economic, and cultural concerns for the nearby territories becomes easier.

Landowners have a vested interest in land usage questions. Establishing a dialogue with fishermen, both commercial and recreational, is relevant for BSPA managers, especially when the areas benefit sustainable fisheries by protecting nursery grounds and fish aggregation areas. Fishermen may be able to provide valuable information on the resources of the site, and their needs should also be taken into consideration.

Private businesses and industries
Many private businesses and industries may have interests in BSPA sites, and their actions may need to be regulated by the MPA management, for example private harbours and tourism enterprises.

Water and energy companies
Water companies and sewage treatments plants, as well as energy companies and power plants, whether privately or state-owned, depend on or are closely associated with the seashore and thus have an interest in and influence on the coastal areas.

Scientists
Scientific research, and the resulting information on ecosystem structure and function, can benefit management in many ways. Through intensive collaboration and planning, the interest of scientists to conduct research in MPAs can be used to fill relevant information gaps. If the threats to biodiversity in the site, as well as the goals and objectives of its protection, have been scrutinized and developed in cooperation with scientists, they can be used to support the conservation efforts more effectively.

NGOs
Environmental NGOs usually have strong interests in the nature conservation issues and have often already lobbied greatly for them, both at the political and general public levels. They usually have good national and/or international networks of experts, as well as regular associates. NGOs also collect and report great amounts of information on nature issues and on the legal aspects of conservation, as well as raising funds for nature conservation. They possess scientific and management expertise and sometimes may carry the main responsibility of voluntary management of a marine area.

1.6. Advisory committees - tools for stakeholder participation

Establishment of committees helps to form partnerships, facilitates local participation, and ensures that all interests are represented in the final proposal, even when not every interested individual can play a central part. Committees are usually appointed by the MPA administration, and their roles should be carefully planned and limited so that no need arises to dissolve them. They should also remain in their advisory role and not play an active role in the management, although it is vital to ensure that the advice given by members is valued and needed. Whatever the composition and nature of the committee, it should be supported and empowered by adequate legislation (Kelleher 1999, Salm *et al.* 2000). Note that advisory committees can be and most often are separate from management groups (EN *et al.* 2000a).

Examples of reasons to set up committees include:

- Periodic consultation;
- Evaluation of the effectiveness of the plan;
- Reviewing progress;
- Approving work plans;
- Authorizing budgets or specific expenditures

(Salm *et al*. 2000, EN *et al,* 2001a).

1.7. Single or separate advisory/ management groups?

The final decision between a single or several separate groups depends on the number and composition of partners, on the location and geography of the site, and on previous initiatives.

Urban/rural. Differences can be found between, for example, highly populated urban sites and sparsely populated rural sites, where the latter usually have fewer stakeholder groups but they often have stronger interests and tighter bonds to the area compared to the former.

Small/large site. Size and geography also affect the stakeholder scheme. The physical nature has an impact on how stakeholders view the site, and therefore their willingness to become participants. While small bays often have a well-defined identity as a place, as well as associated communities, large and open sites may not be recognized as an entity and may have many separate stakeholder communities, indicating a need to establish separate authority and stakeholder groupings. Consequently, larger sites may also need more time to develop awareness, familiarity, and support.

Existing trust/mistrust. The selection between separate and single groups also depends on the existing level of confidence and trust. These may depend on whether earlier initiatives exist and were successful, or whether none exist, in which case the entire structure must be designed from scratch, or whether previous initiatives existed but failed and have created mistrust and conflict. (EN *et al*. 2001 a & 2001b).

Separate groups

This structure model is best suited for:

- Sites in urban locations with high populations and greater numbers of potential stakeholders;
- Situations where there is a stronger political culture for local communities, industry, and other interest groups to act through representatives, that in turn collaborate with statutory authorities;
- Situations where high levels of trust already exist, for example, through previous successful conservation strategies. If not, extra attention might be required to ensure wider stakeholder involvement.

Single group

This structure is best suited for:

- Sites in more rural areas with fewer potential stakeholders, but with stronger interests and dependence on the area;
- Situations where there is an accepted culture to involve both statutory and community groups in decisions affecting the local resources;
- Situations where past conservation initiatives have not developed strong levels of trust;
- Large urban sites.

(EN *et al*. 2001 a & 2001b).

1.8. Practical tips for advisory committees

Experience of MPA management in practise has resulted in many practical tips concerning advisory committees, the ones summarized here first presented by Brody (1998), Kelleher (1999), Salm *et al.* (2000), EN *et al.* (2001b), Jones *et al.* (2001) & Jones (2002).

Composition

Represent all stakeholders. Advisory committees/boards should represent the spectrum of the stakeholders, including members of the local community. This way they can keep the local community informed of activities and provide useful information, in addition to the support provided by their involvement (Salm *et al.* 2000). It should be kept in mind that local communities rarely

are homogeneous units, and do not act as one. Even seemingly homogeneous units can include a variety of interests and concerns. Examples exist where a single group has been left out of the process, causing strong opposition from this group, and leading to “paper parks” that receive no actual protection. Participatory surveys and asking participating stakeholders to suggest other stakeholders can help.

Ensure early participation in the establishment process. Advisory committees should be established prior to or during the planning process, as they are less effective when the plan is completed and ready for implementation. Early involvement helps to reduce conflicts during the later stages and will help local communities to build a sense of ownership. The participation must take place throughout the process (Salm *et al.* 2000, Jones 2002). (Kelleher 1999).

Timetables

Design a well-structured establishment process. Clearly defined stages of decision-making with regularly scheduled, accessible meetings make it easier for individuals to become involved. The stakeholders will participate more willingly if they know how and when they can give their input.

Present realistic schedules. Try to find a balance between meeting deadlines and keeping the process moving forward. However, do not push the process on too quickly, which can lead to the alienation of some stakeholders.

Documents

Beware of finalized documents. Avoid making drafting documents look too finalized so as not to give the stakeholders the impression that the issue is closed already. The first meeting agendas and information letters should clearly indicate which subjects are to be discussed, but not what the outcome should be.

Use maps. Using “sketch maps” has often proved to be an effective means to organize the participatory discussion. All participants can add items and propose alternatives on the map: the flow of materials, energy and people, and their potential negative impacts, as well as ecologically sensitive areas may be captured on paper. The purpose is to capture all reasonable ideas and comments; neatness is not required.

Dialogue

Start small. Concentrate effectively on a few priority issues before trying to deal with all the details, and do not set targets that cannot be met.

Start with listening. Let the stakeholders tell you, who and where the resource users are, how they use the resources, and what they want to achieve.

Use transparent processes. Transparent processes and decision-making are important at every level, in routine administration as well as policy.

Deal with one issue at a time. Stakeholders may benefit from having “their own” issues dealt with in a meeting that does not discuss other issues. This helps to reach decisions/consensus on one issue at a time, which considerably speeds up the building of trust, while simultaneously isolating the difficult issues/topics.

Challenge orthodoxy. The dialogue between partners should not be just head-to-head but involving all levels of the participating agencies and groups. It might be easier to start working bilaterally, by meeting the representatives one by one in private meetings. However, all stakeholders should start working as a team as soon as possible. It can take time for a fruitful conversation and basis for compromise to be established, but it is the only way to build up trust and keep the conversation open.

Favour participation over consultation. In passive participation, stakeholders react to plans already developed rather than creating them from the start. Interested parties should be given specific, tangible responsibility over planning, empowering them in making decisions and taking credit for the final rules.

Ensure equal representation in decision-making. When management decisions by a committee are required, it must be ensured that different subgroups of the community are equally represented (fishers, farmers, etc.).

Feedback

Monitor the effects of decisions on a regular basis. This may reveal mistakes before too much time and effort are spent. Verification of conclusions reached through participatory appraisals must be assessed, both by feedback to resource users and by independent observation and measurement. The evaluation of management effectiveness is presented in the relevant chapter.

Take an "action-learning" approach. Test to see whether the proposed actions work before turning them into policies or strategies.

Dissemination

Ensure that the results are visible to the stakeholders. The initiatives arising and jointly accepted decisions must be implemented, and the participants must see that this is actually taking place. If this is not apparent, participation and commitment will not last and future initiatives may also suffer. Documenting achievements and successes is particularly important, as they can be referred to when a new person becomes involved, if the MPA faces criticism, or other crisis.

Integrating BSPAs with previous initiatives

When previous initiatives around the site have been successful in building trust and confidence, the time invested in building the relationships can be reduced. It is, however, important to:

- Research the situation well;
- Make sure that no stakeholders are left out;
- Explain fully how the management scheme fits alongside existing strategies;
- Show an integration or development of the objectives;
- Involve previous project officers and networks in the development of the management scheme.

Consideration is especially needed when previous initiatives have been voluntary and the current process is statutory. When previous initiatives have failed, address and assess the underlying causes. Try to build up a new network by indicating clearly how the initiative differs from those previously and how problems encountered previously may attempt to be solved in a satisfactory manner (Salm *et al.* 2000, Jones 2002).

1.9. The role of the project officers

Understanding the structure of the communities, as well as the concerns and feelings of security of different groups, is important. Thus, when possible, project officers should have appropriate experience of the local political culture and be aware of existing, possibly latent, conflicts among stakeholders and government authorities. The cohesion of the local population and relevant authorities, or the lack thereof, should be identified. In addition to the capacity to set up group meetings and workshops, the project officers should be able to meet relevant authorities and stakeholders individually. At many rural sites, interpersonal skills and local knowledge can be very important. Political and scientific expertise can play a bigger role at complex urban sites. Initial information leaflets and questionnaires can be a good starting point.

(Salm *et al.* 2000, EN *et al.* 2001b, Jones 2002, MPA news 2004)

1.10. Other tools for stakeholder participation

Other stakeholder-oriented tools for participation include:

- one-to-one discussions and phone calls;
- meetings, round tables, workshops, and public hearings;
- management forums;
- steering committees;
- interagency agreements;
- field visits.

All of these can encourage mutual understanding, build up trust, develop a knowledge base, lead to longer-lasting solutions, and better motivate people to become actively involved. However, they also require time and money, and take a lot of organization and planning, both for establishment and maintenance, as well as requiring interpersonal skills (European Commission 2004b).

1.11. Natura 2000 and "operations advice"

For the Natura 2000 network sites, Habitats Regulations require the statutory nature conservation agencies to provide advice on operations that may cause deterioration or disturbance to interest features. The purpose is to alert relevant authorities to the management of those activities that need particular review in the light of the conservation objectives. The procedure can also be recommended for BSPAs other than Natura 2000 sites.

The identification of these activities is based primarily on an understanding of the sensitivity of the respective feature, or sub-features, to changes in environmental or ecological conditions that can be caused by human activities. The assessment must take account of the effects of activities outside the site, as well as potential activities. To avoid any misunderstanding of the potential impacts, the statutory advice on operations should provide a clear statement on those activities that may cause damage.

On its own, a long list of activities may cause alarm to relevant authorities and stakeholders,

especially if it is perceived as presenting the prohibition of certain activities. It is therefore helpful to involve these bodies in the development of the list, especially in the early stages of information collation, so that relevant authorities and stakeholders can identify for themselves the areas of potential impact. One successful approach for increasing the acceptance of the statutory advice involves the nature conservation agencies of individual countries identifying broad ecological or environmental factors to which the features are sensitive, for example, physical abrasion, toxic contamination or biological disturbance. Other organizations can then consider and advise on how activities within or adjacent to the site might influence these factors. This separates the more scientific assessments of sensitivity from the local information on the actual pattern of human usage on the site. It also provides advice in a more long-lived form than simply the current assessments of potential activities. (EN *et al.* 2001a & 2001c).

Identification of threatening activities is discussed in PART 3, Chapter 3: “Threat analysis” (page 40) and in Attachment 2 “Human activities table” (page 76).

1.12. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Jones, P.J.S., Burgess, J. & Bhattachary, D. 2001. An evaluation of approaches for promoting relevant authority and stakeholder participation in European Marine sites in the UK. English Nature (UK Marine SACs Project). 98 pp.	Evaluation of approaches	http://www.ukmarinesac.org.uk/pdfs/stake_holder.pdf http://www.ukmarinesac.org.uk/
European Commission 2004b. LIFE Focus / LIFE-Nature: communicating with stakeholders and the general public – Best practice examples for Natura 2000. Office for Official Publications of the European Communities, Luxembourg. 72 pp.	Examples of participation in Natura 2000 sites	http://europa.eu.int/comm/environment/life/infoproducts/naturecommunicating_lowres_en.pdf http://europa.eu.int/comm/environment/life/home.htm
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Practical examples from partnerships	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Includes a chapter on participation and relevant authorities	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
Jones, P.J.S. 2002. MPA Perspective: advice for promoting participation of authorities and stakeholders in MPA planning. MPA news 3(7):5.	Promoting participation	http://depts.washington.edu/mpanews/MPA27.htm http://depts.washington.edu/mpanews/MPA27.pdf
Brody, S.D. 1998. An Evaluation of the Establishment Processes for Marine Protected Areas in the gulf of Maine: Understanding the Role of Community Involvement and Public Participation, Gulf of Maine Protected Areas Project. Report #3, July 1998. Gulf of Maine Marine Protected Areas Project. 40 pp.	The role of community involvement	http://www.gulfofmaine.org/library/mpas/process_eval_0798.PDF http://www.gulfofmaine.org/
National Marine Sanctuary Program 2003. Sanctuary Advisory Council Implementation Handbook. Second Edition. 67 pp.	Advisory council handbook	http://sanctuaries.nos.noaa.gov/library/national/sachandbook_new.pdf http://sanctuaries.nos.noaa.gov/
Kessler, B.L. 2004. Stakeholder Participation: A Synthesis of Current Literature. Prepared by the National Marine Protected Areas Center in cooperation with the National Oceanic and Atmospheric Administration Coastal Services Center. 6 pp.	Literature review	http://www.mpa.gov/virtual_library/Publications/Stakeholder_Synthesis.pdf
Pattison, D., dosReis, D. & Smillie. H. 2004: An Inventory of GIS-Based Decision-Support Tools for MPAs. Prepared by the National Marine Protected Areas Center in cooperation with the National Oceanic and Atmospheric Administration and Coastal Services Center. 20 pp.	GIS-based decision-support tools	http://www.mpa.gov/virtual_library/Publications/FINAL_Decision%20Sup%20Rpt.pdf http://www.mpa.gov/

2. Meeting information needs

Available information concerning the state of the environment and the flora and fauna and their interactions with outside areas has to be compiled. Additional information should be gathered through literature studies including ecological changes (in the past), or base-line studies must be undertaken to gather new information.

BSPA management guidelines (Helsinki Commission 2003b)

2.1. A systematic approach to collecting and handling information

There are four important elements in successfully meeting information needs for developing management schemes on marine sites. They are to:

I Identify the purpose of the information in the context of long-term needs;
II Collate and review existing information and knowledge;
III Identify shortfalls and fill the gaps;
IV Feed back the results of data collation and gap filling.

2.2. Collating existing information

Collating and reviewing large amounts of existing information of variable quality on a wide range of topics requires skill and judgement. Stakeholders, both scientists and local people, can contribute to the gathering and evaluation of the existing biophysical, cultural, and political information relevant to the planning process. In many cases, they already possess this information. Information collection provides excellent opportunities for collaboration that can strengthen local partnerships and maximize the use of resources. Successful collaborations applied on demonstration sites have included:

- hiring local fishing vessels for survey work;
- joint research programmes with university research departments;
- linking with PhD research work;
- loaning of sea fisheries survey vessels for biological mapping.

(EN *et al.* 2001a).

2.3. Identifying and filling gaps

Scientific knowledge is never complete. However, gaps must not be seen as obstacles for planning and implementing management measures. In the long run, the chosen management scheme and the evaluation of its effectiveness on a regular basis will help to decide which gaps in information are relevant for management and how and when they should be addressed.

The pursuit of better information and understanding should continue in order to strengthen the basis for management decision, provide better understanding of the underlying ecological and geographical processes, and detect changes in them. It should be remembered that special research is not always needed to answer management questions; answers can be found by tapping into experience from elsewhere (Salm *et al.* 2000).

The issue of scientific research is discussed in greater detail in PART 3, Chapter 8: “Research and monitoring in BSPAs” (page 56).

Key information needs

Table 4. Key information needs for management planning (Salm *et al.* 2000, EN *et al.* 2001a)

Stage	Required information
Setting conservation objectives	Sub-features and attributes that describe the condition of the features on the site including extent of habitats, size of populations, supporting information on physical processes, “typical species” for habitats, and supporting habitats for species. Judgements of what constitutes favourable conditions. These preferences on conditions may depend heavily on understanding where the current condition lies in relation to the variability of the features over time. Additional info can be found in PART 2, Chapter 5: “Developing conservation goals…” (page 28).
Setting operations advice	Environmental conditions and operations to which the features are sensitive. Type and extent of activities occurring or likely to occur on sites, and where they occur. Location of features and sub-features. Additional information can be found in PART 3, Chapter 3: “Threat analysis” (page 40).
Establishing management measures	In the planning phase, research and monitoring are needed to support or challenge perceptions of resource depletion or degradation; in other words, to define why there are problems and how they should be addressed. This means defining, e.g., location and sensitivity of features and sub-features and location, intensity and timing of activities. In addition, current management and monitoring regimes operating on the site have to be clarified, including existing management plans. Additional information can be found in PART 3, Chapter 4: “Choosing management measures” (page 44).
Establishing monitoring requirements	Target values for the attributes that equate to favourable conditions for each of the features. Cost-effective techniques for detecting changes in the attributes. Additional information can be found in PART 3, Chapter 8: “Research and Monitoring in BSPAs” (page 56).

2.4. Feedback

Relevant authority staff and stakeholders generally have a keen interest in understanding their site. Successful dissemination of the results of data collection and collation exercises can increase

this interest and the sense of ownership of the site. It can also increase the understanding and acceptance of the need for management action. In addition, long-term objectives of scientific research and monitoring can then be designed more effectively.

Visual outputs are particularly effective. Video footage from underwater surveys of features on sites has been shown to relevant authorities, both to increase interest in the site, and to illustrate the damaging impact of specific activities. Maps capturing data collected in biological surveys are very useful tools for identifying activities and potential interactions. Overlaying feature and activity information can assist in determining management requirements. The compilation of data into databases, either paper or electronic, and into reviews that are more extensive can help to promote partnerships within groups by providing a common and valued resource (EN *et al.* 2001a).

2.5. Lessons learnt about meeting information needs

- Plan the need for information with regard to the potential impacts and management requirements;
- Involve stakeholders and relevant authorities in determining the gaps in information and the ways to fill them, as well as in the development of the statutory advice on conservation objectives and operations advice;
- Consider how information collection exercises might build local support and a sense of ownership of the site and its feature;
- Draw on local knowledge through one-to-one meetings, workshops or topic groups;
- Investigate university research interests in the site and seek collaborative research projects;
- Consider providing early draft advice on conservation objectives and operations;
- Separate the scientific components of advice on operations from the local understanding of the site to engage stakeholders especially in the latter;
- Ensure the availability of the information by dissemination of the outputs from collation of information. Common databases and visual products are especially valued;
- Provide digestible versions of complex or technical information.

(EN *et al.* 2001a).

2.6. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Management in practice	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Includes a chapter on information needs	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
Gittings, S., Benson, K., Souik, P. & Tartt, M. 2002: Sanctuary Science: Evaluation of Status and Information needs. National Marine Sanctuaries Program, USA. 86 pp.	Information needs evaluation case study	http://sanctuaries.nos.noaa.gov/library/National/science_eval.pdf http://sanctuaries.nos.noaa.gov/welcome.html

3. Threat analysis

"Conflicts between conservation interests and anthropogenic exploitation or side effects from such and other human activities detrimental to nature must be avoided in a BSPA.
Actual and potential ecological stress factors, conflicts and threats have to be scrutinized in order to assess their effects on the environment and on the flora and fauna."

BSPA management guidelines (Helsinki Commission 2003b).

3.1. Why threat analysis?

The marine and coastal biodiversity in the Baltic Sea is threatened by many human activities to which it is exceptionally vulnerable, due to many unique oceanographic, climatic, and biological features. Therefore, when designing the management and monitoring of BSPAs, the current and potential future threats should be carefully examined and listed. A satisfactory description of the relationships between pressure factors and attributes is a powerful management tool. This enables the managers to set thresholds for interest features and thereby assess their condition, to choose management measures, and to evaluate the effectiveness of these measures.

3.2. Step one: identifying human activities

First, the presence, scale, and intensity of human activities in and around the site that potentially have effects upon the site and its features need to be identified. The Attachment 2 “Human activities table” (page 76) is a checklist for potential threat factors and their impacts on the coastal and marine environment. Such tables could be produced locally in order to identify the relevant issues and the ways these issues may affect the site. Maps illustrating human activities in and around the site and areas of conflicts can be used to evaluate relevant uses and their impact on habitats and species on a finer scale and to depict the spatial use of the site.

3.3. Step two: assessing sensitivity

When the above information is not readily available, the sensitivity of the features for conservation in relation to the threatening human activities has to be assessed based on the best available information. This is done by combining the likely impairment of the recoverability of the features into a meaningful assessment of the sensitivity. Methods for carrying out such an assessment are introduced only briefly here. Details can be found in “Useful references” and the schematic presentation in Attachments 3: “Sensitivity assessment rationales for habitats and species” (pages 78 and 79). Managers could seek to establish cooperation with scientists to make such assessments and set standard benchmarks. The results could be entered in a “general sensitivity-to-impact” matrix, which could be distributed for wider use across BSPAs, such as the one shown in Attachment 4: “An example of a general “sensitivity-to-impact” matrix” (page 80).

Sensitivity is the intolerance of a habitat, community, or species (i.e., the components of a biotope) to damage, or death, from an external factor. Sensitivity must be estimated (assessed) in response to a change in a specific environmental factor and to the magnitude, duration, or frequency of that change. It does not change much from site to site.

Recoverability is the ability of a habitat, community or species to return to a viable state, which is at least close to that which existed before the development, activity or event. Recovery may be because of re growth (in the case of damaged species capable of regrowing from remaining tissue), re-colonization by migration or larval settlement from undamaged populations or may require re-establishment of viability where, for instance, reproductive organs or propagules have been damaged by the event. Recovery can be partial or complete.

(Tyler-Walters and Jackson 1999, Hiscock & Tyler-Walters 2003)

3.4. Procedure for species

I Collate and review key information for the species in question;
II Assess the quality of the available data;
III Identify the likely intolerance of the species to external factors;
IV Assess the likely recoverability of the species;
V Assess the sensitivity of the species. (Tyler-Walters & Jackson 1999)

3.5. Procedure for habitats

The sensitivity of a habitat/biotope is dependent upon the sensitivity of the species within that community. As it is impossible to consider the sensitivity of each species, it is useful instead to choose representatives that may have considerable effects on the ecology of the biotope. These key/characteristic/important functional or structural species serve as indicators in the biotope sensitivity assessment. However, the key species approach to management in general must be carefully considered: key species may be context-dependent, and do not necessarily indicate the state of the ecosystem’s biodiversity (Simberloff 1997). The issue is especially difficult in the species-poor Baltic Sea, where, at least in some cases, every species could be claimed to be a key species.

According to Hiscock & Tyler-Walters (2003), the steps to be taken are:

I Collate and review key information for the biotope in question;
II Select species that indicate biotope sensitivity;
III Review key information for these species;
IV Indicate the quality of available data;
V Assess the intolerance, recoverability, and sensitivity of species (as above);
VI Assess the overall intolerance and recoverability of the biotope.

What are the key/structural species?

Key structural species
The species provides a distinct habitat that supports an associated community. Loss/degradation of the population of this species would result in lose/degradation of the biotope. Examples include: Fucus vesiculosus, Zostera marina.

Key functional species
The species maintains community structure and function through interactions with other members of that community (predation, grazing, and competition). Loss/degradation of the population of this species would result in rapid, cascading changes in the ecosystem. Examples include common predators and grazers.

Important characterizing species
The species is/are characteristic of the biotope and is/are important for the classification of the biotope. Loss/degradation of populations of this species would result in loss of that biotope.

Important structural species
The species positively interacts with the key of characterizing species and is important for their viability. For example: parasites, epiphytes, or disease organisms, if key/characterizing species.

Important functional species
The species is the dominant source of organic matter or primary production within the ecosystem. Loss/degradation of the species could result in changes in the community function and structure.

Important other species
Additional species that do not fall under the above criteria but present knowledge of the ecology of the community suggests that they may affect the sensitivity of the community.

(Hiscock & Tyler-Walters 2003)

3.6. Step three: assessing vulnerability

Vulnerability expresses the likelihood that a habitat, community or individual (or individual colony) of a species will be exposed to an external factor to which it is sensitive. The degree of 'vulnerability' therefore indicates the likely severity of damage should the factor occur at a defined intensity and/or frequency. (Hiscock & Tyler-Walters 2003)

This rationale represents a practical approach to the derivation of overall biotope sensitivity. However, the actual impact of human activities on the habitats and species to be protected needs to be assessed locally, as they are dependent on the receiving environment. When the sensitivity and recoverability information is evaluated in combination with the knowledge of the current state of the existing population, the vulnerability and/or recoverability of that particular population can be estimated. For example, an activity that markedly increased siltation may have little effect in a turbid estuary, whereas it would probably have significant effects in a sheltered embayment. A systematic approach to this could, for example, involve the development of a site-specific "Vulnerability to impact matrix" (Hiscock & Tyler-Walters 2003). An example is shown in Attachment 5: "An example of a site-specific "vulnerability-to-impact" matrix (page 81).

3.7. Steps four and five: setting targets and choosing management measures

It is not the purpose of this document to develop new indicators or threshold values. The use of a standard benchmark level of change in an environmental factor ensures that the sensitivity of different species or communities is assessed with respect to the same level of change or perturbation. In addition, standard benchmarks allow the relative sensitivity of different species and communities to be compared (Hiscock & Tyler-Walters 2003). The development of such benchmarks for Baltic Sea purposes is one of the future challenges. However, indicators and regular monitoring are not always necessarily needed to understand that pollution damages the protected features. Examples of setting targets for "favourable conservation status" were given in PART 2, Chapter 5: "Developing conservation goals…" (page 28). The issue of choosing management measures is introduced in PART 3, Chapter 4 (page 44). Finally, the impact of human activities on the conservation features could be compared with management measures and solutions, as well as relevant partners. An example is given in Attachment 6: "An example of a table combining impacts of human

activities on conservation features with management issues" (page 82).

3.8. Separating the impacts of human activities from natural variation

Describing the existing environmental conditions and their variations is essential for understanding how they control the biological community and processes on the site. Given the mosaic of activities occurring within sites, it is very difficult to identify any one activity as the cause of an adverse effect and to separate its impacts from natural changes. On the other hand, although environmental conditions modify the impacts on the environment, threat analysis cannot be based solely on them. Therefore, the status assessment of the condition of the site must also be based on logical segregation of site-specific biological indicators and/or threshold values. In other words, the effects must be measured directly on the organisms. Knowledge of the interaction between pressure factors and the responses of the chosen indicators to these factors is thus fundamental. This knowledge can be established through using both historic and recent data in combination with empirical or dynamical modelling, where possible (Dahl *et al.* 2004). The importance of specific threats to the objectives of the protection should also be considered individually, and therefore the conservation objectives and the desired "favourable conservation status" should be clear before there is any sense in making the threat analysis. At the same time, research to gather sufficient evidence to identify the causes of detrimental change and to justify substantial management action should be encouraged (EN *et al.* 2001a).

3.9. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Dahl, K., Larsen, M.M., Andersen, J.H., Rasmussen, M.B., Petersen, J.K., Josefson, A.B., Lundsteen, S., Dahllöf, I., Christiansen, T., Krause-Jensen, D., Hansen, J.L.S., Ærtebjerg, G., Henriksen, P., Helmig, S.A. & Reker, J. 2004. Tools to assess the conservation status of marine Annex 1 habitats in Special Areas of Conservation. Phase 1: Identification of potential indicators and available data. National Environmental Research Institute, Denmark. 96 pp. – NERI Technical Report No. 488.	Assessment of conservation status	http://www2.dmu.dk/1_viden/2_Publikationer/3_fagrapporter/rapporter/FR488_p1-61.PDF http://www.dmu.dk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Includes a chapter on the role of science in evaluating impacts	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk
Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology 41: 724-734.	Effects of wind farms on birds	http://www.minos-info.de/material/pub/WSI_summary.pdf (abstract)
Hiscock, K. & Tyler-Walters, H. 2003. Assessing the sensitivity of seabed biotopes to human activities and natural events. MarLIN brochure. Edinburgh, Scottish Natural Heritage. 16 pp.	Sensitivity of seabed biotopes	http://www.marlin.ac.uk/PDF/Biotope_sens_brochure.pdf http://www.marlin.ac.uk/
Marine Life Information Network (*MarLIN*) 2006a. Sensitivity assessment rationale - a summary	Sensitivity assessment	http://www.marlin.ac.uk/sah/baskitemplate.php?sens_ass_rat http://www.marlin.ac.uk/
European Commission 2002. Assessment of plans and projects significantly affecting Natura 2000 sites. Luxembourg: Office for Official Publications of the European Communities. 76 pp.	Assessment of projects affecting Natura 2000 sites	http://europa.eu.int/comm/environment/nature/nature_conservation/eu_nature_legislation/specific_articles/art6/pdf/natura_2000_assess_en.pdf http://europa.eu.int/comm/environment/nature/
Tyler-Walters, H. & Jackson, A. 1999. Assessing seabed species and ecosystems sensitivities. Rationale and user guide. Report to English Nature, Scottish Natural Heritage and the Department of the Environment Transport and the Regions from the Marine Life Information Network (MarLIN). Plymouth, Marine Biological Association of the UK. (MarLIN Report No.4.). January 2000 edition.	Assessing seabed and ecosystems sensitivities	http://www.marlin.ac.uk/PDF/MarLINReport4.PDF http://www.marlin.ac.uk/
Simberloff, D. 1997: Flagships, umbrellas, and keystones: is single-species management passé in the landscape era? Biological Conservation 83(3): 247-257.	Single-species versus ecosystem management	

4. Choosing management measures

"The need for management arises from conflicts of interest and from specific nature conservation goals. In addition, the aim to keep an area as it is and to focus on an undisturbed natural succession needs to be described within a management plan. "

General aims of BSPA management. Baltic Sea Protected Areas have been chosen as examples of typical biotopes of ecological significance occurring in each of the Baltic Sea sub-regions. The general aim of management of these areas is to ensure the conservation and/or restoration of a representative set of biotopes and habitats in order to preserve biodiversity and sustainable use of natural resources where appropriate.

Specific aims of BSPA management. "To reach the general aim in an area, it is necessary to focus on a number of specific aims, depending on the conservation needs of the area. Zoning could be a useful tool to reach the specific aims. Elements in need of specific protection within a BSPA must be described comprehensively."

BSPA Management Guidelines (Helsinki Commission 2003b).

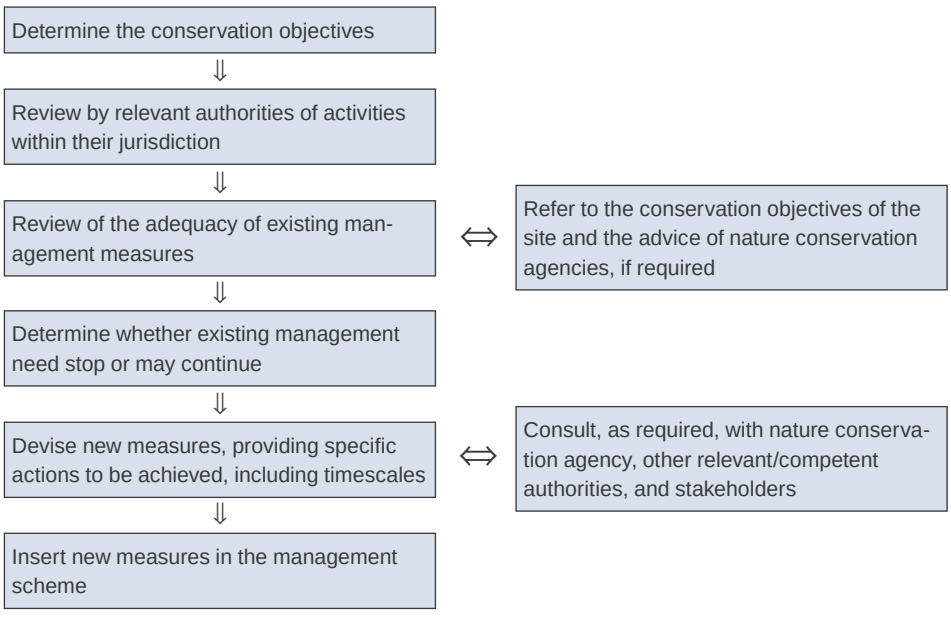
4.1. The procedure

The activities to be regulated and regulation options according to HELCOM BSPA management guidelines can be found in Attachment 7 (page 83).

4.2. The role of science

Lack of understanding of the distribution and intensity of activities is a common constraint on developing effective additional management measures. In some cases, there may be simple information gaps, which can be filled as part of the process of preparing the scheme, if planned into work programmes by the relevant authorities. In other cases, the gaps may be more complex, concerning cause/effect relationships, where developing the necessary level of understanding will involve considerable time and expense. When scientific information on deleterious effects is available it should be clearly provided, by drawing on evidence and experts from elsewhere, if necessary.

In circumstances of uncertainty, development of a measure based upon the current best available knowledge and in accordance with the precautionary principle, implementation of the measure, and review of its effectiveness through a monitoring programme is a valid approach. Where further studies or monitoring are proposed, it is beneficial that their scope and approach is discussed with all the relevant authorities, rather than having authorities acting in isolation. In this way, any new understanding that emerges from the studies or monitoring is more likely to be accepted and applied by both users and regulating bodies. The key information needs are indicated in PART 3, Chapter 2: "Meeting information needs" (page 39).
(EN at el. 2001a)



Procedure for choosing management measures; modified after (EN *et al.* 2001).

4.3. Statutory management

Potential legal and administrative constraints on the management of the site need to be clarified and appropriate action must be taken to deal with them. For example, as the Helsinki Commission does not have the competence to implement management measures for fisheries or shipping activities, the attention of the respective authorities needs to be drawn to these issues if action is considered necessary in a specific site. Building partnerships with relevant authorities is discussed in PART 3, Chapter 1: "Establishing the management framework (page 32).

4.4. Voluntary and statutory management

Where voluntary measures have been applied, they have involved relatively small changes to the existing pattern of an activity. Such measures are only as effective as the willingness of users to support them, which in turn depends on the benefits expected or, conversely, the likely cost. Whilst their role is therefore limited, particularly when it comes to dealing with more significant management issues, voluntary measures are able to secure initial support in situations where a statutory approach would cause significant resentment with little corresponding gain (EN et al. 2001a). Building partnerships with stakeholders, and different approaches to this work, are discussed in PART 3, Chapter 1: "Establishing the management framework (page 32).

4.5. Managing biotopes, habitats, and species

The management and/or restoration of biotopes can be done both directly and indirectly. Conservation measures aimed directly at the species and habitats, or activities occurring at the site, can be implemented by the site manager. Many of the indirect measures, excluding the public awareness campaigning, are beyond the scope of an average manager and require cooperation with relevant authorities as well as the integration of national and international policy instruments.

4.6 Fisheries management

The European Union has had a new common fisheries policy since 1 January 2003. The aim of the new Common Fisheries Policy (CFP) is to ensure exploitation of living aquatic resources that provides sustainable economic, environmental, and social conditions. For this purpose, the precautionary principle has been introduced; the progressive implementation of an ecosystem approach to fisheries management is also anticipated, as well as a need for the adoption of coherent measures limiting the environmental impact of fishing. In the context of this legal framework, several measures have been taken to improve the conservation status of habitats and species in the marine environment over the past few years, such as:

- Reduction of by-catch impacts on cetaceans following the recent ban of driftnets and adoption of regulations related to the mandatory use of acoustic deterrent devices;
- Restriction of bottom-trawling activities to protect valuable habitats. The current CFP allows for better integration of environmental protection requirements. Thus, it directly contributes to achieving the objectives of both the Birds and Habitats Directives.

Fisheries management measures for the protection of the marine environment may already be taken under CFP provisions as indicated above. Furthermore, the CFP provides for a system of protection for marine habitats and species from harmful effects of fishing activities, even in cases where the Natura 2000 provisions do not apply. (Marine Expert Group 2005.)

Direct management	Indirect management
▪ Regulating access in time and space: zoning, closed areas/seasons ▪ Regulating hunting, fishing, and recreational activities: licensing, catch limits, size limits, temporary or permanent closures, reduction of by-catch ▪ Continuing and/or traditional management practices ▪ Active restoration efforts (e.g., reconstruction of spawning grounds and passage routes), reintroductions ▪ Special species- or habitat-targeted programmes, protection of critical habitats	▪ Public awareness campaigns ▪ Managing and restoring water quality ▪ Regulating nutrient and other pollution emissions, e.g., end-of pipe technologies, regulation of dumping and wastewater discharge ▪ Inhibiting the invasion of alien species ▪ Improving the cleanliness and safety of maritime traffic ▪ Through policy instruments, e.g., by increasing coordination and cooperation of national and/or international programmes

Table 5. Direct and indirect management measures.

4.7. Managing water quality

In addition to choosing management measures for human activities directly threatening the species and habitats, efforts to maintain and restore water quality are an important part of the long-term MPA management, as well as the protection of the Baltic Sea marine environment in general. Efforts to coordinate and integrate policies to improve water quality by preventing pollution and by stopping eutrophication are beyond the scope of an average manager, but attempts should be encouraged and could be initiated by MPA management authorities. Water quality issues can also be promoted by MPA managers by including them in BSPA-related public awareness and education campaigns (Anthoni 2004).

Much of the work of HELCOM in the past decades has focused on efforts to reduce pollution inputs to the Baltic Sea. One example of such activities is the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP), which has identified 132 pollution Hot Spots areas around the Baltic Sea. Since 1992, 54 of these have been cleaned up and the aim is to complete the programme by 2012 at the latest.

4.8. Planning for future threats: alien species and climate change

Alien species: A transboundary threat

In the Baltic, alien species can also be a significant threat to biodiversity, and thus to the integrity of protected areas as well. Alien species are another example of a threat that transcends MPA boundaries, as even when not deposited directly into an MPA, species can still crawl, swim or float into the MPA. The matter is complicated further by the potential positive contributions of alien species to the biodiversity and function of the ecosystem. Their management is also a difficult, if not impossible, task once they have invaded the ecosystem. Therefore, the most important, and perhaps the only, strategy for regulation is to focus on vectors that transport and release alien species. (MPA news 2004a)

Managing the vectors of alien species

One of the primary paths is on the hulls or in the ballast water tanks of ships. A single tank may contain hundreds of species and millions of individuals. The International Maritime Organization (IMO) has adopted the International Convention for the Control and Management of Ship Ballast Water and Sediments. In this convention, standards for improved ballast water management worldwide were given concerning where, when, and how ballast waters can be released. At present, the convention awaits ratification by 30 nations before taking effect.

Therefore, an ideally based MPA would be situated far away from vessel traffic. However, as this is practically impossible in many parts of the heavily trafficked Baltic Sea, MPA managers should consider options for controlling invasions on a local level. Divers, fishers, boats, and even researchers may act as secondary vectors for species that have already invaded the system. For example:

- The research vessels entering the MPA could be subjected to voluntary hull inspections by divers;
- Diving gear belonging to researchers could be subjected to thorough soaking and/or chlorine freshwater immersion;
- Bait materials of recreational fishers could be subjected to inspection, and/or public awareness should be increased to inform fishers about the careful selection of bait materials.

MPAs are often intensively monitored, and may therefore play an invaluable role in the early detection of regional invasions. Though not commonly done, monitoring programmes should consider including the detection of alien species as this may be key to any attempts to their management. In addition, as local communities can help in addressing the issue of alien species, public awareness campaigns should provide information on this theme as well. This is another example of why local people should be involved in the MPA planning and management processes from the beginning. (MPA news 2004a).

Managing climate change

Whether or not as a result of greenhouse gas emissions, the potential of climate warming presents long-term challenges for MPA management. Habitats may swiftly alter, and the distribution patterns of species and species compositions may change. In the worst-case scenario, some may even be lost forever. The Baltic Sea is geographically quite small and the extent to which species can move northwards is limited. The levels of primary production may change, as may water circulation patterns. Warmer winters and shorter periods of ice cover can result in problematic situations for some species, for example, seals. In addition, some coastal habitats and human settlements are at risk if the sea level rises. The joint effects of potential warming and increased UV radiation may be fatal for some species.

The warming itself, and the consequent rise in surface water temperatures, are not manageable in the scope of protected areas. The mechanisms by which the changes will occur are complex and not entirely predictable on the basis of current knowledge. How can managers prepare for threats caused by potential climate change? MPAs may be places of refuge for species under threat in a changing environment. Combined with efforts to maintain good water quality, MPAs may support the maintenance of primary production and other vital functions of Baltic ecosystems. (MPA news 2005)

Practical tips on climate change for managers

In practice, attention should be paid to the location and zoning of individual sites, as well as to the integrity of MPA networks. Embedding large enough areas in individual sites enables effective zoning and the inclusion of appropriate buffer zones, which are highly recommended for BSPAs in general. If the zoning system is thoughtfully constructed, with the possibility of future habitat changes kept in mind, only the management regimes for individual zones, and not their boundaries, need be altered in the event of either short- or long-term warming events. Again, the adaptation of the management is the key.

Public awareness campaigns should address the threats of a warming climate, and stakeholders involved in the design and management process should also be aware. Joint national and regional efforts to publicize the effects of warming on marine biota are important in order to pressurize governments into considering the problem and thus advocate internationally for greenhouse gas reduction.

Minimizing all other stress factors that can be managed in the scope of MPA management is an option, and will give the ecosystem a better buffer capacity against the threats that cannot be managed. This also includes promoting sound management and protection of the surrounding areas.

Monitoring programmes should be designed in such a way that changes caused by warming events can be spotted early on and the management regimes and zoning plans changed accordingly, where possible. Good networks with scientists are essential to ensure their mobilization in the event of climate changes. (MPA news 2005)

4.9. Adaptive management

Decision-making for management relies on the assumption that the effects of management actions are predictable. It should preferably be supported by scenario studies with quantitative predictions. This relies on how quantifiable the effects of management actions are, and hence on the availability of proper data and a good understanding of the major processes controlling the ecosystem components affected by management action. However, scientific knowledge is always incomplete, and the extent to which it is incomplete will vary among regions and for different ecosystem components. Therefore, managers will rarely be in a position to use formal rule-based management frameworks. This is also true in the Baltic Sea region (European Commission 2004a).

Why adaptive management?

According to the principles of the Ecosystem Approach, the natural variability in marine ecosystems should be taken into account, and consequently management should recognize that ecosystems are dynamic. This implies that management frameworks will not be static, but continually reassessed and updated as circumstances change. The alternative to rigid and inflexible management frameworks is adaptive management.

Practical tips for adaptive management

Adaptive management requires less stringent assumptions about scientific understanding of ecosystem processes but requires an ability to predict the trend and general magnitude of the effects of management actions. Managers should be guided towards the achievement of the Operational Objectives, and hence the Ecological Objectives and Strategic Goals, through a series of consecutive adjustments of the management measure in response to system reactions. Ecological Quality Objectives are currently also being developed in HELCOM.

Adaptive management is a form of “learning by doing”, with structured feedback and decision-making (Walters 1997). This approach has already been recommended in the context of stakeholder participation. In this approach, ecological indicators are used to support the conservation objectives. This requires that monitoring and assessment are of sufficient accuracy, precision, and frequency to ensure that the effects of management measures can be evaluated in a timely manner, and adjusted as necessary.

Hence, adaptive management is closely linked to Management Effectiveness Evaluation (MEE), which is introduced in PART 4, Chapter 1: "Evaluating management effectiveness by applying quantitative indicators" (page 63).

In order to make adaptive management efficient, the indicators should provide rapid and reliable feedback on activities and management measures. Limit or Target Points will often have to be set with limited knowledge and re-evaluated and revised regularly as learning-by-doing provides more and better information. In the longer term, even the Ecological Objectives and operational objectives may need to be refined to reflect new knowledge of relationships and impacts.

Challenges of adaptive management

There are some pitfalls in the adaptive management concept. First, it is unclear if the changing procedures and goals really result in improved mechanistic understanding of the system, as the prerequisites for a true experimental design (repetition, controls, and adequate time frames) are generally lacking. This approach can thus lead to a situation where it is impossible to use "normal" scientific means to study the underlying mechanisms of the ecosystem. In addition, the types of experiments and observations on individual species that have often provided great insight on the structure and function of whole ecosystems may be bypassed, if the focus is on "ecosystem health" instead of the individual species (Simberloff 1997).

The second problem is that if management measures are continuously modified in the light of new observations, no clear stopping point exists where a particular hypothesis may be rejected and the chosen management measures seen as optimal (Walters 1997).

Third, there is little evidence that any single indicator, whether representing "vital functions/ processes" such as primary production or a key species, truly indicates "ecosystem health" or the state of the environment in general. Ecosystem processes can continue even after the component species normally responsible for them are lost. In addition, the concepts of ecosystem management, ecosystem approach, adaptive management, and ecosystem health are defined and understood in many different ways (Simberloff 1997). Therefore, in the spirit of the Habitats and Birds Directives and the aims of the HELCOM BSPA network, the management measures, their adaptation, and respective indicators should be chosen in a way that the habitats and species to be protected truly benefit from these actions.

4.10. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Anthoni, F. 2004. Scientists Should Focus More on Threat of Pollution. MPA news 5(7):4.	Pollution	http://depts.washington.edu/mpanews/MPA49.htm http://depts.washington.edu/mpanews/MPA49.pdf
Cole, S., Codling, I.D., Parr, W. & Zabel, T. 1999. Guidelines for managing water quality impacts within UK European marine sites. UK Marine SACs program. 448 pp.	Managing water quality	http://www.ukmarinesac.org.uk/pdfs/water_quality.pdf http://www.ukmarinesac.org.uk/
MPA news 2002. Managing water quality in MPAs: How practitioners are handling the challenges. MPA news 3(7):1-4.	Managing water quality	http://depts.washington.edu/mpanews/MPA27.htm http://depts.washington.edu/mpanews/MPA27.pdf
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Includes a chapter on managing human activities	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Includes a chapter on choosing management measures	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
MPA news 2004a.: Invasive Species: Their Threats to MPAs, and How Practitioners Are Responding.6(6):1-4.	Invasive species management	http://depts.washington.edu/mpanews/MPA59.htm http://depts.washington.edu/mpanews/MPA59.pdf
MPA news 2005. Climate Change and Ocean Warming: Preparing MPAs for It. MPA news 6(8):1-3.	Climate Change and MPAs	http://depts.washington.edu/mpanews/MPA61.htm http://depts.washington.edu/mpanews/MPA61.pdf

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Ritterhoff, J., Gubbay, S., & Zucco, C. (eds.) 2004. Marine Protected Areas and Fisheries. Proceedings of the International Expert workshop held at the International Academy for Nature Conservation, Isle of Vilm, Germany 28 June - 2 July, 2004. German Federal Agency for Nature Conservation, Bonn, Germany. 177 pp. – Bfn-Skripten 122.	MPAs and fisheries	www.bfn.de (publisher)
Simberloff, D. 1997. Flagships, umbrellas, and keystones: is single-species management passé in the landscape era? Biological Conservation 83(3): 247-257.	Single-species management	

5. Zoning

5.1. Zoning as a tool for multiple-use MPAs

Taking into consideration all the interests and needs of local residents, tourism and community development, as well as conservation values and needs, is the true challenge of MPA design. In addition to sustainably managing all activities within the MPA, activities in the bordering areas can also cause damage. Several controlled and sustainable uses within the MPA may be permitted using zoning, and this is perhaps the most concrete example of applying ICZM in practice. This way, particular uses can be confined to specific zones within the MPA where they are appropriate or where the uses do not conflict with other activities. Safeguarding of ecological elements can be achieved by keeping people out of the most sensitive, ecologically valuable or recovering areas. Zoning is also a cost-effective means of managing, as staff and maintenance requirements can be minimized (Salm *et al.* 2000).

5.2. Zoning methodology

Mapping any watersheds, rivers, streams, lagoons, and estuaries that influence the MPA is helpful. When they open directly to the protected area, they should be included in the buffer zone or zone of influence management. Potential upcurrent sources of stress should be identified and controlled where possible, such as sewage outfalls, polluted and silt-laden rivers, ports, degraded shipping lanes, oil and gas exploration/production sites, and ocean dumping areas. Some potential zoning categories presented by Salm *et al. (*2000):

Step one: "resource units"

It might be useful to define "resource units" as a basis for zoning. Each MPA will have unique characteristics, and the resource units will be site-specific, for example:

- Natural: beaches, islands, deep-water trenches, turtle or seal rookeries, etc.;
- Development areas: Areas that either have been developed or where development is proposed;
- Areas of impact: Areas showing marked impact of human activity (Salm *et al*. 2000)

Core zones/sanctuaries/preservation zones

These are the areas of high conservation value vulnerable to disturbances; therefore, they should be managed for a high level of protection, allowing no disturbing uses. The sizes of these zones are crucially important. Depending on the primary conservation objectives, such as species, habitats or productivity protection, the core zones must:

- Include an area of the protected habitat large enough to harbour as many species as possible;
- Be large enough to sustain a breeding population of the key species and their support systems;
- Be large enough to contain as great a diversity of habitats as possible

(Salm *et al*. 2000)

Management policies for resource units

The resource units defined above may provide a basis for zoning. Zoning must be easy to understand by both the manager and the managed, and must be consistent with avoiding unnecessary restriction of human activities. The questions to be answered are:

- Why has a particular area been given a zone classification?
- Which activities are permitted or prohibited within each zone?

Activities within individual zones are planned to meet the conservation objectives of the sites, defined in the management plan or other strategy document. Certain zones may require management that is more intensive, while others very little. Examples of different type of zones are "core zones/sanctuaries", "use zones", and "buffer zones". These can be named and divided in different ways; the most important thing is to be clear about the zoning provisions, whatever the system used.

The last-mentioned approach is simple in the rare situations where extensive data are available. This is often not the case, however. Obtaining information on the following categories may be helpful and gathering the information may be included in future goals:

- The number of species and genera present in a given area;
- The distance of the site from human settlements;
- The levels of use by people and their dependence upon it;
- The migratory patterns of key species;
- The feeding patterns and ranges of key species;
- The distance from sources of seeds and larvae for species replenishment;
- The available prototypes, that is, successful designs from apparently similar situations elsewhere

(Salm *et al.* 2000)

Use zones and conservation zones

These zones have a special conservation value, but can tolerate different types of human uses, and are therefore suitable for these uses in dedicated zones. There may be more categories in this group, especially on a large site, including general use zones, habitat protection zones, conservation park zones, and national park zones, which all allow different types and scales of uses within their areas (Day 2002). he types and locations of required zones depend on the planned activities (e.g., water sports, recreational fishing, commercial fishing, research, education zones). Remaining areas between and around these zones may be classified, for example, as “general conservation zones”(Salm *et al.* 2000).

Buffer Zones and zones of influence

The buffer zone surrounds the protected area. It is established to safeguard the area from external influences and to manage the processes or activities that may affect ecosystems within the protected area. Nutrients, pollutants, and sediments may be transported over great distances. Therefore, an external buffer zone requires co-operation with authorities outside the MPA, perhaps as part of a “zone of influence” (Salm *et al.* 2000).

Other zones

A “scientific research zone” is an option for a separate zone set aside for scientific research alone, and where use or entry for any other purpose is prohibited. Shipping, defence, fisheries experiment, seasonal closure, estuarine conservation, traditional use, island zones, and other special management areas are examples that may also be addressed as separate zones.

5.3. Lessons learnt

Lessons from zoning activities have mostly been learnt in the tropics and on very large sites, such as the Great Barrier Reef Marine Park. Some general remarks, presented by Day (2002) may, however, be useful also in the Baltic environment, as well as on a smaller scale:

- Even on a large site, it is better to manage the whole site as an integrated whole, not as a series of isolated protected areas;
- Each zone should have a specific, written objective, with "conservation" or "protection" being the overriding aspect;
- Clear zoning provisions are necessary, outlining what is allowed without a permit, what is allowed only with a permit, and what is prohibited;
- Zoning maps must be accurate enough to show the actual location of zones, and preferably be available in electronic formats which may be interfaced directly with the modern navigational aids found on many vessels;
- The process for the development of the zoning plan should be stipulated in the legislation, including statutory phases of public participation, when appropriate;
- Zoning information can be and should be used to assist public understanding;
- Zone boundary marking can be difficult, even impossible, but other types of markings (e.g., "no-anchoring") may function well as enforcement and self-education measures;
- Seasonal closures tend to work better than attempts to control the levels of extractive activities, e.g., fishing;
- Sudden transitions from highly protected areas to areas of relatively little protection should be avoided;
- Representative samples of marine communities, as well as significant breeding and nursery sites, should be included in highly protected zones;

- Management should be addressed on an appropriate scale, but too many zone types with only minor differences between them may confuse users;
- Only time and experience will show what works and what needs to be fine-tuned, thus, many aspects of management will evolve continuously;
- The high levels of connectivity in marine ecosystems must be considered when determining marine zoning;
- Depending on national legal acts and the embodiment of the MPA in an integrated coastal management scheme, zoning could extend to areas outside the MPA, where some activities could be prohibited or regulated;
- Zoning in a vertical direction can be a viable option;
- Mapping the zones requires some extra attention related to the usage of colours, printing, costs, etc. Details of this and all other experiences can be found in

(Day 2002).

5.4. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Bohnsack, J.A. 1996: Marine reserves, zoning and the future of fisheries management. Fisheries 21(9):14-16.	Zoning, fisheries management	
Day, J.C. 2002: Zoning-lessons from the Great Barrier Reef Marine Park. Ocean & Coastal Management 45:139-156	Zoning lessons	http://www.icriforum.org/docs/zoning_GBRMP.pdf http://www.icriforum.org/
Villa, F., Tunesi, L. & Agardy, T. 2002. Zoning Marine Protected Areas through Spatial Multiple-Criteria Analysis: The Case of the Asinara Island National Marine Reserve of Italy. Conservation Biology 16(2):515-526	Zoning with GIS-based spatial tools: case study	http://www.uvm.edu/giee/publications/asinara.pdf http://www.uvm.edu/

6. Surveillance and enforcement in BSPAs

6.1. Why enforcement?

Enforcement is the most sensitive aspect of law making, but one that has to be considered to avoid so-called “paper parks”, i.e., MPAs that exist on paper but fail to reach their objectives, and sometimes even allow significant deterioration of their condition (Salm *et al.* 2000).

Providing adequate enforcement duties and powers is a prerequisite for effective legislation. However, enforcement operations at sea can be difficult, and means of enforcement by managers are limited. Still, legislation must at least be followed by sensitive measures to ensure that it is respected. The issue of including regulatory measures in the legal act on BSPAs (if and when the management plan in itself is not a legally binding document) is discussed in PART 2, Chapter 2: “Legal framework for BSPAs” (page 21) and in Attachment 1 (page 74).

In practice, this means that a significant part of the enforcement has to be carried out by the users themselves. A prerequisite for this is, therefore, public awareness and acceptance of the significance and benefits of the protection. This is discussed in PART 3, Chapter 7: “Public awareness and education” (page 52). The enforcement can be carried out by measures, including the following presented by Salm *et al. (2000)*::

- Adequate powers for field staff to take effective enforcement action when needed;
- Provisions for local people to reinforce or provide enforcement, especially when they may continue their traditional uses;
- Incentives for self-enforcement of rules and regulations by users;
- Mechanisms for conflict resolution;
- Effective penalties for breaches of regulations;
- Preventive measures, such as education and public awareness campaigns, which can result in reduced costs and requirements for enforcement.

6.2. How to enforce?

Surveillance is important, especially in areas where fishing is a threat to conservation. However, air and sea patrols surveying fishing vessels are not often needed in the Baltic Sea region, and as they are both expensive and may require extensive coordination among agencies, alternatives may be pursued. For example, the local college in one Canadian project financed two human “eco-guardians” for an MPA that have been essential in ensuring compliance. They have successfully approached violators by boat to discuss infractions (MPA news 2001).

Education of staff

The BSPA staff must be trained carefully to carry out enforcement without unnecessary public antagonism. A better option yet is to authorize other officials, such as the coast guard, to enforce the MPA regulations. This way park staff are not considered solely law-enforcement officers and can devote themselves to public relations and education (Salm *et al.* 2000)

Modern technology

Modern surveillance technology, such as the VMS (Vessel Monitoring System), has been adopted in several countries. This enables the managers to monitor fishing vessels on a 24-hour basis without being on-site. Real-time video clips recorded by on-site cameras designed for monitoring purposes have been tested and shown to have the side effect of becoming surveillance tools. Perhaps the most important advantage of cameras may be public awareness and increasing support. Providing the video clips on the internet can help people become more attuned to the values of the protected area (MPA news 2000).

Voluntary practices

In many cases, local divers, tourism companies, and sport fishers have developed, and can be encouraged to develop, their own “best-practice codes” and/or agree to significant limitations on their activities. The voluntary support of these recreational and traditional users has often made a real difference to the success of a site.

6.3. Lessons learnt

- Major measures in compliance should include public education and the help of user groups;
- When enforcement is needed, the “soft glove" approach is recommended, with explanations and warnings being given for the first offences;
- Creating social pressure by sharing the burden of enforcement with coastal communities can also be effective;
- Public attention to regulations can by drawn through local news media, community leaders, brochures, and visitor information centres (Salm *et al*. 2000).

6.4. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
MPA news 2000. MPA Enforcement: Practitioners Employ Mix of High-Tech and Community-Based Strategies. MPA news, 2(5):1-4.	Enforcement strategies	http://depts.washington.edu/mpanews/MPA14.htm http://depts.washington.edu/mpanews/MPA14.pdf
Davis, B.C. & Moretti, G.S. 2005. Enforcing U.S. Marine Protected Areas: Synthesis Report Prepared by the National Marine Protected Areas Center in cooperation with the National Oceanic and Atmospheric Administration Coastal Services Center. 72 pp.	Reviews of various theories on enforcement and compliance, case studies	http://www.mpa.gov/virtual_library/Publications/enforcement.pdf http://www.mpa.gov/

7. Public awareness and education

Promotion is an essential feature of building participation. Raising awareness of the management scheme process and of opportunities for people to participate is one important element. The promotion of the conservation features for the general public is just as important and can be very effective. In general, appreciation of these features is low, as few people are aware of the diversity and beauty of marine plants and animals (EN *et al.* 2001b).

7.1. Public support by the local population

MPA proposals should be communicated early and carefully introduced to affected parties. The parties must then be educated on the benefits of the protection, as resource users who understand the need for conservation and its objectives are more likely to support the concept in the long run. Support by the local population, when evidenced by their understanding of the conservation objectives, can lead to adherence to the protected area rules. This can be achieved by sharing benefits, such as (Salm *et al.* 2000).

- Addressing exclusive user or access rights to particular resources or types of use for local communities;
- Giving local communities the responsibility for continued resource management using (sustainable) traditional practices;
- Creating job opportunities and other economic benefits for local people in facilities and services related to the BSPA;
- Training local tourist guides as BSPA interpreters;

- Using the local user groups in carrying out surveys and monitoring;
- Using, for example, local decision-makers, politicians, other opinion leaders, or teachers to influence peoples' attitudes

(Salm *et al.* 2000).

7.2. Public awareness campaigns

Scientific research should be controlled by the management authority that should be responsible for education and public awareness too.

BSPA management guidelines (Helsinki Commission 2001b).

General public awareness also plays an important role in the general success of the MPA. Any awareness programme should honestly inform all stakeholders, whether communities, politicians, administrators or the private sector, of what the management authority is able to do (Salm *et al.* 2000, Hiscock & Tyler-Walters 2003). General and specific programmes may be needed for different purposes and target groups. Techniques are evaluated in Table 6. According to Salm *et al.* (2000);

General awareness programmes should aim to:

- Explain the long-term, sustainable benefits of conservation using public information;
- Provide information and promote conservation ethics through environmental education;
- Use, e.g., mass media exposure, exhibits, tours, training workshops, or sale of promotional items, and provide informal recreational activities with an educational focus;
- Focus on honest efforts to inform the public instead of producing propaganda for promoting the MPA

Specific awareness programmes should aim to:

- Identify the target audience (tourism industry, fishermen, politicians, port officials, etc.);
- Use terms and concepts familiar to the specific user group;
- Establish specific objectives in terms of knowledge, attitudes, and behaviour to be changed;
- Combine printed materials and audio-visual presentations with face-to-face interactions (see Table 6 "Evaluation of techniques for public awareness and communication").

Remember that changes in basic attitudes do not take place immediately, nor as a result of short-term campaigns. For successful results, the management staff must have a good relationship with the people involved. The change in attitude must be demonstrated and reinforced by people's own experiences. Feedback is an important part of all work promoting awareness, to determine the effectiveness of the programme (Salm *et al.* 2000).

7.3. Dissemination of information on the management of a BSPA (PR)

Transparency of the management process and effective dissemination of results are prerequisites for successful management. The public, and particularly stakeholders, need information on the goals and objectives of the management process that can be easily understood. A dissemination strategy is necessary, and professionals should preferably carry out the compilation of information in order to ensure good results.

7.4. Useful references

Publication	TOPIC	URL (direct link to document, if any, and/or to publisher)
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Chapter on promoting sites, communicating marine science	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Includes a chapter on promoting sites	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
Goodson J. & Willingham, A. : Island Ecology Safari Educational Programs at Catalina Island. An expert paper of the National Marin Sanctuaries Program, U.S. 4 pp.	Combining education and conservation	http://sanctuaries.nos.noaa.gov/library/CI/goodson.pdf http://sanctuaries.nos.noaa.gov/
National Marine Sanctuary Program 2000. Education Plan. National Marine Sanctuary Program. U.S.	Example of education and promotion plan	http://sanctuaries.nos.noaa.gov/library/national/education_plan_2000.pdf http://sanctuaries.nos.noaa.gov/

Table 6.
Evaluation of techniques for public awareness and communication (Hudson 1988, Salm *et al.* 2000, European Commission 2004b).

Technique		Advantage	Disadvantage
One way communication			
Print media: general		+ Use familiar techniques that are simple to manage + Can reach a wide audience, both locally and afield + Draw attention to problems people may not know exist + Keep people informed + Some forms of print media are inexpensive to produce	– Need effective distribution – Are often not read – Are often not enough to motivate people to take action – Effect can be short-lived
	Books, booklets, reports	+ Useful, e.g., in schools + Books can be sold to a selected adult audience + Well-designed booklets can be effective in building local support, but are most effective once the site has already gained local identity + Reports can be useful for specific groups	– Expensive to produce – Reports can contain too much specific information
	Newsletters	+ Well-targeted newsletters can be a valuable means of building identity + Newsletters need not be colourful or glossy, thus quite cheap to make and distributed	– See Print media: general
	Postcards, calendars, posters	+ Attractive; good photographs can reveal wildlife treasures + Easy to make and distribute outside the site (hotels, information centres, etc.). Can be effective in instilling a local sense of pride + Can be sold	– Not suitable for specific groups
	Leaflets and other educational material	+ Easy to make and distribute outside the site (hotels, information centres, etc.) + Are a general educational tool, useful in schools and other institutions	– See Print media: general
	Pamphlets, leaflets	+ Pamphlets can help in specific cases, e.g., rules for management, and are relatively inexpensive to produce	– See Print media: general
	T-shirts, badges	+ Good promotional items + Can be sold to support conservation + Can be used as rewards, e.g., for school groups + Highly visible, a good talking point	– Not suitable for specific groups
Visual media, general		+ Can be memorable, when made enjoyable and entertaining + Simplifies explanation of a complex story	– Expensive to produce – Require specialized skills – Information or technology can become outdated
	Videos, DVDs	+ Make specific programmes for target groups possible + Equipment is relatively cheap and easy to use + Can be of great benefit in public education, e.g., schools + Relatively easy to distribute	– A high quality product for wide circulation is not straightforward and requires specialists and resources.

Technique		Advantage	Disadvantage
	Multimedia programmes, CD-ROMs	+ Can be of great benefit in public education, e.g., schools + Can be sold	– See Visual media, general
	Displays and exhibitions	+ Can provide a permanent, entertaining form of communication	– Can contain too much information, which is off-putting
	Plays, theatre	+ Locally acceptable forms of drama are effective in reaching a specific audience, especially children + Can be effective in raising awareness and motivation of the public + Can be incorporated into local festivals, family days, etc.	– Require resources, planning, and organization, – Require special skills
IT: Websites		+ Avoids printing costs + Can be a form of two-way communication + Responds to an increasingly IT-oriented society, especially among the younger generation	– Not everyone is connected, thus, may not necessarily reach a wide audience – Requires special skills: technical set-up and long-term maintenance have to be considered before setting up
Two-way communication			
	Open meetings	+ Encourage mutual understanding + Build up trust and support + Motivate people to become actively involved + Provide opportunities for socializing + Can be held to discuss specific issues + May be aimed at soliciting ideas from the public + Should encourage interactive participation	– Should not be held to propagandize the people – Require time for planning and organization – Need to be sustained – Have no guarantee of success – Reach only a small audience at a time – Do not reach audiences further afield – Require interpersonal skills
	Open days, guided tours, festivals, events, boat trips, slide shows	+ Good for general awareness raising + Good for face-to-face contact + Good promotional events are excellent opportunities for catching local press interest + Can encourage discussion on the site	– Require significant resources: time, personnel, and money
Indirect communication: media			
	Television/radio (interviews, advertisements, etc.)	+ Reaches a general and wide audience + Raises general awareness + Can motivate people to do something about the issue + Uses the most popular communication medium	– A passive medium for the receiver – Issues have to be presented simply – No control over contents of TV spots, can also be negative – Can generate polarized views – Cannot be targeted for specific groups
	Press releases	+ Can reach both general and specific groups + Regular press releases are good for “keeping the site in mind” + Journalists can be helpful, but should be dealt with carefully	– A passive medium for the receiver – Issues have to be presented simply – Perhaps no control over contents of articles, spots, can also be negative – Can generate polarized views

8. Research and monitoring in BSPAs

8.1. MPAs and science

"...that a monitoring programme be incorporated into the management plans in an appropriate number of these areas including at least monitoring of biological, physical and chemical parameters. The monitoring programme shall be integrated within the Baltic Monitoring Programme of HELCOM."

HELCOM Recommendation 15/5 (Helsinki Commission 1994/2003)

"…it may be necessary to follow up by monitoring at appropriate intervals depending on regeneration potential and the impact and frequency of detrimental activities, in order to assess the need for management."

"Available information concerning the state of the environment and the flora and fauna and their interactions with outside areas has to be compiled. Additional information should be gathered through literature studies including ecological changes (in the past), or base-line studies must be undertaken to gather new information."

"Scientific research should be controlled by the management authority that should also be responsible for education and public awareness."

BSPA management guidelines (Helsinki Commission 2003b)

In order to develop, monitor, and adapt management strategies, managers often need research that is conducted and presented in a way that is relevant to the actual management goals and challenges of the MPA. Science that does not relate to these or relevant contextual issues of the MPA, or does not present the potentially useful information clearly, fails to support the development and adaptation of management. "Science-based" recommendations generated without regard to the actual management context should be used with great caution.

Research on MPA effects has posed particularly many challenges due to, for example, the lack of replication in space and time, both within and between reserves, the lack of control sites, or inadequate time-scales. In addition, comparison between sites is difficult due to simple natural variation between any two sites, meaning that true controls do not exist (Halpern *et al.* 2004, Willis *et al.* 2005). Neither do marine reserves exist in isolation from adjacent marine areas. Therefore, research effort should not be wasted on the creation of "optimal" reserves, but instead used for establishing minimum requirements for target species (Halpern *et al.* 2004 and concentrating on the threats and pollution endangering marine life in general, as part of an integrated approach to marine conservation (Anthoni 2004).

A science-based management might seem ideal from the point of view of biologists and conservationists, and many claim it to be more rational and objective than other strategies. A good scientific understanding of the ecosystem does provide the capacity to make better decisions, and direct the selection of effective measures. However, alone it does not always lead to better decisions. First, reducing complex problems into component parts tends to produce results that are detached from the actual management context. Second, scientific reasoning does not always enable nor guarantee consensus on policy choices. Resting the decision-making power solely in the hands of scientific experts is a type of authoritarianism and does not satisfy the need for more responsible and democratic decision-making. Therefore, based on experience, good decisions rely on finding a balance between scientific reasoning and political reality; neither is adequate in isolation. Participatory processes can be expensive and time-consuming, and may even fail due to problems in the flow of information and inadequate commitment to the process. However, both participation and sound science are desirable for improving management effectiveness (Dahl-Tacconi 2005.) Practical tips for MPA science are given in Table 7.

Tips from managers on improving science in MPA management	Tips from scientists on improving science in the MPA management
▪ **Communicate your needs**. Managers must communicate their needs and those of the community to the scientists so that they understand how the research will be used. ▪ **Establish joint meetings**. This can be done in joint meetings of technical advisory boards or similar. A research translator, who is aware of the different ways in which people assimilate information, can help to interpret research results to managers. ▪ **Make the roles clear**. Scientists need to understand their role, which is to serve as unbiased and informative consultants to the management and policy-making process. ▪ **Build trust with the local community.** Accept and use traditional knowledge. Both managers and scientists must display sensitivity to local cultures by making use of local resources, using local terminology, and finding innovative ways to approach data collection.	▪ **Establish joint meeting and boards.** Scientists agree with managers that scientists and mangers should work together at all times: on research, education, and extension. ▪ **Develop understanding on both sides**. Managers should be trained to ask scientific questions and scientists trained to think in terms of management. ▪ **Be open.** If managers need to come forward with their needs, scientists should be more open and available to managers. ▪ **Communicate.** There is a need for the creation of international research and management networks for MPAs, as well as electronic discussion groups. ▪ **Use local as translators**. In addition, to the suggestion by managers on the involvement of locals in the process, scientists feel that locals can be used as translators between the community and the scientist/manager team. ▪ **Return your information**. Scientific information should be filtered back to the community to show local stakeholders that their involvement has contributed. ▪ **Make sure all voices are heard**, including those of politicians.

Table 7. Practical tips for MPA science (MPA news 2001a & 2001b).

8.2. Monitoring

The issue of monitoring, and its relevance for assessing the effectiveness of the management measures compared to the conservation objectives, is discussed in detail in PART 4, Chapter 1: “Evaluating management effectiveness by applying quantitative indicators” (page 63). When choosing which attributes of the conservation objectives are to be monitored, it is useful to focus on attributes that are most critical to assessing and achieving the objectives of the MPA, and most sensitive or vulnerable to change on a particular site. In this way, deterioration or disturbance is more likely to be detected than by monitoring attributes unlikely to change in response to impacts (regardless of how important these characteristics may be in conservation terms). The precise design, scale, and scope of a monitoring programme depend on the characteristics of the area, as well as on the resources available. The emphasis should be on those elements critical to assessing and achieving the BSPA objectives, especially measuring changes in the ecology and in the interest features of the site.

As Contracting Parties should be under no obligations to take any further action where Natura 2000 sites are also reported as BSPAs, the monitoring conducted in compliance with the corresponding EC Birds and Habitats Directives will be sufficient to monitor BSPAs (see also Section 1). In addition, other monitoring schemes, such as those under the Water Framework Directive, should also be used, if appropriate.

8.3. Research and monitoring needs

Some key information requirements for planning and management are provided in PART 3, Chapter 2: “Meeting information needs” (page 39). According to Kelleher (1999), the research needs include e.g.:

Social sciences

Managers especially need information that is useful for changing or reinforcing user behaviour, including:

- Awareness levels;
- Aspirations and compliance of stakeholders;
- Costs and benefits of management initiatives;

- Changes in stakeholders' perceptions of social and environmental values;
- Current and future political climates;
- Trends in industrial technology.

Natural sciences

Research and monitoring should provide information on:

- Dominant biota,
  - Species,
  - Communities,
  - Life histories,
  - Natural long-term variation in recruitment and population sizes,
  - Trophic levels;
- Rare, endangered or threatened species;
- Alien species;
- Ecological processes;
- Conservation status;
- The scale and extent of pressures and threats on the system;
- Usage of the area;
- Levels of exploitation.

8.4. Inventories and mapping

Inventories

Inventory-taking and mapping of coastal and underwater conditions have recently started in several Baltic countries. It is a highly recommended initiative that should be taken in all coastal areas to efficiently evaluate the ecological coherence of the protected area network and to identify gaps in the protection status of habitats and species. On a smaller scale, each protected area should have an inventory taken at least to support the setting and reviewing of conservation objectives and management measures.

Before taking the inventory, a decision should be made on how to carry out the inventory and which habitat classification system will be used. Currently, the HELCOM Red List of Biotopes and Biotope Complexes (Helsinki Commission 1998) is one of the few classification systems available; however, as it was developed for broad-scale threat evaluation, it is not suitable for detailed habitat inventories. The EC hopes to develop the EUNIS classification system (European Environment Agency 2006) further so that it also includes the marine habitats in the Baltic Sea. National attempts to develop EUNIS-compatible classification systems have been taken, for example, in Finland (the Baltic Marine Biotope Classification System).

Several useful guidelines on how to carry out marine habitat and species inventories have been prepared over the years (Bäck *et al.* 1996, Bäck *et al.* 1998).

Mapping

Maps, as well as photographs, have many advantages. They are easily read and interpreted, and are useful in discovering trends, conflicts, and problem areas that otherwise may easily be overlooked. Overlay mapping is simple using GIS applications, which have become both readily available and inexpensive for personal computers. Therefore, inventories and habitat maps should be integrated into GIS systems. Using GIS to create databases on BSPAs is a future goal of the network, and it is highly recommended for the BSPA managers to invest in the software as well as on training personnel to use GIS (Salm *et al.* 2000).

GIS systems and thematic maps provide many advantages (Salm *et al.* 2000):

- Geographical data and attributes can be transformed into maps;
- Coastal features that have spatial attributes (points, lines, and areas) can be stored, analysed, and printed out as maps;
- Automatic calculation of areas is fast and precise;
- GIS systems are open ended and easily receive new data, therefore, data banks are easily updated;
- GIS systems work well in conjunction with remote sensing and satellite images;
- Maps of different scales can be easily incorporated;
- GIS-based maps can be inexpensively distributed on CD-ROM and over the internet;
- Thematic layers can be incorporated into GIS (e.g., land use, navigation routes, river inputs, locations of discharge pipes, etc.).

These thematic (e.g., habitat) maps can, in turn:

- Be used to assess environmental quality (e.g., the extent of particular threatened or sensitive habitat types, such as salt marshes);
- Significantly help end-users to better understand the ecological status and the impacts of anthropogenic activities;
- Facilitate making decisions on resource use, depending on spatial distribution of the resource;
- Guide more effective placement of scientific measurement tools in the marine environment;

- Be used to develop management zoning schemes within MPAs;
- Inform, and place relevance on, the positioning of national monitoring stations (e.g., for the implementation of the EC Water Framework Directive as well as of Natura 2000);
- Help to evaluate changes over time;
- Help to predict and model the future.

(Salm *et al.* 2000)

8.5. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Davies, J., Baxter, J., Bradley, M., Connor, D., Khan, J., Murray, E., Sanderson, W., Turnbull, C. & Vincent, M. 2001: Marine Monitoring Handbook. Joint Nature Conservation Committee, English Nature, Scottish Natural Heritage, Environment & Heritage Services (DoE NI), Countryside Council for Wales & Scottish Association for Marine Science. 405 pp.	Monitoring handbook and updates	http://www.jncc.gov.uk/PDF/MMH-mmh_0601.pdf http://www.jncc.gov.uk/page-3390 (updates) http://www.jncc.gov.uk/
Cowie-Haskell, B. D. & Delaney, J. M.2003: Integrating Science into the Design of the Tortugas Ecological Reserve. *MTS Journal • 37(1): 68-79.*	Integrating science in reserves, case study	http://www.sanctuaries.nos.noaa.gov/library/national/integratingscience.pdf http://sanctuaries.nos.noaa.gov/
Lubchenco, J., Palumbi, S.R., Gaines, S.D. & Andelman, S. 2003. Plugging a hole in the ocean: the emerging science of marine reserves. Ecological Applications 13(1) Supplement:S3-S7.	MPA science	http://www.stanford.edu/group/Palumbi/manuscripts/EA.Lubchenco%20et%20al%202003.pdf
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.	Includes chapters on monitoring and the role of science in evaluating impacts	http://www.ukmarinesac.org.uk/pdfs/cproceed.pdf http://www.ukmarinesac.org.uk/
Gell, F. & Roberts, C. 2005. MPA Perspective: Difficulties Involved in Studying Marine Reserves. MPA news 5(6):4. Willis, T., Millar, R., Babcock, R. & Tolimieri, N. 2005. MPA Perspective: The Science of Marine Reserves: How Much of It Is Science? MPA news 5(6):3.	Marine reserve science	http://depts.washington.edu/mpanews/MPA48.htm http://depts.washington.edu/mpanews/MPA48.pdf
Fish, T.E., Recksiek, H. & Fan, D.P. 2002. Uses, Values, Stakeholders, and Opinions Associated with Marine Protected Areas: A Content Analysis of News Media, 1995-2001. COASTAL SERVICES CENTER, National Oceanic and Atmospheric Administration. Charleston, South Carolina. NOAA/CSC/20215-PUB.15 pp.	MPAs in the media: analysis example	http://www.csc.noaa.gov/mpa/MPA_MediaContentAnalysis.pdf http://www.csc.noaa.gov/
Wahle, C., & Lyons, S. (Eds.) 2003. Social Science Research Strategy for Marine Protected Areas .National Marine Protected Areas Center, MPA Science Institute, Santa Cruz, California. 52 pp.	Social science research strategy	http://www.mpa.gov/virtual_library/Publications/ssr_strategy.pdf http://www.csc.noaa.gov/
Helsinki Commission 1998. Red List of Marine and Coastal Biotopes and Biotope Complexes of the Baltic Sea, Belt Sea and Kattegat – Including a comprehensive description and classification system for all Baltic marine and coastal biotopes – Baltic Sea Environmental Proceedings No. 75.	Red list of biotopes in the Baltic	http://www.helcom.fi/stc/files/Publications/Proceedings/bsep75.pdf http://www.helcom.fi/
European Environment Agency 2005: EUNIS - European Nature Information System	Information on European habitats, species, and sites	http://eunis.eea.eu.int/index.jsp

9. Administration of the BSPAs

9.1. Required administrative elements

As for other parts of the plan, the administrative plan should be carefully coordinated with management goals and objectives. The administration is expected to develop over time, and two or three years are often required to reach optimal operation. Arrangements required to establish the BSPA and to manage it effectively, including financial, human and physical resources, could cover the following:

- staffing;
- equipment and facilities;
- training;
- interpretation and education;
- monitoring and research;
- maintenance and/or restoration;
- surveillance;
- enforcement;
- evaluation and review of effectiveness.

9.2. Staffing needs

The staff number naturally depends on the size, purpose, and use of the site. Understanding of the conservation goals, ability to communicate to local people as well as visitors, and expertise in many specialized areas are required.

Adequate, well-trained personnel are needed to:

- Interpret relevant policies and objectives;
- Prepare and update management plans;
- Direct the management;
- Assess logistical requirements;
- Undertake field operations, including surveillance, research, and monitoring;
- Undertake educational and training activities;
- Undertake and control visitor use and guidance.

(Salm *et al.* 2000)

9.3. Project officer

A management scheme is very unlikely to be developed without one, or more, individuals who can co-ordinate the overall process and particularly the inputs of the relevant authorities. A project officer, with the specific responsibility to undertake this co-ordination, is generally essential on most sites. Depending on the size and complexity of the issues, there may not need to be a full-time officer and, where there are several neighbouring sites, it may be possible for a single project officer to support more than one site (EN *et al.* 2001a, MPA news 2004b).

The range of skills and competencies needed in a project officer are described in Table 8. The officer may often be involved in sensitive and confrontational discussions with stakeholders and relevant authorities. This calls for a mature individual, confident in working in such situations. Local knowledge can be of particular importance and there may be particular benefits to be gained from appointing a local person to the post of project officer. A local may bring in a good network of connections, gain trust more easily - especially in close-knit communities - and the employment of local individuals can help to counter claims that the MPAS local jobs (EN *et al.* 2001a, MPA news 2004b).

Table 8.
Skills and competencies of an MPA project officer (EN *et al.* 2001a, MPA news 2004b).

Skills and competencies	Comments
Good interpersonal skills	Must be able to communicate with a wide range of people, including specialists
Consensus-building skills	Often has to act as a go-between among relevant authorities, conservation agencies, and stakeholders
Advocacy skills	Promotes the concept of the site designation, and the management scheme process
Self motivation, management, and organization	Able to manage a wide range of duties and co-ordinate others
Knowledge of relevant legislation	Good knowledge of the complex legislation relating to the process is required to guide others through the process
Knowledge of marine ecosystems	Helps to gain credibility and to provide support for other relevant authorities
Knowledge of the site	Helps to gain credibility, especially at the local level
Enthusiasm for the site and sustaining its wildlife	Helps in promotion of the site and for being able to act independently of any organization, even if employed by one of them
Technical skills *	Knowledge of GIS systems
PR skills *	Promotes the site through the media, taking care of public relations

*These points represent skills that the project officer may need to be able to access, though not necessarily possess.

9.4. Funding and budgets of the BSPAS

In developed countries, financial support usually derives from the government, but some funds may be raised locally, for example, by charging entrance fees. Despite government funding of most protected areas, the costs of running, e.g., national parks are high. Greater tourism may increase available funds, but may also increase expenses, as the facilities must be kept in good order, information and services must be provided, etc. The budget must take a long-term strategy, and aim to generate services to support the running of the MPA (Salm *et al.* 2000).

Anticipated annual investments and costs must be described, including:

- Capital costs (developing a management plan, including surveys, promotion costs and so on; one-off expenses for buildings, office and field equipment, recruitment of personnel); and
- Recurring expenses of running an MPA (wages, insurance, services, etc.).

9.5. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Conservation Finance Alliance 2005: Conservation Finance Guide. An internet resource.	Financing protected areas, including a chapter on MPAs	http://guide.conservationfinance.org/
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.	Includes a chapter on administrative resources	http://www.ukmarinesac.org.uk/pdfs/good_prac1.pdf http://www.ukmarinesac.org.uk/
Financing Protected Areas Task Force of the World Commission on Protected Areas (WCPA) of IUCN, in collaboration with the Economics Unit of IUCN (2000). *Financing Protected Areas*. IUCN, Gland, Switzerland and Cambridge, UK. viii + 58pp.	Financial guide	http://app.iucn.org/dbtw-wpd/edocs/PAG-005.pdf http://www.iucn.org/
MPA news 2004b. MPA news Poll: What Qualities Make a Good Managers? MPA news 6(4):3.	Good manager qualities	http://depts.washington.edu/mpanews/MPA57.htm http://depts.washington.edu/mpanews/MPA57.pdf

10. Preparation of a management plan

"... that management plans be established for each BSPA to ensure nature protection and sustainable use of natural resources. These management plans shall consider all possible negatively affecting activities, such as: extraction of sand, stones and gravel; oil and gas exploration and exploitation; dumping of solid waste and dredge spoils; constructions; waste water from industry, municipalities and households; intensive agriculture and intensive forestry; aquaculture; harmful fishing practices; tourism; transport of hazardous substances by ship through these areas; military activities ..."

HELCOM BSPA management guidelines (Helsinki commission 2003b).

10.1. Why a management plan?

- Only a systematically and carefully designed implementation of management can ensure that the desired goals and objectives of a protected area can be met.
- Planning provides the basis for decisions on how resources are to be allocated and protected. In addition, the aim to keep an area in its current state and to focus on an undisturbed natural succession must be described within a management plan.
- A written management plan serves as an operational guide for the BSPA, and identifies actions to resolve specific management issues. It specifies particular courses of action for interested persons and decision–makers.
- The site of the MPA may not need a full management plan to begin operations, but it will need one for the long-term programme development, which should also be the aim of BSPAs

(Salm *et al.* 2000).

10.2. What should be in a plan?

The principal goal of the plan is to maintain the natural resource values of the area, optimize economic uses, and integrate traditional uses. In order to do that, it should:

- Be clear and practical, as well as adaptive enough to allow adjustments in changing natural conditions and other altering situations;'
- Be seen as a working document that is updated periodically;
- Look at past progress, the current issues, and future needs to identify priority actions for each individual site;
- Encompass legal and administrative concerns, as well as educational, social, ecological, and physical objectives;
- Function to achieve interagency coordination;
- Facilitate cooperation among stakeholders;
- Facilitate communication between administration and management;
- Examine the effects on local people and find ways to avoid conflicts, for example, through organizing workshops and public consultations.

(Salm *et al.* 2000).

Detailed guidance on the contents of a BSPA management plan is given in SECTION 1: “Practical guidance for establishing management plans for Baltic Sea Protected Areas” (page 8).

10.3. How much time?

Experiences

As an example, establishing an agreed management scheme in some marine Natura 2000 sites in the UK has taken three to four years for sites with a project officer, measured from the time of officer appointment. A longer time scale may be needed for sites without dedicated project officers. It is expected that time scales may vary substantially according to the size and complexity of the site, the level of knowledge of the features, the management issues, and any attitudes and cultures inherited from any previous initiatives. According to the UK experiences, a considerable proportion of the time taken was due to the novel nature of the work, including the relative novelty of marine conservation initiatives to both relevant authorities and other stakeholders, and the need to establish new approaches, particularly in relation to conservation objectives and operations advice (EN *et al.* 2001a).

Timetables

It is open to debate whether the imposition of mainly externally driven timetables is a net positive or negative factor. Imposing timetables can undermine local ownership of, and responsibility for, delivery of the scheme and lead to frustration with the process. This can be a particular problem where the emphasis in management scheme development is on consensus building. It is important that relevant authorities and stakeholders are able to determine a timetable appropriate to their requirements. With more time, increased collation of information can be undertaken, allowing for improved discussion with relevant authorities. On the other hand, a defined endpoint and milestones as targets are usually good motivating factors and serve to focus the scheduling of work and recording of progress. Furthermore, limiting the length of the process is a means of constraining costs; it may also be difficult to sustain the commitment and participation of relevant authorities during an overly extended preparatory process. Ideally, a balance should be found between setting clear targets, and making them realistic and flexible (EN *et al.* 2001a).

10.4. How much money?

The types of expenditures shown in Table 9 comprise the core costs for developing a management plan, some of which may be shared among the relevant authorities. Table 9 does not include the running costs for implementation of the management scheme; these are the responsibility of individual relevant authorities, in addition to their own staffing costs for the process (attending meetings, undertaking reviews of management needs and measures. No concrete calculations are provided, only the possible sources of expenditures (EN *et al* 2001a). All measures for managing and monitoring BSPAs must be cost-effective, technically feasible and, if appropriate, based on the results of impact assessments, including cost-benefit analyses.

Table 9. Potential costs for developing a management scheme, adjusted from EN *et al,* 2001.

General cost area	Specific details	Overall costs
Biological surveys	For example, acoustic subtidal surveys, underwater biotope mapping surveys, bird counts	High
Collation of data sources	Costs for individual data sets and/or contracts, when needed	Moderate
GIS and data entry	Equipment and contracts	Moderate
Project officer	Salary and running costs (3 years)	High
Site promotion	Leaflets, advertisements, public meetings, guided walks, etc.	Low to moderate
Publishing a scheme	Design and printing of drafts and final versions	Low

PART 4: Management effectiveness evaluation

1. Evaluating management effectiveness by applying quantitative indicators

1.1. Introduction

One of the tasks given by the Joint Ministerial Meeting (JMM) was to develop guidance on the evaluation of BSPA management effectiveness. i.e., how the management of MPAs is achieving the aims of protection, how efficiently the management plan is being carried out or how effectively the site is governed. The current guidelines for managing BSPAs do not include advice on how to evaluate management efficiency.

1.2. Goal

The goal is to prepare an action plan for the evaluation of management efficiency on three levels: the regional scale (Baltic Sea), the national scale (Contracting Party), and the site-specific scale (sub-national or local area). In addition, the plan should determine the appropriate indicators and how to apply them in practice.

The management efficiency evaluation action plan is established using the existing guidelines by the IUCN, WWF, and NOAA (Pomeroy *et al*. 2004), as well as experience from regional or national management efficiency evaluations already completed (e.g., Anon. 2003, IUCN 2004). These experiences are used to adapt the guidelines specifically to the Baltic Sea region and develop them further, where appropriate. The large human impacts on the Baltic Sea region, in combination with fundamental differences in the policies, resources and traditions of nature conservation among the HELCOM Contracting Parties in the Baltic Sea region, create additional challenges for designing a joint framework for management and the assessment of its effectiveness. The fact that HELCOM consists of the nine independent littoral states of the Baltic Sea and the European Commission makes this type of effort unique and challenging.

This work also acknowledges the goals and objectives of the Convention on Biological Diversity (the results from the Conferences of Parties, the Subsidiary Body of Scientific, Technical and Technological Advice), the European Community directives (in particular the Water Framework Directive, the Habitats and Birds Directives, the ICZM recommendation (HELCOM 2003c), and the recent work towards a European marine strategy), and finally the HELCOM recommendations that would benefit from an evaluation of their management efficiency.

1.3. Objective

The objective is to develop a toolbox that includes protocols for management efficiency evaluation. The toolbox also includes the guiding principles for defining indicators, similar to those presented by Delbaere (2004).

Particular attention is given to indicators that are user-driven, responsive to change, easy to comprehend, based on facts, scientifically sound, cost-effective, and relatively simple to use. Such indicators are also likely to be useful when developing monitoring schemes and setting monitoring priorities for the BSPAs. The indicators are also likely to be helpful when communicating with stakeholders.

1.4. Action plan for an evaluation of the management efficiency of MPAs

The plan proposed here is a modification of the plan developed by IUCN (Hockings *et al.* 2000) and described in greater detail for MPA evaluation by Pomeroy *et al*. 2004. The logical step-by-step process, or cycle, is easy to follow and can as easily be adapted for the HELCOM BSPAs as for any other area. This approach has recently been applied in Finland, where the management of governmentally owned protected areas was evaluated by an international team in 2004–2005 (Gilligan *et al.* 2005). However, this evaluation did not cover the Finnish MPAs due to the lack of background data and suitable indicators.

1. CONTEXT: Where are we now?
2. VISION: Where do we want to go?
3. PLANNING: How are we going to get there?
4. INPUTS: What do we need?
5. MANAGEMENT PROCESS: How do we go about it?
6. OUTPUT: What did we do and what products or services were needed?
7. OUTCOME: What did we achieve?
   (Return to step 1. and repeat the process)

Pomeroy *et al*. (2004) propose the use of specific indicators for each of the seven steps and point out the need to use them on relevant scales. However, some of the indicators described later in this chapter are also useful; for example, the biological indicators help to identify whether targets for the purpose of the BSPA are met. This approach, slightly modified, has also been used by others (Belfiore *et al*. 2002).

2. Toolbox of quantitative indicators

2.1. Defining an indicator

The term "*indicator*" is used here to describe a unit of information measured over time that allows documentation of changes in specific attributes of marine area management (Pomeroy *et al*. 2004). It is any type of variable that alone, or in combination with other similar indicators, can be used to describe the state, change, and targets set up for the management and/or the development/evolution of marine areas. The *management* may in this case be any kind of premeditated use of an area or its resources. Resources include the biota as well as the geology of an area.

Indicators can also describe or quantify more than one issue, e.g., the use of a resource as well as the factual or potential threats towards the marine biodiversity. The indicators for which such a connection exists are described here as *multipurpose indicators* and marked with a number referring to all issues that they describe.

However, before an indicator can be identified, created and used, its anticipated significance should be proved, e.g., the relationship between a threat and its most significant consequences for a species or habitat (biological indicator), the quantified value of a specific action taken by a company (socio-economic indicator), or the impact on the municipality of a governmental decision (governmental indicator). In addition, the impact of each indicator on the conservation objectives should be known. This has previously been dealt with in Chapter 10.3 (p. 52) of this report.

2.2. Terms of reference for developing marine management indicators (MMIs)

In this document, terms of reference (ToR) are defined for selecting or developing marine management indicators (MMIs). The ToR have been based on Delbaere (2003) and Pomeroy *et al*. (2004).

1. *The purpose of the indicator must be easily understood (the indicator should be goal-driven with the aim to fulfil the goals and objectives set up in the management plan).*
2. *The target group for the indicator should be identified (the indicator should be user-driven).*
3. *Factual, quantitative information for marine areas in general should be provided.*
4. *It should be possible to describe the use of the indicator concisely and clearly.*
5. *The indicator should be logically (scientifically and methodologically) acceptable.*
6. *The indicator should give the possibility of comparison with a baseline and be responsive to change (in time/space).*
7. *The indicator should be technically feasible and cost-efficient to use.*
8. *Indicators that are developed should preferably be quantitative, e.g., based on numerical data that can be analysed or managed in a GIS.*
9. *Indicators developed should primarily be applicable for BSPAs but, if possible, also be useful in the integrated marine and coastal zone planning of any type of area.*
10. *Existing descriptions of the background and application of the indicators should be referred to, where possible, rather than spending efforts on preparing long, new descriptions.*
11. *Illustrated examples should be given for all indicators described, where feasible.*
12. *The combination between different indicators should be demonstrated, where appropriate.*
13. *The error (degree of precision) of an indicator should be given as precisely as possible; the limitations and strengths of the indicator should be defined, and any occurrence or degree of approximation or vagueness should be clearly indicated. This is particularly important if using proxies when creating or using the indicator.*
14. *The difficulty rating and resource requirements (time for use, costs, know-how) of the indicator should be estimated.*

2.3. Categorization of indicators

Categorization based on application

The indicators that have been developed have been grouped into three main categories, depending on the type of management objective to which they apply.

Bio-physical indicators

These focus on the efficiency of BSPAs for preserving the marine biological diversity as well as the geological diversity (geomorphology and geology), following Pomeroy *et al.* (2004). They are grouped further into qualitative indicators and quantitative indicators. This categorization makes it easier to comprehend the large selection of indicators and more precisely indicate the objective, use, accuracy, and limits of each indicator. These can be divided further into subtypes, e.g., based on the origins of the data from which they are derived, such as from existing GIS/RS, from existing databases or new data (through field and public surveys). Several of these indicators are based on proxies drawn from geophysical data because the biological data available have a poor coverage.

Socio-economic indicators

These focus on the efficiency by which MPAs are managed (use of economic and temporal resources) as well as the role of BSPAs for the social development and economy in the MPA or the marine and coastal areas surrounding it. These are of particular interest when showing the benefits of BSPAs for the local and regional inhabitants. The relationship between these indicators and potential threats to marine biodiversity is also pointed out, where appropriate.

Governance indicators

These evaluate whether or not the MPA is administrated well. They can, for example, be extracted from legal statistics or obtained through empirical studies that measure the extent to which the BSPA or its goals and objectives are known to stakeholders.

Qualitative vs. quantitative indicators

Several indicators described in the literature are qualitative, i.e., comprise specific questions and/or multiple scoring that concisely describe the management status (e.g., Alder *et al.* 2002, Pomeroy *et al.* 2004, Staub and Hatziolos 2004). The advantage of qualitative indicators is that by being descriptive they make it easy for laymen as well as specialists to understand the evaluation process as well as the results. They also allow for a rapid assessment of the management efficiency, and in many cases are cost-efficient to use. However, they are less suitable for following changes in the management efficiency. They are also frequently used for multiple scoring of management efficiency. This is rather surprising due to the subjectivity involved in using several of these indicators, the difficulties in comparing the indicators with each other, and the possible lack of measurable qualities. Nevertheless, acknowledging the pros and cons of qualitative indicators, they are a useful component of most management efficiency evaluations.

In this document, emphasis is placed on the identification of quantitative indicators. Particular emphasis is given to indicators that can be used in GIS and which can be drawn from numerical databases with geographic data (Roff *et al.* 2003), national demographical databases, legal statistics or similar sources. This and similar types of indicators have previously been described by Swenson and Franklin (2000), Delbaere (2002), Dalton (2004), Rogers and Greenaway (2005).

Biological indicators

The identification of biological indicators is perhaps more challenging than that of socio-economic or governance indicators. The existing ecological research on, for example, a key/structural species might be vast, but papers that deal specifically with the value of these species as indicators of ecosystem health might be few. Table 10 shows habitats and species that cover large portions of the seafloor and whose presence/absence or cover can be demonstrated by applying GIS or thematic maps. The information on key/structural species in PART 3, Chapter 3: “Threat analysis” (page 40) should be used for identifying potential biological indicators. Special attention should be paid to the need to confirm the impact of specific indicators (their level/value and change) on the favourable conservation status, as described in the same chapter.

2.4. Discussion

The list of indicators has a great potential when communicating with stakeholders, i.e., the public, decision-makers, practitioners, managers as well as researchers in marine area management. Schiller *et al*. (2001) point out that stakeholders are less interested in the methodological aspects of developing or using indicators

than they are in understanding the results that the indicators provide. Consequently, the first six points of the ToR are for defining and selecting indicators of relevance when communicating with stakeholders.

In addition to being useful for the HELCOM Contracting Parties, the suggested management efficiency guidelines and toolbox may also be useful for the European Commission and the OSPAR Commission. Finally, it is also hoped that these guidelines, tools, and indicators will improve the way in which marine protection is acknowledged within integrated coastal zone management (ICZM). The EU-funded Interreg IIIB project "BALANCE" that started in July 2005 will further develop the list of indicators, as well as the action plan. The results from this project will be funnelled into HELCOM since all Contracting Parties of HELCOM, with the exception of Russia, are partners in BALANCE.

2.5. Introduction to indicator tables

Each indicator is briefly described (one short paragraph), stating the name of the indicator and the objective, data source/origin, links to threats for the indicator as well as the source, i.e., reference(s) for the indicator (see Tables 10, 11, and 12). The intention is to present examples but not to provide a conclusive list of indicators. Instead, the further development of similar quantitative indicators by the HELCOM Contracting Parties is encouraged. The essence of this is also described in a concise table with keywords for each column. The purpose of this table is to point out a representative set of biological, socio-economic, and governance indicators that can be used in the Baltic Sea. The table is a first step and does not, as such, provide tools that can be directly applied. However, the references given make it possible to look up the original papers where the indicators have been described or used. The next step, which is currently being prepared by the BALANCE project, is to make "ready-to-use" descriptions of these indicators with attached examples and illustrations of their use (www.balance-eu.org).

Table 10. Suggestions for biological and abiotic (physical) indicators.

Original = first mentioned in this paper, Common = frequently used or mentioned in several publications

Name	Purpose	Target group	Data sources	Links to potential threats	Reference	Quantitative?
Presence/absence or status and change in the cover of key/structural species	The total lack of key/structural species in areas where they should occur (e.g., indicated by GIS analysis) can serve as an indicator of poor ecosystem health	Managers, public, government	GIS models on key/structural species	Eutrophication? Poor physical health of species?	Martin Isaeus PhD dissertation	Yes
Maximum depth limit of key/structural species	Changes in maximum depth reflect long-term changes in water turbidity (+ or -)	Managers, public, government	UW video or SCUBA monitoring	Eutrophication	Common	Yes
Presence/absence of benthic macrofauna and/or the cover of oxygen-depleted seafloors	Anoxia results in the total loss of macroscopic infauna, which affects food availability for higher trophic levels (e.g., fish)	Managers, public, government	Empirical oxygen level measurements in target areas identified by GIS	Eutrophication and secondary effects thereof	J. Persson PhD dissertation (GIS analysis)	Yes
Presence/absence and amount (catch) of species with economic value, e.g., fish or plants	Species of economic value are important for the local economy. Recording their occurrence helps in building a favourable attitude towards the MPA. Some species also indicate ecosystem health	Managers, public	Records of fishermen's catches	Multiple threats	Pomeroy *et al*. 2004	Yes
Presence/absence and extent of cover of important areas for mobile species, such as suitable spawning, nursery, and feeding areas for fish or marine and coastal birds	These areas are crucial for the life cycle of mobile species and the interactions between populations of a species. Several of these areas also have other values, e.g., for a specific type of plants	Managers, public, government	GIS modelling combined with empirical inventories	Construction activities, dredging	Pomeroy *et al*. 2004	Yes

Name	Purpose	Target group	Data sources	Links to potential threats	Reference	Quantitative?
Recruitment success of key/structural species	The recruitment success is a quantifiable measurement of how well a specific species reproduces and, for example, recovers from a catastrophe (e.g., anoxia, storm)	Managers, public, government	GIS modelling combined with empirical inventories	In some cases symptoms of eutrophication, e.g., decomposing filamentous algae, anoxia,	Pomeroy *et al.* 2004	Yes
Threatened or extinct species as % of known species	Red list species run a risk of disappearing from an area and thus decreasing species diversity. Also, there is an obligation to follow up changes in their abundance	Managers, government	Calculation	Various threats, often described in the red lists	Belfiore *et al.* 2002.	Yes
Abundance of top predators (e.g., seals, white tailed eagle)	Top predators are indicators of ecosystem health (e.g., seals and white tailed eagle have suffered from heavy metals and toxins)	Managers, government, public	Calculation	Heavy metals, toxins	Original	Yes

Table 11.
Suggestions for socio-economic indicators.

Name	Objective	Target group	Data sources used	Links to potential threats	Reference	Quantitative?
ECONOMIC BENEFITS						
Number of companies, or their total annual income, that gain from the MPA	To show a direct gain from MPAs in local communities	Municipal authorities	Questionnaire or tax department statistics	Possible wear on some areas	Original	Yes
TRAFFIC						
Shipping (VMS, ships > 50m)	Pressure identification: Identification of main shipping routes can be used to identify target areas for potential oil spills or coastal erosion and noise	Government	Maritime administration	Oil spills, coastal erosion by waves, noise, and increased turbidity	GBRMPA	Yes
Coastal (small) shipping (20m–50m)	Pressure identification: Identify the position of traffic “nodes” from which urban sprawl may initiate, e.g., piers	Government/ municipal authorities	Maritime administration	Oil spills, coastal erosion by waves, noise, and increased turbidity	Original	Yes
Leisure boats (<20m)	Identification of main leisure boat routes makes it possible to identify highly disturbed areas as well as undisturbed areas	Government/ municipal authorities	Maritime administration	Noise and increased turbidity	Original	Yes
Fishing vessels	Benthic fauna in areas (ha) used for bottom trawling are heavily affected	Government, managers	Maritime/fisheries administration	Overfishing, by-catch, increased turbidity, waste, noise	Original	Yes
DISPERSAL OF HUMAN SETTLEMENTS						
	Urban sprawl increases the impact on the shoreline marine environment causing potential or actual loss of habitats	Municipal authorities	GIS data			Yes

Table 12.
Suggestions for governance indicators.

Name	Objective	Target group	Data sources	Links to potential threats	Reference	Quantitative?
Annual amount (number) of court cases related to the MPA's environment (including biota)	All court cases of this type indicate deficiencies in the governance of the MPA, e.g., the MPA restrictions are not adequately known by the public	MPA authorities	Court files, may require specific inquiries	The reason behind the court case may give an indication of which offences are common (what poses a threat)	Original	Yes
Management plan status	The lack of a management plan indicates unreliable governance	All, especially the MPA authorities	MPA authorities	None specific	Pomeroy *et al.* 2004	No
Cover of protected vs. non-protected shallow areas available for sessile fauna and flora in the MPA	A low percentage (<20%) may indicate that there is an insufficient amount of area that can act as a source of species or create spill-over effects to areas with destroyed or altered habitats or decreased species numbers	MPA authorities, municipal authorities	MPA GIS data	Potential habitat alteration (change)	Common	Yes
Public participation (one-way as well as two-way communication)	The amount of registered mail and e-mail to authorities that relates to MPAs (can be divided based on content or by area). Hits on web pages, number of meetings, newspaper articles etc. This indicates the level of participation	MPA authorities	Records of registered mail and e-mail to MPA authorities	None	Common	Yes

2.6. Useful references

Publication	TOPIC	URL (direct link to document, if any) and/or to publisher
Day, J, Hockings, M, and Jones, G (2002) 'Measuring effectiveness in marine protected areas—principles and practices', Keynote presentation in *Aquatic Protected Areas. What works best and how do we know?* World Congress on Aquatic Protected Areas, Cairns, Australia, August 2002.	Measuring effectiveness of MPAs	http://www.parks.tas.gov.au/publications/tech/MPA_evaluation/Marine%20PAs.pdf http://www.parks.tas.gov.au/
Alder, J., Zeller, D. & Pitcher, T. 2002. A method for evaluating marine protected area management. Coastal Management 30:121-131	MPA management evaluation	http://www.fisheries.ubc.ca/ru/feru/publications/CM30/Alder_et_al.pdf http://www.fisheries.ubc.ca/
Pomeroy, R.S., Parks, J.E. & Watson, L.M. 2004. How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK. xvi + 216 pp.	Measuring effectiveness	http://www.effectivempa.noaa.gov/guidebook/doc/ME_Guidebook1.pdf http://www.effectivempa.noaa.gov/guidebook/doc/ME_Guidebook2.pdf http://www.effectivempa.noaa.gov/guidebook/doc/ME_Guidebook3.pdf http://www.effectivempa.noaa.gov/guidebook/doc/ME_Guidebook4.pdf http://www.effectivempa.noaa.gov/
Stolton, S., Hockings, M., Dudley, N., MacKinnon, K. & Whitten, T. 2003: Reporting Progress in Protected Areas. A Site-Level Management Effectiveness Tracking Tool. World Bank/WWF Alliance for Forest Conservation and Sustainable Use.19 pp.	MEE tracking tools	http://lnweb18.worldbank.org/ESSD/envext.nsf/48ByDocName/ReportingProgressinProtectedAreasASite-LevelManagementEffectivenessTrackingToolbinEnglishb/$FILE/ReportingProgressInProtectedAreasToolIn English2003.pdf http://www.worldbank.org/
World Commission on Protected Areas (WCPA) 1999: Management effectiveness of protected areas. PARKS 9(2).	MEE general	http://www.iucn.org/themes/wcpa/pubs/pdfs/PARKS/Parks_Jun99.pdf http://www.iucn.org/
IUCN 2004. Assessment of Management Effectiveness in Selected Marine Protected Areas in the Western Indian Ocean. Final Report. 35 pp.	Case studies	http://www.icran.org/pdf/ICRAN_IUCN_ME_study_Eastern_Africa.pdf http://www.icran.org/
Staub, F., Hatziolos, M.E. 2004. Score Card to Assess Progress in Achieving Management Effectiveness Goals for Marine Protected Areas. The World Bank. 1-30 pp.	Score card for MEE	http://www.icriforum.org/mpa/SC2_eng_nocover.pdf http://www.icriforum.org/
Hockings, M., Stolton, S. and Dudley, N. 2000. Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK.	IUCN framework for MEE	http://app.iucn.org/dbtw-wpd/edocs/PAG-006.pdf www.iucn.org
Delbaere, B. 2003. An Inventory of Biodiversity Indicators in Europe, 2002. European Environment Agency. Technical Report 92. Office for Official Publications of the European Communities, Luxemburg. 42 pp.	Biodiversity indicators	http://reports.eea.eu.int/technical_report_2004_92/en/Technical92_for_web.pdf http://reports.eea.eu.int/

References

Agardy, T. S. 1997. Marine Protected Areas and Ocean Conservation. Academic Press, Texas, USA.

Alder, J., Zeller, D. & Pitcher, T. 2002. A Method for Evaluating Marine Protected Area Management. Coastal Management 30: 121-131.

Anon. 2002. Recommendation of the European Parliament and of the Council concerning the implementation of Integrated Coastal Zone Management in Europe. Official Journal of the European Communities L 148/24 (2002/413/EC).

Anon. 2003. Recommendations on Methodology for Monitoring the Effectiveness of MPA Management. Report from the Conservation and Sustainable Use of the Mesoamerican Barrier Reef Systems Project. MBRS Technical Document No. 5. 49pp.

Anthoni, F. 2004. Scientists Should Focus More on Threat of Pollution. MPA news 5(7):4.

Belfiore, S., Balgos, M., Galofre, J., McLean, B., Blaydes, M. & Tesch, D. International workshop – the role of indicators in integrated coastal management. Department of Fisheries and Oceans Canada, Intergovernmental Oceanographic Commission, National Oceanic and Atmospheric Administration (NOAA), International Geographical Union. 162pp.

Bryant, D., Burke, L., McManus, J. & Spalding, M. 1998. Reefs at risk: A map based indicator of threats to the world's coral reefs. World Resources Institute, Washington, DC. 56 pp.

Bäck, S., Ekebom, J., Johansson, C., Kangas, P., Kautsky, H., Krause-Jensen, D., Mäkinen, A. & Nielsen, K. 1998. Operative Methods for Mapping and Monitoring Phytobenthic Zone Biodiversity in the Baltic Sea. II Report of the PHYTOBIOS Project. Copenhagen, Nordic Councils of Ministers. – TemaNord 1998:568.

Bäck, S., Ekebom, J., Kangas, P., Kautsky, H., Mäkinen, A. & Rönnberg, O. 1996. Mapping and monitoring of phytobenthic biodiversity in the Northern Baltic Sea - background, methods, and recommendations. Copenhagen, Nordic Councils of Ministers. – TemaNord 1996:559.

Brody, S.D. 1998. An Evaluation of the Establishment Processes for Marine Protected Areas in the gulf of Maine: Understanding the Role of Community Involvement and Public Participation, Gulf of Maine Protected Areas Project. Report #3, July 1998. Gulf of Maine Marine Protected Areas Project. 40 pp. http://www.gulfofmaine.org/library/mpas/process_eval_0798.PDF

Canessa, R., Conley, K., Smiley, B. & Gueret, D. 2003. Building an ecosystem-based management plan for the proposed Bowie Seamount marine protected area. The fifth international SAMPAA conference University of Victoria, British Columbia, Canada. May 11 to 16, 2003.

Czybulka, D. & Kersandt, P. 2000. Legal regulations, legal instruments and competent authorities with Relevance for Marine Protected Areas (MPAs) in the Exclusive Economic Zone (EEZ) and the High Seas of the OSPAR maritime area. German Federal Agency for Nature Conservation, Bonn, Germany. 84 pp. – Bfn-Skripten 22.

Commonwealth of Australia 2003. The benefits of marine protected areas. Commonwelth of Australia brochure. 24 pp. http://www.deh.gov.au/coasts/mpa/wpc/benefits/pubs/benefits-mpas.pdf.

Dahl-Tacconi, N. 2002. MPA perspective: MPA perspective: Basis of MPA success lies in the objectives. MPA news 3(10):4.

Dahl-Tacconi, N. 2005. MPA Perspective: Science, Participation and Politics in MPA Management. MPA news 6(11):3-4.

Dahl, K., Larsen, M.M., Andersen, J.H., Rasmussen, M.B., Petersen, J.K., Josefson, A.B., Lundsteen, S., Dahllöf, I., Christiansen, T., Krause-Jensen, D., Hansen, J.L.S., Ærtebjerg, G., Henriksen, P., Helmig, S.A. & Reker, J. 2004. Tools to assess the conservation status of marine Annex 1 habitats in Special Areas of Conservation. Phase 1: Identification of potential indicators and available data. National Environmental Research Institute, Denmark. 96 pp. – NERI Technical Report No. 488. http://technical-reports.dmu.dk.

Dalton, T.M. 2004. An approach for integrating economic impact analysis into the evaluation of potential marine protected area sites.

Journal of Environmental Management, 70: 333-349.
Day, J.C. 2002. Zoning-lessons from the Great Barrier Reef Marine Park. Ocean & Coastal Management 45:139-156.
Delbaere, B. 2003. An Inventory of Biodiversity Indicators in Europe, 2002. European Environment Agency. Technical Report 92. Office for Official Publications of the European Communities, Luxemburg. 42 pp.
EMMA 2005. Report of the Meeting of the Working Group on European Marine Monitoring and Assessment (EMMA (1) 05/8/1), Copenhagen, 8 – 9 February 2005. Internal report, unpublished.
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001a. Indications of good practise for establishing management schemes on European Marine sites. Learning from the UK Marine SACs project 1996-2001. Peterborough, English Nature.
EN, SNH, CCW, EHS (NI), JNCC, & SAMS 2001b. Natura 2000. UK Marine SACs project: Partnerships in action. Proceedings of a conference held in Edinburgh, 15th-16th November 2000.Peterborough, English Nature.
EN, SNH, EHS(DOE(NI)), CCW, JNCC, SAMS 2001c. Guidelines for developing conservation objectives for Marine SACs - Learning from the UK Marine SACs Project 1996-2001. Peterborough, English Nature.
European Commission 1998. Implementing the EC Habitats directive in marine and coastal areas. Luxembourg, Office for Official Publications of the European Communities. 62 pp.
European Commission 2004a. Guidance on the Application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment. A paper prepared for the Second Stakeholder Conference on the Development of a European Marine Strategy 10-12 April 2004, Rotterdam, Netherlands.
European Commission 2004b. LIFE Focus / LIFE-Nature: communicating with stakeholders and the general public – Best practice examples for Natura 2000. Office for Official Publications of the European Communities, Luxembourg. 72 pp.
European Environment Agency 2006. EUNIS - European Nature Information System. http://eunis.eea.eu.int/index.jsp
Gell, F.R. & Roberts, C.M. 2003. The Fishery Effects of Marine Reserves and Fishery Closures. WWF-US, 1250 24th Street, NW, Washington, DC 20037, USA.
Gilligan, B., Dudley, N., de Tejada, A.F. & Toivonen, E. 2005. Management Effectiveness Evaluation of Finland's Protected Areas. Nature Protection Publications of Metsähallitus. Series A 147.
Halpern, B., Warner, R. R. & Gaines, S.D. 2004. Moving the Discussion About Marine Reserves Science Forward. MPA news 5(7):1-2.
Halpern, B.S. 2003. The impact of marine reserves: Do reserves work and does reserve size matter? Ecological Applications 13(1) Supplement:S117-S137.
Hastings, A. & Botsford, L. 2003. Comparing designs of marine reserves for fisheries and for biodiversity. Ecological Applications 13(1) Supplement:S65-S70.
Helsinki Commission 1994/2003. HELCOM Recommendation 15/5. http://www.helcom.fi/Recommendations/en_GB/rec15_5/
Helsinki Commission 1998. Red List of Marine and Coastal Biotopes and Biotope Complexes of the Baltic Sea, Belt Sea and Kattegat – Including a comprehensive description and classification system for all Baltic marine and coastal biotopes – Baltic Sea Environmental Proceedings No. 75.
Helsinki Commission 2003a. Guidelines for Designating Marine and Coastal Baltic Sea Protected Areas (BSPA) and Proposed Protection Categories. http://www.helcom.fi/Recommendations/guidelines/en_GB/guide15_5/
Helsinki Commission 2003b. Guidelines for Management of Baltic Sea Protected Areas (BSPAs). http://www.helcom.fi/Recommendations/guidelines/en_GB/guidel_15_5_mgt/
Helsinki Commission 2003c. HELCOM Recommendation 24/10. http://www.helcom.fi/Recommendations/en_GB/rec24_10/
Helsinki Commission & OSPAR Commission 2003. Statement on the Ecosystem Approach to Human Activities "Towards an Ecosystem Approach to the Management of Human Activities" . A paper prepared for the First Joint Ministerial Meeting of the Helsinki and OSPAR Commissions (JMM) in Bremen, Germany.
Hiscock, K. & Tyler-Walters, H. 2003. Assessing the sensitivity of seabed biotopes to human activities and natural events. MarLIN bro-

chure. Edinburgh, Scottish Natural Heritage. 16 pp.

Hockings, M., Stolton, S. & Dudley, N. 2000. Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK.

Hudson, B.E.T. 1988. User and public information. In: Kenchington, R. & Hudson, B.E.T. (eds.): Coral Reef Management Handbook. UNESCO Regional office for Science and Technology for South East Asia, Jakarta. Pp. 163-176.

IUCN – The World Conservation Union 1994. Guidelines for Protected Area Management Categories. IUCN, Cambridge, UK. 94 pp.

IUCN – The World Conservation Union 2004. Assessment of Management Effectiveness in Selected Marine Protected Areas in the Western Indian Ocean. Final Report. 35 pp.

Jameson, S.C., Erdmann, M.V., Gibson, Jr. G.R., & Potts, K.W. 1998. Development of biological criteria for coral reef ecosystem assessment. Atoll Research Bulletin 450. 102 pp.

Jones, P.J.S. 2002. MPA Perspective: advice for promoting participation of authorities and stakeholders in MPA planning. MPA news 3(7):5.

Jones, P.J.S., Burgess, J. & Bhattachary, D. 2001. An evaluation of approaches for promoting relevant authority and stakeholder participation in European Marine sites in the UK. English Nature (UK Marine SACs Project). 98 pp.

Kelleher, G. 1999. Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.

Laine, A. 2005. Integrated Management System for the Bothnian Bay - Bothnian Bay. In: Marine Expert Group (ed.) (2005) Guidelines: Natura 2000 network in the marine environment Application of the Habitats and Birds Directives A working draft of the Marine Expert Group. Unpublished.

Lewis, A., Slegers, S. Lowe, D. Muller, L., Fernandes, L. & Day, J. 2003. Use of Spatial Analysis and GIS Techniques to Re-Zone the Great Barrier Reef Marine Park. Coastal GIS Workshop, July 7-8, 2003, University of Wollongong, Australia.

Lubchenco, J., Palumbi, S.R., Gaines, S.D. & Andelman, S. 2003. Plugging a hole in the ocean: the emerging science of marine reserves. Ecological Applications 13(1) Supplement:S3-S7

Marine Expert Group 2005. Guidelines: Natura 2000 network in the marine environment. Application of the Habitats and Birds Directives. A working draft of the Marine Expert Group. Internal report. Unpublished.

Marine Life Information Network (*MarLIN*) 2006a. Sensitivity assessment rationale - a summary. http://www.marlin.ac.uk/sah/baskitemplate.php?sens_ass_ratMarLIN.

Marine Life Information Network (*MarLIN*) 2006b. Maritime and coastal activities to environmental factors matrix. http://www.marlin.ac.uk/PDF/activities3.pdf.

McGinnis, M.V. & Hastings, S.P. An Ecosystem Management Approach for the Santa Barbara Channel Islands. National Marine Sanctuaries Library. http://sanctuaries.noaa.gov/library/alldocs.html.

MPA news 2000. MPA Enforcement: Practitioners Employ Mix of High-Tech and Community-Based Strategies. MPA news, 2(5):1-4.

MPA news 2001a. Workshop results: Tips from Managers on Improving Science in MPA management. MPA news 3(4):4

MPA news 2001b. Workshops Results: Tips from scientists on Improving Science in the MPA Management. MPA news 3(3):5.

MPA news 2004a.: Invasive Species: Their Threats to MPAs, and How Practitioners Are Responding.6(6):1-4.

MPA news 2004b. MPA news Poll: What Qualities Make a Good Managers? MPA news 6(4):3.

MPA news 2005. Climate Change and Ocean Warming: Preparing MPAs for It. MPA news 6(8):1-3.

OSPAR Commission 2004. Document MASH 04/5/3-E: Draft proposal for a work program on the development of practical guidance for the application of HELCOM and OSPAR management guidelines Meeting of the working group on Marine Protected Areas, Species and Habitats (MASH) 5-8 October 2004.Unpublished.

Palumbi, S. R. 2002. Marine Reserves: a tool for ecosystem management and Conservation. Arlington, US, Pew Oceans Commission.

Pomeroy, R.S., Parks, J.E. & Watson, L.M. 2004. How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN, Gland, Switzerland and Cambridge, UK. xvi + 216 pp.

Ritterhoff, J., Gubbay, S., & Zucco, C. (eds.) 2004. Marine Protected Areas and Fisheries. Proceedings of the International Expert

workshop held at the International Academy for Nature Conservation, Isle of Vilm, Germany 28 June - 2 July, 2004. German Federal Agency for Nature Conservation, Bonn, Germany. 177 pp. – Bfn-Skripten 122.

Roberts, C.M. & Sargant, H. 2002. Fishery benefits of fully protected marine reserves: why habitat and behaviour are important. Natural Resources Modelling 15(4):487-507.

Roberts, C.M. & Hawkins, J.P. 2000. Fully-protected marine reserves: a guide. WWF Endangered Seas Campaign, 1250 24th Street, NW, Washington, DC 20037, USA and Environment Department, University of York, York, YO10 5DD, UK.

Rogers, S.I. & Greenaway, B. 2005. A UK perspective on the development of marine ecosystem indicators. Marine Pollution Bulletin, 50: 9-19.

Roff, J.C., Taylor, M.E. & Laughren, J. 2003. Geophysical approaches to the classification, delineation and monitoring of marine habitats and their communities. Aquatic Conservation: Marine and Freshwater Ecosystems 13:77-90.

Salm, R.V. Clark J.R. & Siirilä E. 2000. Marine and Coastal Protected Areas: A guide for planners and managers. IUCN. Washington DC. Xxi + 371pp.

Schiller, A., Hunsaker, C.T., Kane, M.A., Wolfe, A.K., Dale, V.H., Suter, G.W., Russell, C.S., Pion, G., Jensen, M.H. & Konar, V.C. 2001. Communicating Ecological Indicators to Decision Makers and the Public. Ecology and Society, 5(1):19.

Simberloff, D. 1997. Flagships, umbrellas, and keystones: is single-species management passé in the landscape era? Biological Conservation 83:247-257.

Solway Firth LIFE Project 2000). Solway Firth European Marine Site: Management Scheme. http://www.solway-ems.co.uk/management_document_contents.htm.

Staub, F. & Hatziolos, M.E. 2004. Score Card to Assess Progress in Achieving Management Effectiveness Goals for Marine Protected Areas. The World Bank. 1-30 pp.

Stein, D. 2003. MPA perspective: Tips for developing marine boundaries. MPA news 4(7):5.

Swenson, J.J. and Franklin, J. 2000. The effects of future urban development on habitat fragmentation in the Santa Monica Mountains. Landscape Ecology 15: 713-730.

Thiel, H. & Koslow, J.A. (eds.) 2001. Managing risks to biodiversity and the environment on the high sea, including tools such as marine protected areas: scientific requirements and legal aspects. Proceedings of the Expert Workshop held at the International Academy for Nature Conservation, Isle of Vilm, Germany, 27 February – 4 March 2001. German Federal Agency for Nature Conservation, Bonn, Germany. 216 pp. - Bfn -Skripten 43.

Tyler-Walters, H. & Jackson, A. 1999. Assessing seabed species and ecosystems sensitivities. Rationale and user guide. Report to English Nature, Scottish Natural Heritage and the Department of the Environment Transport and the Regions from the Marine Life Information Network (MarLIN). Plymouth, Marine Biological Association of the UK. (MarLIN Report No.4.). January 2000 edition.

Villa, F., Tunesi, L. & Agardy, T. 2002. Zoning Marine Protected Areas through Spatial Multiple-Criteria Analysis: The Case of the Asinara Island National Marine Reserve of Italy. Conservation Biology 16(2):515-526

Walters, C. 1997. Challenges in adaptive management of riparian and coastal ecosystems. Conservation Ecology [online]1(2):1.

Willis, T., Millar, R., Babcock, R. & Tolimieri, N. 2005. MPA Perspective: The Science of Marine Reserves: How Much of It Is Science? MPA news 5:5-7

World Commission on Protected Areas (WCPA) 1999. Management effectiveness of protected areas. PARKS 9:68.

Yaffee, S., Phillips, A., Frentz, I., Hardy, P., Maleki, S. & Thorpe, B. 1996. Ecosystem Management in the United States: An Assessment of Current Experience., Island Press, Washington DC.

Attachments

ATTACHMENT 1: International laws and conventions

The Helsinki Convention
Inspired by the 1972 UN Conference on the Human Environment, in 1974 the governments of the Baltic Sea states signed the Baltic Marine Environment Protection Convention (Helsinki Convention), which entered into force in 1980. The worldwide and regional awareness of the need for protection of coastal and marine areas and habitats led to the inclusion of the new Article 15 on Nature Conservation and Biodiversity into the new 1992 Convention, emphasizing the importance of conserving natural habitats and biodiversity, as well as protecting ecological processes. Many HELCOM recommendations support the protection of the marine environment and regulation of human activities.

http://www.helcom.fi/Convention/en_GB/text/
http://www.helcom.fi/Recommendations/en_GB/valid/

EU legislation: Habitats and Birds Directives
EU legislation aims to protect the natural environment through the "Habitats Directive" (Council Directive 92/43/EEC) and species through the Birds Directive (Council Directive 79/409/EEC). Both mention the creation of protected areas as measures for conservation, and when they are established, they jointly form a network known as Natura 2000. Both Directives may be and have been applied to the coastal and marine environments, and many existing BSPAs belong to the Natura 2000 network. In addition, the Water Framework Directive, Urban Wastewater Treatment Directive, Nitrates Directive, and Discharges of Dangerous Substances Directive could be integrated in MPA design and management.

http://europa.eu.int/comm/environment/nature/nature_conservation/eu_nature_legislation/habitats_directive/index_en.htm (HABITATS Directive)
http://europa.eu.int/comm/environment/nature/nature_conservation/eu_nature_legislation/birds_directive/index_en.htm (BIRDS Directive)
http://europa.eu.int/comm/environment/nature/

The UN Convention on the Law of the Sea (UNCLOS)
This convention provides a tool for conserving marine areas beyond territorial waters, both in Exclusive Economic Zones (EEZs) and on the High Seas. It enables nations to take measures, including the regulation of fishing and the protection of living resources on the continental shelf up to a distance of 200 nautical miles from their national jurisdictional baselines. In addition, UNCLOS has created a formal responsibility for countries to protect the sea from all sources of pollution, including land-based pollution.

http://www.univie.ac.at/RI/KONTERM/intlaw/konterm/vrkon_en/html/doku/unclos.htm

The Convention on Biological Diversity (CBD)
The CBD aims to conserve biodiversity and promote sustainable use, as well as sharing benefits from biological resources. It also supports marine conservation, particularly the establishment of MPAs.

http://www.biodiv.org/

The RAMSAR Wetland Convention
"The conservation and wise use of wetlands by national action and international cooperation" is the objective of this convention. Therefore, RAMSAR sites are often situated on the coast and may thus contain marine components. This convention may therefore serve as an additional tool for MPA managers.

http://www.ramsar.org/

The World Heritage Convention
To protect cultural and natural sites of universal value, the UNESCO World Heritage Committee may accept sites nominated by governments for the World Heritage list. One site including a good proportion of marine areas is the "High Coast" in the Bothnian Bay, which includes a marine component of 80,000 ha containing a number of offshore islands. The World Heritage Convention is a name that carries much weight and clearly has a value for the area, both by highlighting its

importance as an area with great natural value, and also by attracting visitors.

http://whc.unesco.org/world_he.htm

UNESCO Man and the Biosphere Programme
The biospheres are "areas of terrestrial and coastal-marine ecosystems which are internationally recognized for promoting and demonstrating a balanced relationship between people and nature", a concept of great relevance to marine areas. Examples of this in the Baltic area include The North Vidzeme Biosphere Reserve located in Latvia, which comprises 53 km of the coastline of the Gulf of Riga and along the border with Estonia to the north, and the Archipelago Sea in Finland.

http://www.unesco.org/mab/

The Bonn Convention (The Migratory Species Convention; CMS)
This convention predominantly concerns managing, controlling take, and controlling damage to individual migratory species, some of which are marine such as whales, seals, and porpoises. However, it may also include the creation of reserves.

http://www.cms.int/

The Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats)
The Bern Convention aims to ensure the conservation of the habitats of wild flora and fauna and of endangered natural habitats, giving special attention to migratory species. The **Emerald Network** was launched by the Council of Europe as part of the work under the Bern Convention. It is an ecological network of "areas of special conservation interest" (ASCIs). The network involves all the European Union States, some non-Community states, and a number of African states. In addition, the European Community is a Contracting Party to the Bern Convention. The Emerald Network is based on the same principles as the EU Natura 2000. For EU Member States, Emerald Network sites are those of the Natura 2000 Network.

http://conventions.coe.int/Treaty/en/Treaties/Html/104.htm

IMO and MARPOL
The MARPOL Convention is the main international convention dealing with the prevention of pollution of the marine environment by ships from operational or accidental causes. It is a combination of two treaties, adopted in 1973 and 1978, respectively, and updated by amendments over the years. The combined instrument is referred to as the International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and it entered into force on 2 October 1983. Currently, the entire body of water of the Baltic Sea, excluding Russian waters, has been identified as a Particularly Sensitive Sea Area (PSSA) by the IMO, and should receive special protection by special routeing measures, as an area to be avoided, and/or other navigational duties, such as piloting.

http://www.imo.org/InfoResource/mainframe.asp?topic_id=783
http://www.imo.org/

ASCOBANS
The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) was concluded in 1991 under the auspices of the Convention on Migratory Species (UNEP/CMS or Bonn Convention) and entered into force in 1994. ASCOBANS is open for accession by all Range States (i.e., any state that exercises jurisdiction over any part of the range of a species covered by the Agreement or whose flag vessels engage in operations adversely affecting small cetaceans in the Agreement area) and by regional economic integration organizations.
The ASCOBANS Area is defined as follows: "the marine environment of the Baltic and North Seas, as delimited to the north-east by the shores of the Gulfs of Bothnia and Finland; to the south-west by latitude 48°30' N and longitude 5°W; to the north-west by longitude 5°W and a line drawn through the following points: latitude 60°N/longitude 5°W, latitude 61°N/longitude 4°W, and latitude 62°N/longitude 3°W; to the north by latitude 62°N; and including the Kattegat and the Sound and Belt passages but excluding the waters between Cape Wrath and St Anthony Head."

http://www.ascobans.org/
(European Commission 1998, Czybulka & Kersandt 2000)

ATTACHMENT 2:
Human activities table

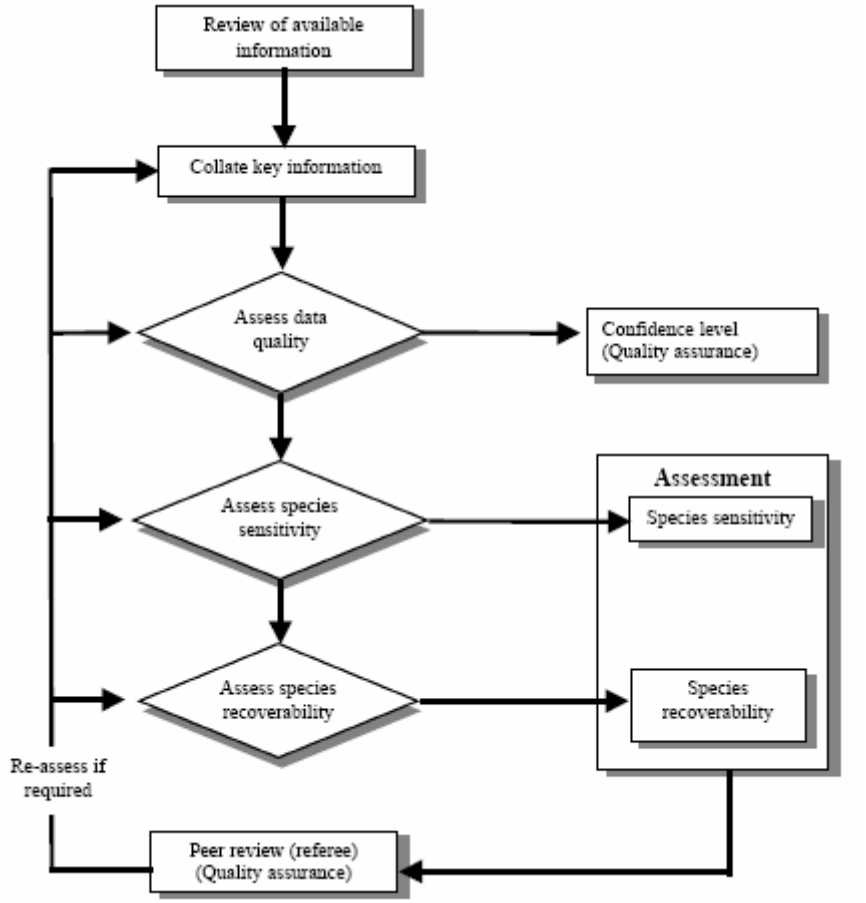
This table is a checklist for all possible human activities and the mechanisms by which they might threaten the biodiversity of a site. It is general rather than definitive, and does not indicate the magnitude or significance of any environmental effect, nor of indirect or cumulative effects. Many activities have been grouped to make the list reasonably sized. The table does not address the impacts of the activities on the terrestrial/coastal species, e.g., a public beach or a marina may cause noise disturbance that affects coastal birds. Modified from the report of EMMA (EMMA 2005) and the original work of MarLIN (Marine Life Information network 2006b).

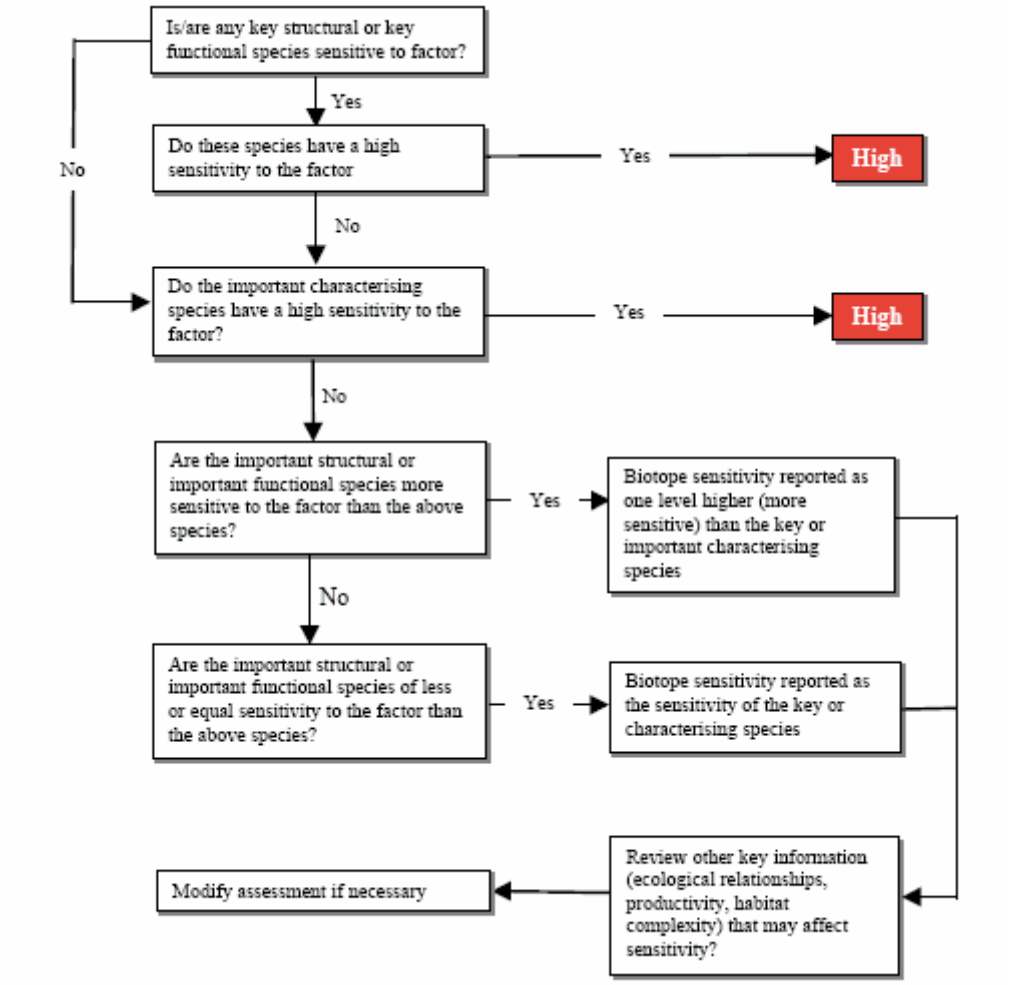
	Environmental Factors	**Physical**												**Chemical**							**Biological**						
Activities	Sub-activities/ events	Substratum removal	Substratum change (including smothering)	Increased siltation (deposited sediment)	Turbidity changes (suspended sediment)	Emergence regime changes (including desiccation)	Water flow rate changes	Temperature changes	Wave exposure changes	Noise disturbance	Visual disturbance	Electromagnetic changes	Litter	Synthetic compound contamination	Heavy metal contamination	Hydrocarbon contamination	Radionuclide contamination	Nutrient changes (eutrophication)	Salinity changes	De-oxygenation	Physical damage to species (including abrasion)	Displacement (moving) of species	Removal of target species	Removal of non-target species	Changes in population/community dynamics/structure	Introduction of microbial pathogens/ parasites	Introduction of non-native species
Aquaculture	Finfish																	x		x						x	x
	Macroalgae																									x	x
	Shellfish																	x								x	x
Climate change	Global warming					x	x	x										x									
Coastal defence	Barrages		x			x			x										x								
	Beach replenishment		x																								
	Groynes		x				x																				
	Sea walls/breakwaters		x				x		x																		
Collecting	Angling																						x				
	Bait digging																				x	x	x				
	Bird eggs																						x				
	Curios																						x				
	Higher plants																						x				
	Kelp/wrack																						x	x			
	Macroalgae																						x				
	Peelers																				X		x				
	Shellfish																						x				
Development	Artificial reefs		x				x		x																		
	Cables/pipes		x																								
	Construction phase of coastal defences/ other structures	x	x	x	x						x																
	Culverting lagoons					x	x	x	x										x								
	Docks, ports, marinas		x				x		x																		
	Land claim		x																								
	Oil/gas platforms		x																								
Extraction	Freshwater																		x								
	Maerl	x		x	x																		x				
	Navigational/maintenance dredging	x		x	x																						
	Oil/gas		x							x																	
	Rock/minerals	x																									
	Sand/gravel	x		x	x																						

	Environmental Factors	Physical												Chemical							Biological						
Activities	Sub-activities/ events	Substratum removal	Substratum change (including smothering)	Increased siltation (deposited sediment)	Turbidity changes (suspended sediment)	Emergence regime changes (including desiccation)	Water flow rate changes	Temperature changes	Wave exposure changes	Noise disturbance	Visual disturbance	Electromagnetic changes	Litter	Synthetic compound contamination	Heavy metal contamination	Hydrocarbon contamination	Radionuclide contamination	Nutrient changes (eutrophication)	Salinity changes	De-oxygenation	Physical damage to species (including abrasion)	Displacement (moving) of species	Removal of target species	Removal of non-target species	Changes in population/community dynamics/structure	Introduction of microbial pathogens/ parasites	Introduction of non-native species
Fisheries	Fixed netting (gill/tangle)																						x	x			
	Mobile netting (seine) and pelagic trawling																						x	x			
	Potting/creeling																						x	x			
	Suction/hydraulic dredging	x		x	x																x	x	x	x			
	Benthic trawling/ scallop dredging			x	x																x		x	x			
Pollution	Eutrophication																	x									
	Heavy metals														x												
	Hydrocarbons															x											
	Oil dispersants													x													
	Oil/tar/chemicals															x											
	Organotins/TBT													x													
	Pesticides/herbi-cides													x													
	Sewage				x													x									
Recreation	Boating/yachting									x	x										x						
	Diving										x																
	Marina																	x									
	Public beach										x										x						
	Resort										x							x									
	Water sports									x	x																
Uses	Coastal forestry/ farming			x														x									
	Education/interpreta-tion										x																
	Energy generation (wind/tide/wave)						x																				
	Military										x										x						
	Research										x										x		x				
	Shipping									x				x		x					x	x					x
Waste	Cooling water (power stations)							x																			
	Industrial effluent discharge													x	x												
	Industrial/urban emissions (including air pollution)													x													
	Land/riverine runoff (including agricul-tural pollution)													x													
	Litter and debris																				x						
	Nuclear effluent discharge																x										
	Quarry waste (mining)	x																			x						
	Sewage discharge		x	x														x								x	
	Shipping (including fisheries)																										
	Spoil dumping	x		x										x													

ATTACHMENT 3:
Sensitivity assessment rationales for habitats and species

Sensitivity assessment rationale for species (Tyler-Walters & Jackson 1999).





Sensitivity assessment rationale for biotopes (Hiscock & Tyler-Walters 2003).

ATTACHMENT 4:
An example of a general "sensitivity-to-impact" matrix

The table below is a suggestion for a general "sensitivity-to-impact" matrix structure, using fishing activities as an example. The sensitivity scale used (very high/high/moderate/low/very low/not sensitive/not relevant) was employed in MarLIN in the "Sensitivity assessment rationale - a summary" (Marine Life Information Network 2006a). An alternative categorization for effects could be likely/possible/unlikely, as introduced by Ritterhoff and co-authors in "Marine Protected Areas and Fisheries" (Ritterhoff *et al.* 2004), by whom the model table was created as well.

The evaluations are not based on facts, and should not be used as such; it is only intended as a suggestion for a matrix structure.

	Benthic trawls	**Pelagic trawls**	**Dredging**	**Netting**	**Potting**	**Longline**	**Collecting**
Habitats/biotopes							
Mussel beds	High	Not relevant	Very high	Not sensitive	Not relevant	Not sensitive	High
Zostera beds	Moderate	Not relevant	Very high	Not sensitive	Not relevant	Not sensitive	Not relevant
Estuaries	Not relevant	Not relevant	Not relevant	Low	Not relevant	Not relevant	Low
Sublittoral sandy bottoms	High	Not relevant	Moderate	Not sensitive	Not relevant	Not sensitive	Not relevant
Large shallow inlets	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Not relevant	Moderate
Species							
Mammals	Low	Moderate	Not sensitive	High	Not relevant	Not relevant	High
Fish	Moderate	High	Moderate	Moderate	Low	Moderate	Not relevant
Migratory birds	Low	Low	Not sensitive	High	Not relevant	Low	High

ATTACHMENT 5:
An example of a site-specific "vulnerability-to-impact" matrix

The evaluation in the table is not based on facts and should not be used as such; it is only intended as a suggestion for a matrix structure. The model table was created by Ritterhoff *et al.* 2004.

	Benthic trawls	**Windmills**	**Pollution: heavy metals**	**Recreational fishing**	**Waste: litter**	**Sand extraction**	**Oil spills**
Habitats/biotopes							
Sandy bottoms; sublittoral zone level bottoms	High	Moderate	Moderate	Not relevant	Low	High	Moderate
Coastal dunes; foredunes	Not relevant	High	Low	Not relevant	Moderate	High	Low
Sandy beaches	Not relevant	High	Low	Not relevant	High	Moderate	Moderate
Glo-lakes; brackish, eutrophic	Not relevant	Not relevant	Moderate	Not relevant	High	Not relevant	Low
River banks	Not relevant	Low	High	Low	High	Low	Moderate
Species							
Zostera sp. beds	High	High	Low	Not relevant	Low	High	Low
Salmo salar L.	Low	Not relevant	High	High	Low	Moderate	Moderate
Haliaeetus albicilla	Not relevant	Moderate	High	Moderate	Moderate	Not relevant	High

ATTACHMENT 6:
An example of a table combining impacts of human activities on conservation features with management issues

This table represents an example of a matrix that may be presented in a management plan, combining the information on threatening activities and their impact on biodiversity with that on conservation objectives and current/required management solutions. Different interest features on the site could be indicated with numbers and explained; for example: 1=subtidal mussel beds, 2=sandy beach. The table has been modified from tables used in the Solway Firth European Marine Site Management Scheme (Solway Firth Life Project 2000).

Activity and location	Interest features				Impact on interest features and significance	Conservation objective	Existing management	Management solutions	Relevant authority	Key partners	Time scale
	1	2	3	4							
Water quality											
Agricultural pollution											
Heavy metals											
Coastal development											
Building on shore											
Extraction											
Sand											
FISHING											
Bottom trawling											
Netting											
SHIPPING											
Maintenance dredging											
Oil pollution											
RECREATION											
Motor boats											
Bird watching											
OTHER											
Bait collecting											

ATTACHMENT 7: Activities to be regulated and regulation options according to HELCOM BSPA management guidelines

Activities to be regulated

According to HELCOM/OSPAR guidelines, the following activities and threats should be regulated:

1. Extraction of sand, stone, and gravel;
2. Oil and gas exploration and exploitation (including accidental spillage of oil) and exploitation of other natural resources such as amber;
3. Dumping of solid waste and dredged spoils;
4. Constructions (including coastal defence measures and infrastructure);
5. Wastewater (from industry, municipalities, and households) and other harmful discharges,
   a. discharges of nutrients and biodegradable organic substances,
   b. discharges of heavy metals and other hazardous substances such as pesticides, antifouling agents, chemicals, and radioactive substances;
6. Aquaculture;
7. Transport of hazardous substances by ship through these areas;
8. Military activities;
9. Installation of wind-farms (including offshore wind-farms);
10. Submarine cables.

The following activities and threats should be regulated, where appropriate:

1. Agriculture and forestry including water regulation;
2. Fishing and hunting;
3. Tourism and recreational activities.

Regulation options

Legislation must provide for making regulations to control and, if necessary, prohibit activities:

- Interim regulations to provide protection of an area for which a plan is being developed;
- Regulations to enforce a plan;
- External regulations to control activities occurring outside a managed area which may adversely affect features, resources, or activities within the area.

The options for regulations are:

a) Maintenance of sustainable and traditional uses, when appropriate;
b) Restriction of activities in extent
c) Restriction of activities in space (including zoning);
d) Regulation of activities in time (ban of certain activities for a specific period, such as, during breeding seasons or spawning periods);
e) Alteration of procedures (e.g., reintroduction of traditional land and sea use practices);
f) Substitution of materials or substances (e.g., to avoid contamination);
g) Total ban on building or demolition of construction (e.g., demolition of dykes);
h) Restoration, reintroduction.

(Helsinki Commission 2003b)

www.helcom.fi