

## **APPENDICES**

### **Strategic Advice on Designing and Implementing Coastal and Marine Spatial Plans**

**Draft Report to the NOAA Science Advisory Board  
From the Ecosystem Science and Management Working Group**

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# **APPENDIX 1. QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS**

## **A. Objectives**

- 1. What are the stated objectives of the plan, if any?*
- 2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?*
- 3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?*

## **B. Scope**

- 1. Does the plan consider all uses or just selected sectors?*
- 2. How long did the spatial planning process take (years)?*
- 3. Were particular steps especially demanding of time or resources?*
- 4. How long does the plan apply? What is the planning interval for update and revision?*
- 5. What was the funding structure for this project?*
- 6. At what spatial scale was the plan developed (km<sup>2</sup>)?*
- 7. How does plan scale match ecosystem scale?*
- 8. What is the spatial scale for implementation (km<sup>2</sup>)?*

## **C. Authority**

- 1. What is the legal basis for this plan?*
- 2. Which level(s) of government is (are) driving the spatial plan?*
- 3. What institutional change, if any, was made as part of creating the plan?*
- 4. What governance and institutional arrangements are used to implement the plan?*

## **D. Data**

- 1. What data are used?*



Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical						
Geological						
Chemical						
Biological						
Economic						
Social						

*2. Were there clear criteria for data inclusion? If so, what were they?*

*3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?*

#### **E. Participants**

*1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?*

*2. Did they have equal status at all parts of the process?*

*3. Were stakeholders included in the planning process?*

*4. Was there a broad public participation process?*

*5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?*

*6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?*

*7. In which parts of the process were stakeholders allowed to participate?*

*8. What form was their participation?*

## **F. Tools & Decision Support**

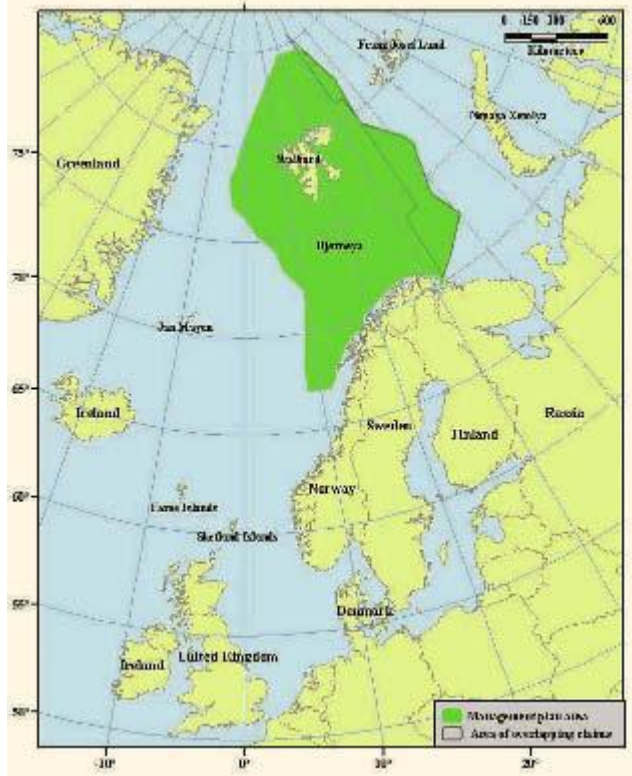
- 1. Which decision support tools are used to inform spatial allocation decisions?*
- 2. How are key trade-off issues framed and formalized into decision support tools?*
- 3. How are trade-offs analyzed?*
- 4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?*
- 5. How does the plan recognize and deal with uncertainty and risk?*
- 6. Are the decision support tools dynamic?*
- 7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?*
- 8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).*
- 9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?*

## **G. Monitoring & Performance Measures**

- 1. What are the products of the marine spatial planning process?*
- 2. What constitutes success of the plan?*
- 3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?*
- 4. Does the plan incorporate monitoring?*
- 5. Is adaptive management an explicit component?*
- 6. Is the adaptive management formally structured around response to feedback from monitoring?*
- 7. If so, are the responses formally rule-based?*

## APPENDIX 2. RESPONSES TO QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS

### QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Barents Sea, Norway



#### **Purpose: [Added as background information].**

The purpose of this management plan is to provide a framework for the sustainable use of natural resources and goods derived from the Barents Sea–Lofoten area and at the same time maintain the structure, functioning and productivity of the ecosystems of the area. The management plan is thus a tool which will be used both to facilitate value creation and to maintain the high environmental value of the area. This requires a clarification of the overall framework for activities in these waters in order to pave the way for the co-existence of different industries, particularly the fisheries industry, petroleum industry and maritime transport. The management plan is also intended to be instrumental in ensuring that business interests, local, regional and central authorities, environmental organisations and other interest groups all have a common understanding of the goals for the management of the Barents Sea– Lofoten area.

#### **A. Objectives:**

##### ***1. What are the stated objectives of the plan, if any?***

The overall objectives are to provide a tool for promoting value creation and maintaining the environmental assets in the Barents Sea-Lofoten area. The plan is intended to provide a framework for activities in the area and facilitate co-existence between the industries involved,

such as the fisheries, maritime transport and petroleum industries, while at the same time taking environmental considerations into account.

***The Government's objectives are:***

1. Management of the Barents Sea- Lofoten area will promote sustainable use of the area and its resources to the benefit of the region and the country in general;
2. The management regime will ensure that activities in the area do not threaten the natural resource base and thus jeopardize opportunities for future value creation;
3. Harvesting of living marine resources will promote value creation and secure welfare and business development to the benefit of the country as a whole;
4. Living marine resources are managed sustainably through the ecosystem approach;
5. Petroleum activities will promote value creation and secure welfare and business development to the benefit of the country as a whole;
6. Steps will be taken to facilitate the profitable production of oil and gas on the basis of health, environment and safety requirements and standards that are adapted to environmental considerations and the needs of other industries;
7. Favorable conditions will be provided for safe, secure, and effective maritime transport that take account of environmental considerations and promotes value creation in the region.

In addition there are more specific targets for biodiversity, combating pollution, and ensuring safe seafood (See next section).

***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Both conceptual and operational. The operational components are spelled out in previous and later plan elements so these general statements below capture the intent.

Releases and inputs of pollutants to the Barents Sea–Lofoten area will not result in injury to health or damage the productivity of the natural environment and its capacity for self-renewal.

Activities in the area will not result in higher levels of pollutants;

The environmental concentrations of hazardous and radioactive substances will not exceed the background levels for naturally occurring substances and will be close to zero for man-made synthetic substances. Releases and inputs of hazardous or radioactive substances from activity in the area will not cause these levels to be exceeded;

Operational discharges from activities in the area will not result in damage to the environment or elevated background levels of oil or other environmentally hazardous substances over the long term;

Litter and other environmental damage caused by waste from activities in the Barents Sea–Lofoten area will be avoided;

Fish and other seafood will be safe and will be perceived as safe by consumers in the various markets;

The risk of damage to the environment and living marine resources from acute pollution will be kept at a low level and continuous efforts will be made to reduce it further. Activity that involves a risk of acute pollution will be managed with this objective in mind;

Maritime safety measures and the oil spill response system will be designed and dimensioned to effectively keep the risk of damage to the environment and living marine resources at a low level;

Management of the Barents Sea–Lofoten area will ensure that diversity at ecosystem, habitat, species and genetic levels, and the productivity of ecosystems, are maintained. Human activity in the area will not damage the structure, functioning, productivity or dynamics of ecosystems;

Activities in particularly valuable and vulnerable areas will be conducted in such a way that the ecological functioning and biodiversity of such areas are not threatened;

Damage to marine habitats that are considered to be threatened or vulnerable will be avoided. In marine habitats that are particularly important for the structure, functioning, productivity and dynamics of ecosystems, activities will be conducted in such a way that all ecological functions are maintained;

Naturally occurring species will exist in viable populations and genetic diversity will be maintained;

Harvested species will be managed within safe biological limits so that their spawning stocks have good reproductive capacity;

Species that are essential to the structure, functioning, productivity and dynamics of ecosystems will be managed in such a way that they are able to maintain their role as key species in the ecosystem concerned;

Populations of endangered and vulnerable species and species for which Norway has a special responsibility will be maintained or restored to viable levels. Unintentional negative pressures on such species as a result of activity in the Barents Sea–Lofoten area will be reduced as much as possible by 2010;

The introduction of alien species through human activity will be avoided;

A representative network of protected marine areas will be established in Norwegian waters, at the latest by 2012. This will include the southern parts of the Barents Sea–Lofoten area.

***3. Were the objectives mandated or were they identified during the planning process?***

These were set by the government and approved by the Storting (Parliament) to be consistent with national guidelines and practices.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

All uses.

### ***2. How long did the spatial planning process take (years)?***

3 years, began with a White paper accepted by Parliament in 2002.

2003: data compilation

2003-2004: impact assessments carried out

2004: expert group assembled to compile the scientific basis for an integrated management plan

2005: report on the scientific basis for environmental quality objectives completed

2005: conference held on the management plan

2006: final plan released in a report to the Storting.

### ***3. Were particular steps especially demanding of time or resources?***

Unknown.

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

The background studies and assessments for this plan are based on scenarios for the period up to 2020. A process to update the whole management plan for the period after 2020 is planned.

There will also be regular updates in the period up to 2020. Every two years there will be an update and actions will be taken as necessary to achieve the targets of the plan (von Quillfeldt 2010). The most recent update was done in 2011.

### ***5. What was the funding structure for this project?***

Funding came from the central government and involved many agencies and departments as well as scientific institutions and organizations from the private sector and non-governmental organizations. The steering committee was led by the Ministry of the Environment. It consisted of Ministry of the Environment, Ministry of Petroleum and Energy, Ministry of Fisheries and Coastal Affairs, Ministry of Foreign Affairs, Ministry of Labor and Social Inclusion and Ministry of Trade and Industry. The process was preceded by a White Paper accepted by the Parliament in 2002. Process began in 2003 with setting the scientific basis, sectoral studies, and overall integration.

### ***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

Originally the area covered by the management plan was 1,400,000 km<sup>2</sup>, but was reduced to 1,200,000 km<sup>2</sup> with the adoption of the Norwegian Sea Plan in 2009. Activities in the coastal zone on the landward side of the baseline that do not affect the sea areas outside the baseline have not been included, as coastal zone management involves problems of a different nature and to discuss these here would not serve the purpose of this management plan. However, impacts on the coastal zone caused by activities in the Barents Sea–Lofoten area, for example acute oil pollution, have been included.

### ***7. How does plan scale match ecosystem scale?***

The delimitation of the area is based on ecological and administrative considerations. The area is delimited by the Norwegian Sea in the southwest, by the Arctic Ocean in the north and by the Russian part of the Barents Sea in the east. One of the reasons for including the Lofoten Islands is the close ecological relationship between fish stocks here and in the Barents Sea. North

Atlantic salmon are not included. Negotiations with Russia will affect the eastern boundary [agreement recently concluded 9/2010].

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

Same as plan- as of 2009- 1,200,000 km<sup>2</sup>.

**C. Authority**

**1. What is the legal basis for CMSP?**

The plan itself is not an act of legislation, but it gives the government direction in regards to different sectors which operate under existing legal frameworks, but the plan is enforceable (for example petroleum activities operation under the Petroleum Act). The actual regulation of activities in petroleum, fisheries, etc occurs on the basis of relevant legislation, conforming to the plan framework.

The Storting [Norway's Parliament] endorsed the need for integrated management of Norwegian maritime areas based on the ecosystem approach. This is also in line with international developments in this field, for example in regional cooperation in the northeast Atlantic within the framework of OSPAR, in the Arctic Council, through the North Sea Conferences and in the European Union. The "ecosystem approach" has been developed and incorporated in several international agreements over the past ten years and has an important place in the follow-up to the Convention on Biological Diversity. Under this Convention, general criteria have been developed for the implementation of the ecosystem approach to the management of human activities (the Malawi Principles), which Norway has adopted. Under the auspices of the Food and Agriculture Organization of the United Nations (FAO), a Code of Conduct for Responsible Fisheries was drawn up in 1995. It includes guidelines for ecosystem-based management of fisheries resources. The International Council for the Exploration of the Sea (ICES) uses an ecosystem-based approach in its advice on how much should be harvested of each stock.

**2. Which level(s) of government is (are) driving the spatial plan?**

The prime driver is at the national level although some provincial involvement is also engaged. Because coastal areas are not included in the plan local governments play a relatively small role except by commenting on economic and social impacts in the plan.

**3. What institutional change, if any, was made as part of creating the plan?**

No institutional change was made. Implementation of the plan is to be carried out by sectors using their general authorities. In 2006, as a result of the plan, the government established three new bodies:

1. A *Reference Group* for the work on the ecosystem-based management regime that represents the various interests involved, including business and industry, environmental organisations and Sami interest groups. The Reference Group will be given the opportunity, through meetings with the bodies responsible for implementing the management plan and in other appropriate ways, to express its views on the implementation of the plan;
2. An *Advisory Group on Monitoring* of the Barents Sea to assist in the coordination of the system proposed by the Government for monitoring the state of the environment. The group will be headed by the Institute of Marine Research and its activities will be conducted in line with the current division of expertise between sectors. It will have a broad membership, with representatives from the relevant public institutions with responsibility for and [a whole long list of participants];

3. A *Forum on Environmental Risk Management* focusing on acute pollution in the area, which will provide valuable input to environmental risk assessments.

**4. What governance and institutional arrangements are used to implement the plan?**

Existing government ministries, scientific institutions, etc. are the primary institutions who will implement the plan using their existing authorities. The spatial integration and the principles in the plan will guide their efforts. Most of the core coordinating takes place in the 3 working groups, but all major decisions are made by the Government at the cabinet level.

**D. Data**

**1. What data are used?**

A multiyear scientific synthesis laid the scientific basis for the plan. Data from all sectors and all sources were consolidated. Scientific studies were performed to fill data gaps. A full interdisciplinary set of data was amassed and analyzed.

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	X		
Geological	X	X	X	X		
Chemical	X	X	X	X		
Biological	X	X	X	X		
Economic	X	X	X	X		
Social	X	X	X	X		

**2. Were there clear criteria for data inclusion? If so, what were they?**

The Barents Sea is one of the most intensively studied sea areas in the world and as a result there is a lot of high quality data and publications. Although the plan does not identify specific data inclusion criteria, the commitment seems to be to a high data quality standard and use of best available scientific information. The assessments were designed in a transparent way and multiple opportunities were offered to other scientists from academia and the private and NGO sectors to review the results. No specific peer review, per se, was performed.

**3. Were there QA/QC standards for “expert opinion and qualitative information? If so, what were they?**

It does not appear that any particular standards were set. The only use of the term qualitative in the reference document is with respect to a “qualitative” review of risks which acknowledges that formal risk assessments remain to be performed under the plan.

**E. Participants**

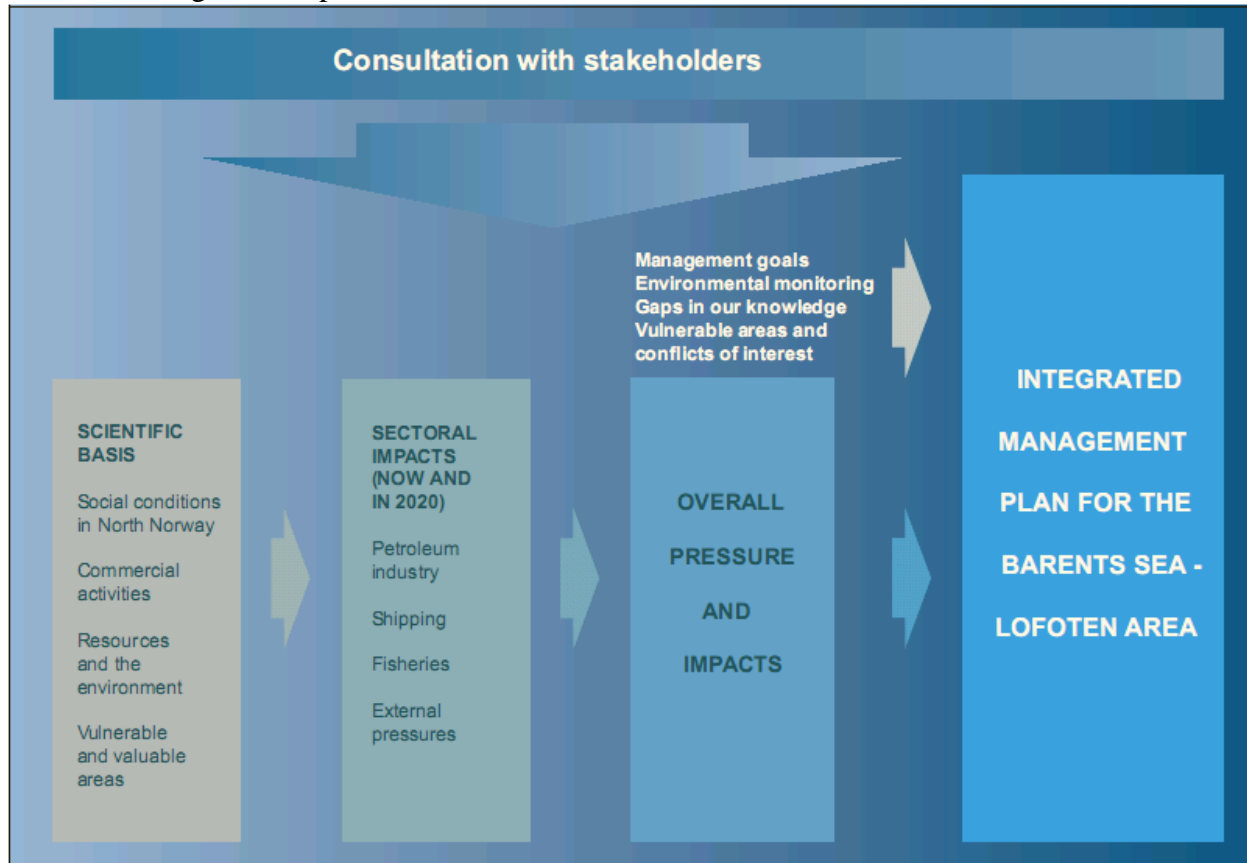
**1. What entities and regulatory authorities is part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

See the first section for a list of Ministries engaged. Provincial governments participated but not many local governments [although they seem to have monitored the process and had ample opportunity to engage]. Direct negotiations occurred between Sami people’s organization and the Sami Parliament.



## **2. Do they have equal status at all parts of the process?**

The Ministries and scientific organizations were most engaged in developing the management plan, however, private and public stakeholders had ample opportunities to monitor and comment throughout the process. There were well-designed and transparent ways for stakeholders to be involved throughout the process.



## **3. Were stakeholders included in the planning process?**

Stakeholders were afforded opportunity to engage and be heard in the planning process, but were not co-equal partners with the Ministries and scientific organization.

## **4. Was there a broad public participation process?**

The reference document cites a few examples of as many as 200 individuals being present at scientific reviews and other junctures in the process. Extensive comments were received in writing and responses generated. Thus, it is fair to say there was broad public and private participation.

## **5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?**

Economic and social data gathering in Norway is remarkably extensive. All interest appeared to be included in the stakeholder lists. Specific efforts were made to include the perspectives of Sami people.

***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

No specific definition of stakeholders appears in the document; however the listing of stakeholders involved seems to be extensive. It seems that stakeholders were largely self-selected according to self-interest. [There is a complex arrangement where Norway may actually subvene participation costs of stakeholders but it is not discussed if this process took advantage of that arrangement.] Legislation in Norway requires the government to hear anyone who can be affected by a decision.

***7. In which parts of the process were stakeholders allowed to participate?***

The political process in the Storting initiated the process and the Storting is open to public engagement. As noted in the figure above, stakeholders were involved in developing the scientific basis, the assessment of impacts the evaluation of current pressures and finally on integration. Thus, the whole process “allowed” for public participation.

***8. What form was their participation?***

Review of results of scientific studies, assessment of impacts and integration. This took formal, i.e., written comments and informal, i.e., question and answers at public sessions, presentations, etc.

**F. Tools and Decision Support**

***1. Which decision support tools are used to inform spatial allocation decisions?***

In broad terms there were all manner of scientific studies of the issues relevant to the spatial planning – descriptive baselines, trends analysis, impacts assessments, conflict identification, geospatial mapping, etc. These led to what seems a negotiated agreement on how and where management should occur. As repeated below the use of risk assessments was not systematically applied nor were decision rules drafted and applied. However, the use of risk assessment is currently being discussed in the revision of the plan.

***2. How are key trade-off issues framed and formalized into decision support tools?***

This issue of trade-off analysis through formal decision support tools was recognized as a longer term goal than that addressed in the Barents Sea plan. It is anticipated that risk assessments and trade-off analysis will be part of the adaptive process of implementation between 2006 and 2020.

***3. How are trade-offs analyzed?***

In general, these are analyzed qualitatively in a negotiated plan consensus building process. The document on which this assessment is based recognizes the need for a systematic risk assessment and trade-off analysis using a formal procedure but it does not purport to have developed such an approach. From consideration of goals to proposed action implementation, there is a strong commitment to value added economic growth from utilization of the sea and its resources at the same time protecting the environment. This broad consideration guides the planning effort but it is not formalized in planning. Political trade-offs are discussed by the government at the cabinet level.

**4. Does the trade-off analysis consider market and non-market (e.g., ecosystem service value) economic components?**

The term ecosystem services is used one time in the Barents Sea plan document to indicate that the highly valuable marine tourism is supported by ecosystem services. A broader conceptualization and usage in analysis does not go beyond this level explicitly. Implicitly, many of the ecosystem service concepts clearly apply even if not stated. Cultural resources like shipwrecks and coastal archeological sites are identified as important.

**5. How does the plan recognize and deal with uncertainty and risk?**

Risk assessment and identification of various types of uncertainty is recognized as a need in the plan but it is anticipated to perform these analyses in the future. The discourse in the plan is about acute risk such as from a major shipping or oil platform disaster that would release toxic materials into the ocean and, most importantly, coastal environments of Norway. The working groups specifically deal with risk.

**6. Are decision support tools dynamic?**

Given the scant discussion in the plan of decision support tools it is safe to say that there is recognition that they must be dynamic. This is not to say that decision-making in the plan is not dynamic but it is not yet a formalized process.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Yes, a resounding positive on this.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)?**

So far, the conflict resolution in the planning process has to be seen as a negotiated agreement as opposed to resort to an alternative form of resolution, e.g., formally agreed decision rules in face of evidence, administrative law facilitators, etc. Focus seems to be on achieving consensus.

**9. What mechanisms are used to attempt to achieve the objectives (e.g., zoning, market-based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

At the ecosystem scale the primary mechanisms used have been geospatial mapping and designation of exclusive or multiple use zones. These are largely dictated by physical and ecosystem processes as well as human uses taking advantage of location and temporal distribution of activities. The plan results from extension of current and planned human activities. In the Barents Sea issues have been temporarily resolved – or so it seems until the next planning effort. This may be a function of relatively dispersed economic activity or discretely organized human activity such that coastal and marine spatial planning is more or less recognition of existing spatial distribution of uses and not so much about assessments of trade-offs. However, with the recent expansion of petroleum related activities this may change.

## **G. Monitoring and Performance Measures**

**1. What are the products of the marine spatial planning process?**

First, a set of reports from the three working groups to the Parliament, collected into a report called “The scientific basis for an update of the management plan for the Barents Sea and the sea areas off Lofoten.” On the basis of that and its own deliberations, the government will prepare a

Report to the Storting on which this assessment for the ESMWG of NOAA SAB is made. The agreements in the Barents Sea Plan rely on implementation at the sectoral level and this will involve further planning processes.

**2. What constitutes success of the plan?**

Success of the plan was not formally addressed therefore it is necessary to assume that meeting its objectives is what would constitute success.

**3. Have formal metrics of success of the plan (e.g., indicators and reference targets been adopted? If so, what are they?**

In general, formal metrics have not been adopted except with respect to the three specific target areas. A set of indicators has been developed for the monitoring of the developments in the plan area.

**4. Does the plan incorporate monitoring?**

Yes, it instigates a major new monitoring effort.

**5. Is adaptive management an explicit component?**

Yes, it envisions response to monitoring results and implementation reports on a two year cycle.

**6. Is adaptive management formally structured around response to feedback from monitoring?**

Yes, it envisions response to monitoring results and implementation reports on a two year cycle.

**7. If so, are the responses formally rule-based?**

No, responses are not formally rule-based.

## **H. References**

Report No. 8 to the Storting. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Recommendation of 31 March 2006. The Royal Norwegian Ministry of the Environment.

Report No. 12 to the Storting (2001-2001). Protecting the Riches of the Sea. Recommendation of 15 March 2001. The Royal Norwegian Ministry of the Environment.

[http://www.imr.no/temasider/havomrader\\_og\\_okosystem/barentshavet/forvaltningsplan/nb-no](http://www.imr.no/temasider/havomrader_og_okosystem/barentshavet/forvaltningsplan/nb-no)

<http://www.regjeringen.no/en/dep/md/Selected-topics/hav--og-vannforvaltning/integrated-management-of-the-barents-sea.html?id=87148>

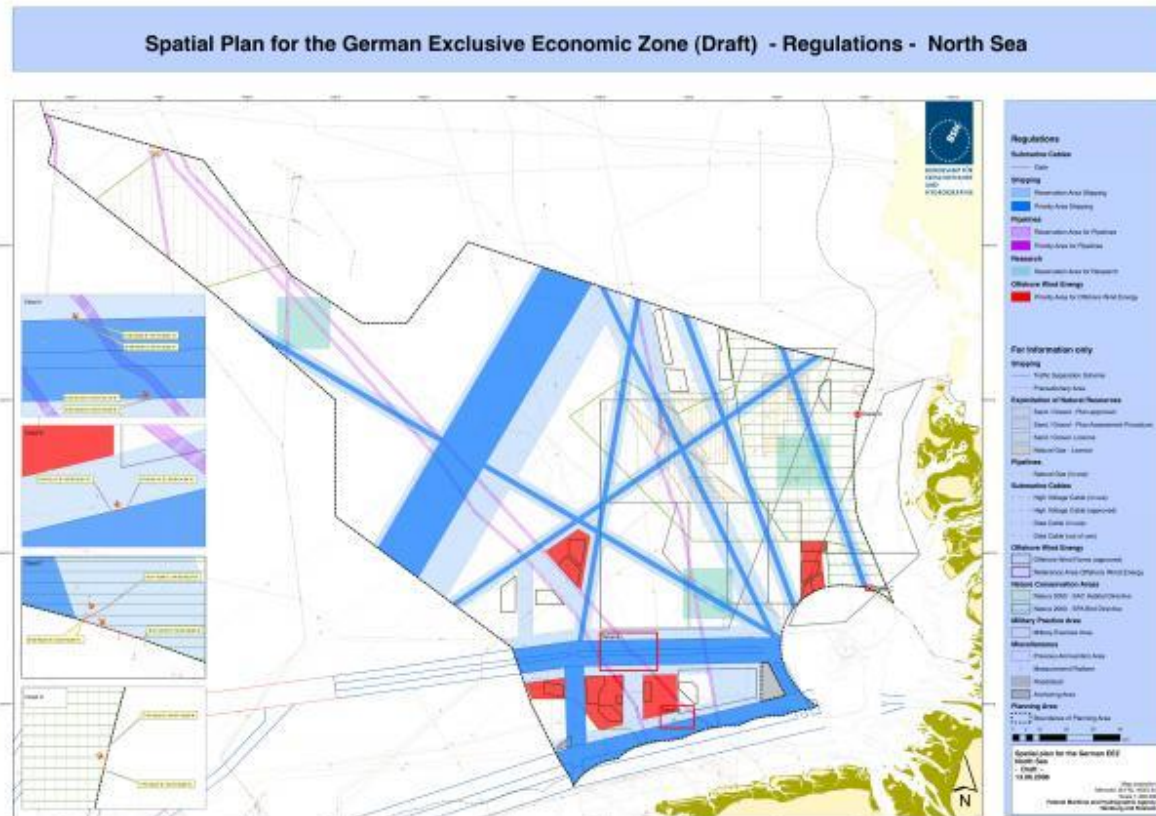
<http://www.regjeringen.no/nb/dep/md/tema/hav--og-vannforvaltning/forvaltningsplan-barentshavet.html?id=87148>

Miljøverndepartementet. 2011. Melding til Stortinget: Oppdatering av forvaltningsplanen for det marine miljø i Barentshavet og havomradene utenfor Lofoten. Miljøverndepartementet. Oslo. 11 mars. [Environmental Department. 2011. Report to the Parliament: Updating of the Management Plan for the Marine Miljø in the Barents Sea and Sea Areas off the Lofoten Islands. Environmental Department. Oslo. March 11. 224 pp.]

Olsen, E., Gjørseter, H., Røttingen, I., Dommasnes, A., Fossum, P., and Sandberg, P. 2007. The Norwegian ecosystem-based management plan for the Barents Sea. – ICES Journal of Marine Science, 64: 599–602.

von Quillfeldt, S.H. [Ed.]. 2010. Det faglige grunnlaget for oppdateringen av forvaltningsplanen for Barentshavet og havomradene utenfor Lofoten. Fisken og havet. Saernummer 1. 2010 Havforskningsinstituttet. [The factual basis for updating of the management plan for the Barents Sea and sea areas off the Lofoten Islands. Fisheries and the Ocean. Special Number 1, Institute for Marine Research. 334 pp.]

# QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The German Exclusive Economic Zone in the North Sea



## A. Objectives

### *1. What are the stated objectives of the plan, if any?*

The Spatial Plan addresses the targets and principles of spatial planning, with regard to its economic and scientific use, with regard to safety and efficiency of maritime traffic as well as for the protection of the marine environment.

The following guidelines have been formulated for spatial development in the EEZ:

1. Securing and strengthening maritime traffic;
2. Strengthening economic capacity through orderly spatial development and optimization of spatial use;
3. Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy;
4. Long-term sustainable use of the properties and potential of the EEZ through reversible uses, economic use of space, and priority of marine uses; and
5. Securing natural resources by avoiding disruptions to and pollution of the marine environment.

**2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?**

Conceptual and operational.

Conceptual: “Stationary uses must be reversible... Multiple use of space should be sought where uses can be combined... We must strive to preserve, protect and promote natural functions, systems and processes... Disruptions to and pollution of the ecosystem, sea and related natural functions, systems and processes must be avoided; biological diversity must be promoted and preserved... The precautionary principle is of special importance in the EEZ... The focus of marine environmental protection is on marine fauna and flora including their biotopes and habitats and on the bird migration routes... Regenerability and sustainable use of natural resources must be ensured for the long term... Also sea water quality, hydrography, and sediment conditions are part of the marine environment...”<sup>1</sup>

Operational: The plan identifies targets and principles for shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment.

**3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?**

The spatial plan objectives came out of international conventions (in which Germany is a contracting party), EU directives, and national objectives. Of particular importance are the United Nations Convention on the Law of the Sea (UNCLOS), the Federal Government’s sustainability strategy, and NATURA 2000 areas.

**B. Scope**

**1. Does the plan consider all uses or just selected sectors?**

Selected Sectors: shipping, the exploitation of non-living resources, laying of pipelines and submarine cables, scientific marine research, wind power production, fisheries and mariculture, and protection of the marine environment.<sup>2</sup> Does not consider: Military use, Leisure and Tourism, Ammunition dumpsites, or Sediment dumping (which is not being carried out or planned in German EEZ)<sup>3</sup>

**2. How long did the spatial planning process take (years)?**

Approximately 5.5 years

June 24, 2004: §18 of the Federal Spatial Planning Act introduced June 24, 2004.<sup>4</sup>

April 21, 2005: Discussion with representatives of authorities and associations about scope and amount of detail of environmental report.<sup>5</sup>

Aug. 26, 2008: Oral hearings with bordering states.

Sept. 25, 2008: Oral hearings with bordering states.

Oct. 6, 2008: Oral hearings with authorities and the public.

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<sup>1</sup> North Sea Spatial Plan, p. 4.

<sup>2</sup> North Sea Spatial Plan, p. 3.

<sup>3</sup> North Sea Spatial Plan, pp. 22-23.

<sup>4</sup> North Sea Spatial Plan, p. 3.

<sup>5</sup> North Sea Spatial Plan, p. 30.

Sept. 21, 2009: Ordinance enacted.

**3. Were particular steps especially demanding of time or resources?**

Data and information collection and assessment, writing the Strategic Environmental Assessment (SEA) report.

**4. How long does the plan apply? What is the planning interval for update and revision?**

There is no fixed end to the plan or a set interval for update and revision, although a local expert says that updates will be made as necessary and may be done every 5-7 years

**5. What was the funding structure for this project?**

Not stated. It appears that funding is through the national government and/or through EU.

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

German Exclusive Economic Zone (EEZ): 28,600 km<sup>2</sup>

**7. How does plan scale match ecosystem scale?**

It does not match ecosystem scale.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

German EEZ: 28,600 km<sup>2</sup>

**C. Authority**

**1. What is the legal basis for CMSP?**

Legislative. Statutory ordinance due to § 18a Federal Spatial Planning Act, which was introduced by the act of June 24, 2004 into the Federal Spatial Planning Act.<sup>6</sup>

**2. What institutional change, if any, was made as part of creating the plan?**

Does not appear that there was any institutional change.

**3. What governance and institutional arrangements are used to implement the plan?**

Federal governmental agency: Federal Maritime and Hydrographic Agency (BSH) was responsible for the strategic environmental assessment and is responsible for monitoring efforts for the plan.<sup>7</sup>

**D. Data**

**1. What data are used?**

Data type	Quantitative time series	Quantitative "snapshot"	Qualitative information	Expert opinion	Not available	Not applicable
Physical	x		x			
Geological	x		x			
Chemical	x		x			
Biological	x		x			
Economic						

<sup>6</sup> North Sea Spatial Plan, p. 3.

<sup>7</sup> Non-technical summary, p. 80.



Social						
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**2. Were there clear criteria for data inclusion? If so, what were they?**

It appears so: “The scope and amount of detail of the environmental report (scoping) were discussed, in co-operation with the Federal Agency for Nature Conservation (BfN), at 21 April 2005 with representatives of authorities and associations.”<sup>8</sup>

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Unknown.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The Federal Ministry of Transport, Building and Urban Affairs issued the ordinance for the plan. Federal Agency for Nature Conservation contributed to environmental assessment report. The environmental report was created by the Federal Maritime and Hydrographic Agency (BSH). Drafts of the spatial plan and the environmental report were made available to bordering states, the German authorities and the public.

**2. Did they have equal status at all parts of the process?**

It does not appear so.

**3. Were stakeholders included in the planning process?**

Yes. There were two “participation rounds” in which the bordering states, German authorities, and the public had the opportunity to issue statements.

**4. Was there a broad public participation process?**

Yes, there were two oral hearings with more than 100 participants each. Most participants represented agencies and NGOs.

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

Does not appear to have included larger scale economic and social data.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Stakeholders are not defined in the plan.

**7. In which parts of the process were stakeholder allowed to participate?**

Bordering states, German authorities, and the public were invited to review of environmental report and spatial plan drafts and issue oral and written statements on the drafts.

**8. What form was their participation?**

Participation rounds. Oral and written statements were received in drafting the plan.

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<sup>8</sup> North Sea Spatial Plan, p. 30.

## **F. Tools & Decision Support**

### ***1. Which decision support tools are used to inform spatial allocation decisions?***

Targets and principles are outlined in depth for the seven principal uses (shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment are listed in depth on pages 5-27.

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>9</sup>

### ***2. How are key trade-off issues framed and formalized into decision support tools?***

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>10</sup>

### ***3. How are trade-offs analyzed?***

Shipping is granted priority over the other spatially significant uses in the priority areas for shipping as indicated in the map. To the extent spatially significant planning, measures and projects are not compatible with the function of the shipping priority areas they are not permitted.<sup>11</sup> Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>12</sup>

### ***4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

“Ecosystem services” are not mentioned. However, the environmental assessment does take into account “natural scenery,” “tangible assets,” and “cultural heritage.”<sup>13</sup>

### ***5. How does the plan recognize and deal with uncertainty and risk?***

The plan does not explicitly deal with uncertainty and risk. There is recognition of information gaps and lack of evaluation criteria in the context of: Soil, Water, Phytoplankton and Zooplankton, Benthos, Fishes, Marine Mammals, Seabirds and resting birds, Migratory Birds, Bats.<sup>14</sup>

### ***6. Are the decision support tools dynamic?***

Not explicitly.

### ***7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?***

Not explicitly stated in the plan.

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<sup>9</sup> North Sea Spatial Plan, p. 5.

<sup>10</sup> North Sea Spatial Plan, p. 5.

<sup>11</sup> North Sea Spatial Plan, p. 6.

<sup>12</sup> North Sea Spatial Plan, p. 5.

<sup>13</sup> Non-technical Summary (North Sea), pp. 57-58.

<sup>14</sup> Non-technical summary (North Sea), pp. 75-80.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Conflict resolution is not addressed in the plan.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

Targets and principles are outlined in depth for the seven principal uses (shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment are listed in depth on pages 5-27.

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>15</sup>

## **G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

Legal enactment of an ordinance.

**2. What constitutes success of the plan?**

To have a legally binding plan.

**3. Does the plan incorporate monitoring?**

Yes. The plan calls for project related impact monitoring efforts to be implemented at the project level, and uses existing national and international monitoring programs in the North Sea.<sup>16</sup>

**4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

No.

**5. Is adaptive management an explicit component?**

No.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

No.

**7. If so, are the responses formally rule-based?**

No.

## **H. References**

The Federal Ministry of Transport, Building and Urban Affairs. (2009d). *Spatial Plan for the German Exclusive Economic Zone in the North Sea*. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs.

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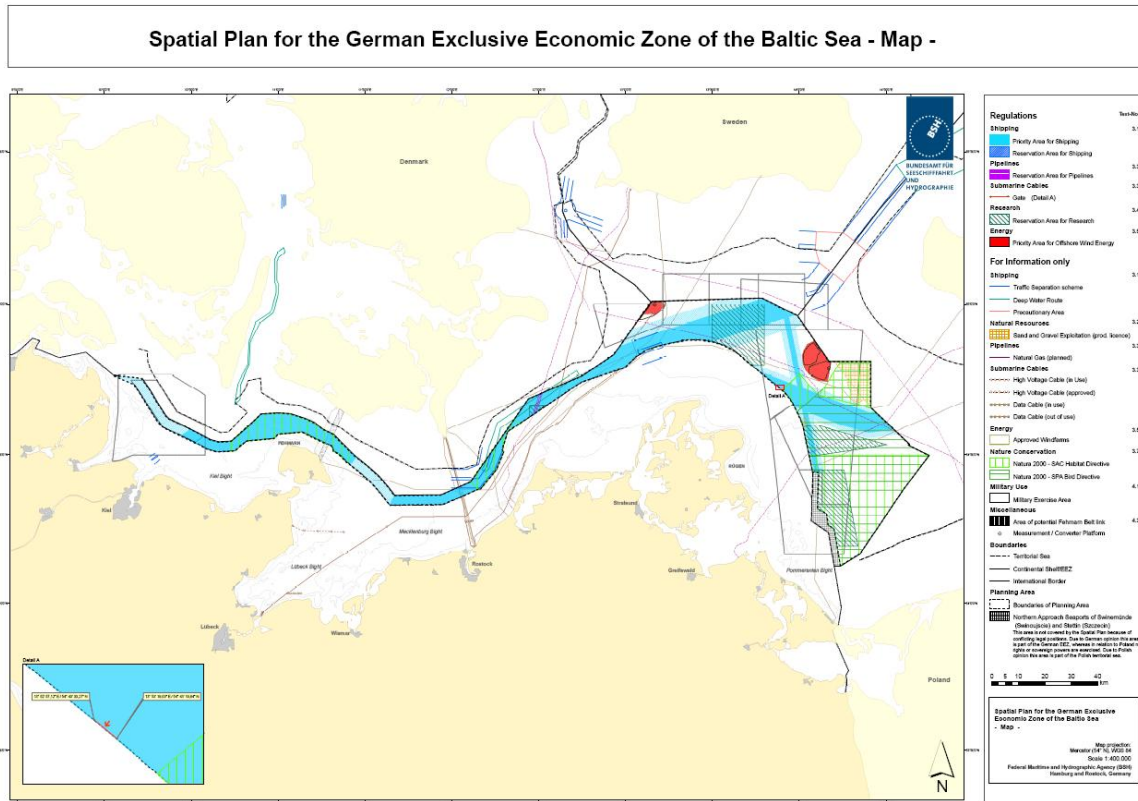
<sup>15</sup> North Sea Spatial Plan, p. 5.

<sup>16</sup> North Sea Spatial Plan, p. 31.

The Federal Ministry of Transport, Building and Urban Affairs. (2009b). *Non-technical Summary (North Sea)*. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs.

Tiefensee, W. (2009). *Ordinance on Spatial Planning in the German Exclusive Economic Zone in the North Sea*. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs.

# QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The German Exclusive Economic Zone in the Baltic Sea



## A. Objectives

### *1. What are the stated objectives of the plan, if any?*

Establishes targets and principles of spatial planning in the German Exclusive Economic Zone (EEZ) regarding economic and scientific uses, ensuring the safety and efficiency of navigation, as well as protection of the marine environment<sup>17</sup>

The following guidelines have been formulated for spatial development in the EEZ:

1. Securing and strengthening maritime traffic;
2. Strengthening economic capacity through orderly spatial development and optimization of spatial use;
3. Promotion of offshore wind energy use in accordance with the Federal Government's sustainability strategy;
4. Long-term sustainable use of the properties and potential of the EEZ through reversible uses, economic use of space, and priority of marine uses; and

<sup>17</sup> Baltic Sea Spatial Plan, p. 3.

5. Securing natural resources by avoiding disruptions to and pollution of the marine environment.

**2. Are the objectives conceptual (e.g., conserve biodiversity) and/or operational (e.g., protect 15% of the coastline)?**

Conceptual and operational.

Conceptual in that there are broad, overarching goals. For example: “Stationary uses must be reversible... Multiple use of space should be sought where uses can be combined... We must strive to preserve, protect and promote natural functions, systems and processes... Disruptions to and pollution of the ecosystem, sea and related natural functions, systems and processes must be avoided; biological diversity must be promoted and preserved... The precautionary principle is of special importance in the EEZ... The focus of marine environmental protection is on marine fauna and flora including their biotopes and habitats and on the bird migration routes... Regenerability and sustainable use of natural resources must be ensured for the long term... Also sea water quality, hydrography, and sediment conditions are part of the marine environment...”<sup>18</sup>

Operational. The plan identifies targets and principles for shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment.

**3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?**

The spatial plan objectives came out of international conventions (in which Germany is a contracting party), EU directives, and national objectives. Of particular importance are the United Nations Convention on the Law of the Sea (UNCLOS); Helsinki Commission (HELCOM) “Baltic Sea Action Plan;” EU directives including Flora Fauna Habitat Directive, Birds Directive, Water Directive, and Common Fisheries Policy; the Federal Government Strategy for the Use of Wind Energy at Sea, and NATURA 2000 areas within the EEZ.

## **B. Scope**

**1. Does the plan consider all uses or just selected sectors?**

Selected Sectors: shipping, the exploitation of non-living resources, laying of pipelines and submarine cables, scientific marine research, wind power production, fisheries and mariculture, and protection of the marine environment.<sup>19</sup> Does not consider: Military use, Leisure and Tourism, Ammunition dump sites, or Sediment dumping (which is not being carried out or planned in German EEZ)<sup>20</sup>

**2. How long did the spatial planning process take (years)?**

Approximately 5.5 years.

June 24, 2004: §18 Federal Spatial Planning Act introduced by the act of June 24, 2004.<sup>21</sup>

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<sup>18</sup> Baltic Sea Spatial Plan, p. 4.

<sup>19</sup> Baltic Sea Spatial Plan, p. 3.

<sup>20</sup> Baltic Sea Spatial Plan, pp. 22-23.

<sup>21</sup> Baltic Sea Spatial Plan, p. 3.

May 10, 2005: Discussion with representatives of authorities and associations about scope and amount of detail in environmental report.<sup>22</sup>

Sept. 24-25, 2008, Sept. 30, 2008, Dec. 12, 2008, and Sept. 29, 2009: Oral hearings with bordering states, German authorities, and/or the public.<sup>23</sup>

Dec. 10, 2009: Ordinance signed and enacted.<sup>24</sup>

**3. *Were particular steps especially demanding of time or resources?***

Data and information collection and assessment, writing the Strategic Environmental Assessment (SEA) report.

**4. *How long does the plan apply? What is the planning interval for update and revision?***

There is no fixed end to the plan or a set interval for update and revision, although a local expert says that updates will be made as necessary and may be done every 5-7 years

**5. *What was the funding structure for this project?***

It appears that funding is through the national government and/or through the EU.

**6. *At what spatial scale was the plan developed (km<sup>2</sup>)?***

4,500 km<sup>2</sup> (German EEZ in the Baltic Sea).<sup>25</sup>

**7. *How does plan scale match ecosystem scale?***

It does not match ecosystem scale. This plan is part of Germany's commitment to the Helsinki Convention (HELCOM) Baltic Sea Action Plan to create a spatial plan for its jurisdiction.

**8. *What is the spatial scale for implementation (km<sup>2</sup>)?***

4,500 km<sup>2</sup> (German EEZ in the Baltic Sea).

**C. Authority**

**1. *What is the legal basis for CMSP?***

Legislative. Based on § 18a Federal Spatial Planning Act, introduced by the act of June 24, 2004. The spatial plan is a legal ordinance enacted by the Federal Ministry of Transport, Building and Urban Affairs, signed on December 10, 2009.

**2. *What institutional change, if any, was made as part of creating the plan?***

Does not appear that there was any institutional change.

**3. *What governance and institutional arrangements are used to implement the plan?***

Federal governmental agency: Federal Maritime and Hydrographic Agency (BSH) was responsible for the strategic environmental assessment and is responsible for monitoring efforts for the plan.<sup>26</sup>

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<sup>22</sup> Baltic Sea Spatial Plan, p. 23.

<sup>23</sup> Baltic Sea Spatial Plan, p. 24.

<sup>24</sup> Federal Ministry of Transport, Building and Urban Affairs Ordinance of Dec. 10<sup>th</sup> 2009, § 2.

<sup>25</sup> [http://www.unesco-ioc-marinesp.be/msp\\_practice/germany\\_north\\_baltic\\_seas](http://www.unesco-ioc-marinesp.be/msp_practice/germany_north_baltic_seas)

<sup>26</sup> Non-technical summary, p. 80.

## **D. Data**

### ***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X		X			
Geological	X		X			
Chemical	X		X			
Biological	X		X			
Economic						
Social						

### ***2. Were there clear criteria for data inclusion? If so, what were they?***

It appears so: “The scope and amount of detail of the environmental report (scoping) were discussed, in co-operation with the Federal Agency for Nature Conservation (BfN), at 21 April 2005 with representatives of authorities and associations.”<sup>27</sup>

### ***3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?***

Unknown.

## **E. Participants**

### ***1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?***

The Federal Ministry of Transport, Building and Urban Affairs issued the ordinance for the plan. Federal Agency for Nature Conservation contributed to environmental assessment report. The environmental assessment report was created by the Federal Maritime and Hydrographic Agency (BSH). Drafts of the Spatial Plan were open to bordering states, German authorities, and the public.<sup>28</sup>

### ***2. Did they have equal status at all parts of the process?***

It does not appear so.

### ***3. Were stakeholders included in the planning process?***

Yes. There were “participation rounds” in which the bordering states, German authorities, and the public had the opportunity to issue statements.

### ***4. Was there a broad public participation process?***

Yes, there were two oral hearings with more than 100 participants each. Most participants represented agencies and NGOs.

### ***5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?***

Does not appear to have included larger scale economic and social data.

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<sup>27</sup> Baltic Sea Spatial Plan, p. 23.

<sup>28</sup> Baltic Sea Spatial Plan, p. 24.



**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Stakeholders are not defined in the plan.

**7. In which parts of the process were stakeholder allowed to participate?**

Public hearing and comment before enactment of legislation.

**8. What form was their participation?**

Bordering states, German authorities, and the public were invited to review of environmental report and spatial plan drafts and issue oral and written statements on the drafts.

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

Targets and principles are outlined in depth for the seven principal uses (shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment are listed in depth on pages 5-22.

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>29</sup>

**2. How are key trade-off issues framed and formalized into decision support tools?**

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>30</sup>

**3. How are trade-offs analyzed?**

Shipping is granted priority over the other spatially significant uses in the priority areas for shipping as indicated in the map. To the extent spatially significant planning, measures and projects are not compatible with the function of the shipping priority areas they are not permitted.<sup>31</sup>

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>32</sup>

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

The term “ecosystem services” does not appear in the plan or environmental assessment. Environmental assessment does account for “natural scenery,” “tangible assets,” and “cultural heritage” in its analysis.

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<sup>29</sup> Baltic Sea Spatial Plan, p. 5.

<sup>30</sup> Baltic Sea Spatial Plan, p. 5.

<sup>31</sup> Baltic Sea Spatial Plan, p. 5.

<sup>32</sup> Baltic Sea Spatial Plan, p. 5.

**5. How does the plan recognize and deal with uncertainty and risk?**

The plan does not explicitly deal with uncertainty and risk. There is recognition of information gaps and lack of evaluation criteria in the context of: Soil, Water, Phytoplankton and Zooplankton, Benthos, Fishes, Marine Mammals, Seabirds and resting birds, Migratory Birds, Bats.<sup>33</sup>

**6. Are the decision support tools dynamic?**

Not explicitly.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Not explicitly.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Conflict resolution is not addressed in plan.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

Targets and principles are outlined in depth for the seven principal uses (shipping, exploitation of non-living resources, pipelines and submarine cables, marine scientific research, energy production (wind energy in particular), fisheries and mariculture, and the marine environment are listed in depth on pages 5-22.

Priority areas were designated where other uses are prohibited unless they are compatible with the priority uses. Reservation areas were designated for uses that are considered particularly important when balancing spatially significant competing uses.<sup>34</sup>

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

Legal enactment of an ordinance.

**2. What constitutes success of the plan?**

A legally binding plan.

**3. Does the plan incorporate monitoring?**

Yes. The plan calls for project related impact monitoring efforts to be implemented at the project level, and uses existing national and international monitoring programs in the North Sea.<sup>35</sup>

**4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

No.

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<sup>33</sup> Non-technical summary (Baltic Sea), pp. 72-77.

<sup>34</sup> Baltic Sea Spatial Plan, p. 5.

<sup>35</sup> Baltic Sea Spatial Plan, p. 24. Also, Non-technical Summary (Baltic Sea), pp. 78-79.

**5. Is adaptive management an explicit component?**

No. Adaptive management is not explicit in plan.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

No.

**7. If so, are the responses formally rule-based?**

No.

**H. References**

The Federal Ministry of Transport, Building and Urban Affairs. (2009c). *Spatial Plan for the German Exclusive Economic Zone in the Baltic Sea*. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs.

The Federal Ministry of Transport, Building and Urban Affairs. (2009a). *Non-technical Summary (Baltic Sea)*. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs.

*Ordinance on Spatial Planning in the German Exclusive Economic Zone in the Baltic Sea*. December 10, 2009. (Unofficial, Trans.). Berlin, Germany: The Federal Ministry of Transport, Building and Urban Affairs

[http://www.unesco-ioc-marinesp.be/msp\\_practice/germany\\_north\\_baltic\\_seas](http://www.unesco-ioc-marinesp.be/msp_practice/germany_north_baltic_seas)

## **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Baltic Sea Action Plan**

### **A. Objectives**

#### ***1. What are the stated objectives of the plan, if any?***

“To achieve a Baltic Sea in Good Environmental Status by 2012”<sup>36</sup>

The plan states four (4) strategic goals, all “ecological”:

1. Baltic Sea unaffected by eutrophication;
2. Baltic Sea with life undisturbed by hazardous substances;
3. Maritime activities carried out in an environmentally friendly way;
4. Favorable conservation status of Baltic Sea biodiversity.<sup>37</sup>

#### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

The plan has the “conceptual” vision to have “A healthy Baltic Sea environment, with diverse biological components functioning in balance, resulting in a good environmental/ecological status and supporting a wide range of sustainable human economic and social activities having biodiversity at its core and which builds upon concepts such as ‘favorable conservation status’ and ‘good ecological and good environmental status.’”<sup>38</sup>

It is operational in that for each of the 4 goals it:

1. States that management decisions will be based on sub-regional targets;
2. Identifies and uses appropriate indicators to measure progress towards targets;
3. Plans to periodically review and revise objectives and targets;
4. Creates a monitoring and assessment program.<sup>39</sup>

#### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Identified during the planning process. The objectives were not stated or mandated in the “The Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992, entered into force on 17 January 2000.” (a/k/a “Helsinki Convention” or “HELCOM”). They were presented at the “Kick-off Stakeholder Conference on the development of the HELCOM Baltic Sea Action Plan” in March 2006.<sup>40</sup>

### **B. Scope**

#### ***1. Does the plan consider all uses or just selected sectors?***

All uses. The plan is designed around the four (4) areas: eutrophication, hazardous substances, biodiversity and nature conservation, and maritime activities. That said the plan explicitly adopts an ecosystem approach “based on an integrated management of all human activities impacting the marine environment,”<sup>41</sup> and “stresses the need for integrated management of

<sup>36</sup> HELCOM Baltic Sea Action Plan, p. 5.

<sup>37</sup> HELCOM Baltic Sea Action Plan, p. 4.

<sup>38</sup> HELCOM Baltic Sea Action Plan, p. 4.

<sup>39</sup> HELCOM Baltic Sea Action Plan, p. 4.

<sup>40</sup> [http://www.helcom.fi/BSAP/kickoff/en\\_GB/kick\\_off/](http://www.helcom.fi/BSAP/kickoff/en_GB/kick_off/).

<sup>41</sup> HELCOM Baltic Sea Action Plan, p. 3.

human activities and the need to take into account their impact on the marine environment in all policies and programmes implemented in the Baltic Sea region.”<sup>42</sup>

## **2. How long did the spatial planning process take (years)?**

As for the HELCOM Plan: The HELCOM website says “after 18 months of drafting and negotiation” the plan was created.<sup>43</sup> Drafting of the “new” HELCOM Baltic Sea Action Plan began in 2005.<sup>44</sup> It was presented at the Stakeholder Conference in March 2006 and the 2<sup>nd</sup> Stakeholder Conference in March 2007, underwent further negotiations from April to October 2007, and was adopted at the HELCOM Ministerial Meeting on 15 November 2007.<sup>45</sup>

## **3. Were particular steps especially demanding of time or resources?**

Unknown.

## **4. How long does the plan apply? What is the planning interval for update and revision?**

There is no stated “end” to the plan. The overall goal is to achieve “Good Environmental Status by 2021,”<sup>46</sup> so it can be assumed that the plan goes at least through 2021. Also, there are time lines and targets for each of the four (4) categories: Eutrophication, Hazardous Substances, Biodiversity and Nature Conservation, and Maritime Activities.

## **5. What was the funding structure for this project?**

The Plan lists sources of potential funding, including state budgets, EU’s structural funds including the Cohesion Fund, EU Regional Fund, EU Neighbourhood and Partnership Instruments, European Neighbourhood and Partnership Initiative (ENPI), Northern Dimension Environmental Partnership (NDEP), non-profit foundations, and private companies.<sup>47</sup>

## **6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

The Baltic Sea: 415,266 km<sup>2</sup><sup>48</sup>

## **7. How does plan scale match ecosystem scale?**

It matches ecosystem scale. The plan “covers the whole of the Baltic Sea area, including inland waters as well as the water of the sea itself and the sea-bed. Measures are also taken in the whole catchment area of the Baltic Sea to reduce land-based pollution.”<sup>49</sup>

## **8. What is the spatial scale for implementation (km<sup>2</sup>)?**

Collectively, the Plan covers the entire Baltic Sea (415,266 km<sup>2</sup>). It is implemented on the national, member state, level.

## **C. Authority**

### **1. What is the legal basis for CMSP?**

International Convention. “The Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992, entered into force on 17 January 2000.” (Helsinki Convention a/k/a

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<sup>42</sup> HELCOM Baltic Sea Action Plan, p. 4.

<sup>43</sup> [http://www.helcom.fi/BSAP/MinisterialMeeting/en\\_GB/Ministerial\\_Meeting\\_2007/](http://www.helcom.fi/BSAP/MinisterialMeeting/en_GB/Ministerial_Meeting_2007/).

<sup>44</sup> [http://www.helcom.fi/BSAP/en\\_GB/intro/](http://www.helcom.fi/BSAP/en_GB/intro/).

<sup>45</sup> [http://www.helcom.fi/BSAP/en\\_GB/intro/](http://www.helcom.fi/BSAP/en_GB/intro/).

<sup>46</sup> HELCOM Baltic Sea Action Plan, p. 5.

<sup>47</sup> HELCOM Baltic Sea Action Plan, p. 33.

<sup>48</sup> <http://www.saveourbalticsea.com/our-baltic-sea/about-the-baltic-sea>.

<sup>49</sup> [http://www.helcom.fi/Convention/en\\_GB/convention/](http://www.helcom.fi/Convention/en_GB/convention/).

“HELCOM”). Contracting parties to HELCOM are Denmark, Estonia, European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden.<sup>50</sup>

**2. What institutional change, if any, was made as part of creating the plan?**

No institutional change. This plan was made “without prejudice to international agreements and legislation of the European Community.”<sup>51</sup>

**3. What governance and institutional arrangements are used to implement the plan?**

Implementation is at the national, member state, level.

**D. Data**

**1. What data are used?**

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical						
Geological						
Chemical	x					
Biological	x					
Economic						
Social						

**2. Were there clear criteria for data inclusion? If so, what were they?**

Not explicitly. There is reference to using “Best Available Techniques,” “Best Available Technology,” and “Best Environmental Practices.”

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Unknown.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

Representatives from member state government, European Union, scientific and business communities, academia, major regional organizations, and NGO’s.

The “Kick-off Stakeholder Conference” in March 2006 included “up to 200 participants, representing scientific and business communities, governments of the coastal countries, as well as major regional organizations [who] met to discuss the objectives of the strategy and to provide input to its further development”<sup>52</sup>

The “2<sup>nd</sup> Stakeholder Conference” in March 2007 included “up to 200 delegates, representing governments, businesses, and academia of the coastal countries, as well as the European Union,

<sup>50</sup> [http://www.helcom.fi/Convention/en\\_GB/convention/](http://www.helcom.fi/Convention/en_GB/convention/).

<sup>51</sup> HELCOM Baltic Sea Action Plan, p. 5.

<sup>52</sup> [http://www.helcom.fi/BSAP/kickoff/en\\_GB/kick\\_off/](http://www.helcom.fi/BSAP/kickoff/en_GB/kick_off/).

major regional organizations and NGO's [who] met to discuss the new strategy and provide input into its further development."<sup>53</sup>

**2. Did they have equal status at all parts of the process?**

No. It does not appear that they had equal status.

**3. Were stakeholders included in the planning process?**

No. It does not appear that stakeholders were included in the planning process.

**4. Was there a broad public participation process?**

It does not appear that there was any public participation in the creation process. The plan encourages stakeholder and public participation in implementation of the plan.

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

It does not appear that larger-scale economic and social data was used in planning process

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

National authorities, Politicians, IFIs, other Baltic Sea regional bodies, industry, scientific community, private foundations and NGOs.

**7. In which parts of the process were stakeholder allowed to participate?**

Annual "Stakeholder conferences."

**8. What form was their participation?**

Annual "Stakeholder conferences."

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

"HELCOM Contracting Parties committed themselves to develop, by 2010, as well as test, apply and evaluate by 2012, in co-operation with other relevant international bodies, broad-scale, cross-sectoral, marine spatial planning principles based on the Ecosystem Approach."<sup>54</sup>

HELCOM is using GIS and assimilating data from contracting member states into databases, which are available on the HELCOM website: [http://www.helcom.fi/GIS/en\\_GB/HelcomGIS/](http://www.helcom.fi/GIS/en_GB/HelcomGIS/)

**2. How are key trade-off issues framed and formalized into decision support tools?**

Unknown.

**3. How are trade-offs analyzed?**

Trade-offs are not analyzed in the plan. There is an acknowledgement that "when selecting the necessary management measures within different sectors, focus shall be put on cost-benefit and cost-efficiency taking in account economic and social sustainability in the Baltic Sea Region."<sup>55</sup>

These measures have not been done.

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<sup>53</sup> [http://www.helcom.fi/BSAP/2nd/en\\_GB/2nd\\_Stakeholder\\_Outcome/](http://www.helcom.fi/BSAP/2nd/en_GB/2nd_Stakeholder_Outcome/)

<sup>54</sup> [http://www.helcom.fi/BSAP/3rd/en\\_GB/3rd\\_St\\_Conf\\_outcome/](http://www.helcom.fi/BSAP/3rd/en_GB/3rd_St_Conf_outcome/).

<sup>55</sup> HELCOM Baltic Sea Action Plan, p. 4.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

The plan acknowledges the need to support sustainable use of ecosystem goods and services.<sup>56</sup>

**5. How does the plan recognize and deal with uncertainty and risk?**

The plan recognizes and deals with risk. With many issues the plan sets a timetable to develop and agree upon a common methodology for the assessment of risk, finalize the assessment, quantify the emergency and response resources, and identify gaps. The plan is “aware” of uncertainty, stating that a large number of problems have yet to be addressed and that major threats still persist which are hindering restoration, protection, and sustainable utilization of the marine goods and services.<sup>57</sup>

**6. Are the decision support tools dynamic?**

Not explicitly.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Yes. “HELCOM’s monitoring and assessment programme will contribute to an improved scientific understanding of the marine environment that will in turn contribute to the periodic review of the objectives, associated targets and indicators, and will be decisive when determining the need for further management measures.”<sup>58</sup>

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Conflict Resolution is addressed in Article 26 of the Helsinki Convention. Conflicting parties should first attempt to settle dispute through negotiation. If negotiation is unsuccessful, then disputes will be settled through mediation by a third Contracting Party, a qualified international organization, or a qualified person. Finally, if that is unsuccessful, disputes are submitted to an ad hoc arbitration tribunal, to a permanent arbitration tribunal, or to the International Court of Justice.<sup>59</sup>

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

There is reference in the plan to using “Best Available Techniques,” “Best Available Technology,” and “Best Environmental Practices” to achieve the objectives.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

The plan sets a timetable for contracting parties to create marine spatial plans for their jurisdictional waters.

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<sup>56</sup> HELCOM Baltic Sea Action Plan, p. 3.

<sup>57</sup> HELCOM Baltic Sea Action Plan, p. 3.

<sup>58</sup> HELCOM Baltic Sea Action Plan, p. 4.

<sup>59</sup> Helsinki Convention, Article 26, p. 11.



“HELCOM Contracting Parties committed themselves to develop, by 2010, as well as test, apply and evaluate by 2012, in co-operation with other relevant international bodies, broad-scale, cross-sectoral, marine spatial planning principles based on the Ecosystem Approach.”<sup>60</sup>

**2. What constitutes success of the plan?**

“To achieve a Baltic Sea in Good Environmental Status by 2021.”<sup>61</sup> The plan is also sets detailed timelines for achieving milestones within the four (4) strategic goals in the years leading up to 2021.

**3. Does the plan incorporate monitoring?**

Yes. The entire plan incorporates monitoring.

**4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

Yes. Eutrophication: nutrient reduction targets for phosphorus and nitrogen was identified. Reduction requirements were allocated to each country<sup>62</sup> (pgs. 8-9). Summertime water transparency: indicator and targets (p. 76); Hazardous Substances: indicators and targets (pgs. 81-82); Nature Conservation and Biodiversity: indicators and targets (pgs. 83-84); Maritime Activities: indicators and targets (pgs. 84-85).

**5. Is adaptive management an explicit component?**

Yes. The Preamble to the HELCOM Baltic Sea Action Plan explicitly states that the plan will pursue adaptive management principles and that the objectives and targets should be periodically reviewed and revised using a harmonized approach and the most updated information.<sup>63</sup>

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

It is not explicitly stated, but yes. The plan sets detailed timelines for achieving interim goals and sets review periods to assess whether the goals are being met, if existing measures are working, and if adjustments need to be made.

**7. If so, are the responses formally rule-based?**

No.

**H. References**

Helsinki Commission: Baltic Marine Environment Protection Commission. (2008). *Convention on the Protection of the Marine Environment of the Baltic Sea Area*. Helsinki, Finland: Helsinki Commission.

Helsinki Commission: Baltic Marine Environment Protection Commission. (2007). *HELCOM Baltic Sea Action Plan*. Helsinki, Finland: Helsinki Commission.

Helsinki Commission website: <http://www.helcom.fi/>.

Save Our Baltic Sea website: <http://www.saveourbalticsea.com/our-baltic-sea/about-the-baltic-sea>.

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<sup>60</sup> [http://www.helcom.fi/BSAP/3rd/en\\_GB/3rd\\_St\\_Conf\\_outcome/](http://www.helcom.fi/BSAP/3rd/en_GB/3rd_St_Conf_outcome/).

<sup>61</sup> HELCOM Baltic Sea Action Plan, p. 5.

<sup>62</sup> HELCOM Baltic Sea Action Plan, p. 9.

<sup>63</sup> HELCOM Baltic Sea Action Plan, p. 4.

## **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Wadden Sea Plan**



### **A. Objectives**

#### ***1. What are the stated objectives of the plan, if any?***

Through WSP-2010 the objectives of the Trilateral Cooperation, as contained in the Joint Declaration, will be implemented. More specifically, the WSP aims at achieving the trilateral Targets for the ecosystem, landscape, and culture values:

1. A natural ecosystem, its functions and characteristic biodiversity;
2. Resilience to climate change and other impacts;
3. Maintenance of the landscape and cultural heritage;
4. Sustainable use as defined by the Convention on Biological Diversity and the Habitats Directive;
5. Public support for the protection of the Wadden Sea.

#### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Conceptual.

**3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?**

The objectives are contained in the Joint Declaration on the Protection of the Wadden Sea (2010), which is a political agreement between the three Wadden Sea states (Netherlands, Germany, and Denmark). The Joint Declaration is the formal basis of the trilateral Wadden Sea Cooperation.

**B. Scope**

**1. Does the plan consider all uses or just selected sectors?**

The WSP implicitly considers all sectors, including tourism and recreation, agriculture, industry, shipping, and fisheries.

**2. How long did the spatial planning process take (years)?**

19 years since the first conference in 1991. It is a further development of WSP-1997.

**3. Were particular steps especially demanding of time or resources?**

The delineation and the setting of Ecosystem Targets were the most difficult political issues to be solved.

**4. How long does the plan apply? What is the planning interval for update and revision?**

Progress in implementing the WSP will be evaluated every 6 years.

**5. What was the funding structure for this project?**

There was no specific funding for the WSP. The WSP is supported by the Common Wadden Sea Secretariat (CWSS), with an administrative budget of ~700,000 Euro. Money for specific projects comes from other sources, for example the EU or national programmes.

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

The Wadden Sea Area is 15,000 km<sup>2</sup>. Within this area, the Wadden Sea Conservation Area is 11,000 km<sup>2</sup>.

**7. How does plan scale match ecosystem scale?**

Not quite. The Wadden Sea Area almost covers the whole Wadden Sea ecosystem, including part of the adjacent North Sea and parts of the rivers.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

Implementation is for the whole Wadden Sea Area, but more stringent measures apply to the core area, the so-called Wadden Sea Conservation Area.

**C. Authority**

**1. What is the legal basis for CMSP?**

The WSP encompasses the relevant EU directives, in particular the Habitats, Birds, and Water Framework Directives. It is a legally non-binding document of common political interest.

**2. Which level(s) of government is (are) driving the spatial plan?**

The WSP is executed through national ministries responsible for nature protection.

**3. What institutional change, if any, was made as part of creating the plan?**

None, the WSP will be implemented on the basis of existing legislation.

**4. What governance and institutional arrangements are used to implement the plan?**

Decision-making within the Trilateral Wadden Sea Cooperation (TWSC) is limited to two levels. The Trilateral Wadden Sea Governmental Council (see figure in WSP 2010) is the politically responsible body (Ministers) for the Cooperation. It establishes and oversees the Cooperation, approves its Strategy, gives political leadership, assures international policy development, harmonization and decision-making between the three governments. The Wadden Sea Board is the governing body of the Cooperation. It prepares and implements the Strategy, oversees the operational and advisory bodies, and secures relations with key stakeholders.

**D. Data**

**1. What data are used?**

Data are collected by the Trilateral Monitoring and Assessment Program (TMAP) and for the so-called Quality Status Report (QSR). (Economic and social data were collected in the framework of the independent Wadden Sea Forum).

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	X		
Geological	X	X	X	X		
Chemical	X	X	X	X		
Biological	X	X	X	X		
Economic	X	(X)	X	X		
Social	X	(X)	X	X		

**2. Were there clear criteria for data inclusion? If so, what were they?**

Data collection is guided by the Trilateral Targets. There is a table of parameters measured by the Trilateral Monitoring and Assessment Program. Socio-economic data are collected by the Wadden Sea Forum for a sustainability index.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Expert assessments are in general done by all leading experts in the particular field.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The plan was drafted by government authorities.

**2. Did they have equal status at all parts of the process?**

There was a consultation process of the final draft for all stakeholders.

**3. *Were stakeholders included in the planning process?***

Yes, the Wadden Sea Forum (WSF) is the main stakeholder forum, established in 2002. WSF was consulted in an early stage of the drafting process; other stakeholders were consulted starting with the final draft.

**4. *Was there a broad public participation process?***

The draft plan was open to comment by all stakeholders.

**5. *To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?***

Unknown.

**6. *How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

All commercial and non-commercial organizations active in or adjacent to Wadden Sea. For practical reasons cooperation with stakeholders was mainly through organized (national, trilateral) bodies.

**7. *In which parts of the process were stakeholder allowed to participate?***

Unknown.

**8. *What form was their participation?***

For the WSF: delivery of items to be covered plus commenting on final draft. All other stakeholders: commenting on final draft.

**F. Tools & Decision Support**

**1. *Which decision support tools are used to inform spatial allocation decisions?***

There is not one specific tool. Generally the Quality Status Reports (including reports on specific items, such as breeding birds) are the basis for decision-making. In addition, a scientific conference precedes the Tri-annual ministers' conference and submits recommendations to the ministers. For specific policy issues expert groups provide advice.

**2. *How are key trade-off issues framed and formalized into decision support tools?***

Unknown.

**3. *How are trade-offs analyzed?***

Generally through best expert judgment.

**4. *Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

The WSP mainly addresses nature conservation. Ecosystem services is an emerging issue, just like sustainable use. Economic trade-offs are dealt with by the WSF.

**5. *How does the plan recognize and deal with uncertainty and risk?***

Not explicitly.

**6. *Are the decision support tools dynamic?***

Yes.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Decision support is frequently discussed in the framework of optimizing the monitoring and assessment process.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

For several issues (for example World Heritage dossier) extensive consultation processes have taken place, but in the end, decisions are taken by the Wadden Sea Board (i.e. the national ministries).

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

In each country, zoning regulations for specific activities like agriculture, hunting, fisheries, or tourism are implemented. Spatial and temporal zoning is the main instrument but finding sustainable alternatives for human activities is becoming increasingly important (for example regarding mussel fisheries and tourism).

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

National policies, regulations, and management in accordance with the overall principles of the WSP.

**2. What constitutes success of the plan?**

The extent to which the Targets are achieved and the level of harmonization of policy and management.

**3. Does the plan incorporate monitoring?**

Yes, there is a Trilateral Monitoring and Assessment Program to provide a scientific assessment of the status of the ecosystem and to assess the implementation of the Targets of the WSP.

**4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

No, there are no quantified targets. Plan success is based on a regular (every 3-4 year) assessment of the status of the ecosystem (in terms of qualitative open-ended eco-targets, which have been formally adopted). In general, increase or recovery of populations (seals, birds, mussel beds, seagrass etc.) means success.

**5. Is adaptive management an explicit component?**

Yes

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

Yes. Monitoring data are the basis for the QSRs and other assessment reports, the results of which are fed into the political decision-making process.

***7. If so, are the responses formally rule-based?***

Partly. There is generally response from policy-makers and/or politicians to important changes coming out of the monitoring and assessment process.

**H. References**

Wadden Sea Forum website ([www.waddensea-forum.org](http://www.waddensea-forum.org))

Wadden Sea Plan (WSP) 2010.

<http://www.waddensea-secretariat.org/tgc/DocumentsSylt2010/WSP2010%20Final.pdf>

Wadden Sea Quality Status Report (QSR) 2005. <http://www.waddensea-secretariat.org/QSR/index.html>

Wadden Sea Quality Status Report (QSR) 2009. <http://www.waddensea-secretariat.org/QSR-2009/index.htm>

# QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Netherlands

Acknowledgements:

We thank the following individuals for their help in answering our questions: Rolf Groeneveld, Arie van Duijn, Wim van Urk, Remmant ter Hofstede, and Titia Kalker. Any remaining errors are our own.

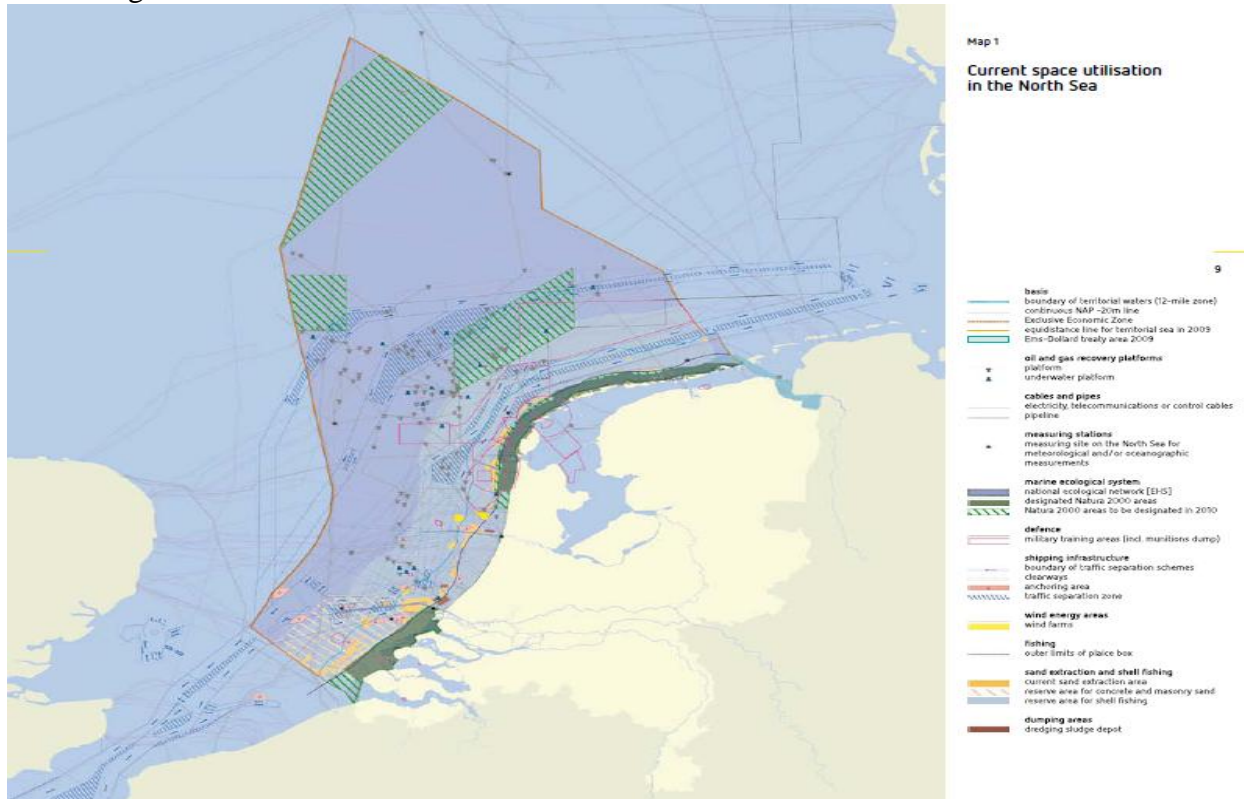


Figure: Netherlands EEZ and CMSP planning areas. Source: Policy Document on the North Sea (Dec. 2009)

## A. Objectives

### ***1. What are the stated objectives of the plan, if any?***

1. Sustainable economic development that is in balance with the marine ecosystem;
2. Additional emphasis on setting aside sand extraction sites for coastal and flood protection purposes;
3. Additional emphasis on setting aside space for large-scale renewable energy. Wind energy was the driving force behind the plan.

The plan must also meet the EU directives on birds and habitat, water framework directive, the Marine strategy directive.

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Conceptual in the sense that the National Water Plan is a strategic framework. Management plans usually have more operational objectives (e.g., management plans for Natura 2000). Some



of the objectives are translated into spatial claims: e.g. to find space for 6000 MW wind energy. The starting point during the making of the plan was e.g. to keep free the 12 mile zone from constructions. This was not a “hard” objective though.

***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

The objectives were mostly identified during the planning process, but it was already clear from former processes which areas were to be designated as Natura 2000 areas. EU Water Framework Directive, Marine Strategy Framework, the Bird and Habitat Directive, IMO regulations on safety, and UNCLOS regulations on obstacle free zones played a role in the plan development. Emphasis of the plan was to elaborate on a SPATIAL framework. Note as of 1/2011 the National Water Plan was endorsed by the new cabinet. There was a change in government and cabinet between the drafting of the plan and the implementation.

**B. Scope**

***1. Does the plan consider all uses or just selected sectors?***

All sectors.

***2. How long did the spatial planning process take (years)?***

About 4 years.

2005: The first integrated management plan was developed.

2008 and 2009: A more strategic and forward looking plan was made with a greater focus on spatial development.

2010: Final decisions were made.

The plan will go into effect in the near future as the NWP was just approved and is due to apply until 2015.

***3. Were particular steps especially demanding of time or resources?***

The most demanding aspect was determining the “search area” for wind energy. Also, making decisions in the parts of the sea with greater spatial pressures took more time. A sub process was organized to solve spatial conflicts in this area.

***4. How long does the plan apply? What is the planning interval for update and revision?***

On the basis of the National Water Plan the integrated management plan will begin in 2011. The NWP also mandates that the plans are revised, if deemed necessary, every 6 years. The first plan under the NWP is due to expire in 2015.

***5. What was the funding structure for this project?***

The first plan and the plan under the NWP were both funded by the national government.

***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

The plan is approximately 57,000 km<sup>2</sup>, which includes the territorial sea and the EEZ of the Netherlands (excludes region from low tide out to 1 kilometer mark).

***7. How does plan scale match ecosystem scale?***

Because the North Sea is considered one ecosystem, the Netherlands plans are less than the ecosystem scale. The plan is attentive to other activities within the North Sea and consistent with

EU directives. The plan was developed in the context of present shipping routes and future electricity grid energy production.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

The implementation scale is the same as the scale of the plan.

**C. Authority**

**1. What is the legal basis for CMSP?**

The legal basis is defined in the NWP and is consistent with UNCLOS Law on the Seas (declaration of EEZ), Dutch Law on Spatial Development (2008), EU directives, and OSPAR.

**2. Which level of government is driving the plan?**

Prior to the new government in 2010, the Dutch Ministry of Transport, Public Works and Water Management was the lead ministry. When the new government took control in 2010, the NWP is now under the purview of Ministry of Infrastructure and the Environment. An exception is from the low tide mark out to one kilometer, which is the under the jurisdiction of coastal municipalities and provinces. In this area, implementation is under the authority of these local governments. (Source: <http://www.noordzeeatlas.nl/en/index.html> )

**3. What institutional change, if any, was made as part of creating the plan?**

The institutional change occurred with the writing and passing of the NWP. The National Water Plan supersedes the National Spatial Strategy. The Spatial Strategy was based on exclusion zones, that is, activities that were not excluded were allowed. According to reports, this created a problem as there was sort of gold rush in permits for offshore wind energy in an attempt to claim space. The Water plan creates wind energy zones, which are more like dominant use zones, where permitting and stakeholder processes will still be needed to get a permit and limits the potential areas. Outside of these areas no wind energy can be realized.

**4. What governance and institutional arrangements are used to implement the plan?**

The Ministry of Infrastructure and the Environment will implement the plan, which includes a system of permits that provides additional flexibility to actors.

**D. Data**

**1. What data are used?**

An expert on this plan commented that financial data was used (costs for wind energy, expectations of oil and gas presence, etc.), which was separate from economic data. The expert also commented that safety data should also be included in this assessment, as shipping safety is very important. This plan also used shipping intensity data and wind speed data.

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X					
Geological		X				
Chemical	X					
Biological	X					
Economic	X					
Social	X					

Source: <http://www.noordzeeatlas.nl/en/index.html>

**2. Were there clear criteria for data inclusion? If so, what were they?**

The clearinghouse for data used in the NWP is the National Oceanographic Data Committee (NODC) of the Netherlands. The web page for the NODC is <http://www.nodc.nl/>.

From the web page, “National Oceanographic Data Committee (NODC) of the Netherlands is to effect a major and significant improvement in the overview and access to marine and oceanographic data and data-products from government and research institutes in the Netherlands.”

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Expert opinion, which included many different points of views, and stakeholder acceptance, determined what data were included. The expert solicitation process was facilitated to ensure that there was agreement on the information used in the plan. All qualitative and theoretical data were reviewed by experts.

## **E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The entities involved were the National Ministries, NGOs, and stakeholders such as oil and gas representatives, harbors, captains, wind energy developers, fisheries, and sand extractors.

**2. Did they have equal status at all parts of the process?**

The equal status issue is not clear, but the roles were clearly defined. The stakeholders that are most directly involved in spatial tensions (shipping, wind energy, oil and gas) played a larger role, but all stakeholders were invited to meetings, etc.

**3. Were stakeholders included in the planning process?**

Yes, there appears to have been an extensive stakeholder process. Sectors/stakeholders include: general public, science and technology community, conservation community, industry, and other governments (local, EU).

**4. Was there a broad public participation process?**

Documents were sent out for public comment and there were public meetings. Stakeholders developed proposed solutions.

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

Extensive economic and social data were gathered and information is available at <http://www.nodc.nl/> and <http://www.noordzeeatlas.nl/en/index.html>. However, these data did not play a major role in the decision making. Rather, a strategic environmental impact assessment was done and for the most difficult parts of the plans (dealing with the multiple users) various possible solutions were investigated with respect to costs, safety, ecological effects, and effects on other users.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

The Integrated Management Plan for the North Sea 2015 was produced in close cooperation by the Ministry of Transport, Public Works and Water Management, the Ministry of Agriculture, Nature and Food Quality, the Ministry of Housing, Spatial Planning and the Environment and the Ministry of Economic Affairs, industry and other stakeholders.

**7. In which parts of the process were stakeholder allowed to participate?**

Stakeholders had access to data, input into the development of alternatives, and were able to provide both oral comments and written comments.

**8. What form was their participation?**

In particular, they used two forms of stakeholder participation. First, they had a formal “platform” of stakeholders that advised the minister. Second, they invited all relevant stakeholders, who were easily identified because they often ask for permits for their activities. Most of the stakeholders organized themselves into groups and would typically send a representative. According to government officials, multiple representatives from one user group were invited when there were known differences within a stakeholder organization. Stakeholders could make written or oral comments.

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

No official tools, such as MARXAN, seem to be used. Different plans (allocation of space) were determined based on past usage and for their ability to meet the objectives. Conflicts were attempted to be minimized during the allocation of space. Some models, including cost-benefit analysis, were used to calculate the costs of wind energy and safety risks.

**2. How are key trade-off issues framed and formalized into decision support tools?**

The goal was to designate the areas to minimize the conflicts. Additional conflicts will be resolved in a sub process and later on during permitting procedures, and only when no agreement can be reached, in courts. The National Waterplan itself, however, did not lead to court cases. Netherlands will make assessment of a permit within a zone based on the following criteria:

- (1) Definition of spatial claim
- (2) Precaution
- (3) Usefulness and necessity
- (4) Choice of location and use of space
- (5) Restriction of effects and compensation

Permits are not required for existing uses and activities that are regulated at an international level, such as fishing, shipping, and leisure activities.

**3. How are trade-offs analyzed?**

The trade-offs were done using quantitative summaries of data and in the development of the areas but not formally analyzed using a single decision-theoretic modeling tool. According to a government official, their belief was that final decisions are often political ones and data are so different from each other that an overarching decision making tool did not make much sense.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Yes. Non-market components were dictated by the EU conservation directives.

**5. How does the plan recognize and deal with uncertainty and risk?**

In the planning stage, discussions occurred on whether a plan was likely to meet to the objectives or not. There is no formal treatment of uncertainty, e.g., decision making under uncertainty, but the plans are to be renewed every 6 years.

**6. Are the decision support tools dynamic?**

To get access for wind energy, the company will still need to do an EIA and additional stakeholder to get a permit. It is in this process that the results will be dynamic.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

The permitting process will allow updating over time and the plans will also be updated every other 6 year plans.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Conflicts that are not resolved via the allocation of the space within the plan will be resolved in the courts.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

The areas are allocated to dominant uses that do not guarantee a particular use within each area but does provide an opportunity for the use. Uses such as wind energy facilities for example, will still need to apply for a permit and undertake an EIA.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

The product is a national spatial plan.

**2. What constitutes success of the plan?**

The EU directives and other targets, including wind and sand extraction, were part of the planning process.

**3. Does the plan incorporate monitoring?**

No. A lot of monitoring takes place in the Netherlands, but not in the framework of the National Water Plan itself. Besides monitoring performed by the state on ecology, morphology, shipping intensities, fisheries intensities etc., monitoring is usually a part of the permit, obliging developers to monitor (effects) of their actions.

**4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

Yes, targets are for area for 6000 MW of renewable energy and sand. But the plan is mainly a strategic framework.

**5. *Is adaptive management an explicit component?***

The plans are for 6 years. As such, there is built in some feedback from monitoring. But if anything this would be classified as passive adaptive management.

**6. *Is the adaptive management formally structured around response to feedback from monitoring?***

Feedback from monitoring will be incorporated in the next 6 year plan and throughout the planning process.

**7. *If so, are the responses formally rule-based?***

No. It will become part of the data for next plan.

**H. References**

National Oceanographic Data Committee (NODC) of the Netherlands: <http://www.nodc.nl/>

North Sea Atlas: <http://www.noordzeeatlas.nl/en/index.html>

UNESCO web page on CMSP for the Netherlands: [http://www.unesco-ioc-marinesp.be/spatial\\_management\\_practice/the\\_netherlands](http://www.unesco-ioc-marinesp.be/spatial_management_practice/the_netherlands)

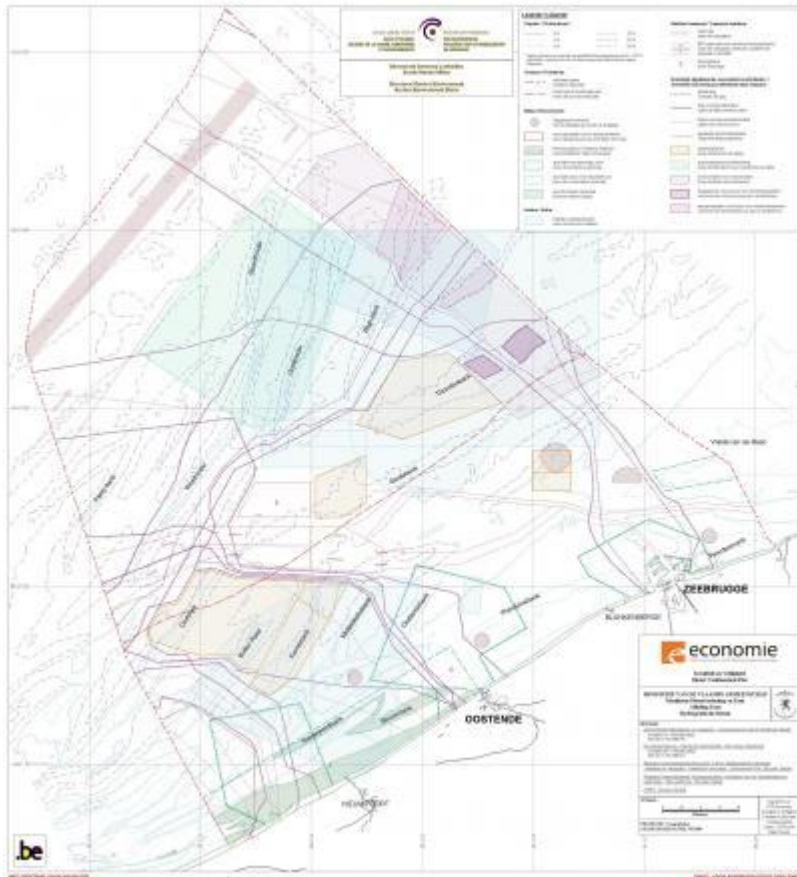
---Integrated Management Plan for the North Sea 2015. 2005. Published by the Directors' Consultative Committee North Sea. [www.noordzeeloket.nl](http://www.noordzeeloket.nl)

Lindeboom, H.J., Geurts van Kessel, A.J.M. & Berkenbosch, A. 2005. Areas of special ecological values at the Dutch Continental Shelf. Report RIKZ/2005.008/Alterra Report no. 1203.

National Water Plan. Available at [www.nationaalwaterplan.nl](http://www.nationaalwaterplan.nl)

Policy Document on the North Sea. 2009-2015. Available at [www.noordzeeloket.nl](http://www.noordzeeloket.nl)

## QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Belgian Part of the North Sea



Please note: The Preface to the report explicitly states: “it is not the ambition of the report to produce a final spatial plan for the BPNS. In this respect it is intended to provide a procedure rather than a result. The report is structured in such a way that the reader can travel from a strict scientific discussion of data through to an analysis of that data in interaction with data from other scientific disciplines. This allows the reader to easily move between scientific information and the use of that information, to creatively consider ways in which spatial structure planning might be achieved in the BPNS.

**Discussion is therefore meant to encourage consideration of how a spatial planning might be prepared rather than to provide a strict guideline.**<sup>64</sup>

The authors to the GAUFRE project formulated a 4-step approach to prepare and implement a spatial plan for the Belgian Part of the North Sea:

Step 1. Determination of the core values of the North Sea

Step 2. Development of various scenarios for the BPNS

Step 3. Drawing of the structure plan for the BPNS

Step 4. The transnational approach (setting the Belgian plan within the international policy

<sup>64</sup> Maes et al., p. i. (emphasis added).

context)<sup>65</sup>

The GAUFRE project only addressed the first two steps, stating that the final two steps are “a government task.”<sup>66</sup> Accordingly, this review is limited in scope.

## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

“GAUFRE is one of the first projects within Europe to investigate marine spatial planning in any depth. The aims and objectives of the project can be described on three levels:

1. Since few actual marine structure plans and their results can be used as examples, the process, procedure and methodology underlying the preparation of a plan was set as one of the main objectives of the project.
2. Rather than leading to a single “finished” marine spatial structure plan for the BPNS, the aim was to actually produce several scenarios and proposals for a spatial plan.
3. The outcomes were meant to provide a starting point for discussion on forms of decision-making and public participation within the context of a marine spatial structure plan.”<sup>67</sup>

### ***2. Are the objectives conceptual (e.g., conserve biodiversity) and/or operational (e.g., protect 15% of the coastline)?***

Currently conceptual. The intent is to make an operational spatial structure plan. This is in many ways “a plan” to create a Marine Spatial Plan.

“It is clear that while this project stops with the development of spatial planning scenarios and the first public workshop, **this is only the first step in the development of an operative spatial structure plan for the BPNS.** The next step should be for the project’s findings to be made available to government, private and public sectors as part of a discussion document. The aim of such a discussion document should be to obtain feedback on support or opposition to any of the scenarios identified for spatial planning within the Belgian part of the North Sea.”<sup>68</sup>

### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Identified during the planning process. There is no legislation or executive order for MSP in Belgium. It is likely that objectives were guided by existing National and EU directives.

“The project was made up of an interdisciplinary team of experts, representing legal sciences, socio-economic sciences, as well as experts in marine biology and marine geology, who worked together for two years.”<sup>69</sup>

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

All uses. Comprehensive. 1) wrecks and wreck salvage; 2) military ammunition; 3) shipping; 4) commercial fisheries; 5) military exercises; 6) sand and gravel extraction; 7) dredging and

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<sup>65</sup> Maes et al., p. 413.

<sup>66</sup> Maes et al., p. 413.

<sup>67</sup> Maes et al., p. 1.

<sup>68</sup> Maes et al., p. 2-3. (emphasis added).

<sup>69</sup> Maes et al., p. 1.



disposal of dredged material; 8) recreation and tourism on the beach; 9) recreation and tourism at sea; 10) aquaculture; 11) scientific research vessels; and 12) nature conservation.<sup>70</sup>

“It is clear that marine spatial planning must include an integrated vision of all the uses within the North Sea. It is not possible to plan with just one user in mind. The combined actions of uses as they relate to other uses, and as they relate to the environment, should also be taken into account. A sectoral approach or strict zoning is not suitable for managing the sea’s dynamic system.”<sup>71</sup>

**2. How long did the spatial planning process take (years)?**

2 years. “The project was made up of an interdisciplinary team of experts, representing legal sciences, socio-economic sciences, as well as experts in marine biology and marine geology, who worked together for two years.”<sup>72</sup>

**3. Were particular steps especially demanding of time or resources?**

Unknown.

**4. How long does the plan apply? What is the planning interval for update and revision?**

N/A. This project did not create a final spatial plan.

**5. What was the funding structure for this project?**

Belgian Science Policy funded the project. The Biological Valuation Map was funded by the Belgian Federal Science Policy office, Ghent University, and EU programs. “The research was financed by the project BWZee (‘A biological valuation map for the Belgian part of the North Sea’) of the Belgian Federal Science Policy Office (Contract No EV/02/37), the BOF-GOA project BBSea (Project No 01G00705) of Ghent University, the ENCORA project (European Network on Coastal Research, Contract No GOCE-518120) of the European Union (FP6) and the MarBEF Network of Excellence ‘Marine Biodiversity and Ecosystem Functioning’, which is funded by the Sustainable Development, Global Change and Ecosystems Programme of the European Community’s Sixth Framework Programme (Contract No GOCE-CT-2003-505446). This publication is contribution No MPS-07022 of MarBEF. Additional funding for the workshop on marine biological valuation was also granted by the Belgian Federal Science Policy Office (Fund No MN00000/10).”<sup>73</sup>

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

3600 km<sup>2</sup>. Belgian Part of the North Sea (BPNS), encompassing the territorial sea (TS) and the EEZ/fishery zone/continental shelf.<sup>74</sup>

**7. How does plan scale match ecosystem scale?**

It does not match ecosystem scale.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

3600 km<sup>2</sup>. Belgian Part of the North Sea (BPNS)

“It is important to consider the North Sea as a very dynamic system that cannot be delineated by the territorial borders of the BPNS. Accordingly, a good national policy should take an

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<sup>70</sup> Maes et al., pp. iv-viii.

<sup>71</sup> Maes et al., p. 422.

<sup>72</sup> Maes, et al. (2005), p. i.

<sup>73</sup> OCEANOLOGICA (2007) p. 99.

<sup>74</sup> Douvere, p. 183.

international approach in which the specific issues of the BPNS are considered in the context of the whole North Sea, and perhaps even beyond. National plans should be translated into international policy in which sea uses should be planned to complement one another on an international scale.”<sup>75</sup>

### **C. Authority**

#### ***1. What is the legal basis for CMSP?***

There is no legal basis for MSP in Belgium.<sup>76</sup>

“Despite the lack of a formal legal system for MSP in Belgium, there are many existing initiatives that seek to manage human uses spatially in the area. MSP in Belgium developed on an ad hoc basis, mainly driven by international and European legislation and increasing opportunities for the exploitation of the marine environment.”<sup>77</sup>

#### ***2. Which level(s) of government is (are) driving the spatial plan?***

N/A. This project is a “first step” by the Belgian Science Policy to create a spatial plan.

#### ***3. What institutional change, if any, was made as part of creating the plan?***

N/A. “The last two steps indicate how various visions based on different scenarios can be implemented in policy. The realization of these two steps is considered a government task. Therefore, these two steps will not be discussed in this report.”<sup>78</sup>

#### ***4. What governance and institutional arrangements are used to implement the plan?***

The plan does not address implementation. “The last two steps indicate how various visions based on different scenarios can be implemented in policy. The realization of these two steps is considered a government task. Therefore, these two steps will not be discussed in this report.”<sup>79</sup>

### **D. Data**

#### ***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X		X			
Geological	X					
Chemical	X		X			
Biological	X		X			
Economic	X		X			
Social	X		X			

#### ***2. Were there clear criteria for data inclusion? If so, what were they?***

Methods used were readily ascertainable.

<sup>75</sup> Douvere et al., p. 191.

<sup>76</sup> See Douvere et al., p. 183.

<sup>77</sup> Douvere et al., p. 190.

<sup>78</sup> Maes et al., p. 413.

<sup>79</sup> Maes et al., p. 413.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Available literature and expert judgment of the GAUFRE-partners. “The qualitative evaluation of the impacts of the users on the environment is based on available literature and on expert judgment of the joint Gaufre-partners. We are aware of the incompleteness and potential bias of this method, but it is the best option for performing an impact analysis that delivers results relevant for the end-users of the project.”<sup>80</sup>

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

Primarily academia and a consulting firm. Partners in the Project include: Maritime Institute University of Gent Team, Maritime Biology Section University of Gent Team, Renard Centre of Marine Geology University of Gent Team, Ecolas Environmental Consultancy and Assistance Team.<sup>81</sup>

“End Users” Committee composed of representatives from Centre for Integrated Coastal Zone Management; Ministry of the Flemish Community, Administration Waterways and Coast; Ministry of the Flemish Community, Administration Shipping Traffic Control; Royal Belgian Institute for Natural Sciences; Management Unit of the North Sea Mathematical Models; Institute for Nature Conservation; Federal Public Service Economy; Energy; Flemish Institute for the Sea; Sea Fisheries Department – Centre for Agricultural Research; Institute for Nature Conservation; and Federal Public Service Economy.

“Expert Workshop” took place on Jan. 16-17, 2004 and consisted of advisors in MSP from around the world.<sup>82</sup>

**2. Did they have equal status at all parts of the process?**

“The project was made up of an interdisciplinary team of experts, representing legal sciences, socio-economic sciences, as well as experts in marine biology and marine geology, who worked together for two years.”<sup>83</sup>

**3. Were stakeholders included in the planning process?**

Yes, to a limited extent. There was a “stakeholder workshop” held on the 11<sup>th</sup> of Feb. 2005. Forty-five (45) invited guests attended, all of which were involved with the use of the Belgian part of the North Sea.<sup>84</sup>

If the plan moves forward into implementation, there is recognition that “[t]he participation of stakeholders in the development and implementation of MSP is therefore essential for its success.”<sup>85</sup>

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<sup>80</sup> Maes et al., p. 339.

<sup>81</sup> Maes et al., p. xii.

<sup>82</sup> Maes et al., pp. 301--332.

<sup>83</sup> Maes et al, p. 1.

<sup>84</sup> Maes et al., p. 501.

<sup>85</sup> Douvere et al., pp. 190-91.

**4. Was there a broad public participation process?**

No. There was not any public participation at this stage. There is a “conclusion” that the public should actively be involved in the planning process.<sup>86</sup>

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

The plan evaluates socio-economic impact of each of the uses in the BPNS.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Stakeholders were defined as “representatives of all economic activities in the BPNS, nature conservation groups and politics.”<sup>87</sup>

**7. In which parts of the process were stakeholder allowed to participate?**

“Stakeholder Workshop” consisting of 45 participants held on Feb. 11, 2005.

**8. What form was their participation?**

During the “Stakeholder Workshop” presentations were given to the stakeholders, followed by interactive group discussion on ‘decision rules’.

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

GIS. “Two steps were taken before developing various scenarios. The analysis of all available scientific data was the first phase. It led to the creation of basic GIS layers, suitability maps, and use interaction maps. Once this analytical framework was in place, it gave way to a structural approach. This structural approach was able—by making use of the results as generated in the analytical approach—to create structural maps.”<sup>88</sup>

“Various physical datasets have been evaluated to serve as a basis for a geophysical zonation of the Belgian part of the North Sea. In combination with an ecological zonation, both approaches should lead to a delineation of zones that are more or less homogeneous in nature. These homogeneous zones could then be used as an environmental base map against which anthropogenic activities can be balanced.”<sup>89</sup>

Conclusions from the Expert workshop: “Decision support systems are extremely important tools during the planning process. Possible techniques are multiple objective analysis, cost benefit analysis and comparison methods in which decision rules of sectors and among sectors are evaluated and balanced.”<sup>90</sup>

“Suitability analysis is an important tool within marine spatial planning as it indicates which zones of the BPNS are suitable for different types of activities. The suitability analysis is initially based on jurisdictional and technical constraints the different users should take into account. For

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<sup>86</sup> Maes et al., p. 330.

<sup>87</sup> Maes et al.

<sup>88</sup> Douvere et al., p. 187.

<sup>89</sup> Maes et. al, p. 14.

<sup>90</sup> Maes et al., p 331.

some users, specific economical and social aspects can play an important role in the suitability evaluation of the BPNS.”<sup>91</sup>

Environmental Impact Analysis. The environmental impact maps are “Arc GIS maps”<sup>92</sup>

## **2. How are key trade-off issues framed and formalized into decision support tools?**

Key values. “Well-being, ecology and landscape, and economic value were chosen as key issues for sustainable management of the North Sea. These key values determine each use within the BPNS. Every activity in the BPNS can be correlated to these three key issues.”

“Suitability focuses on the importance of understanding how the environment of the BPNS would affect its use before space is actually allocated to that use in a planning context. This “suitability analysis” indicates to what extent a certain space on the BPNS is appropriate for the allocation of a certain use.”<sup>93</sup>

## **3. How are trade-offs analyzed?**

“GIS layers allowed an analysis of possible compatibilities and interactions among the environment, infrastructure, and uses.”<sup>94</sup>

Identification of core values (the value of well-being, ecological and landscape value, and economic value) and identification of three general principles (precautionary principle, sustainable management and sustainability, and security) were then used to develop scenarios for the BPNS.<sup>95</sup>

Structural maps. “[F]uture structural maps were set against a background of key values that determine each use within the North Sea. These key values were then translated in decision rules that allowed for the creation of six scenarios for the future management of the PBNS. Visions, partial strategies, and preferential areas of use were formulated within each of these scenarios.”<sup>96</sup>

- (i) The relaxed sea, focusing on well-being;
- (ii) The natural sea, focusing on ecology and landscape;
- (iii) The rich sea, focusing on economy;
- (iv) The playful sea, focusing on both well-being, and ecology and landscape;
- (v) The mobile sea, focusing on both ecology and landscape, and economy; and
- (vi) The sailing sea, focusing on both economy and well-being.

No final decision is made. “The process of creating alternative scenarios of MSP is a means rather than an end in itself. MSP must include an integrated vision of all uses within the North Sea. This approach would place a desirable structural plan for the North Sea somewhere in the middle of the six scenarios. In other words, there should be a consideration and weighing of the different values to elaborate a complete spatial structural plan for the BPNS. However, the selection of a desirable structural plan is a political, not a technical decision.”<sup>97</sup>

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<sup>91</sup> Maes et al., p. 333.

<sup>92</sup> Maes et al., p. 342.

<sup>93</sup> Douvere et al., p. 189.

<sup>94</sup> Douvere et al., p. 188.

<sup>95</sup> Maes et al., pp. 413-14.

<sup>96</sup> Douvere et al., p. 189.

<sup>97</sup> Douvere et al., p. 190.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Yes. The term “ecosystem services” is not used, but non-market components are included. For example, “Landscape” is included in the Environmental Impact Analysis: “The physical disturbance of landscape is mainly a social judgment. The coastline is a symbol of infinity, and an infringement of this symbolic value can have large social consequences.”<sup>98</sup>

**5. How does the plan recognize and deal with uncertainty and risk?**

“The actual use in frequency and intensity of this transit zone is being studied by other BELSPO projects (ECOSONOS “Emissions of CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> from Ships” and RAMA “Risk Analysis of Marine Activities in the Belgian Part of the North Sea”). This data is not available for the Belgian part of the North Sea. It will need to be collected, making use of transfer data from France or the UK.”<sup>99</sup>

“There is no legal basis for the Belgian policy concerning coastal defense, but a policy document is made up by AWK. The main priority of coastal defense should be ‘the protection of the hinterland against a 1000-year storm’. This is based partly on risk assessments of the chance that heavy storms occur on the Belgian coast and partly on the associated costs for this kind of protection. Also considered, but not as priority, is nature protection (protection of ecologically valuable dune areas). Coastal defense works are not executed to promote or increase tourism, but if possible tourist demands can be considered (for instance in the case of bathing beach elevations). This consideration is only made for beaches that are given in concession to the coastal communities.”<sup>100</sup>

“The Risk Analysis Marine Systems (RAM) gives information concerning the possible emission of oil with benzoapyrene (BaP) and fluoranthene (Flu), Copper, Zinc, Lead and TBT. These pollutants mainly come from cabin sailing boats (Maes et al. 2002).”<sup>101</sup>

**6. Are the decision support tools dynamic?**

N/A. This is not really a functional plan.

There is acknowledgment that when the spatial plan is created, “the planning process should be dynamic and continuous with a large degree of flexibility towards modification in time. Continuous monitoring within carefully selected reference sites is a way to guide this process.”<sup>102</sup>

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

N/A. This project does not create a final spatial plan.

There is acknowledgment that when the spatial plan is created, “the planning process should be dynamic and continuous with a large degree of flexibility towards modification in time.

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<sup>98</sup> Maes et al., p. 345.

<sup>99</sup> Maes et al., p. 119.

<sup>100</sup> Maes et al., p. 79.

<sup>101</sup> Maes et al., p. 257.

<sup>102</sup> Maes et al., p. 332.

Continuous monitoring within carefully selected reference sites is a way to guide this process.<sup>103</sup>

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Conflict resolution is not addressed in the plan.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

N/A. This project has identified marine spatial planning scenarios, but has left the decision, and the methods to achieve the objectives to the “government” to decide.

## **G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

This product is the “the first step in the development of an operative spatial structure plan for the BPNS.”<sup>104</sup>

**2. What constitutes success of the plan?**

Success of the plan is not explicitly defined. There is identification that that “the next step should be for the project’s findings to be made available to government, private and public sectors as part of a discussion document. The aim of such a discussion document should be to obtain feedback on support or opposition to any of the scenarios identified for spatial planning within the Belgian part of the North Sea.”<sup>105</sup>

**3. Does the plan incorporate monitoring?**

No. Monitoring is not in this plan.

**4. Have formal metrics of success of the plan (e.g., indicators and reference targets) been adopted? If so, what are they?**

No. This plan does not have indicators or reference targets.

**5. Is adaptive management an explicit component?**

No. Adaptive management is not an explicit component in this plan.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

N/A.

**7. If so, are the responses formally rule-based?**

N/A.

## **H. References**

Derous, S., Agardy, T., Hillewaert, H., Hostens, K., Jamieson, G., Lieberknecht, L., Mees, J. Moulart, I., Olenin, S., Paelinckx, D., Rabaut, M., Rachor, E., Roff, J., Stienen, E.W.M., van der Wal, J.T., van Lancker, V., Verfaillie, E., Vincx, M., Weslawski, J.M., & Degraer, S.

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<sup>103</sup> Maes et al., p. 332.

<sup>104</sup> Maes et al., p. 2.

<sup>105</sup> Maes et al., pp. 2-3.

(2007). A concept for biological valuation in the marine environment. *Oceanologia*, 49(1), 99-128.

Derous, S., Verfaillie, E., Van Lancker, V., Courtens, W., Stienen, E., Hostens, K., Moulaert, I., Hillewaert, H., Mees, J., Deneudt, K., Deckers, P., Cuvelier, D., Vincx, M., & Degraer, S., (2007). *A Biological valuation map for the Belgian part of the North Sea: BWZee, Final report*, Research in the framework of the BSP programme

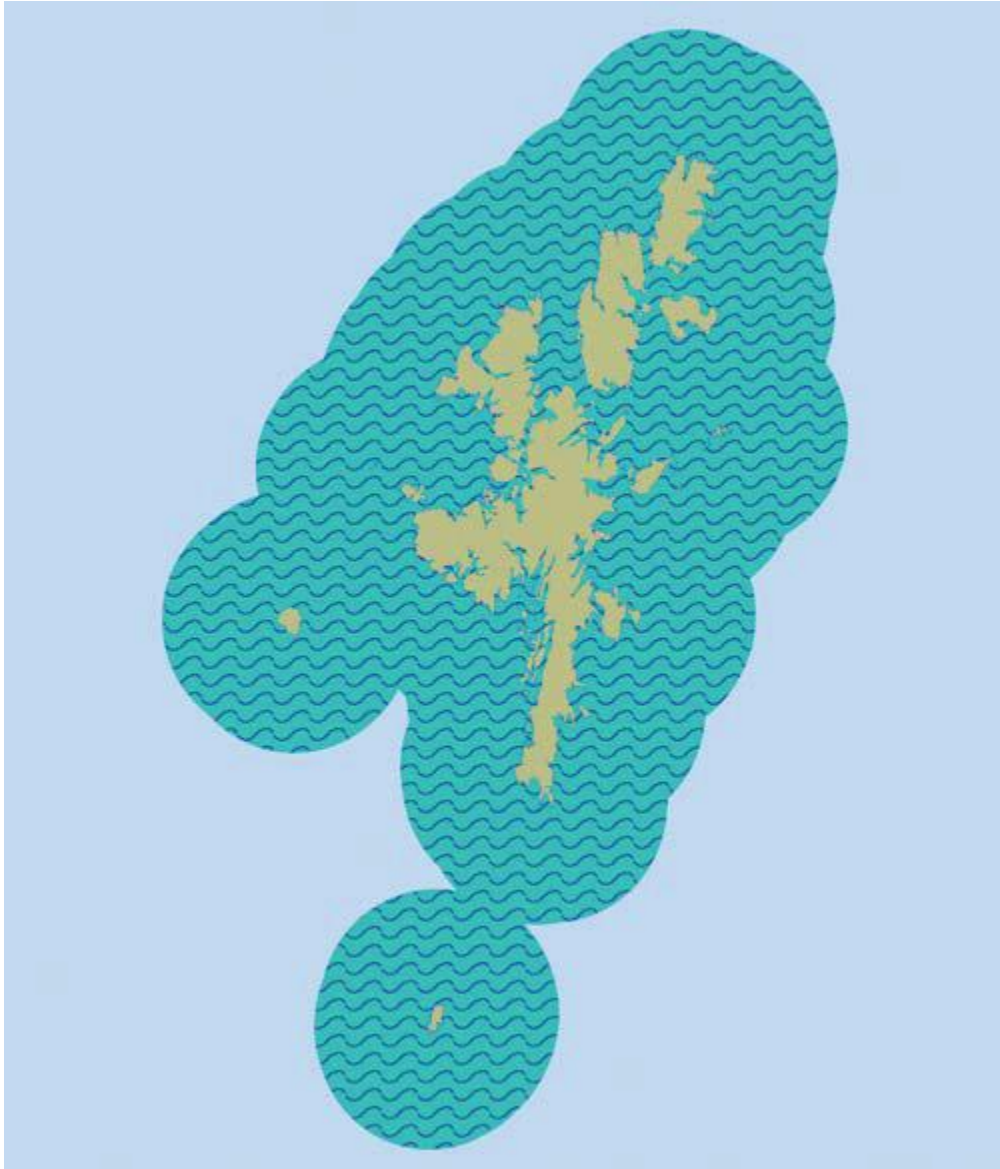
“Sustainable Management of the Sea” – PDO II, February 2007, pp. 100 (+ Annexes).

Douvere, F., Maes, F., Vanhukke, A., & Schrijvers, J. (2006). The role of marine special planning in sea use management: The Belgian case. *Marine Policy* 31(2007), 182-191.

Maes, F., Schrijvers, J., Van Lancker, V., Verfaillie, E., Degraer, S., Derous, S., De Wachter, B., Volckaert, A., Vanhulle, A., Vandenabeele, P., Cliquet, A., Douvere, F., Lambrecht, J. & Makgill, R. (2005). Towards a spatial structure plan for sustainable management of the sea. Research in the framework of the BELSPO Mixed Actions – SPSD II, June 2005, pp. 539.



**QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT  
PLANS PERTAINING TO: The Shetland Isles**



Note: This plan sets a framework and guidelines for planning in the Shetland Islands. Several other pilot plans have been developed, i.e., Firth of Clyde, Sound of Mull, and Berwickshire. The Shetland Islands plan is voluntary but is expected to guide developers and others in putting together their proposals for changes to existing uses and introduction of new uses and to assist managers in making licensing decisions. It provides suggestions, proposes directions and highlights opportunity for development. Within the Shetland Islands pilot plan subarea plans are developed in more detail for Swarbacks Minn, and Fair Isles which offer a convenient way to view the nested scale concept in marine planning, i.e., that more detailed arrangements are devised to accommodate smaller focus areas within a larger scale plan.

## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

“The main purpose of the SMSP is to provide guidance and recommendations to assist current and future planning, regulation and management of marine and coastal activities. The SMSP’s high-level aims are to:

1. Ensure a high quality, fully functioning marine and coastal ecosystem for the benefit and prosperity of local communities;
2. Protect and enhance areas where there are locally, nationally or internationally important marine species and habitats whilst taking account of natural changes;
3. Identify areas with differing priorities for sustainable use (such as fishing, aquaculture, recreation & tourism, oil, nature conservation etc.); and
4. Ensure that stakeholders can take advantage of development opportunities in a sustainable way.”

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Plan is much more conceptual than operational.

### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Suggested by the Scottish Sustainable Marine Environmental Initiative [SSMEI] of the Scottish Government. Follow-on planning efforts are expected to revisit the objectives as appropriate and to develop spatially explicit management plans.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Plan implies that all users / uses that are under existing legislation would require a permit or license. This includes a wide range of uses and interests.

### ***2. How long did the spatial planning process take (years)?***

At least 3 years and possibly 4 years depending on what is considered starting date and completion date. Process started in 2006 with a limited application on a voluntary basis in 2008. Third draft comments period ended June 2010.

### ***3. Were particular steps especially demanding of time or resources?***

No particular steps were specified as demanding of time or resources. It can be surmised that data compilation and synthesis did require significant efforts in this regard in preparation of the Shetland Marine Atlas and the Strategic Environmental Assessment.

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

Maximum 5 years as a framework with the recommendation to review after 2-3 years.

### ***5. What was the funding structure for this project?***

Funding ((£144K over 4 years) came from: The Scotland Government, Scottish Natural Heritage, NAFC Marine Centre, Shetland Islands Council, the Crown Estate, and the Highland and Islands Enterprise.

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

Total area 10,580 km<sup>2</sup>.

**7. How does plan scale match ecosystem scale?**

Plan scale is intended to match the sea area offshore that is affected by coastal processes, but it is embedded in a much larger marine ecosystem.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

Same as total area: 10, 580 km<sup>2</sup>.

**C. Authority**

**1. What is the legal basis for this plan?**

Plan was instituted in response to EU Marine Strategy Framework Directive and the EU Water Frameworks Directive [inside 3 miles]. The planning effort was started in The Shetland Marine Spatial Plan has been developed under the auspices of the Scottish Sustainable Marine Environment Initiative (SSMEI), which was initiated by the Scottish Government to inform future marine policy and test new management framework options for Scotland's marine and coastal environment. The Plan is an example of how a regional level plan could be set out. Three other pilot projects were set up across Scotland, located in the Firth of Clyde, the Sound of Mull and Berwickshire. Finalization of the Marine [Scotland] Act in 2010 provides a legislative basis for completion and implementing the plans.

**2. Which level(s) of government is (are) driving the spatial plan?**

In Shetland, the Project Officer based at the NAFC Marine Centre took the lead and was advised by the Local Steering Group.

**3. What institutional change, if any, was made as part of creating the plan?**

Initial plans are developed under the Scottish Sustainable Marine Environment Initiative [SSMEI] which is a collaboration among various governmental and non-governmental entities. Local Steering Groups were put in the lead for preparation of the Pilot Plans, e.g., Shetland Islands. With passage of the 2010 Marine [Scotland] Act a framework for implementation and enforcement is established including a permit process to ensure alignment with the Plan. This includes collaboration with the River Basin Management Plans. The Marine Spatial Plan will be enforced at the local level from 2012 through the terrestrial plan (the SMSP will be referred to as Supplementary Guidance).

**4. What governance and institutional arrangements are used to implement the plan?**

Permitting and enforcement processes under the Marine (Scotland) Act 2010. The Act does not change existing jurisdictions but calls on them to cooperate in planning.

**D. Data**

**1. What data are used?**

This plan identifies spatial components of uses but does not quantify them. Data and information has been collected not only from authoritative sources but also from individuals in the wider

community fishermen, boating and yacht clubs, sea-angling, diving, tour operators – see sources listed at back of Atlas.

The Marine Atlas is based on data and expert opinion. Similarly the Strategic Environmental Assessments are based on qualitative information. Scotland continues to develop the basis for marine spatial planning (Marine Scotland 2010). The metadata conforms to MEDIN standards. Data is available on web to download.

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical						X
Geological						X
Chemical						X
Biological						X
Economic						X
Social						X

**2. Were there clear criteria for data inclusion? If so, what were they?**

This is not explicitly addressed in the Plan. Experts familiar with marine planning (Scotland has 30 years of marine planning experience from the Zetland County Council Act), choose which data to include based on prior planning experiences and those “important feature” identified from legislation that needed protected.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Unclear from the plan.

This from local expert:

Two points: 1) authoritative data was used (e.g. from historical surveys) and this was transferred to GIS in maps. Biodiversity data was scrutinized by local experts through the Shetland SSMEI Biodiversity Working Group. I worked very closely with them to get maps accurate where there were no clear geographic boundaries (e.g. seals and birds). 2) These experts (ranging from fishermen to divers) are the very people who would object to planning applications so we aim to have covered everything in the map. However we do acknowledge the maps are not set in stone and we advocate consultation before submitting planning applications.

It may be worth noting that the data (i.e. the metadata behind the maps) conforms to MEDIN standards. Metadata available on web to download and as GIS files are downloaded from the internet.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The Scotland Government, Scottish Natural Heritage, NADC Marine Centre, Shetland Islands Council, the Crown Estate, and the Highland and Islands Enterprise were key members of SSMEI. A 16-member Local Steering Group oversaw the development of the plan working with the SSMEI lead, as follows:

Association of Shetland Community Councils, British Petroleum, Fair Isle Marine Environment and Tourism Initiative, Friends of the Earth Scotland, Scottish Environmental Protection Agency, Scottish Natural Heritage, Scottish Sustainable Marine Environment Initiative, Seafood Shetland, Shetland Amenity Trust, Shetland Aquaculture, Shetland Fishermen's Association, Shetland Islands Council (represented by Coastal Zone Manager) Shetland Islands Council (Planning represented Heritage), Shetland Islands Council (Councillor), Shetland Shellfish Management Organization, Royal Society for the Protection of Birds.

***2. Did they have equal status at all parts of the process?***

Local Steering Group appears to operating on equal status among representatives. The NAFC Marine Center assisted by other entities prepared the plan.

***3. Were stakeholders included in the planning process?***

Yes as advisors to SSMEI plan leads.

***4. Was there a broad public participation process?***

Yes, public comments were invited at several points in the plan development process. Also went into the community to get involvement - attending community council meetings, visiting recreational clubs, and fishermen in their homes. The latest comment period ended June 2010.

***5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?***

As noted above, there was very little quantitative data displayed in the planning process. Much of the plan relies on a consensus of issues and their importance by the Local Steering Group.

***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

No specific definition or standard was applied. It appeared all who wanted to participate was considered to have legitimate standing.

***7. In which parts of the process were stakeholders allowed to participate?***

Through the Local Steering Group there was involvement from beginning to end. Public comments were sought on draft documents at various points in plan development. In the mapping process specific user groups were targeted as individuals (fishermen and recreational and tourism users).

***8. What form was their participation?***

Local Steering Group supplied materials and attended meetings. Public involvement was through verbal and written statements. Fishermen (about 20% of the local fleet) were interviewed face-to-face, as were all recreational and tour operators - they mapped areas important to them (i.e. potential planning application objections).

**F. Tools & Decision Support**

***1. Which decision support tools are used to inform spatial allocation decisions?***

Primary tool was construction of a Marine Atlas showing known activities.

**2. *How are key trade-off issues framed and formalized into decision support tools?***

Trade-offs are not made in the Plan. The plan is intended to assist new users and those changing use patterns by providing information about existing use patterns so they can identify potential conflicts and work to avoid them or cooperate in finding solutions.

**3. *How are trade-offs analyzed?***

Under the guidance of the plan by managers who must make permit and license decisions. Trade-offs are not explicitly analyzed.

**4. *Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

Not explicitly as part of the Plan, however, these values are considered in the permit and licensing process.

**5. *How does the plan recognize and deal with uncertainty and risk?***

In a qualitative sense, the Plan recognizes that uncertainty exists and can be taken into account in decision making but it does not attempt to quantify risk. It is understood that research would continue to identify sources of uncertainty and that information would be incorporated into revisions of the Plan.

**6. *Are the decision support tools dynamic?***

The prime decision support tool is the Marine Atlas which offers a “snapshot” of current use patterns. There are no trend analyses or models used to support decision making in the Plan.

**7. *Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?***

No explicit discussion was found with respect to improving decision support tools. Monitoring and evaluation are addressed in two ways. First, it is recognized that significant marine monitoring is underway as the result of the 2005 monitoring strategy. Second, gaps in the monitoring and specific monitoring needs for the Plan are considered in the Delivery Plan [separate part of the Plan].

**8. *How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).***

There are not new conflict resolution mechanisms identified in the Plan. Existing conflict resolution processes in the management of permits and licensing would be used.

**9. *What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?***

It appears that the prime mechanism for achieving the plan objectives is seen in the spatial mapping of uses. The support decisions by potential users and by the planners and managers.

**G. Monitoring & Performance Measures**

**1. *What are the products of the marine spatial planning process?***

The Plan with a Delivery Plan, a Marine Atlas, a Strategic Environmental Assessment.

**2. *What constitutes success of the plan?***

Achieving the objectives of the plan.

***3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?***

Performance indicators have been identified but detailed reference targets have not been set for what constitutes success. Qualitative standards are expressed under four objectives, i.e., integrate, know, assess sensitivities and restore and applied to themes, actions to be taken, and partners with target dates for completion.

***4. Does the plan incorporate monitoring?***

The Plan explicitly incorporates monitoring.

***5. Is adaptive management an explicit component?***

One specific reference is made to adaptive management with respect to actions for environmental restoration. The Plan itself calls for revisions based on new information in 2-3 years which implies an adaptive approach.

***6. Is the adaptive management formally structured around response to feedback from monitoring?***

Not formally structured although it is certain to incorporated feedback.

***7. If so, are the responses formally rule-based?***

No, responses are not formally rule-based.

**H. References**

Ironside Farrar/Scottish Marine Environment Initiative. 2010. Strategic Environmental Assessment, A Marine Spatial Plan for the Shetland Islands, Environmental Report. March. Available [www.nafc.ac.uk/ssmei.aspx](http://www.nafc.ac.uk/ssmei.aspx). February 24, 2011.

Marine Scotland, 2010. Report on Social and Economic Objectives for a Scottish Marine Plan. The Scottish Government. Edinburgh. February. Available at <http://www.scotland.gov.uk/Resource/Doc/308369/0097119.pdf>. February 24, 2011.

Scottish Sustainable Marine Environment Initiative/Shetland Local Steering Group. 2010. A Marine Spatial Plan for the Shetland Islands, Part One: Policy Framework; Part Two, Marine Atlas, Consultative Draft – 3<sup>rd</sup> Edition. June. Available [www.nafc.ac.uk/ssmei.aspx](http://www.nafc.ac.uk/ssmei.aspx). February 24, 2011.

## QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Canada Oceans Act: Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM)



NOTE: These plans are not Marine Spatial Plans. They are Integrated Management plans, intended as a comprehensive planning approach for managing the resource and human activity with an overarching goal of sustainable development. They are for spatially delineated areas, but the areas are fairly large and extend well offshore from the coastal zone. The *Oceans Act* of 1996 mandated the development and implementation of a comprehensive national strategy for managing the estuarine, coastal, and marine ecosystems within Canada. Five Large Ocean Management Areas (LOMAs) were identified as priority areas for IOMPs. Canada's Oceans Strategy calls for the development of integrated management plans for each of the five (5) management areas. Two plans have been released to date: The Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM), created in December, 2006, and the Beaufort Sea Integrated Ocean Management Plan (IOMP), released in June, 2009. The Beaufort Sea IOMP was implemented in August, 2010. The ESSIM has not been implemented due to a dispute over the eastern boundary of the plan.

This review looks at both the enabling legislation (*Oceans Act*) and the two management plans.

### A. Objectives

#### *1. What are the stated objectives of the plan, if any?*

*Oceans Act* states the following objectives:

- a) **Sustainable development**, that is, development that meets the needs of the present without compromising the ability of future generations to meet their own needs;
- b) The **integrated management** of activities in estuaries, coastal waters and marine waters that form part of Canada or in which Canada has sovereign rights under international law; and
- c) A healthy, clean, productive marine ecosystem



d) The **precautionary approach**, that is, erring on the side of caution.<sup>106</sup>

Eastern Scotian Shelf Integrated Ocean Management (ESSIM) Plan stated objectives under 3 major goals:

1. Collaborative governance and integrated management;
  - Collaborative structures and processes with adequate capacity, accessible to community members are established;
  - Appropriate legislation, policies, plans and programs are in place;
  - Legal obligations and commitments are fulfilled;
  - Ocean users and regulators are compliant and accountable;
  - Ocean stewardship and best practices are implemented;
  - Multi-sectoral resource use conflict is reduced;
  - Natural and social science research is responsive to knowledge needs;
  - Information management and communication are effective;
  - Monitoring and reporting are effective and timely.
2. Sustainable human use;
  - Communities are sustainable
  - Sustainable ocean/community relationships are promoted and facilitated;
  - Ocean area is safe, healthy and secure;
  - Wealth is generated sustainably from renewable ocean resources;
  - Wealth is generated sustainably from non-renewable ocean resources;
  - Wealth is generated sustainably from ocean infrastructure;
  - Wealth is generated sustainably from ocean-related activities.
3. Healthy ecosystems.
  - Diversity of benthic, demersal and pelagic community types is conserved;
  - Incidental mortality of all species is within acceptable levels;
  - At risk species protected and/or recovered;
  - Invasive species introductions are prevented and distribution is reduced;
  - Genetic integrity (i.e. genetic fitness and diversity) is conserved;
  - Primary production and secondary productivity are healthy;
  - Trophic structure is healthy;

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<sup>106</sup> Oceans Act, sec. 30, p. 14-15. (emphasis added).

- Biomass and productivity of harvested and other species are healthy;
- Physical characteristics of ocean bottom and water column support resident biota;
- Harmful noise levels are reduced to protect resident and migratory species and populations;
- Wastes and debris are reduced;
- Chemical characteristics of ocean bottom and water column support resident biota;
- Atmospheric pollution from ocean activities is reduced;
- Habitat integrity is conserved.<sup>107</sup>

***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Oceans Act: Conceptual.

ESSIM: Conceptual with the intent to make operational objectives. “The approach is organized around a hierarchy of goals, element, strategic-level objectives and operational objectives,” ranging from “high-level statements of the desired outcome [they] hope to achieve” to specific objectives needed to achieve a specific desired outcome.<sup>108</sup>

***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Identified during the planning process.

ESSIM: “No national-level guidance for addressing human use objectives (i.e., social, cultural, economic and governance aspects) existed, so the ESSIM Planning Office used a multi-stakeholder working group to develop an initial set of human use elements and objectives.”<sup>109</sup> However, there are a number of Regional Development Plans for both Atlantic Canada and the Canadian Arctic, and these contain economic and social goals that must be reflected in human use objectives of the IM Plans.

There are many conservation objectives that are mandated by legislation and enabling policies. An overall framework was developed as part of the Ocean Action Plan, to ensure protection of ecologically and biologically significant areas and species (EBSAs and EBSSs). The process has put off the setting the operational objectives associated with conservation needs until “later”, but the EBSAs and EBSS have been identified for all LOMAs. The overall framework provides for the Conservation Objectives to serve as constraints on social and economic objectives, but this has not yet been tried in practice.

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<sup>107</sup> ESSIM plan, pp. 34-41.

<sup>108</sup> ESSIM plan, p. 29.

<sup>109</sup> ESSIM plan, p. 31.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Oceans Act: All uses. “With the passage of the *Oceans Act* in 1997, Canada became one of the first countries in the world to make a legislative commitment to a comprehensive approach for the protection and development of oceans and coastal waters.”<sup>110</sup>

ESSIM: All uses.

### ***2. How long did the spatial planning process take (years)?***

Implementation of the *Oceans Act*: work in progress.

1997: *Oceans Act* came into force. (10 years to enact, by one account)<sup>111</sup>

2001: National Workshop on Objectives and Indicators for Ecosystem-based Management (frequently referred to as the Dunsmuir Workshop)<sup>112</sup>

2002: Canada Ocean Strategy (COS) was released providing a policy framework for oceans management<sup>113</sup>

2004: Report of a National Working Group on Conservation Objectives which was the basis for the core approach in the OAP. (the Powles – Mageau Report)

2005: Oceans Action Plan (OAP) released. Identified five (5) priority areas for integrated management planning

2007: Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM) released. Work on the Eastern Scotian Shelf was already well under way as a regional initiative when the Oceans Act was passed. The ESSIM initiative dates to at least 1998, if not earlier. A framework with broad objectives to guide integrated management.<sup>114</sup> Not implemented yet, due in part to a boundary dispute.

2009: Integrated Ocean Management Plan (IOMP) for the Beaufort Sea plan produced. First plan to be implemented. The plan took “three years of very hard work grappling with difficult concepts, conflicting values, multiple interests and large-scale changes in the natural environment.”<sup>115</sup> The plan does not supersede the autonomy of any of Aboriginal communities in the North. It does have some zonation for key industries looking for future development and it is meant as a guide for regional consultations.

2011: One of five Integrated Management Plans has been implemented.

Creation of the ESSIM plan:

2002: *The Scotian Shelf: An Ecological Overview for Ocean Planning*

2003: Ecosystem status report, *State of the Eastern Scotian Shelf Ecosystem*

2005: Review of social and economic ESSIM information completed (in a contracted report), Initial draft of management plan presented to stakeholders, circulated for public comment

2006: Stakeholder Advisory Council assembled final draft, circulated for comment; final plan was endorsed in December, 2006.

2007: Forwarded for Ministerial approval.

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<sup>110</sup> Canada’s Ocean Strategy, p. ii.

<sup>111</sup> Jessen, p. 4.

<sup>112</sup> ESSIM plan, p. 31.

<sup>113</sup> Jessen, p. 7.

<sup>114</sup> Jessen, p. 25.

<sup>115</sup> IOMP, p. vii

2011: Not implemented. “[D]ispute with the Governments of Newfoundland and Labrador over the eastern border of the ESSIM.”<sup>116</sup>

### **3. Were particular steps especially demanding of time or resources?**

All aspects of implementation of the *Oceans Act* have been demanding of time and resources. Identified issues:

1. Inadequate governance arrangements for implementation of the *Oceans Act*; (DFO has leadership role but no authority over other federal Departments or other levels of Government, to ensure they participate.)
2. Ministerial Discretion is fundamental to almost all Departments, meaning each department can make its own decisions about actions to take, notwithstanding any agreements;
3. Inability to meet timelines;
4. Lack of accountability framework to measure outcomes;
5. No specific provision and/or regulation to give integrated management plans legal force;
6. No requirements for other federal departments to comply with or implement the *Oceans Act*.
7. Inadequate funding.<sup>117</sup>

“Departmental strategy plans articulated intentions to complete three plans by 2002, and five plans by 2007. However, in 2009, these goals still elude the department, and the Auditor General and others have described the process as slow and ad hoc, due to the lack of national guidance, the need to develop key concepts, the complexity of moving from the conceptual to the practical, and the need to engage and develop an understanding of [integrated management] among a wide range of participants from government to stakeholders.”<sup>118</sup>

### **4. How long does the plan apply? What is the planning interval for update and revision?**

ESSIM review: 5 years.<sup>119</sup>

### **5. What was the funding structure for this project?**

Federal Government Agency/Federal government. DFO estimated that it redirected \$100 million from internal operations to fund *Oceans Act* activities during the first 8 years of implementation.<sup>120</sup> Canadian federal government provided new funding in 2005.<sup>121</sup>

One account states that: “Inadequate funding allocated by government to various federal departments with ocean responsibilities to implement the act means that there are no “carrots or sticks” – incentives or requirements—that would bring the various federal departments, other government parties, along with stakeholders, to the table to accomplish the aims of the legislation.”<sup>122</sup>

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<sup>116</sup> Jessen, p. 25.

<sup>117</sup> Jessen, p. 9. (citing OAG, 2005; Foster et al., 2005; Chircop and Hildebrand, 2006:59; VanderZwaag and Hutchings, 2005).

<sup>118</sup> Jessen, p. 26. (citing VanderZwaag and Hutchings, 2005; O’Boyle and Jamieson 2006).

<sup>119</sup> ESSIM Plan, p. 64.

<sup>120</sup> Jessen, p. 12. (citing Auditor General of Canada, 2005).

<sup>121</sup> Jessen, p. 12.

<sup>122</sup> Jessen, p. 10.

## **6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

“[All] estuaries, coastal waters, and marine waters that form part of Canada, or in which Canada has sovereign rights under International law.”<sup>123</sup> ESSIM has defined the 12-nm Territorial Sea out of the IM plan and it extends to the limits of the Canadian EEZ.

## **7. How does plan scale match ecosystem scale?**

Does not match ecosystem scale. “The boundaries of the planning area comprise a mix of administrative and ecological considerations.”<sup>124</sup>

ESSIM: “From the outset, there has been debate as to whether the boundaries of the ESSIM planning area are the right ones to use. A number of people and organizations have recommended that the Plan be expanded to include coastal areas, as well as the western portions of the Scotian Shelf or potentially even the Gulf of Maine.”<sup>125</sup>

“The ESSIM boundary is based on the administrative fishing zone boundaries under the North Atlantic Fishery Organization (NAFO). NAFO fishing zone boundaries were defined to reflect what was known of functional stock boundaries at the time they were created, and the north-eastern boundary along the Laurentian Channel and the offshore boundary on the continental slope are ecologically meaningful. The northeastern boundary overlaps with the Newfoundland and Labrador offshore oil and gas region boundary (which is not an ecological boundary). This overlap is administratively complex and has led to problems in having the final management plan approved by the Minister of Fisheries and Oceans, due to objections from the governments of Newfoundland and Labrador. It includes a number of marine habitats (banks, “deeps”, shelf-break and canyons, which are sometimes considered “ecosystems” below the LOMA scale.

## **8. What is the spatial scale for implementation (km<sup>2</sup>)?**

The implementation scale is the same as the Canada’s Oceans Action Plan five (5) Integrated Management Planning areas:

1. Placentia Bay (3,600 km<sup>2</sup>) and the Grand Banks (PBGM) (500,000 km<sup>2</sup>);
2. The Eastern Scotian Shelf (ESSIM) (325,000 km<sup>2</sup>);
3. The Gulf of St. Lawrence (GOSLIM) (200,000 km<sup>2</sup>);
4. The Beaufort Sea (BSIMPI) (1,750,000 km<sup>2</sup>);
5. The Pacific North Coast (PNCIMA) (88,000 km<sup>2</sup>).<sup>126</sup>

## **C. Authority**

### **1. What is the legal basis for this plan?**

Legislative act. *Canada Oceans Act*. Many other pieces of legislation also underpin management of the individual sectors, and the Oceans Act does not have priority over any of the sectoral acts.

### **2. Which level(s) of government is (are) driving the spatial plan?**

“The *Oceans Act* calls on the Minister of Fisheries and Oceans to lead and facilitate the development of a national oceans strategy that will guide the management of Canada’s estuarine,

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<sup>123</sup> Canada’s Ocean Strategy, p. 6. (quoting Oceans Act).

<sup>124</sup> ESSIM Plan, p. 15.

<sup>125</sup> ESSIM Plan, p. 18.

<sup>126</sup> Canada’s Ocean Action Plan, pp. 13-15.

coastal and marine ecosystems.”<sup>127</sup> Regional governance is guided and driven by the federal Fisheries and Oceans Canada.

### **3. What institutional change, if any, was made as part of creating the plan?**

No new agency was created by the *Oceans Act*. Fisheries and Oceans Canada (DFO) (existing agency) was designated as the responsible federal authority for all matters not assigned by law to any other department, board or agency of the Government of Canada, relating to the policies and programs of the Government of Canada respecting oceans.<sup>128</sup> A new sector was created within DFO to implement the *Oceans Act* to reflect the added demands and responsibilities. The new sector is present within both Headquarters and in each Regional office.

### **4. What governance and institutional arrangements are used to implement the plan?**

“[T]he Minister of Fisheries and Oceans, in collaboration with other ministers, boards and agencies of the Government of Canada, with provincial and territorial governments and with affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements, is encouraging the development and implementation of a national strategy for the management of estuarine, coastal and marine ecosystems [.]”<sup>129</sup>

“Implementation relies on the cooperation of over 20 federal departments and agencies to use their existing powers and resources”<sup>130</sup>, as well as cooperation by Provincial and Territorial governments, and in the Beaufort, all tribal Councils and Management Boards recognized by Land Claims Agreements, Treaties, and enabling court decisions.

“Implementation of the management strategies will occur through the collective effort of all involved with the Plan. A variety of actors from both within and outside government will play leading roles in implementation of the management strategies. While government is likely to play a lead role in strategies involving regulatory tools, industry may take the lead in developing best practices and operating procedures. Academic institutions may provide the leadership for research programs, and community or environmental organizations may initiate stewardship projects.”<sup>131</sup> Community groups, labour associations (ESSIM), and Tribal and Band Councils and similar bodies (in the Beaufort) will be important actors in many implementation aspects.

ESSIM: Stakeholder Advisory Counsel (SAC) and ESSIM Working Group were formed to create and implement the management plan. “ESSIM Working Group includes representatives of over 20 ocean-related federal and provincial departments, agencies, and boards that have some regulatory responsibility and policy or program interest in the planning area...An intergovernmental forum that focuses on policy, management, operations and regulatory coordination for the ESSIM Initiative. The Working Group builds governmental support and cohesion for integrated ocean management and provides an opportunity for information sharing and discussion of issues.”<sup>132</sup>

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<sup>127</sup> Canada’s Oceans Strategy, p. i.

<sup>128</sup> Oceans Act, section 40.

<sup>129</sup> Oceans Act, Preamble, pp. 1-2.

<sup>130</sup> Jessen, p. 10.

<sup>131</sup> ESSIM Plan, p. 42.

<sup>132</sup> ESSIM Plan, p. 26.

## **D. Data**

### ***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	x		
Geological	X	X		X		
Chemical	X	X		X		
Biological	X	X	X	X		
Economic	X	X	X	X		
Social	X	X	X	X		

### ***2. Were there clear criteria for data inclusion? If so, what were they?***

For the EOAR exercises in all LOMAs there were inclusive workshops held according to CSAS protocols for peer review of all ecological data and analyses, (including spatial analyses) used in the EOARs (and the ESSIM documents referenced earlier were submitted as their EOARs, and accepted as comparable by national reviewers).

### ***3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?***

All information used in the workshops that led to the EOARs was reviewed according to the standards and protocols found on the CSAS website for peer review, including expert opinion.

## **E. Participants**

### ***1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?***

The collaborative planning approach includes all sectors and stakeholders.

### ***2. Did they have equal status at all parts of the process?***

No. “The collaborative planning model is not intended to supersede or interfere with the ability of federal and provincial departments and agencies to carry out their legislative mandates. They retain their authority, but work with other stakeholders to develop and pursue shared goals and objectives through the integrated management process.”<sup>133</sup>

### ***3. Were stakeholders included in the planning process?***

Yes. Stakeholder involvement in the planning process of the ESSIM.

### ***4. Was there a broad public participation process?***

ESSIM: Yes. “The ESSIM Planning Office launched a broad public review of the draft Plan over the spring, summer, and fall of 2005.”<sup>134</sup>

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<sup>133</sup> ESSIM Plan, p. 21.

<sup>134</sup> ESSIM plan, Foreword.

**5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?**

ESSIM: The plan dedicates one of three goals to “sustainable human use,” with subcategories and objectives addressing “social and cultural well-being” and “economic well-being,” as well as strategies on how to accomplish those objectives. Larger-scale economic and social data was used in the planning process as available.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Oceans Act: “At the heart of Integrated Management is a commitment to citizen engagement in the broadest sense; that is governments at all levels, Aboriginal groups, corporate and sectoral interests, community interests, non-governmental organizations, and Canadians generally.”<sup>135</sup> “Sectoral participation includes government, coastal communities, Aboriginal groups, fisheries, oil and gas, marine conservation, telecommunications, shipping, and academia.”<sup>136</sup>

ESSIM: Stakeholders include representatives of all major ocean sectors and government agencies in the planning area.<sup>137</sup> There is a long history of community-based consultation on fisheries issues, and that network contributed to stakeholder identification.

**7. In which parts of the process were stakeholders allowed to participate?**

All CSAS peer review and advisory meetings include a set of external participants, invited from the various industry sectors, community groups, and other levels of government, so they were also involved in reviewing the completeness and quality of scientific and technical information on ecological, social, and economic aspects relevant to IM planning. The subsequent advisory groups, fora, and partnerships were fully involved in development of vision, goals and strategic direction, review and feedback on planning documents and materials, including action plans and performance evaluations.<sup>138</sup>

**8. What form was their participation?**

ESSIM: ESSIM Forum: “an inclusive assembly for all stakeholders to participate in the collaborative planning process. It serves as a network for multi-stakeholder communications, information sharing and input to the ESSIM Initiative.”<sup>139</sup>

Stakeholder Advisory Council (SAC): “The SAC operates on a consensus basis for the stewardship of the Plan and undertakes monitoring and evaluation functions for plan implementation. The SAC works in partnership with the ESSIM Planning Office by providing input into content of the Plan and ongoing feedback as the Plan evolves.”

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

Decision support tools to inform spatial allocation are being created under both plans.

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<sup>135</sup> Canada’s Oceans Strategy, p. 11.

<sup>136</sup> ESSIM Plan, p. 22.

<sup>137</sup> ESSIM plan, Foreword.

<sup>138</sup> ESSIM Plan, p. 22.

<sup>139</sup> ESSIM Plan, p. 22.



ESSIM: GIS-based planning tool. “An atlas of human activity on the Scotian Shelf has been compiled by the ESSIM Planning Office in order to map existing use patterns. . . . Based on the data gathered for the atlas and other information layers, work is continuing with the development of a GIS-based decision support tool. This tool will help provide decision makers with accurate information about human activities and environmental characteristics across the Scotian Shelf.”<sup>140</sup> All the ecological data are also geo-referenced, and layering of mapping was used extensively in identifying the ecologically and biologically significant areas on the Scotian Shelf.

**2. How are key trade-off issues framed and formalized into decision support tools?**

ESSIM: Next round of planning, if quantitative objectives can be developed and accepted.

**3. How are trade-offs analyzed?**

ESSIM: Next round of planning, if quantitative objectives can be developed and accepted.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Yes.

ESSIM: There is an explicit recognition that “benefits, wealth and values associated with the ocean are not exclusively monetary. They can also be intrinsic in nature and include natural assets of the marine environment and our traditional and cultural relationships and connections with the sea.”<sup>141</sup> However, at present, no framework exists for bringing non-monetary values into the trade-off analyses; nor are there plans collect the information needed to start the consideration of non-monetary valuation.

“The coordination of ocean uses and management systems through spatial and temporal management can assist in finding appropriate balances among the ecosystem and human use objectives for the planning area. The effective application of spatial and temporal management requires the recognition of the multiple scales at which the ecological systems function, with the realistic understanding that management areas and lines are limited by the dynamic nature of the marine environment.”<sup>142</sup>

**5. How does the plan recognize and deal with uncertainty and risk?**

All the EOARs deal extensively with uncertainty in all the ecological (and where available social and economic) information that was peer reviewed and accepted. Focus was on uncertainty in data sources and knowledge of ecological relationships, but moderate attention was given to uncertainty about future states of nature and there was some consideration of implementation uncertainty as well. Once there are quantitative operational objectives set for targets, and especially for limits – there are overarching Privy Council Office Standards and Guidelines for best practices in risk-based decision-making. These are mandatory for all departments. DFO has many pieces of PCO-compliant comprehensive risk analysis and risk management frameworks already peer-reviewed and in place. However, until the operational objectives are set, the risk assessment (even qualitative risk assessment) tools can’t be applied.

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<sup>140</sup> ESSIM Plan, p. 45.

<sup>141</sup> ESSIM Plan, p. 35.

<sup>142</sup> ESSIM Plan, p. 45.

**6. Are the decision support tools dynamic?**

Not at this point.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Yes.

ESSIM: “Implementation of the objectives and management strategies contained in the Plan will be undertaken through regular development and implementation of shorter term action plans (e.g., 2-3 year cycles). These action plans may be sector- or issue-based, or collaborative in nature, involving parties from across sectors or communities of interest.”<sup>143</sup>

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

Oceans Act: Conflict resolution is not addressed in the enabling legislation.

ESSIM: Addresses procedural conflict and conceptually addresses spatial conflict resolution.

Eastern Scotian Shelf Management Plan, Stakeholder Advisory Council (SAC) “has protocols for working through situations in which consensus is difficult to reach, or where conflict needs to be resolved. A facilitator is able to provide support to SAC. The facilitator is content neutral and assists the group in conducting dialogue and reaching consensus.”<sup>144</sup> From local expert: This process has to this point not dealt with conservation limits, which greatly reduces the risk of irreconcilable conflicts, because there are no ecosystem-based limits to force conflicts among competing uses. In addition the decisions at the IM tables are not binding on participating regulatory agencies or industries. This has so far allowed “conflict resolution” primarily to consist of facilitated agreement on higher-level conceptual outcomes to which all participants subscribe. Real tests of the ability of facilitated dialogue to resolve conflict will come when quantitative operational objectives, particularly for conservation outcomes, must be set. Preparations are underway for that future step:

“In order to reduce or prevent conflict, it is necessary to understand existing use patterns and interactions. An atlas of human activity on the Scotian Shelf has been compiled by the ESSIM Planning Office in order to map existing use patterns.”<sup>145</sup>

“Procedures must be developed to address multiple use conflicts. This will require dialogue within and across sectors. The ESSIM Initiative will provide multi-sector forums where proposals for new ocean activities can be tabled and discussed by the proponent and affected ocean interests in order to reach an agreement that is satisfactory to all involved. In some cases mechanisms have already been established, such as the Joint Fisheries/Submarine Telecommunications Cable Working Group.”<sup>146</sup>

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<sup>143</sup> ESSIM Plan, p. 63.

<sup>144</sup> ESSIM Plan, p. 24.

<sup>145</sup> ESSIM Plan, p. 45.

<sup>146</sup> ESSIM Plan, p. 45.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**  
Cooperation among the government entities. As stated previously, there have been no operational objectives yet set within which to test any mechanisms. Management will remain sectoral, however. No higher level management tools are being contemplated for super-ceding sectoral management processes.

## **G. Monitoring & Performance Measures**

### **1. What are the products of the marine spatial planning process?**

Development of a plan itself.

“At the 2008 ESSIM forum the next stage of the process was described as the development of action plans. . . It was recognized that marine spatial planning (MSP) was an important new international thrust that ESSIM should incorporate in future plan implementation activities and a commitment was made to design an appropriate regional approach that benefits from global best practice... It was noted that “a clear mandate for MSP may be needed to get explicit shareholder buy-in”<sup>147</sup>

### **2. What constitutes success of the plan?**

Implementation constitutes success. The plan has set strategies on how to accomplish articulated objectives and goals. (See question 4 below).

### **3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

No, although the plan acknowledges that existing monitoring plans in the respective regions will provide information for measuring success of the ecological outcomes of the Plans. However, in neither case have specific indicators and reference levels been agreed as performance metrics for the Plans.

### **4. Does the plan incorporate monitoring?**

Yes.

ESSIM: “The reporting system is based on two main types of indicators: outcome indicators and management performance indicators. Outcome indicators provide a measure of progress against the management objectives by reporting on the level of improvement in the planning area over time. These indicators may not cover all aspects of each objective, but should provide a good indication of the direction in which the system is moving. Management performance indicators provide a measure of implementation of the management strategies and actions identified for the Plan. They provide an assessment of the degree to which management actions have been carried out within a given time limit.”<sup>148</sup> The classes of indicators have been identified. The members of the class have not been and operational ones are proving problematic.

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<sup>147</sup> Jessen, p. 29.

<sup>148</sup> ESSIM Plan, p. 30.

**5. *Is adaptive management an explicit component?***

Oceans Act: There is not an explicit component of “adaptive management” in the enabling legislation. However, the “ecosystem approach” is explicit in the Oceans Act and in national policy “adaptive management” is explicitly part of an ecosystem approach. Thus the Oceans Act implicitly provides for a commitment to adaptive management in the legislation.

ESSIM: Yes. Adaptive management is an explicit component.

“Integrated management and planning processes need to respond to changing environmental, social, economic and institutional conditions, and take into account new information and knowledge. Ongoing monitoring and regular review of management plans and actions are used to measure and evaluate progress on management objectives. They also identify alterations and revisions required to address changing conditions or improved levels of knowledge.”<sup>149</sup>

**6. *Is the adaptive management formally structured around response to feedback from monitoring?***

The regular review should accomplish this.

**7. *If so, are the responses formally rule-based?***

No.

**H. References**

Beaufort Sea Partnership. 2009. Integrated Ocean Management Plan (IOMP) for the Beaufort Sea: 2009 and Beyond. Beaufort Sea Planning Office.

Government of Canada. 1996. *Canada Oceans Act*, RSC 1996: Bill C-26, Chapter 31, 2<sup>nd</sup> Session, 35<sup>th</sup> Parliament, 45, Eliz. 2. 1996.

Government of Canada, Fisheries and Oceans. 2002. *Canada’s Oceans Strategy: Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada*. Ottawa: Fisheries and Oceans Canada.

Government of Canada, Fisheries and Oceans. 2003. *State of the Eastern Scotian Shelf Ecosystem*. Fisheries and Oceans Canada.

Government of Canada, Fisheries and Oceans. 2007b. *Eastern Scotian Shelf Integrated Ocean Management Plan: Strategic Plan*. Dartmouth, NS: Fisheries and Oceans Canada.

Jessen, S. 2011. A review of Canada’s Implementation of the Oceans Act since 1997 – from Leader to Follower? *Coastal Management* 39:20-56.

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<sup>149</sup> ESSIM Plan, p. 12.

**QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Canada Oceans Act: Beaufort Sea Integrated Ocean Management Plan (IOMP)**



NOTE: These plans are not Marine Spatial Plans. They are Integrated Management plans, intended as a comprehensive planning approach for managing the resource and human activity with an overarching goal of sustainable development. They are for spatially delineated areas, but the areas are fairly large and extend well offshore from the coastal zone. The *Oceans Act* of 1996 mandated the development and implementation of a comprehensive national strategy for managing the estuarine, coastal, and marine ecosystems within Canada. Five Large Ocean Management Areas (LOMAs) were identified as priority areas for IOMPs. Canada's Oceans Strategy calls for the development of integrated management plans for each of the five (5) management areas. Two plans have been released to date: The Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM), created in December, 2006, and the Beaufort Sea Integrated Ocean Management Plan (IOMP), released in June, 2009. The Beaufort Sea IOMP was implemented in August, 2010. The ESSIM has not been implemented due to a dispute over the eastern boundary of the plan.

This review looks at both the enabling legislation (*Oceans Act*) and the two management plans.

**A. Objectives**

***1. What are the stated objectives of the plan, if any?***

*Oceans Act* states the following objectives:

- a) **Sustainable development**, that is, development that meets the needs of the present without compromising the ability of future generations to meet their own needs;
- b) The **integrated management** of activities in estuaries, coastal waters and marine waters that form part of Canada or in which Canada has sovereign rights under international law; and
- c) A healthy, clean, productive marine ecosystem

d) The **precautionary approach**, that is, erring on the side of caution.<sup>150</sup>

Integrated Ocean Management Plan (IOMP) for the Beaufort Sea has stated 6 major goals:

1. Governance—To achieve effective governance for the sustainable use of the Beaufort Sea;
  - Establish collaborative inter-governmental and inter-departmental structures and processes;
  - Conduct spatial planning in the LOMA;
  - Promote an effective regulatory environment;
  - Promote effective planning and decision making;
  - Ensure Aboriginal organizations have the capacity to be involved in the IOMP;
  - Profile the Beaufort Sea LOMA in the circumpolar context;
  - Establish an inter-governmental Implementation Coordination Office to oversee implementation and renewal of this plan;
  - Assess and develop an adaptive management response to climate change.
2. Economic—To foster sustainable economic opportunities and options for Canadians, northerners, and coastal communities.
  - Manage large-scale marine traffic
  - Prepare to take advantage of large scale economic opportunities in the coastal and marine environment;
  - Strengthen and diversify local and northern economy
3. Cultural—To maintain and increase peoples' sense of place and preserve cultural identity and spiritual connections as they relate to oceans and coastal areas.
  - Generate and promote opportunities to practice and share culturally important marine traditions, sites and artifacts;
  - Promote a vibrant local subsistence economy
4. Social—To improve human capacity, health, quality of life and opportunities as they connect to oceans and coastal areas.
  - Engage and support the objectives of the Beaufort Delta Agenda and the MGP Impact Fund;
  - Improve long-term local and northern career opportunities reliant on ocean based resources;
  - Increase educational success of the local population;
  - Increase individual and community mental and physical health and well-being;

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<sup>150</sup> Oceans Act, sec. 30, p. 14-15. (emphasis added).

- Increase community capacity to respond to ocean based challenges and opportunities
5. Traditional and local knowledge—To promote the value, credibility and use of Traditional Knowledge (TK) and local knowledge (LK) to current and future generations
    - Use TK and LK in resource management, monitoring and identification of sensitive species and areas;
    - Establish a set of guidelines for the collection, validation and use of TK and LK;
    - Promote the respect, value and sharing of TK and LK
  6. Ecosystem—To understand the Beaufort Sea ecosystem, to identify important areas and priority species and to maintain or enhance ecosystem integrity.
    - Maintain ecosystem integrity within the LOMA;
    - Protect and conserve representative marine areas and special species within the LOMA;
    - Determine baseline environmental quality conditions within the LOMA.<sup>151</sup>

***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Oceans Act: Conceptual.

IOMP: Conceptual with the intent to make operational objectives. “This IOMP provides the general strategic direction that will be realized through development and implementation of detailed annual work plans. The work plans will be developed cooperatively under the leadership of the organizations identified for specific objectives in the IOMP, through the Beaufort Sea Partnership.”<sup>152</sup>

***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Identified during the planning process.

There are many conservation objectives that are mandated by legislation and enabling policies. An overall framework was developed as part of the Ocean Action Plan, to ensure protection of ecologically and biologically significant areas and species (EBSAs and EBSSs). The process has put off the setting the operational objectives associated with conservation needs until “later”, but the EBSAs and EBSS have been identified for all LOMAs. The overall framework provides for the Conservation Objectives to serve as constraints on social and economic objectives, but this has not yet been tried in practice.

**B. Scope**

***1. Does the plan consider all uses or just selected sectors?***

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<sup>151</sup> IOMA, pp. vii-ix.

<sup>152</sup> IOMA, p. ix.

Oceans Act: All uses. “With the passage of the *Oceans Act* in 1997, Canada became one of the first countries in the world to make a legislative commitment to a comprehensive approach for the protection and development of oceans and coastal waters.”<sup>153</sup>

IOMP: All uses and users. “The intent of this IOMP is to consider all users of the marine environment, as well as the interactions among human activities and between those activities and the marine environment.”<sup>154</sup> Fisheries management will be informed by the discussions at the IM tables. In the Beaufort Sea, the IM is a consultation process, and Treaty Rights, Co-Management Land Claims Agreements, and court decisions on rights of Aboriginal Peoples to self-government in the North all supersede any IM decisions.

## **2. How long did the spatial planning process take (years)?**

Implementation of the *Oceans Act*: work in progress.

1997: *Oceans Act* came into force. (10 years to enact, by one account)<sup>155</sup>

2001: National Workshop on Objectives and Indicators for Ecosystem-based Management (frequently referred to as the Dunsmuir Workshop)<sup>156</sup>

2002: Canada Ocean Strategy (COS) was released providing a policy framework for oceans management<sup>157</sup>

2004: Report of a National Working Group on Conservation Objectives which was the basis for the core approach in the OAP. (the Powles – Mageau Report)

2005: Oceans Action Plan (OAP) released. Identified five (5) priority areas for integrated management planning

2007: Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM) released. Work on the Eastern Scotian Shelf was already well under way as a regional initiative when the *Oceans Act* was passed. The ESSIM initiative dates to at least 1998, if not earlier. A framework with broad objectives to guide integrated management.<sup>158</sup> Not implemented yet, due in part to a boundary dispute.

2009: Integrated Ocean Management Plan (IOMP) for the Beaufort Sea plan produced. First plan to be implemented. The plan took “three years of very hard work grappling with difficult concepts, conflicting values, multiple interests and large-scale changes in the natural environment.”<sup>159</sup> The plan does not supersede the autonomy of any of Aboriginal communities in the North. It does have some zonation for key industries looking for future development and it is meant as a guide for regional consultations.

2011: One of five Integrated Management Plans has been implemented.

Creation of the IOMP plan: 3 years.

2006: Beaufort Sea Partnership (BSP) was formed. Regional Coordination Committee (RCC) was formed.

2007: Vision statement adopted

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<sup>153</sup> Canada’s Ocean Strategy, p. ii.

<sup>154</sup> IOMP, p. 5.

<sup>155</sup> Jessen, p. 4.

<sup>156</sup> ESSIM plan, p. 31.

<sup>157</sup> Jessen, p. 7.

<sup>158</sup> Jessen, p. 25.

<sup>159</sup> IOMP, p. vii



- 2008: Ecosystem Overview and Assessment Report (EOAR) completed. Includes identification of the areas and species which meet the criteria for Ecologically and Significant Areas (EBSAs) and Species (EBSSs). Drafts of management plan were circulated for comment.
- 2009: Social, Cultural and Economic Overview and Assessment Report (SCEOAR) completed; Drafts of management plan circulated for comment; approval-in-principle of the final plan June 4, 2009.
- 2010: August, 2010. Prime Minister announced the final Beaufort Sea plan.

### **3. Were particular steps especially demanding of time or resources?**

All aspects of implementation of the *Oceans Act* have been demanding of time and resources.

Identified issues:

1. Inadequate governance arrangements for implementation of the *Oceans Act*; (DFO has leadership role but no authority over other federal Departments or other levels of Government, to ensure they participate.)
2. Ministerial Discretion is fundamental to almost all Departments, meaning each department can make its own decisions about actions to take, notwithstanding any agreements;
3. Inability to meet timelines;
4. Lack of accountability framework to measure outcomes;
5. No specific provision and/or regulation to give integrated management plans legal force;
6. No requirements for other federal departments to comply with or implement the *Oceans Act*.
7. Inadequate funding.<sup>160</sup>

“Departmental strategy plans articulated intentions to complete three plans by 2002, and five plans by 2007. However, in 2009, these goals still elude the department, and the Auditor General and others have described the process as slow and ad hoc, due to the lack of national guidance, the need to develop key concepts, the complexity of moving from the conceptual to the practical, and the need to engage and develop an understanding of [integrated management] among a wide range of participants from government to stakeholders.”<sup>161</sup>

### **4. How long does the plan apply? What is the planning interval for update and revision?**

IOMA review: First review in 3 years. 5 year review thereafter. “The first Plan (addressing 2009 and beyond) will be reviewed after three years and modified as needed. Thereafter, the Plan will be reviewed at least every five years.”<sup>162</sup>

### **5. What was the funding structure for this project?**

Federal Government Agency/Federal government. DFO estimated that it redirected \$100 million from internal operations to fund *Oceans Act* activities during the first 8 years of implementation.<sup>163</sup> Canadian federal government provided new funding in 2005.<sup>164</sup>

<sup>160</sup> Jessen, p. 9. (citing OAG, 2005; Foster et al., 2005; Chircop and Hildebrand, 2006:59; VanderZwaag and Hutchings, 2005).

<sup>161</sup> Jessen, p. 26. (citing VanderZwaag and Hutchings, 2005; O’Boyle and Jamieson 2006).

<sup>162</sup> IOMP, p. 23.

<sup>163</sup> Jessen, p. 12. (citing Auditor General of Canada, 2005).

<sup>164</sup> Jessen, p. 12.

One account states that: “Inadequate funding allocated by government to various federal departments with ocean responsibilities to implement the act means that there are no “carrots or sticks” – incentives or requirements—that would bring the various federal departments, other government parties, along with stakeholders, to the table to accomplish the aims of the legislation.”<sup>165</sup>

#### **6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

“[All] estuaries, coastal waters, and marine waters that form part of Canada, or in which Canada has sovereign rights under International law.”<sup>166</sup> The northern boundary of Beaufort is also not the full EEZ (and will depend on UN/World Court decisions about international maritime boundaries that are not expected until mid-decade or longer).

#### **7. How does plan scale match ecosystem scale?**

Does not match ecosystem scale. “The boundaries of the planning area comprise a mix of administrative and ecological considerations.”<sup>167</sup>

IOMA: Only covers the Canadian portion of the Beaufort Sea. “For this reason, it is important to be aware of international initiatives and remain aligned with circumpolar nations, as goals, objectives, and guiding principles are developed.”<sup>168</sup>

#### **8. What is the spatial scale for implementation (km<sup>2</sup>)?**

The implementation scale is the same as the Canada’s Oceans Action Plan five (5) Integrated Management Planning areas:

1. Placentia Bay (3,600 km<sup>2</sup>) and the Grand Banks (PBGM) (500,000 km<sup>2</sup>);
2. The Eastern Scotian Shelf (ESSIM) (325,000 km<sup>2</sup>);
3. The Gulf of St. Lawrence (GOSLIM) (200,000 km<sup>2</sup>);
4. The Beaufort Sea (BSIMPI) (1,750,000 km<sup>2</sup>);
5. The Pacific North Coast (PNCIMA) (88,000 km<sup>2</sup>).<sup>169</sup>

### **C. Authority**

#### **1. What is the legal basis for this plan?**

Legislative act. *Canada Oceans Act*. Many other pieces of legislation also underpin management of the individual sectors, and the Oceans Act does not have priority over any of the sectoral acts.

#### **2. Which level(s) of government is (are) driving the spatial plan?**

“The *Oceans Act* calls on the Minister of Fisheries and Oceans to lead and facilitate the development of a national oceans strategy that will guide the management of Canada’s estuarine, coastal and marine ecosystems.”<sup>170</sup> Regional governance is guided and driven by the federal Fisheries and Oceans Canada.

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<sup>165</sup> Jessen, p. 10.

<sup>166</sup> Canada’s Ocean Strategy, p. 6. (quoting Oceans Act).

<sup>167</sup> ESSIM Plan, p. 15.

<sup>168</sup> IOMP, p. 3.

<sup>169</sup> Canada’s Ocean Action Plan, pp. 13-15.

<sup>170</sup> Canada’s Oceans Strategy, p. i.

**3. What institutional change, if any, was made as part of creating the plan?**

No new agency was created by the *Oceans Act*. Fisheries and Oceans Canada (DFO) (existing agency) was designated as the responsible federal authority for all matters not assigned by law to any other department, board or agency of the Government of Canada, relating to the policies and programs of the Government of Canada respecting oceans.<sup>171</sup> A new sector was created within DFO to implement the *Oceans Act* to reflect the added demands and responsibilities. The new sector is present within both Headquarters and in each Regional office.

**4. What governance and institutional arrangements are used to implement the plan?**

“[T]he Minister of Fisheries and Oceans, in collaboration with other ministers, boards and agencies of the Government of Canada, with provincial and territorial governments and with affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements, is encouraging the development and implementation of a national strategy for the management of estuarine, coastal and marine ecosystems [.]”<sup>172</sup>

“Implementation relies on the cooperation of over 20 federal departments and agencies to use their existing powers and resources”<sup>173</sup>, as well as cooperation by Provincial and Territorial governments, and in the Beaufort, all tribal Councils and Management Boards recognized by Land Claims Agreements, Treaties, and enabling court decisions.

“Implementation of the management strategies will occur through the collective effort of all involved with the Plan. A variety of actors from both within and outside government will play leading roles in implementation of the management strategies. While government is likely to play a lead role in strategies involving regulatory tools, industry may take the lead in developing best practices and operating procedures. Academic institutions may provide the leadership for research programs, and community or environmental organizations may initiate stewardship projects.”<sup>174</sup> Community groups, labour associations (ESSIM), and Tribal and Band Councils and similar bodies (in the Beaufort) will be important actors in many implementation aspects.

IOMP: Regional Coordination Committee, Beaufort Sea Partnership, and a number of working groups were created to lead and implement the management plan.<sup>175</sup>

**D. Data**

***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	x		
Geological	X	X		X		
Chemical	X	X		X		
Biological	X	X	X	X		

<sup>171</sup> Oceans Act, section 40.

<sup>172</sup> Oceans Act, Preamble, pp. 1-2.

<sup>173</sup> Jessen, p. 10.

<sup>174</sup> ESSIM Plan, p. 42.

<sup>175</sup> IOMP, p. 6.

Economic	X	X	X	X		
Social	X	X	X	X		

**2. Were there clear criteria for data inclusion? If so, what were they?**

For the EOAR exercises in all LOMAs there were inclusive workshops held according to CSAS protocols for peer review of all ecological data and analyses, (including spatial analyses) used in the EOARs. For the Beaufort, where TK was the primary source of information, experienced social scientists collected the TK using formal methods for quality assurance of narrative data that are well established in anthropology and sociology.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

All information used in the workshops that led to the EOARs was reviewed according to the standards and protocols found on the CSAS website for peer review, including expert opinion. In the Beaufort IOMP social scientists applied disciplinary standards to all collected information and all information extracted from interviews was validated with Elders.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The collaborative planning approach includes all sectors and stakeholders.

**2. Did they have equal status at all parts of the process?**

No. “The collaborative planning model is not intended to supersede or interfere with the ability of federal and provincial departments and agencies to carry out their legislative mandates. They retain their authority, but work with other stakeholders to develop and pursue shared goals and objectives through the integrated management process.”<sup>176</sup> However, the treaty rights and Land Claims Agreements in the North give Aboriginal “stakeholders” in the Beaufort a privileged position, even relative to federal departments in many aspects of governance relative to IM planning and implementation.

**3. Were stakeholders included in the planning process?**

Yes. Stakeholder involvement in the planning process of the IOMP.

**4. Was there a broad public participation process?**

IOMP: Yes. Public review of the IOMP involved significant efforts to visit most northern communities dependent on the Beaufort LOMA area several times during the full process. Also wherever Land Claims Agreements apply there are legally defined standards for what constitutes “consultation” and “informed consent”. All those standards have to be met before anything like an IM plan can be released for an area where there are treaty rights and/or Land Claims Agreements.

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<sup>176</sup> ESSIM Plan, p. 21.

**5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?**

IOMP: “The Social, Cultural and Economic (SCE) Working Group documented the baseline conditions and objectives for communities in the ISR and contributed their findings to this Plan. A Social, Cultural and Economic Overview and Assessment Report (SCEOAR) (Social, Cultural and Economic Working Group, 2009) similar to the EOAR have been completed for the LOMA.”<sup>177</sup> Important oceans uses are subsistence hunting and fishing.

“Social, cultural and economic information is used to identify the needs, interests, and expectations of the people that live in and use the LOMA. This information also enhances the ability to understand and anticipate conflicting interests, and reveals the values and potential interests, which may influence decision-making. . . Assessing SCE characteristics and issues allows diverse interest groups to find common ground and set priorities based on core social, cultural, economic and environmental values.”<sup>178</sup>

“Indicators Project: A project that reflects and measures cultural and traditional facets of well-being. It also develops an index of well-being that incorporates these factors that can be used for a variety of purposes in terms of social and economic development in the region. Work will analyze and build on current Mackenzie Gas Project Impact Fund (MGPIF) Plan Indicators Project and formalize indicators with stakeholders, including data collection, sharing and access arrangements for effective monitoring.”<sup>179</sup>

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Oceans Act: “At the heart of Integrated Management is a commitment to citizen engagement in the broadest sense; that is governments at all levels, Aboriginal groups, corporate and sectoral interests, community interests, non-governmental organizations, and Canadians generally.”<sup>180</sup>

“Sectoral participation includes government, coastal communities, Aboriginal groups, fisheries, oil and gas, marine conservation, telecommunications, shipping, and academia.”<sup>181</sup>

IOMP: “The social, cultural and economic scope of the LOMA includes the users of the marine area and/or those impacted by marine activities occurring in the LOMA. While these impacts will apply primarily to the Inuvialuit communities, it is recognized that secondary economic impacts will also be realized in the Yukon and in other areas of the Northwest Territories.”<sup>182</sup>

**7. In which parts of the process were stakeholders allowed to participate?**

All CSAS peer review and advisory meetings include a set of external participants, invited from the various industry sectors, community groups, and other levels of government, so they were also involved in reviewing the completeness and quality of scientific and technical information on ecological, social, and economic aspects relevant to IM planning. The subsequent advisory groups, fora, and partnerships were fully involved in development of vision, goals and strategic

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<sup>177</sup> IOMP, p. 9.

<sup>178</sup> IOMP, p. 14.

<sup>179</sup> IOMP, p. 30.

<sup>180</sup> Canada’s Oceans Strategy, p. 11.

<sup>181</sup> ESSIM Plan, p. 22.

<sup>182</sup> IOMP, p. 14.

direction, review and feedback on planning documents and materials, including action plans and performance evaluations.<sup>183</sup>

### **8. What form was their participation?**

IOMP: “A Beaufort Sea e-Forum served as a repository for workshop reports and minutes of meetings/consultations, and offered stakeholders the opportunity to ask questions and provide feedback on draft documents.”<sup>184</sup> “Extensive feedback was solicited through workshops, meetings, and over the internet.”<sup>185</sup>

Beaufort Sea Partnership (BSP). “the primary forum for stakeholder engagement in the integrated ocean management of the Beaufort Sea area. The BSP has broad stakeholder representation with 82 members from 37 organizations providing a forum for all groups who are active or have an interest in the Beaufort Sea LOMA to share information about their activities/interests.”<sup>186</sup>

## **F. Tools & Decision Support**

### **1. Which decision support tools are used to inform spatial allocation decisions?**

Decision support tools to inform spatial allocation are being created.

IOMP: “tools are under development.”<sup>187</sup> Objective 1.2 is to “Conduct spatial planning in the LOMA” and the action proposed in the plan is to “identify the areas of the LOMA that need protection, and the areas that are available for development [and] develop management tools that dictate where and when various types of activities can occur”<sup>188</sup> All the ecological data that exist are geo-referenced and most of the TK that has been collected was collected as map-referenced narrative. These have already been used in the application of nationally agreed criteria for Ecologically and biologically Significant Areas (and Species), to identify the priority areas for conservation.

### **2. How are key trade-off issues framed and formalized into decision support tools?**

IOMP: Still under discussion; any trade-off analyses will need to accommodate Aboriginal rights.

### **3. How are trade-offs analyzed?**

IOMP: Still under discussion; any trade-off analyses will need to accommodate Aboriginal rights.

### **4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Yes.

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<sup>183</sup> ESSIM Plan, p. 22.

<sup>184</sup> IOMP, p. 10.

<sup>185</sup> IOMP, p. 11.

<sup>186</sup> IOMP, p. 42.

<sup>187</sup> IOMP, p. 5.

<sup>188</sup> IOMP, p. 48.

IOMP: The plan does not use the term “ecosystem service value” but does reference the need to address “sense of identity, way of life, cultural distinctiveness, social network and kinship systems” and “set priorities based on core social, cultural, economic, and environmental values.”<sup>189</sup>

**5. How does the plan recognize and deal with uncertainty and risk?**

All the EOARs deal extensively with uncertainty in all the ecological (and where available social and economic) information that was peer reviewed and accepted. Focus was on uncertainty in data sources and knowledge of ecological relationships, but moderate attention was given to uncertainty about future states of nature and there was some consideration of implementation uncertainty as well. Once there are quantitative operational objectives set for targets, and especially for limits – there are overarching Privy Council Office Standards and Guidelines for best practices in risk-based decision-making. These are mandatory for all departments. DFO has many pieces of PCO-compliant comprehensive risk analysis and risk management frameworks already peer-reviewed and in place. However, until the operational objectives are set, the risk assessment (even qualitative risk assessment) tools can’t be applied.

**6. Are the decision support tools dynamic?**

Not at this point.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Yes.

IOMP: The plan outlines four main components for performance evaluation and reporting: assess plan outcomes; assess plan performance; reporting; and plan review and renewal. The stated intention is to develop, report, and evaluate “work plans” annually.<sup>190</sup>

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

Oceans Act: Conflict resolution is not addressed in the enabling legislation.

IOMP: Conflict resolution is not explicitly addressed in the IOMP plan at this point. There are great governance complexities about the priority of Land Claims Agreement and treaty rights over any federal legislation that may be implemented in lands covered by such agreements. These will require legal frameworks to be used when at least conflicts between development and subsistence uses of ecosystems need resolution.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

Cooperation among the government entities. As stated previously, there have been no operational objectives yet set within which to test any mechanisms. Management will remain sectoral, however. No higher level management tools are being contemplated for super-ceding sectoral management processes.

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<sup>189</sup> IOMP, p. 14.

<sup>190</sup> IOMP, p. 22.

## **G. Monitoring & Performance Measures**

### ***1. What are the products of the marine spatial planning process?***

Development of a plan itself.

The products for the IOMP are the Plan itself. It was intended to serve as a high-level framework and not include detailed provisions for individual uses of the ocean.

### ***2. What constitutes success of the plan?***

Implementation constitutes success. The plan has set strategies on how to accomplish articulated objectives and goals. (See question 4 below).

### ***3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?***

No, although the plan acknowledges that existing monitoring plans in the respective regions will provide information for measuring success of the ecological outcomes of the Plans. However, in neither case have specific indicators and reference levels been agreed as performance metrics for the Plans.

### ***4. Does the plan incorporate monitoring?***

Yes.

IOMP: The activities for years 1 and 2 of the plan include “evaluation and review of principles/indicators [and to] establish baselines for indicators.”<sup>191</sup>

### ***5. Is adaptive management an explicit component?***

Oceans Act: There is not an explicit component of “adaptive management” in the enabling legislation. However, the “ecosystem approach” is explicit in the Oceans Act and in national policy “adaptive management” is explicitly part of an ecosystem approach. Thus the Oceans Act implicitly provides for a commitment to adaptive management in the legislation.

IOMP: Yes. Explicit component. Objective 1.8 is to “assess and develop an adaptive management response to climate change” and to develop strategies for adapting to anticipated changes.<sup>192</sup>

### ***6. Is the adaptive management formally structured around response to feedback from monitoring?***

The regular review should accomplish this.

### ***7. If so, are the responses formally rule-based?***

No.

## **H. References**

Beaufort Sea Partnership. 2009. Integrated Ocean Management Plan (IOMP) for the Beaufort Sea: 2009 and Beyond. Beaufort Sea Planning Office.

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<sup>191</sup> IOMP, p. 24.

<sup>192</sup> IOMP, p. 49.



Government of Canada. 1996. *Canada Oceans Act*, RSC 1996: Bill C-26, Chapter 31, 2<sup>nd</sup> Session, 35<sup>th</sup> Parliament, 45, Eliz. 2. 1996.

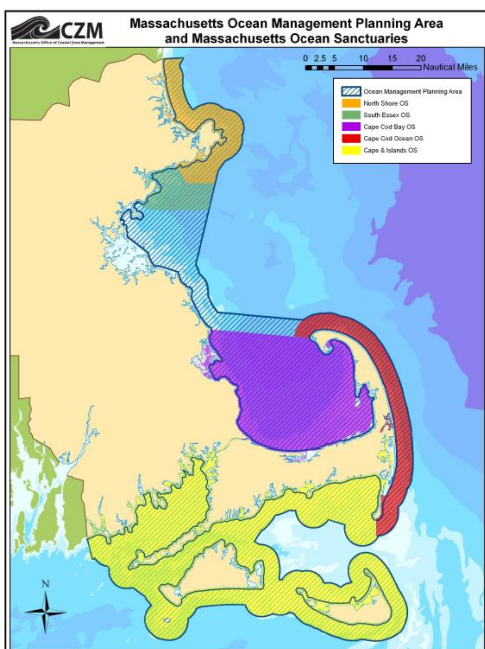
Government of Canada, Fisheries and Oceans. 2002. *Canada's Oceans Strategy: Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada*. Ottawa: Fisheries and Oceans Canada.

Government of Canada, Fisheries and Oceans. 2003. *State of the Eastern Scotian Shelf Ecosystem*. Fisheries and Oceans Canada.

Government of Canada, Fisheries and Oceans. 2007b. *Eastern Scotian Shelf Integrated Ocean Management Plan: Strategic Plan*. Dartmouth, NS: Fisheries and Oceans Canada.

Jessen, S. 2011. A review of Canada's Implementation of the Oceans Act since 1997 – from Leader to Follower? *Coastal Management* 39:20-56.

## QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Massachusetts Ocean Management Plan



**Editorial comment from an expert observer:** The Massachusetts marine spatial planning effort is best described as nascent and rudimentary. Fisheries are mentioned but treated separately. Department of Marine Fisheries (DMF) still retains its regulatory jurisdiction over fisheries, and fisheries keep its status as a public trust (i.e., priority) use. The management concepts in the plan are vaguely defined and are best understood as extensions of the existing MEPA environmental impact review process (note that, by law, the plan cannot supersede existing law or authority) to require more explicit determinations of public benefits and strategies for avoiding damage to existing resources and uses.

The plan provides a general division of Massachusetts ocean waters into three areas: prohibited; multi-use; renewable energy. It also presents a spatial distribution of existing uses and resources/habitats across those areas. Most of the management-relevant aspects of the plan focus on the siting of specific smaller scale projects within those large-scale areas.

There is a responsibility on the part of a prospective developer or new user to demonstrate no significant impact or the non-existence of less environmentally damaging alternatives to a project when it impinges on SSUs (special, sensitive, or unique estuarine and marine life and habitats) and to determine public (net) benefits. Consequently, one could argue that decision support is provided in large part by new project proponents. The Executive Office of Energy and Environmental Affairs (EEA) was to promulgate regulations to flesh out the plan in 2010, but no activity to date and it's doubtful that any of the elements of the plan have been implemented in any specific case to date.

## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

The Objectives are to:

1. Balance and protect the natural, social, cultural, historic, and economic interests of the marine ecosystem through integrated management;
2. Recognize and protect biodiversity, ecosystem health, and the interdependence of ecosystems;
3. Support wise use of marine resources, including renewable energy, sustainable uses, and infrastructure;
4. Incorporate new knowledge as the basis for management that adapts over time to address changing social, technological, and environmental conditions.

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

The formal objectives are conceptual, although the driver was offshore renewable energy, specifically a proposed large offshore wind farm.

### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

The plan was mandated by the Massachusetts Ocean Act of 2008 which was signed into law by Governor Deval Patrick on May 28, 2008 and provided general objectives and defined the scope of the plan. The Secretary of the Executive Office of Energy and Environmental Affairs of the Commonwealth of Massachusetts was directed to develop the plan.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Yes, the plan considers all uses and sectors. However, fisheries are referred to as a public trust use. Potential conflicts with fisheries actually involve a higher level of scrutiny, including a requirement for a new project to "minimize economic impacts" (not carefully defined) to commercial and recreational fisheries.

The plan is designed to "consider" fisheries, particularly any effects that the plan might have on fisheries. However, in the enabling legislation is clear that commercial and recreational fisheries are deemed "allowable uses" and that "exclusive jurisdiction [remains in] the division of marine fisheries."

The plan is also use/spatially constrained by a nearshore (inner) boundary line that generally excludes 0.3 nautical miles from the high water mark as well as many embayments. The practical sector effect of this nearshore boundary is the removal of most marine and mooring activities in state waters.

### ***2. How long did the spatial planning process take (years)?***

The draft plan took 13 months to develop from the signing of the Ocean Act, and a final plan was completed 6 months later (December, 31, 2009).

### ***3. Were particular steps especially demanding of time or resources?***

There was a tight deadline (18 months) to complete the plan. During the first year, 18 open public hearings were held throughout the State. In addition 6 stake holder working groups met to look closely at fisheries, habitat, sediment management, marine infrastructure, regulatory and historical, cultural, and archaeological issues. In the 5-month period following release of the

draft plan, the assistant secretary for Oceans and Coastal Zone Management in the Massachusetts Executive office of Energy and Environmental Affairs received 300 written comments, more testimony in 5 public hearings and 25 informational meetings.

***4. How long does the plan apply? What is the planning interval for update and revision?***

Legislation requires that the plan be revisited every 5 years. Administrative changes can occur more frequently and are initiated by a request to the Secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) or generated internally by the EEA Ocean Team (OT) that is charged with implementation, planning, coordination and oversight. The OT is chaired by the Office of Coastal Zone Management and comprised of personnel from that office, the Department of Environmental Protection's Wetlands and Waterways Program, the Department of Fish and Game's Natural Heritage and Endangered Species Program and Division of Marine Fisheries and the Massachusetts Environmental Policy Act Office.

***5. What was the funding structure for this project? Correct?***

Funded by the state and the Massachusetts Ocean Partnership.

***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

Coastal waters at least 0.3 nautical miles seaward of mean high water and extending to the three-mile limit of state control - excluding the most developed harbor and port areas. This is an area of 5500 km<sup>2</sup>.

The Prohibited Area - located east of Lower Cape Cod coincident with the Cape Cod Ocean Sanctuary and abutting the Cape Cod National Seashore - is an area where most uses, activities and facilities are prohibited.

The Multi-Use Area, covering nearly two-thirds of the planning area, is where strong new protections are established for critical species like rare marine mammals and birds and for critical habitat such as eelgrass beds and submerged rocky areas.

***7. How does plan scale match ecosystem scale?***

The plan does not match the Large Marine Ecosystem (LME) scale, although it does perhaps match the scale for near-shore waters, and in particular for the coastal waters between Martha's Vineyard and the shoreline of the mainland. It does not match the LME of the Gulf of Maine nor of the Mid Atlantic Bight.

***8. What is the spatial scale for implementation (km<sup>2</sup>)?***

State waters. 5500 km<sup>2</sup>.

**C. Authority**

***1. What is the legal basis for this plan?***

The plan was mandated by the Massachusetts Ocean Act of 2008 which was signed into law by Governor Deval Patrick on May 28, 2008.

***2. Which level(s) of government is (are) driving the spatial plan?***

The Secretary of the Executive Office of Energy and Environmental Affairs (EEA) of the Commonwealth of Massachusetts was directed to develop and implement the plan.

**3. What institutional change, if any, was made as part of creating the plan?**

No institutional changes have been made to date.

**4. What governance and institutional arrangements are used to implement the plan?**

Primary responsibility is with the Secretary of the EEA and the OT (see above).

**D. Data**

**1. What data are used?**

The data was gathered from multiple Federal, State, NGO, and private sources and includes data on hazard locations, biological species, living resources, rugosity, recreational fishing areas, density of fishing vessels, surficial sediments and other types of data.

Much of the data were deposited in MORIS, the Massachusetts Ocean Resource Information System. This is an online mapping tool created by the Massachusetts Office of Coastal Zone Management (CZM), the Massachusetts Office of Geographic and Environmental Information (MassGIS), the Massachusetts Ocean Partnership (MOP), and Applied Science Associates (ASA). MORIS can be used to search and display spatial data pertaining to the Massachusetts coastal zone.

The purpose of MORIS is to:

- Provide spatial data that are, to the extent possible, accurate, scientifically sound, and credible.
- Provide information to decision makers, planners, and the general public that can be used to strengthen environmental policy and guide management decisions.
- Use a collaborative, interactive process that involves a variety of partners and data sources.
- Ensure that the data are available in an easily accessible and useful manner.

From expert reviewer: In addition some datasets were considered for use in the plan, but due to quality issues or uncertainties were not ultimately used (did not show up in the final plan documents). However, they were instrumental in informing managers by providing best available information where better data didn't exist, identifying key data/science gaps, and informing future (some now current) data collection and research efforts. All data, both in final plan documents and not, that were used to inform the plan are listed in the table below.

Data type	Quantitative time series	Quantitative "snapshot"	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X				
Geological		X				
Chemical						X
Biological	X	X	X	X		
Economic		X	X	X		
Social			X	X		

**2. Were there clear criteria for data inclusion? If so, what were they?**

No clear criteria. However, MORIS is the data repository and users are encouraged to report errors or omissions. (Massachusetts Coastal Zone Management (CZM) maintains MORIS). The draft report was open for public comment for 5 months.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

No real standards. From expert reviewer: Expert opinion was mostly used to better understand and map the occurrence of certain key uses (such as commercial and recreational fishing and recreational boating). Due to the extremely tight timeline, standards for this type of information were not developed. Currently more thorough and defensible methods for eliciting expert opinion or information from user groups are being implemented. Expert opinion on the vulnerability of marine ecosystems was utilized in a standardized manner through the cumulative impacts project (NCEAS/Halpern). However, due to the timing of this project, the use of these results in the MA Ocean Plan was limited.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The EEA Ocean Team (OT) is charged with implementation, planning, coordination and oversight. The OT is chaired by the Office of Coastal Zone Management and comprised of personnel from that office, the Department of Environmental Protection’s Wetlands and Waterways Program, the Department of Fish and Game’s Natural Heritage and Endangered Species Program and Division of Marine Fisheries and the Massachusetts Environmental Policy Act Office. The OT is advised by the Ocean Advisory Commission that meets quarterly, Ocean Science Advisory Council, Regional Planning Agencies for development and review of renewable energy projects and Federal Agency and Tribal Government including the US EPA, NMFS, US Fish and Wildlife Service, Army Corps, the Mashpee Wampanoag Tribe, and the Wampanoag Tribe of Aquinnah. Massachusetts is also active in the Northeast Regional Ocean Council led by the White House Council on Environmental Quality) and partners with the Massachusetts Ocean Partnership (MOP) which is an independent organization of ocean stakeholders funded by the Gordon and Betty Moore Foundation and ensures stakeholder involvement in the evolution of the plan.

**2. Did they have equal status at all parts of the process?**

All of the above had input to the plan via the OT, but the OT lead the effort.

**3. Were stakeholders included in the planning process?**

Yes, see below.

**4. Was there a broad public participation process?**

Yes, see below.

**5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?**

Unknown.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Stakeholder working groups met during plan development to look closely at fisheries, habitat, sediment management, marine infrastructure, regulatory and historical, cultural, and archaeological issues. And see below regarding MOP.

***7. In which parts of the process were stakeholders allowed to participate?***

Providing input to the development of the plan.

***8. What form was their participation?***

Working groups and public hearings. In addition to public hearings, 6 stakeholder working groups met during plan development to look closely at fisheries, habitat, sediment management, marine infrastructure, regulatory and historical, cultural, and archaeological issues.

In addition, the Massachusetts Ocean Partnership (MOP) was specifically included as part of the plan development and for future changes to the plan. MOP approach includes:

Stakeholder engagement, public involvement and communications: Designing and conducting effective stakeholder and public processes can improve acceptance and durability of an ocean management plan;

Human use data acquisition and analysis: Understanding where, when and how people use the ocean – and the value associated with those uses – is a critical component of marine spatial planning and an area where information is typically lacking;

Data integration, analysis, management and access: Current, credible and comprehensive data are only useful if people have ready access. The process of coastal and marine spatial planning requires efficient access to multiple, concurrent data streams from disparate sources, including enhancements to MORIS;

Design and application of tradeoff analysis models and related decision support tools: Accommodating new ocean activities in a seascape that already includes multiple competing uses is no simple task. It not only requires access to comprehensive data but also the tools to rationally weigh the ecological, economic and other societal tradeoffs between competing interests;

Development of ecological and socioeconomic indicators. The only way to gauge the effectiveness of a management plan is to measure outcomes relative to goals. Developing indicators designed to measure key ecosystem, economic and policy parameters and to effectively communicate progress to stakeholders, managers, policy makers and the media is an integral component of successful CMSP.

**F. Tools & Decision Support**

***1. Which decision support tools are used to inform spatial allocation decisions?***

Resource/habitat/use mapping; compatibility assessments (used to rank the "vulnerability" of SSUs to new uses in the multi-use area); baseline feasibility analysis (for renewable energy areas); environmental impact reports (MEPA); agency permitting; public benefit determinations (not carefully defined); demonstration of damage avoidance to SSUs.

***2. How are key trade-off issues framed and formalized into decision support tools?***

There is a classification of ocean waters into three general areas: prohibited (the Cape Cod Ocean Sanctuary); renewable energy; and multi-use. Most of the state's waters are classified as multi-use. In the multi-use area, "siting and performance standards" are to be applied. These

standards include: avoidance of mapped SSU areas; where SSUs cannot be avoided, demonstrations of practicable ways to avoid damage to and no significant alteration of SSUs; a public benefit determination; evaluation of impacts to commercial and recreational fishing and areas of concentrated recreational activity; and identification and minimization of potential economic impacts to fisheries and recreation. Key trade-off issues are framed through the implementation of these siting and performance standards. Some of the decision-support tools (as listed above) provide data for use in making tradeoffs.

### ***3. How are trade-offs analyzed?***

There is a lot of administrative discretion on the part of the permitting and licensing agencies and EEA, which is required to coordinate and oversee agency decision-making, to analyze tradeoffs qualitatively. Nevertheless, the requirement for a public benefit determination (specifically the project proponent must show that "public benefits associated with the proposed project clearly outweigh the public detriments") is an explicit requirement for the analysis of tradeoffs. The plan does not refer to any specific methodology (such as benefit-cost analysis) for making the public benefit determination, however.

### ***4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

There is a requirement to identify and minimize potential economic impacts to fisheries and recreation. "Economic impacts" is a general term that may or may not comprise the theoretically correct measure of economic value useful for tradeoff analysis. Without further definition, one cannot know what the plan is looking for here. Also, in a public benefit determination, presumably economic values would be utilized.

### ***5. How does the plan recognize and deal with uncertainty and risk?***

There is a general recognition the data that are used to develop the SSU maps are incomplete and changing over time. There is some discussion about updating data and obtaining additional baseline data for specific siting decisions and for the renewable energy areas. There is a requirement to revise the plan every five years; thus, the planning process could be characterized as "adaptive." The requirements for project proponents to demonstrate avoided damage to and no significant alteration of SSUs and to undertake public benefit determinations are arguably precautionary approaches.

### ***6. Are the decision support tools dynamic?***

Not in the sense of modeling changes in the status of fish stocks or ecosystems. They are dynamic in the sense of recognizing the need to compile better and more comprehensive data, to update resource/habitat maps, and to revise the plan on a regular basis.

### ***7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?***

Not the decision support tools, per se, but data on the uses and SSUs are to be updated and improved.

### ***8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).***

Approvals for new uses are to be consistent with the ocean management plan (again, here, "consistency" is undefined). EEA serves to coordinate agency permitting and licensing



decisions, and presumably determines consistency of projects with the plan. Stakeholders provide input through the traditional MEPA processes. In general, resolution of conflicts occurs as before through the traditional permitting processes, but with the added requirements of the siting and performance standards. One objective of the plan is to identify suitable/unsuitable areas for particular activities such that the likelihood of some conflicts is reduced by steering some users away from potential conflict.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**  
Unknown.

## **G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

Unknown.

**2. What constitutes success of the plan?**

Unknown.

**3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

Performance indicators are classified within three categories: Environmental, Socio-economic and Governance.

Environmental:

Change in location and/or extend of core and important habitat.

Change in abundance/population density of species.

Change in fish, mollusks and crustacean species including total biomass/abundance and distribution.

Expansion in the range of watched invasive species.

Fish population assessment.

Mean sea level rise.

Sea surface, water column and bottom temperature.

Socio-Economic:

Economic value of commercial fisheries.

Economic value and leased area of aquaculture operation.

Economic value of recreational fisheries.

Economic value and total production capacity of offshore renewable energy.

Economic value of recreational boating.

Governance:

Number and areal extent of management areas.

Number of projects proposed/permited in use areas and areal extend, by type

Number of projects proposed/permited in Special, Sensitive or Unique Marine and Estuarine Life and Habitat (SSUs).

Number of actions in science framework initiated/implemented.

Percent of required state energy produced from renewable energy in planning area.

Resources expended for implementation of plan and science framework.  
Mitigation funds paid to the Ocean Use Trust Fund.

***4. Does the plan incorporate monitoring?***

Yes.

***5. Is adaptive management an explicit component?***

Yes.

***6. Is the adaptive management formally structured around response to feedback from monitoring?***

Yes.

***7. If so, are the responses formally rule-based?***

Unknown.

**H. References**

Website of Massachusetts Executive Office of Energy and Environmental Affairs:

<http://www.mass.gov/?pageID=eoeeahomepage&L=1&L0=Home&sid=Eoeea>

Massachusetts Ocean Management Plan. Volume 1. Management and Administration.  
December, 2009.

Massachusetts Ocean Management Plan. Volume 2. Baseline Assessment and Science  
Framework.

Interview with staff at Marine Policy Center, Woods Hole Oceanographic Institution.

# **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Rhode Island Ocean Special Area Management Plan**



## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

The Objectives are to:

1. Foster a properly functioning ecosystem that is both ecologically sound and economically beneficial;
2. Promote and enhance existing uses;
3. Encourage marine-based economic development that considers the aspirations of local communities and is consistent with and complementary to the state's overall economic development; and
4. Build a framework for coordinated decision-making between state and federal management agencies.

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

The formal objectives are conceptual but there is an operational goal for Rhode Island to meet 15% of its energy needs from offshore renewable energy sources.

### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

The objectives were identified at the start of the planning process.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Yes, the plan considers all uses and sectors.

**2. How long did the spatial planning process take (years)?**

The Ocean SAMP has been developed over a required 26-month period.

**3. Were particular steps especially demanding of time or resources?**

Especially demanding tasks included project research, drafting of policies based on research and considering realistic management issues, public review of chapter, and subsequent revisions. In addition, significant time and effort was dedicated to the organization of an effective and efficient process to communicate with and engage a wide array of stakeholders and to ensure learning opportunities and tools were provided regularly to these public and private sector audiences.

**4. How long does the plan apply? What is the planning interval for update and revision?**

The plan is predicated on the practice of regular review and revision. Because we are applying the adaptive management approach, adjustment of objectives and practices will be ongoing.

**5. What was the funding structure for this project?**

Below is an estimated breakdown of Ocean SAMP Funds from 2008 – 2010:

<b>Funding amount (and Agency)</b>	<b>Synthesis of existing info</b>	<b>Generating new information</b>	<b>SAMP document/ Outreach</b>	<b>Admin (approx)</b>
\$3.2 (RIEDC)	40%	15%	35%	10%
\$607,438 (DOE)	10%	60%	20%	10%
\$2.8 (RIEDC)	10%	80%		10%

**6. At what spatial scale was the plan developed (km2)?**

The spatial scale of the Ocean SAMP is approximately 3,800 km2. The study area begins 500 feet from the coastline in state waters, from the mouth of Narragansett Bay seaward, and all federal waters within the boundary. The study area abuts the state waters of Massachusetts, Connecticut and New York.

**7. How does plan scale match ecosystem scale?**

The SAMP covers portions of the Rhode Island Sound and Block Island Sound ecosystems, which are shallow, near shore continental shelf waters. The SAMP study area is located at the boundary of two bio-geographic provinces, the Acadian to the north (Cape Cod to the Gulf of Maine) and the Virginian to the south (Cape Cod to Cape Hatteras). The area is dynamically connected to Narragansett Bay, Buzzards Bay, Long Island Sound, and the Atlantic Ocean via the Inner Continental Shelf. Although the management and policy focus is the study area, most research extended outside the study area sometimes out to the OCS.

**8. What is the spatial scale for implementation (km2)?**

Short term will be state waters; long term includes entire study area including federal waters.

### **C. Authority**

#### ***1. What is the legal basis for this plan?***

Once approved by the state’s coastal program, it will then be submitted to the National Oceanographic and Atmospheric Administration (NOAA) for formal adoption into Rhode Island’s Coastal Program. Once adopted, CRMC will be able to exercise its federal consistency in state and federal waters. CRMC, however, does plan to apply to NOAA for extended jurisdiction for the entire SAMP study area – for both state and federal waters.

#### ***2. Which level(s) of government is (are) driving the spatial plan?***

The plan is being driven from the state level of government by the Rhode Island Coastal Resources Management Council (CRMC), in response to a request from the Governor. Federal agencies such as the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and the U.S. Army Corps of Engineers are encouraging Ocean SAMP development because they view it as a proactive MSP approach to responding to future development and in some cases streamlining federal requirements.

#### ***3. What institutional change, if any, was made as part of creating the plan?***

No institutional changes have been made to date.

#### ***4. What governance and institutional arrangements are used to implement the plan?***

The CRMC coordinates extensively with the University of Rhode Island to implement the research, governance, and policy development aspects of the plan.

### **D. Data**

#### ***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical		X		X		
Geological		X	X	X		
Chemical				X		
Biological	X	X	X	X		
Economic		X	X	X		
Social		X	X	X		

#### ***2. Were there clear criteria for data inclusion? If so, what were they?***

Data were peer reviewed. We consulted with federal and state agencies and stakeholders to ensure that we were including the appropriate information and that we were using proper methodologies to collect data.

#### ***3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?***

All SAMP chapters and reports were subject to peer review and public comment.

## **E. Participants**

### ***1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?***

Key entities include: The Rhode Island Coastal Resources Management Council (CRMC), the Rhode Island Department of Environmental Management (RIDEM), the Rhode Island Historical Preservation & Heritage Commission, the University of Rhode Island, Rhode Island coastal municipalities, the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), the U.S. National Oceanographic and Atmospheric Administration (NOAA), The U.S. Navy, U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the U.S. Coast Guard.

### ***2. Did they have equal status at all parts of the process?***

While the CRMC is the lead agency, all community sectors and groups were welcome to engage in the process and access all education tools and opportunities that are part of the Ocean SAMP outreach effort. BOEM and ACE were more actively involved than any of the other Federal Agencies to ensure the SAMP responded to their regulatory needs.

### ***3. Were stakeholders included in the planning process?***

Yes, see the complete list at:

[http://seagrant.gso.uri.edu/oceansamp/pdf/stakeholder/sh\\_list\\_march2010.pdf](http://seagrant.gso.uri.edu/oceansamp/pdf/stakeholder/sh_list_march2010.pdf)

### ***4. Was there a broad public participation process?***

Yes.

### ***5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?***

Significant amount of economic and social data were included on Fisheries, Marine Transportation, Recreation and Tourism.

### ***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

Stakeholders were selected who represent groups with a vested interest in the decisions made in the project area. Membership in the stakeholder group was targeted to allow each group represented to have adequate opportunity to offer meaningful input to the process. In addition, those interested in being added to the stakeholder list so they could participate in the process were able to submit formal letters requesting consideration (See the stakeholder report at: [http://seagrant.gso.uri.edu/oceansamp/pdf/appendix/22-Payne\\_stakeholders.pdf](http://seagrant.gso.uri.edu/oceansamp/pdf/appendix/22-Payne_stakeholders.pdf)).

### ***7. In which parts of the process were stakeholders allowed to participate?***

Stakeholders were allowed to take part in all public meetings, dialogues, and learning events, lectures, and conferences and the development and review of all chapters including the finding of facts sections and development of policies in many cases.

### ***8. What form was their participation?***

Participation largely consisted of regular monthly meetings with each meeting providing information about a key SAMP topic of interest. Meetings with individual stakeholders between researchers, chapter writers and other key individuals took place constantly.

## **F. Tools & Decision Support**

### ***1. Which decision support tools are used to inform spatial allocation decisions?***

For the Ocean SAMP, we have made use of a Technology Development Index (TDI), and we plan to also make use of the Ecological Services Values Index once this planning tool is completed. In addition, we consider discussions and dialogues with stakeholders, scientists and policy makers are serving as valuable decision support tools.

### ***2. How are key trade-off issues framed and formalized into decision support tools?***

We develop tools for transparent dialogue, such as forums or boards, such as the Ocean SAMP Fisherman's Advisory Board, to ensure that real issues are provided a process of resolution during, not after, policymaking for regulatory plans. These forums are then supported, or nested within, a larger network of state-sanctioned public processes.

### ***3. How are trade-offs analyzed?***

Trade-offs are analyzed through a consistent and transparent public process focused on discussing and reviewing existing policies and water classifications.

### ***4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

Not always. In some cases yes.

### ***5. How does the plan recognize and deal with uncertainty and risk?***

We ensure that the best available science and most open public processes are brought to bear on decision-making for coastal and ocean resources. We use our portfolio of 30-plus years of coastal management expertise to apply lessons learned from places both locally and around the world to ensure a full range of solutions and learning situations can benefit a particular plan or public decision.

### ***6. Are the decision support tools dynamic?***

Yes, we employ policy development tools that are flexible and can be tailored to ensure the needs of the people of the place are answered with solutions that serve their economic, environmental and social goals.

### ***7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?***

Yes, we are actively testing monitoring and evaluation tools, and are employing adaptive management approaches, to constantly study the effectiveness of our projects and plans and improve them so they can be useful here and replicated elsewhere.

### ***8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).***

We approach conflict resolution through a combination of discussions, policy reviews, and dialogues that focus on applying the best available science to the issue at hand.

### ***9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?***

As stated above, we employ a portfolio of coastal and ocean management tools and techniques to achieve objectives. We ensure that the best available science and most open public processes are brought to bear on decision-making for coastal and ocean resources. We use our portfolio of 30-plus years of coastal management expertise to apply lessons learned from places both locally and around the world to ensure a full range of solutions and learning situations can benefit a particular plan or public decision. In addition, we consider discussions and dialogues with stakeholders, scientists and policy makers are serving as valuable decision support tools.

## **G. Monitoring & Performance Measures**

### ***1. What are the products of the marine spatial planning process?***

For the Ocean SAMP, our products are the SAMP itself – a regulatory document with specific policies pertaining to particular existing and future ocean uses, as well as the public process which supports document creation, and the data tools that are used to capture and depict new information that informs the policies.

### ***2. What constitutes success of the plan?***

We consider a plan successful if policies and recommendations within the plan are applied effectively by government, and if constituencies of public and private sector interests are active in plan implementation, policy revision, and efforts to secure funding for support of activities outlined in the plan. Public buy in.

### ***3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?***

Yes. Marine spatial planning is complex and must span long time periods. It is therefore important to clearly define how success will be achieved and how progress will be assessed. Simplified methods are needed that offer an overview of the status of a given program at a given time, can trace progress by a consistent set of indicators, and invite comparison and learning across initiatives. As such, we have employed an “Orders of Outcomes” tool, which provides a framework to assess progress toward the goals of MSP. Each ‘order’ is composed of a number of categories of outcome indicators that together define the sequence of achievements that mark the path toward more sustainable forms of development. The framework offers three intermediate and one final order.

### ***4. Does the plan incorporate monitoring?***

Yes.

### ***5. Is adaptive management an explicit component?***

Yes, the Ocean SAMP is a tool for implementing adaptive management.

### ***6. Is the adaptive management formally structured around response to feedback from monitoring?***

Yes.

### ***7. If so, are the responses formally rule-based?***

No, there are no formal rules to feedback from monitoring to management.



## **H. References**

Rhode Island Coastal Resources Management Council. 2010. *Rhode Island Ocean Special Area Management Plan*. Volume 1. Adopted October 19, 2010.

<http://seagrant.gso.uri.edu/oceansamp/>

## **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Maryland Oyster Management Plan**

### **A. Objectives**

#### ***1. What are the stated objectives of the plan, if any?***

It is the goal of the O'Malley-Brown Administration to develop an abundant, self-sustaining native oyster population to the Chesapeake Bay and its tributaries — one that will be an ecological, economic and cultural resource for the Bay and for Maryland citizens.

Maryland's Vision for Oysters- Establish an expanding and sustainable population of native oysters in significant portions of Chesapeake Bay and its tributaries. Establish a private aquaculture industry that emerges as a major economic contributor to the State of Maryland while maintaining a more targeted and scientifically managed wild oyster fishery.

#### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline).***

The objectives appear to be largely conceptual, but the Department did offer criteria (particularly for sanctuaries) so that counties and others could offer alternatives.

Sept 6, 2010 - Based on the recommendations of the OAC, USACE, MACC, as well as the requirements of the 2009 lease law, the Maryland Department of Natural Resources developed a 10-point Oyster

Restoration and Industry Revitalization plan for oysters.

The main objectives of this plan are to:

1. Expand the oyster sanctuary program
2. Shift commercial oyster production to aquaculture, and
3. Develop a more targeted, scientifically managed and sustainable wild oyster fishery.

Given the new vision for oysters, the 2004 Chesapeake Bay Oyster Management Plan will need to be revised. Until the revision is completed, this amendment will allow the expansion of the sanctuary program and growth of an aquaculture industry.

#### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process***

See Scope #2.

### **B. Scope**

#### ***1. Does the plan consider all uses or just selected sectors?***

Selected sectors – primarily Conservation, Aquaculture, Fisheries

#### ***2. How long did the spatial planning process take (years)?***

The state suggests 6 years but it seems that a great deal of the actual process from planning to (near) implementation has been a less than 2 year effort. "The plan and proposed regulations are the culmination of 6 years of scientific evaluation and public participation. Both the Programmatic Environmental Impact Statement (2004-09) and Oyster Advisory Commission (2008-09) recommended an expanded sanctuary program, increased aquaculture, and a more

targeted and scientifically based managed public oyster fishery. The Aquaculture Coordinating Council has lead efforts to advance aquaculture within the Chesapeake and Coastal Bays for over a decade”.

Jan 2003: Environmental Impact Statement Initiated.

Sept 2007: Oyster Advisory Commission Formed.

Sept 2008: Aquaculture Coordinating Council submits Shellfish Aquaculture Report to Governor O'Malley.

Feb 2009: Oyster Advisory Commission Issues Findings and Recommendations in Legislative Report.

May 2009: Governor O'Malley signs Aquaculture Lease Law that the General Assembly approved unanimously.

June 2009: Environmental Impact Statement Completed. MD, VA, Corps, NOAA, FWS, EPA all agree on native oyster strategy – expand sanctuaries, expand aquaculture, and implement science based management of wild fishery.

Dec 2009: Governor O'Malley Announces Proposed Oyster Restoration and Aquaculture Development Plan.

Dec 2009- May 2010: DNR Conducts Extensive Public Participation Process including four open houses, and more than 100 consultation stakeholder meetings. Several oyster policy bills debated in 2010 legislature.

May 27, 2010: Proposed regulations submitted to AELR.

September 2010: Plan was just finalized– Enforcement of plan is just beginning.

***3. Were particular steps especially demanding of time or resources?***

Unknown.

***4. How long does the plan apply? What is the planning interval for update and revision?***

At least 5 yrs.

***5. What was the funding structure for this project?***

It does not appear that significant new funds were used.

***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

>10,000km<sup>2</sup>.

***7. How does plan scale match ecosystem scale?***

No – since it encompasses primarily only the northern portion of Chesapeake Bay and the oyster populations (i.e., MD waters).

***What is the spatial scale for implementation (km<sup>2</sup>)?***

>10,000km<sup>2</sup>.

**C. Authority**

***1. What is the legal basis for this plan?***

Legislation in 2009 and the development of regulations in 2010.

In order to implement Governor Martin O'Malley's Oyster Restoration and Aquaculture Development Plan as authorized by Ch. 173, Acts of 2009, the Department has five regulatory packages.

**2. Which level(s) of government is (are) driving the spatial plan?**

The Governor's office and the Department of Natural Resources.

**3. What institutional change, if any, was made as part of creating the plan?**

None.

**4. What governance and institutional arrangements are used to implement the plan?**

DNR leasing and enforcement.

**D. Data**

***What data are used?***

Data type	Quantitative time series	Quantitative "snapshot"	Qualitative information	Expert opinion	Not available	Not applicable
Physical						
Geological						
Chemical						
Biological	X					
Economic	X					
Social	X					

**2. Were there clear criteria for data inclusion? If so, what were they?**

It does not appear so.

**3. Were there QA/QC standards for "expert opinion" and qualitative information? If so, what were they?**

Unknown.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

Primarily regulatory agencies (and secondarily science advisors). Also, the Oyster Advisory Commission called for the development of a plan- this involved many stakeholders.

**2. Did they have equal status at all parts of the process?**

No.

**3. Were stakeholders included in the planning process?**

Yes. There were several public commenting periods and (semi-formal) opportunities to offer alternatives.

**4. Was there a broad public participation process?**

While there were several public commenting periods and (semi-formal) opportunities to offer alternatives, it does not seem that one could call these ‘broad’.

**5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?**

Unknown.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Unknown.

**7. In which parts of the process were stakeholders allowed to participate?**

Meetings.

**8. What form was their participation?**

DNR staff and other state officials have held over a hundred meetings with legislators, advisory commissions, local officials, watermen, recreational fisherman, environmental organizations, aquaculturists, scientists and other citizens to gain additional input in advance of this formal regulatory proposal submittal. Since December, DNR received formal comments from nearly 1,000 citizens — more than 90% of whom support the plan. Public comment will continue through the formal regulatory process throughout the summer including four advertised public hearings.

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

It’s not clear that any “tools” beyond GIS were used.

**2. How are key trade-off issues framed and formalized into decision support tools?**

Trade-offs do not appear to have been formally analyzed. There was consideration of impacts to fishermen from closures.

**3. How are trade-offs analyzed?**

Unknown.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Unknown.

**5. How does the plan recognize and deal with uncertainty and risk?**

It does not appear to deal with uncertainty and risk.

**6. Are the decision support tools dynamic?**

No.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

NCBO is working with the state of Maryland and oyster restoration partners to develop common monitoring and evaluation protocols that will be applied to all oyster restoration projects in the Bay.

NCBO provides high resolution multibeam sonar surveys. The multibeam survey data is used to develop habitat characterization and assessment maps which are used in identifying areas within the sanctuaries that will best support oyster restoration projects.

NCBO has developed a bay wide, geo referenced, oyster database that includes information on harvest, disease, water quality, and ROMS model outputs. This database is being refined and will be ready to serve as a decision support tool in the near future. In addition, NCBO conducts benthic surveys with multi-beam, video and diver (university divers) transects. Data from these surveys will be added to the oyster data tool and used for evaluation of restoration progress. NCBO is working with NOAA's National Centers for Coastal Ocean Science (NCCOS) to develop tributary specific biogeographic assessments. These analyses will be targeted in tributaries undergoing oyster restoration, or slated for future restoration. They will be a part of a larger bay wide effort to restore oysters in 20 tributaries by 2025 in Maryland and Virginia. This work is planned to be conducted in collaboration with MD, VA, USACE, and NOAA.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

Unknown.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

Zoning.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

4 zones- Oyster sanctuaries, Lease areas, Public Shellfish Fishery Areas (PSFA), and Power Dredge Study Areas.

**2. What constitutes success of the plan?**

Executive Order 13508 Chesapeake Bay Protection and Restoration Strategy established NOAA and USACE as the lead federal agencies for Bay-wide oyster restoration. This strategy set a goal to restore 20 Bay tributaries with oyster healthy populations and habitat by 2025. In working toward this goal, NOAA and USACE will help implement the MD spatial plan. The first step in this process is to identify a list of priority tributaries in the bay for restoration. These tributaries will be selected in part based on the MD spatial plan and the USACE Native Oyster Restoration Master Plan.

**3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

No, but they are under development. NCBO is leading the Sustainable Fisheries Goal Implementation Team (FGIT), which is under the Chesapeake Bay Program and comprised of

senior fisheries managers from across the Bay as well as other stakeholders. The FGIT has established an oyster metric team to develop common, bay-wide restoration goals, success metrics and monitoring and assessment protocols. The team is expected to provide the following by March 15, 2011):

- 1) Develop bay wide restoration goals (success/performance metrics) for a sustainable oyster populations that include specific, compatible and quantitative goals for ecological function and ecosystem services from restored oyster populations.
- 2) Develop and identify support for a bay-wide complementary survey and monitoring and assessment program of oyster abundance and other key physical, chemical, and ecological parameters that will allow consistent evaluation of progress toward the oyster restoration goals. These goals and metrics will promote progress and facilitate accountability in restoration efforts.

***4. Does the plan incorporate monitoring?***

NCBO is working with the state of Maryland and oyster restoration partners to develop common monitoring and evaluation protocols that will be applied to all oyster restoration projects in the Bay. Findings from the Oyster Metric team discussed in question 3 will inform the development of a monitoring plan.

***5. Is adaptive management an explicit component?***

Five Year Review:

The adoption of a fishery management plan, including the 2004 Chesapeake Bay Oyster Management Plan, establishes a framework for adaptive management over time. Fishery management plans are periodically reviewed to determine if the goals, objectives, strategies and actions are still appropriate. The Department has committed to reviewing the effectiveness of the locations of sanctuaries, public shellfish fishery areas, and aquaculture areas every 5 years and to propose changes where needed.

***6. Is the adaptive management formally structured around response to feedback from monitoring?***

Unknown.

***7. If so, are the responses formally rule-based?***

Unknown.

*Note* - most of the text and answers were copied from materials on the MD DNR web page including from regulations and public presentations made by DNR.

We suggest that SAB staff contact Mike Naylor ([MNAYLOR@dnr.state.md.us](mailto:MNAYLOR@dnr.state.md.us)) at Maryland Department of Natural Resources to address the questions on public process, staffing and resources, and regulatory procedures.

**H. References**

<http://www.dnr.state.md.us/fisheries/oysters/OysterRestoration&AquacultureDevelopmentProposedRegulationsFactsheet.pdf>

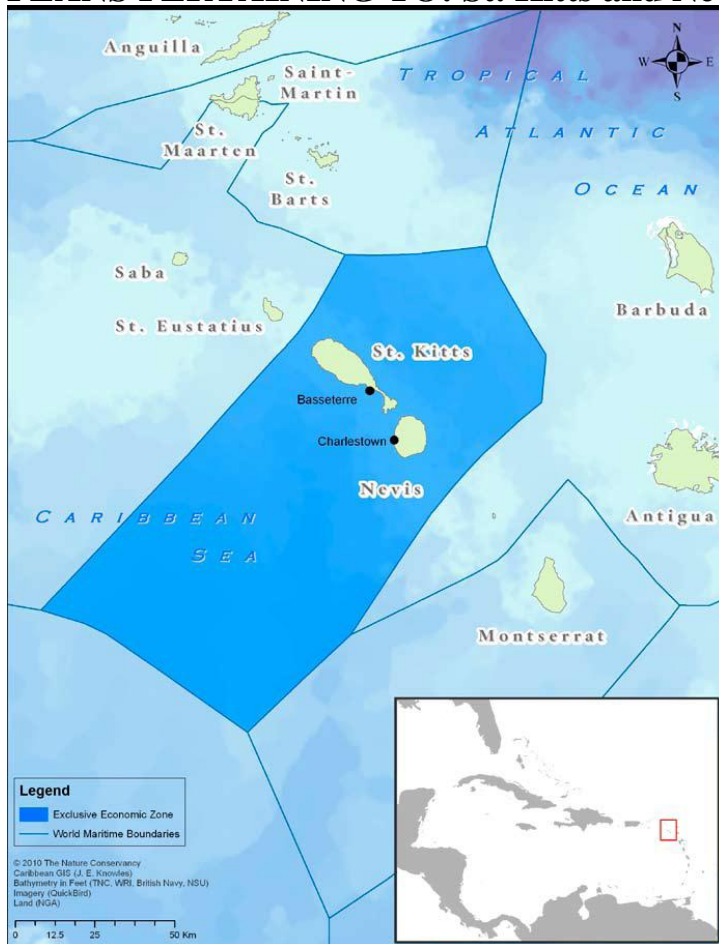
<http://www.dnr.state.md.us/fisheries/oysters/2010GovEventhandoutNaylorFinal2.pdf>

[http://www.dnr.state.md.us/fisheries/oysters/Statement\\_of\\_Purpose\\_for\\_proposed\\_oyster\\_regulations.pdf](http://www.dnr.state.md.us/fisheries/oysters/Statement_of_Purpose_for_proposed_oyster_regulations.pdf)

[http://www.dnr.state.md.us/fisheries/regulations/pdfs/Amendment\\_I\\_to\\_the\\_2004\\_Chesapeake\\_Bay\\_Oyster\\_Management\\_Plan\\_September\\_2010.pdf](http://www.dnr.state.md.us/fisheries/regulations/pdfs/Amendment_I_to_the_2004_Chesapeake_Bay_Oyster_Management_Plan_September_2010.pdf)



## **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: St. Kitts and Nevis**



### **A. Objectives**

#### ***1. What are the stated objectives of the plan, if any?***

The plan was developed for four main objectives:

1. Sustainable recreation and tourism development;
2. Sustainable fisheries;
3. Conservation;
4. Secure transportation.

#### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)? Describe***

Mainly conceptual, a few operational.

#### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Identified during planning process by Steering Committee which included Government reps, Fishers, NGOs, Business reps.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

All Major Sectors.

### ***2. How long did the spatial planning process take (years)?***

2 years for plan development, starting in 2008.

### ***3. Were particular steps especially demanding of time or resources?***

Stakeholder workshops. Data development, particularly gathering fisheries information.

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

2 years.

### ***5. What was the funding structure for this project?***

USAID.

### ***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

Nationwide coastal waters ~260km<sup>2</sup>.

### ***7. How does plan scale match ecosystem scale?***

The plan is smaller than the ecosystem scale, though it does contain, for example, all the coral reef ecosystems of these islands.

### ***8. What is the spatial scale for implementation (km<sup>2</sup>)?***

Same as plan.

## **C. Authority**

### ***1. What is the legal basis for CMSP?***

No legal basis.

### ***2. Which level(s) of government is (are) driving the spatial plan?***

International Aid Agency and National Government Steering Committee, Ministry of Agriculture and Marine Resources (St. Kitts), and the Ministry of Agriculture and Fisheries (Nevis).

### ***3. What institutional change, if any, was made as part of creating the plan?***

None.

### ***4. What governance and institutional arrangements are used to implement the plan?***

There is not a formal arrangement to implement. The required arrangements and policies were identified during the process.

## **D. Data**

### ***1. What data are used?***

Data type	Quantitative time series	Quantitative "snapshot"	Qualitative information	Expert opinion	Not available	Not applicable
Physical		X				

Geological		X				
Chemical						
Biological		X				
Economic				X		
Social		X		X		

**2. Were there clear criteria for data inclusion? If so, what were they?**

The criteria are moderately clear. The Steering Committee reviewed data (not in depth) and significant data were developed with stakeholder input.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Internal technical review, expert review, committee review and Stakeholder comment.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

Department of Physical Planning and Environment, Department of Maritime Affairs, Dept of Fisheries, Tourism Authority, Dive boat operators, National Trust, Fishers Cooperatives.

**2. Did they have equal status at all parts of the process?**

Yes.

**3. Were stakeholders included in the planning process?**

Yes.

**4. Was there a broad public participation process?**

Yes.

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

Significant economic and social data gathering.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Stakeholders were defined by government agencies with authority to manage components of marine areas, and by consultations with local NGSs and community organizations.

**7. In which parts of the process were stakeholder allowed to participate?**

Development of goals, development of data, and review of plan.

**8. What form was their participation?**

Steering Committee and Public Workshops.

## **F. Tools & Decision Support**

### ***1. Which decision support tools are used to inform spatial allocation decisions?***

MarZone.

### ***2. How are key trade-off issues framed and formalized into decision support tools?***

There are spatial goals for each of the four main sectors.

### ***3. How are trade-offs analyzed?***

Multiple zone scenarios are developed that jointly meet all goals as best as possible. Advantages and disadvantages of each were discussed by the Steering Committee.

### ***4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

Implicit in Fisheries and Tourism Data and Targets.

### ***5. How does the plan recognize and deal with uncertainty and risk?***

No.

### ***6. Are the decision support tools dynamic?***

Moderately Yes, although it is not generally feasible to change parameters and develop new runs within a workshop.

### ***7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?***

Not yet.

### ***8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)***

Steering Committee.

### ***9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?***

Zoning based on analysis of Marzone outputs and then ‘horse trading.’ A legal analysis of federal laws was conducted and a term sheet provided to the Steering Committee as part of the final suite of tools available.

## **G. Monitoring & Performance Measures**

### ***1. What are the products of the marine spatial planning process?***

Draft Zoning Map & Policy Analysis.

### ***2. What constitutes success of the plan?***

Implementation of at least some zones.

### ***3. Does the plan incorporate monitoring?***

No.

### ***4. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?***

Not yet.

**5. *Is adaptive management an explicit component?***

Not yet.

**6. *Is the adaptive management formally structured around response to feedback from monitoring?***

No.

**7. *If so, are the responses formally rule-based?***

No.

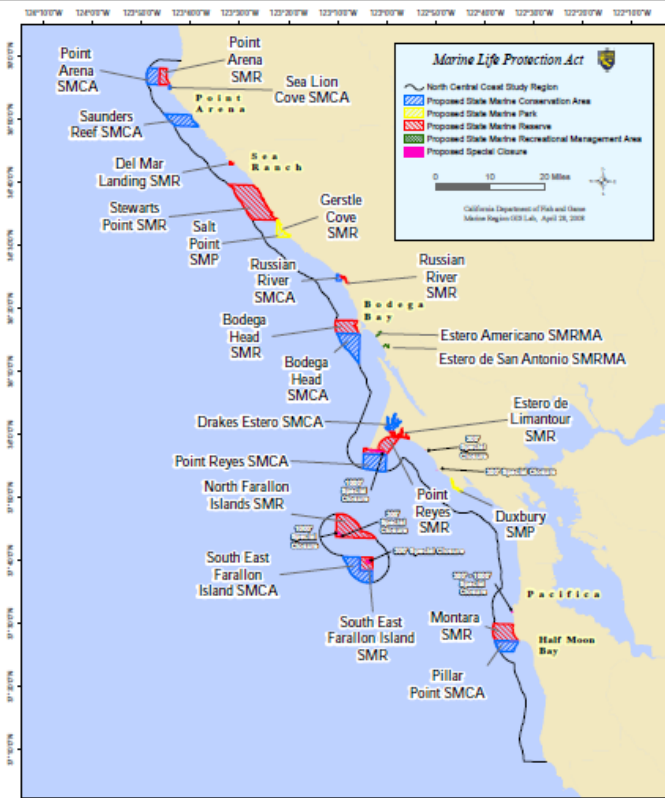
**H. References**

<http://conserveonline.org/workspaces/ecbiotaproject/documents/st.-kitts-and-nevis-marine-zoning-technical-report/view.html>

<http://conserveonline.org/workspaces/ecbiotaproject/documents/all.html>

<<https://email.tnc.org/exchweb/bin/redirect.asp?URL=http://conserveonline.org/workspaces/ecbiotaproject/documents/all.html>>

# QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The California Marine Life Protection Act



## North Central Coast Study Region *Integrated Preferred Alternative*

This marine protected area (MPA) proposal was unanimously selected on April 23, 2008 by the MPA Blue Ribbon Task Force (BRTF) as its preferred alternative and is being submitted to the California Fish and Game Commission (CFGC) for consideration. This proposal integrates elements from three proposals developed by the North Central Coast Regional Stakeholder Group (NCCSRG) (proposals 1-3, 2-XA, and 4). These NCCSRG proposals will also be forwarded in their entirety to the CFGC for consideration. Further information on each MPA proposal can be found in the associated text document with the same MPA proposal name.



## A. Objectives

### *1. What are the stated objectives of the plan, if any?*

Goals of California's Marine Life Protection Act (1999):

1. To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems;
2. To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted;
3. To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity;
4. To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value;
5. To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines;
6. To ensure that the MPAs are designed and managed, to the extent possible, as a component of a statewide network.

These goals are mostly focused on ecosystem protection and guided the work of the stakeholder panel, science advisory team, and policy-makers. There was no prioritization among these goals under the MLPA. (Gleason et al. 2010). In addition, for each of the four study regions, regional objectives were identified; to a large extent those regional objectives mirrored, but were more specific than, the statewide goals of the MLPA identified above.

**2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?**

Conceptual. In the MLPA process, the Science Advisory Team deliberated on and recommended a specific set of science guidelines for MPA design that aimed to meet the goals of the Act and were peer reviewed. The science guidelines were endorsed by the Blue Ribbon Task Force, adopted in the Commission's draft Master Plan [51], and communicated to the stakeholders as core guidance. This two-step process of scientific deliberation and confirmation of policy guidance was a key determinant of success of the MLPA process as it provided stakeholders with a set of unambiguous yardsticks by which the respective MPA proposals were to be evaluated.

The science guidelines focused on:

- 1) Habitat representation – identification of a list of habitats that needed to be represented, but no numeric goals for amount,
- 2) Habitat replication- identification of the number of replicate habitats needed to be protected in each biogeographical region; this guidance included the minimum amount (area or linear threshold) of each habitat that was needed to count as a replicate.
- 3) size and spacing of MPAs to promote connectivity; a set of minimum and preferred quantitative guidelines for size and spacing of MPAs that in combination resulted in rough estimates of how much of the total area should be protected if guidelines were met .

**3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?**

Mandated in MLPA but further refined in the planning process.

**B. Scope**

**1. Does the plan consider all uses or just selected sectors?**

Planning considered many sectors but primary focus on balancing conservation and fishing (consumptive) uses.

**2. How long did the spatial planning process take (years)?**

10+ years including 2 failed efforts.

1999: The law passed.

2000- 2001: 2 failed attempts to implement law.

2004- 2011: The third effort completed planning and designation in 3 regions and planning in a fourth region with fifth region under study.

The first attempt to implement the MLPA was based on a strict interpretation of the MLPA mandate. It relied upon a Master Plan. Team of scientists, who represented state and federal government, as well as university scientists and consultants, identified potential MPAs in a statewide network. Public involvement was limited to directed mailings to known commercial and recreational fishing groups and resulted in few responses. The initial MPA areas proposed by

the Master Plan Team were shared with stakeholders in a public outreach effort in 2001. The presentation of a preliminary plan without significant prior public consultation, however, led to strong negative reactions by the public, and the plan was abandoned six months after the public meetings [45]. Among other factors, the lack of stakeholder participation, unclear goals and objectives for the MPAs, misunderstandings about the MLPA mandate, and limited amount of time for public input resulted in an unsuccessful process.

One year later a second attempt was initiated that created seven regional stakeholder groups and attempted to simultaneously complete MPA planning statewide. The stakeholders represented a variety of interests and began negotiations in the summer of 2002 to recommend siting of MPAs. Although the second effort included facilitation support, there was an overall lack of resources (staffing, funding, and technical tools), and the process was halted in spring of 2003 during a budget crisis in California [45].

Two earlier unsuccessful attempts to implement the law highlight the importance of other enabling conditions (political will, funding and capacity) beyond a legislative mandate. There has also been organized opposition to implementation of the MLPA, primarily by commercial and recreational fishing organizations. (Gleason et al. 2010)

### ***3. Were particular steps especially demanding of time or resources?***

Stakeholder engagement was very intensive and the development of the decision support system involved substantial commitment in time and funding ([www.marinemap.org](http://www.marinemap.org)).

There was significant investment in data collection – primarily seafloor mapping and mapping of areas of importance to commercial and recreational fishing.

This effort was a public – private partnership that brought private funds for contractors, studies, tool development to support the public agency (CDFG) responsible for implementation. The private funding investment for 7 years was US\$19.5million.

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

MPAs are reviewed every 5 years by the CA Fish and Game Commission for their effectiveness. The first review of the Channel Islands MPAs implemented in 2003 took place in 2009 and resulted in no change to those MPAs.

### ***5. What was the funding structure for this project?***

For the third stage private foundations provided a significant amount of the capital. Private investment of \$19.5 million.

In 2004, a public-private partnership created the MLPA Initiative, leveraging public money with private resources to provide additional funds and other resources needed to complete planning of the statewide network of MPAs. The public-private partnership was established via a memorandum of understanding among two state agencies, California Natural Resources Agency and DFG, and a private foundation, the Resources Legacy Fund Foundation, that provided structure, funding, and capacity for regional-scale planning. The MLPA Initiative team includes DFG staff in partnership with contract staff (project managers, planners, facilitators, and support staff) to coordinate the efforts of the carefully-recruited volunteer bodies convened to take on specific roles in the MLPA planning process. A Blue Ribbon Task Force (Task Force) was also



created, composed of public leaders selected by the Secretary of the California Natural Resources Agency, to provide key policy interpretation, manage use of private funds, and oversee the regional planning effort.

The MLPA mandates a statewide system of MPAs within the 14,374 square km (5550 square miles) of state waters along California's 1770 km (1100 mile) coastline. Under state law, MPAs primarily regulate take of living marine resources in state waters. There are three types of MPA designations used in California: state marine reserves (fully protected no-take areas), state marine parks (may allow or limit recreational take; commercial take is not allowed), and state marine conservation areas (may allow or limit recreational and/or commercial take); and some other marine managed area designations used in special circumstances.

**6. *At what spatial scale was the plan developed (km<sup>2</sup>)?***

Ultimately will include 14,374 square km (5550 square miles) of state waters along California's 1770 km (1100 mile) coastline.

The state was divided into 5 regions; 4 roughly equal sized coastal regions and San Francisco Bay.

**7. *How does plan scale match ecosystem scale?***

In many respects, it matches ecosystem scale. There are two biogeographic regions in California and several smaller bioregions within each of those. The planning specifically incorporated biogeographical patterns in identification of required replicates.

**8. *What is the spatial scale for implementation (km<sup>2</sup>)?***

Statewide by region.

**C. Authority**

**1. *What is the legal basis for this plan?***

CA MLPA 1999.

**2. *Which level(s) of government is (are) driving the spatial plan?***

CA Department of Fish and Game (DFG) is the implementing agency that manages and enforces the MPAs and associated regulations. The CA Fish and Game Commission (FGC) has the authority to designate or revise MPAs and to approve associated regulations.

DFG, as the implementing agency for the MLPA and a lead trustee for state natural resources, is responsible for planning, implementation, management, monitoring, and enforcement of MPAs through the Marine Life Protection Program. DFG provided key input on policy and science issues, fisheries management, and feasibility guidelines for MPA design. The feasibility guidelines focused on appropriate design of MPA boundaries, designation, and regulations to ensure MPAs would be enforceable and easily understood by the public.

The MLPA Initiative provided the necessary resources and additional capacity needed to support DFG in implementing a statewide planning process for the MLPA. In addition to DFG staff, the Initiative included contractors with expertise in facilitation, marine spatial planning, geographic information systems (GIS), and policy analysis. These contractors and DFG staff worked together as an integrated team (the "Initiative team") to support the entire process. A key role of

the MLPA Initiative was to structure and manage the activities of the volunteer bodies (RSG, SAT, and Task Force) and to facilitate interactions among these groups.

**3. What institutional change, if any, was made as part of creating the plan?**

Implementation of the MLPA reflects a new focus of CDFG on more ecosystem-scale planning and management of marine resources in California. There is also a new entity, the MPA Monitoring Enterprise, funded by OPC, which works directly with CDFG on overseeing a program to monitor effectiveness of the MPAs.

**4. What governance and institutional arrangements are used to implement the plan?**

The MOU cited above was used to facilitate the planning. Partnership between OPC and DFG is being used to implement the monitoring. Additional institutional arrangements were made between DFG and State Parks on planning and implementation.

**D. Data**

**1. What data are used?**

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical		X				
Geological		X				
Chemical		X				
Biological		X	X	X		
Economic		X	X	X		
Social			X	X		

The most often utilized spatial data layers in the MLPA geodatabase (Table 5):

Base maps: MLPA region boundary, coastline, terrestrial region and features, nautical charts, graticule of latitude and longitude;

Physical and bathymetric: bathymetric imagery (where available), depth contours, submarine features, coastal watersheds, rivers and streams, landcover and landuse patterns;

Biological/Habitats: shoreline habitats (rocky intertidal, sandy beach, marsh, etc.), surfgrass beds, kelp forests, estuaries and associated habitats (eelgrass, marsh), hard bottom habitat (characterized by depth zone: 0-30 m, 30-100 m, 100-200 m, >200 m), soft bottom habitats (characterized by depth zone: 0-30 m, 30-100 m, 100-200 m, >200 m), submarine canyons, upwelling zones, seabird and marine mammal colonies and haulouts;

Cultural: towns and cities, roads and infrastructure, harbors and ports, coastal access points, geographic names, and impaired water bodies;

Consumptive uses: commercial fishing data (logbook and landing receipt data), areas of importance to commercial fisheries (Ecotrust study), recreational fishing data (commercial-passenger fishing vessel data, abalone report card data, etc.), areas of importance to recreational fisheries (Ecotrust study), mariculture operations;

Non-consumptive uses: dive sites, kayaking areas, wildlife viewing areas;

Existing coastal and marine managed areas: existing MPAs, fishery closures, coastal protected areas.

**2. Were there clear criteria for data inclusion? If so, what were they?**

There were very clear criteria for data inclusion and the SAT also was enlisted to review data sets for inclusion.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Yes, through the SAT.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

Key entities include: California DFG, State Water Board, State Parks, Coastal Commission, Ocean Protection Council, NOAA-NMS, DOD, NGOs, science advisors, stakeholders. From Table 3: Roles and responsibilities in the North Central Coast MPA planning and implementation process.

MLPA Initiative staff (20 contracted staff with expertise in project management, planning, facilitation, GIS): partner with DFG to design, implement, and manage the public planning process. Provide facilitation, planning, science, and GIS support to the RSG, SAT, and Task Force.

North Central Coast Regional Stakeholder Group (RSG) (45 individuals representing local knowledge and diverse interests in the region): develop regional goals and objectives, as well as MPA-specific objectives. Evaluate and make recommendations on the existing state MPAs within the region. Design alternative proposals for MPAs in the region that will meet the goals of the MLPS.

Master Plan Science Advisory Team (SAT) (16 scientists with expertise in ecology, oceanography, fisheries, and socioeconomics): provide science input to and interaction with stakeholders and decision-makers. Develop and communicated scientific guidelines on MPA network design. Develop and implement methodology to evaluate alternate MPA proposals based on the science guidelines.

Blue Ribbon Task Force (“Task Force”) (5 members, appointed by the California Secretary of Natural Resources, with experience in public policy process): oversee and provide policy guidance to the regional MPA planning process, direct funding and capacity for the MLPA Initiative, review and recommend alternative MMPA network proposals for the region, including a preferred alternative, to the CA Fish and Game Commission.

California Department of Fish and Game (DFG) (11 staff with expertise in policy, fisheries and resource management, and GIS): Provide policy and science input into the process from

implementing agency. Develop feasibility guidelines and conduct feasibility evaluation of MPA proposals. Develop regulatory language for final preferred alternative for consideration by Fish and Game Commission. Conduct required environmental review of MPA proposal alternatives.

***2. Did they have equal status at all parts of the process?***

No, but roles and responsibilities were quite clearly designated. Stakeholders responsible for MPA designs; scientists for advice and evaluation; Task Force for policy guidance; DFG for feasibility guidance; FGC for decision-making.

***3. Were stakeholders included in the planning process?***

Extensively and a tool was built explicitly for their input. All meetings were webcast, extensive public outreach, extensive public comments, etc. For example in the N. Central Coast Region: The North Central Coast Regional Stakeholder Group was comprised of 45 members, including primaries and alternates, representing commercial and recreational fishermen, nonconsumptive users, conservation organizations, resource managers, Native American tribes, coastal communities, and state and federal agencies. These individuals were nominated by their constituencies, and formally appointed by the DFG Director and the Task Force Chair. From the outset of the process, the RSG worked with the SAT in a joint fact-finding process to prepare a compendium of information about the region known as the regional profile [54]. The stakeholders were also charged with developing regional goals and objectives, evaluating existing MPAs, and developing multiple MPA network proposals to support the Task Force in identifying a preferred alternative for the region that would be recommended as part of the statewide network. (Gleason et al. 2010).

***4. Was there a broad public participation process?***

Yes.

“A large investment was made in making the entire process transparent to the general public by providing access to meetings and materials. All meetings of the RSG, SAT, and Task Force were public, noticed in advance, and webcast over the Internet so that viewers could watch the proceedings live or from video archives. At every meeting, times were allotted on the agendas for public comment on the process, and a public comments email address was created to allow the public to submit their ideas or concerns at virtually any time. A website<sup>3</sup> provided access to meeting agendas, materials, and documents for review. Public comments on draft MPA proposals, as well as other materials, were compiled by the Initiative team and provided to members of the RSG, SAT, and Task Force and placed on the website.

The MLPA north central coast project had a relatively short timeline of just over one year for the stakeholder planning process. There were 12 stakeholder meetings or work sessions between May 2007 and June 2008. The Initiative team carefully planned the agenda and steps for each meeting to ensure the meeting objectives were met and to keep the planning process on track. Similarly, agendas for the SAT and Task Force meetings were carefully sequenced and orchestrated to ensure that scientific and policy issues could be discussed and resolved in a timely manner to inform the planning process. There were also ten SAT meetings and eight Task Force meetings between May 2007 and June 2008. This total of 30 public meetings in a 13-month process highlights the need for significant staff and resources in processes like this.”

***5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?***

There was an emphasis on commercial and recreational fisheries data. Significant new data were captured by Ecotrust – that represented areas of importance to fishing interests. Other socioeconomic data and info captured in regional profiles (documents).

***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

Formal representative committees were established involving an extensive process of nomination, interviews, and selection of members with approval by the Secretary of Natural Resources.

***7. In which parts of the process were stakeholders allowed to participate?***

Stakeholders were allowed to take part in meetings, dialogues, and learning events, lectures, and conferences and the development. Stakeholders charged with identifying regional goals and objectives, reviewing regional profile, participating in regional stakeholder group discussion and all meetings, design of alternative MPA proposals.

***8. What form was their participation?***

Participation largely consisted of regular monthly or bi-monthly meetings with each meeting providing information about a key topic of interest. Stakeholders were charged with marine spatial planning designs.

**F. Tools & Decision Support**

***1. Which decision support tools are used to inform spatial allocation decisions?***

MarineMap.

Centralized Spatial Database: A comprehensive and Internet accessible geospatial database that contains over 400 spatial datasets for California’s marine environment compiled from state and federal agencies, scientists and non-governmental organizations. There were about 30–40 data layers that were the most useful for MPA planning.

Web-based map services: An interactive online map service (requiring only a web browser and Internet connection) to provide the stakeholders and general public with the ability to view and download spatial data layers from the database and to view submitted MPA proposals.

Desktop GIS tools and analytical products: Tools to generate summary data products and maps to support the science evaluation and to summarize information about the proposals.

MPA Decision Support Tool: An online MPA decision support tool named “Doris” (after a Greek goddess of the sea) that allowed stakeholders to draw candidate MPAs and generate reports on habitats and other features captured within individual MPAs or multiple MPAs based on a quantitative GIS analysis of thematic data. This web-accessible, password protected tool allowed stakeholders to explore design options individually or share their concepts with the larger stakeholder group and was the prototype for a new and improved tool called Marinemap that is now being used in the south coast region.

**2. How are key trade-off issues framed and formalized into decision support tools?**

These were addressed thru the SAT and there was substantial debate, illustration and development of tools and conceptual models that focused on costs and benefits of MPAs related to fisheries.

**“8.3. Socioeconomic evaluation of MPA proposals:**

While minimizing socioeconomic impacts is not an explicit goal in the MLPA, it was incorporated as a key consideration by the stakeholders and decision-makers in the design of the MPA proposals. Based on results of interview surveys<sup>6</sup> that identified areas of highest stated importance to commercial and recreational fishermen, an analysis of maximum potential adverse impacts to commercial and recreational fisheries provided important information that helped stakeholders refine their proposals and ultimately informed the decision process. At each phase in their proposal development, stakeholders received an evaluation of the maximum potential impact to commercial and recreational fisheries by port or fishing mode. Maximum potential impact was defined as all fishing currently occurring within a proposed MPA being “lost” and not replaced by relocation of effort or increased long-term abundance of species. This gave stakeholders information on how to reduce immediate potential impacts by making adjustments or refinements to their proposals.”

**3. How are trade-offs analyzed?**

Informally through discussions, dialog and negotiation among stakeholders and policy-makers. A bioeconomic model was also used and presented for each round of evaluation.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

Not always. In some cases, yes, but informally.

**5. How does the plan recognize and deal with uncertainty and risk?**

Creation of a network of MPAs that are ecologically connected and represent all habitats aims to address some risk; adaptive management and review every 5 years will address uncertainty. At every step, risk and uncertainty were discussed though not always formally addressed.

**6. Are the decision support tools dynamic?**

Yes, in terms of evaluating different designs. No, in terms of process or future change considerations.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Not really.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

Many conflicts were handled through the Regional Stakeholder Group meetings where compromise among user groups was struck. The Science Advisory Team resolved conflicts about “best available science”. The Task Force resolved policy conflicts and provided guidance to the other two groups.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

It is ensured that the best available science and the most open public processes are brought to bear on decision-making for coastal and ocean resources. Science guidelines were linked specifically to the MLPA goals to best ensure they will be met. Marinemap explicitly incorporated the science guidelines to help designers. In addition, discussions and dialogues with stakeholders, scientists, and policy makers are serving as valuable decision support tools. Sometimes clusters of MPAs (almost a zoning) were used to achieve specific objectives at a given geography.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

Three different types of MPAs (reserves, conservation areas, parks) used in a statewide network of approximately 121 MPAs that cover 16.6% of state waters.

**2. What constitutes success of the plan?**

We consider a plan successful if the areas are accepted and implemented and over time prove to be effective at meeting objectives. To date planning for four of five regions in the state is completed with 121 MPAs designated or soon to be designated covering 16.6% of state waters.

**3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

The MPA Monitoring Enterprise has identified indicators and priority efforts for baseline monitoring.

**4. Does the plan incorporate monitoring?**

Yes. “A statewide MPA monitoring enterprise has been established to work with DFG and other partners on monitoring a subset of MPAs in the statewide network, though long-term funding for this enterprise is uncertain. An adaptive management framework is in place to review the MPAs at approximately five-year intervals.”

**5. Is adaptive management an explicit component?**

Yes.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

Yes.

**7. If so, are the responses formally rule-based?**

Still under development by the MPA Monitoring Enterprise.

Additional Note.

Key Guidance:

1. Clearly defining roles and responsibilities for all involved in MPA planning and implementation.

2. Facilitating cross-interest stakeholder participation and public participation in the MPA planning process.
3. Clearly defining and communicating goals and objectives for the regional component of the MPA network, consistent with legislative goals.
4. Providing clear science guidelines and effective decision support to ensure access to the best readily available scientific information, local knowledge, and spatial data by stakeholders, scientists, and decision-makers in a joint fact-finding approach.
5. Building toward broad-based support in the design of alternative MPA proposals that fulfill legislative goals and meet scientific and feasibility guidelines, while minimizing potential socioeconomic impacts.
6. Ensuring a robust and transparent decision-making process for evaluating proposals and selecting a preferred alternative.

## **H. References**

California Department of Fish and Game. 2008. California Marine Life Protection Act. Master Plan for Marine Protected Areas. Revised Draft January 2008.

CDFG. 2004. Marine Life Protection Act: Sections 2850-2863. Sacramento, CA: California Department of Fish and Game, Marine Region.

Mary Gleason, S. McCreary, M. Miller-Henson, J. Ugoretz, E. Fox, M. Merrifield, W. McClintock, P. Serpa, K. Hoffman. 2010. Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California. *Ocean & Coastal Management* 53: 52–68.

<http://www.dfg.ca.gov/mlpa/>



# **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: Hawai'i Ocean Resources Management Plan**

## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

The Hawai'i Ocean Resources Management Plan (ORMP) provides a framework for integrated coastal management that aligns the numerous management agency jurisdictions to support the various cultural, environmental, and socioeconomic needs of the State. The framework is founded on three guiding perspectives, which are accompanied by concrete management goals and strategic actions in five-year implementation phases over the next 30 years.

### **Perspective 1: Connecting Land and Sea**

*Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.*

Strategic actions recommended under Perspective 1 include reducing soil erosion and pollutant loads, developing beach management plans, and protecting priority coastal areas from coastal hazards.

### **Perspective 2: Preserving Our Ocean Heritage**

*A vibrant and healthy ocean environment is the foundation for the quality of life valued in Hawai'i and the well-being of its people, now and for generations to come.*

Management goals emphasize the improvement of coastal water quality, strengthening marine protected area management, enhancing community capacity to restore and operate Hawaiian fishponds, and promoting sustainable ocean-based tourism.

### **Perspective 3: Promoting Collaboration and Stewardship**

*Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.*

This perspective highlights the need for community participation in cultural and natural resources management and the exploration of place-based approaches, including Native Hawaiian principles of land division such as *ahupua'a*.

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

The three guiding perspectives are conceptual: (1) connecting land and sea, (2) preserving ocean heritage, and (3) promoting collaboration and stewardship). Likewise, the management goals subsumed under each perspective are conceptual. However, under each management goal are strategic actions, some of which are also conceptual but some are operational (*example*: Management Goal: Reduce illegal storm-water discharges to the wastewater system. Strategic Action: Develop new rules establishing penalties for noncompliance (ORMP pg. 24).

**3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?**

Identified during the planning process. However, the Office of Planning (OP), as lead agency for the state's Coastal Zone Management (CZM) Program, is mandated to periodically update the ORMP and coordinate implementation of the plan with other state agencies under Chapter 205A-62 of the Hawaii Revised Statutes (HRS).

**B. Scope**

**1. Does the plan consider all uses or just selected sectors?**

The plan attempts to consider all land and sea uses within the state's coastal zone, including the Hawaiian archipelago, but recognizes unique tripartite management of the Papahānaumokuākea Marine National Monument (joint NOAA-FWS-State).

Hawaii's coastal zone, defined in HRS 205A-1, includes: all the lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea.

**2. How long did the spatial planning process take (years)?**

*There was no spatial planning process associated with the ORMP.* For the most part, recent MSP in state waters of the main islands has been piecemeal, focused on planning for Marine Protected Areas (e.g., the talk by TNC at the Maui ESMWG meeting) and siting of oceanic net-based aquaculture.

The DLNR-Division of Aquatic Resources is the state agency responsible for establishing and managing MPAs in Hawaii. They are currently developing a CMSP workshop in partnership with NOAA's Hawaiian Islands Humpback Whale National Marine Sanctuary and the Western Pacific Regional Fishery Management Council for end of May.

**3. Were particular steps especially demanding of time or resources?**

The 2006 version of the ORMP was developed over a period of approximately 18 months and required substantial consultation, *however there was no spatial planning process associated with the ORMP.*

**4. How long does the plan apply? What is the planning interval for update and revision?**

The ORMP framework is founded on three guiding perspectives, which are accompanied by concrete management goals and strategic actions in five-year implementation phases over the next 30 years. The ORMP is meant to be reviewed and updated every 5 years. The next update of the plan will begin in July, 2011.

**5. What was the funding structure for this project?**

The update of the ORMP that resulted in the 2006 plan was funded by the Hawaii CZM Program, via their federal CZM grant from NOAA OCRM.

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

The ORMP covers the entire state of Hawaii, as Hawaii's coastal zone includes the entire state. This includes the Hawaiian Archipelago, approx. 2,575 km stretching from the Big Island to Kure Atoll.

**7. How does plan scale match ecosystem scale?**

The ORMP is strategic, there are no spatial analyses. That being said, the plan acknowledges traditional Hawaiian “resource management” units (moku, ahupua`a) for the Main Hawaiian Islands.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

To date, the ORMP has not been used to guide CMSP for any specific location or use sector.

**C. Authority**

**1. What is the legal basis for this plan?**

The ORMP is a statewide plan mandated by Chapter 205A-62 of the Hawai‘i Revised Statutes [Coastal Zone Management; [http://www.capitol.hawaii.gov/hrscurrent/vol04\\_ch0201-0257/hrs0205a/hrs\\_0205a-.htm](http://www.capitol.hawaii.gov/hrscurrent/vol04_ch0201-0257/hrs0205a/hrs_0205a-.htm)]. The Office of Planning, the lead agency for the Hawaii CZM Program, is mandated by this chapter to review, update, and coordinate implementation of the plan.

**2. Which level(s) of government is (are) driving the spatial plan?**

See above. The state government is driving the ORMP, but there is no spatial planning process involved

**3. What institutional change, if any, was made as part of creating the plan?**

To date, no institutional change has been made.

**4. What governance and institutional arrangements are used to implement the plan?**

The Hawai‘i CZM Program in the State Office of Planning (OP), Department of Business, Economic Development and Tourism (DBEDT), is charged with reviewing and periodically updating the ORMP, as well as coordinating its overall implementation. In order to implement and further develop the ORMP, in the summer of 2007 the CZM Program established a Policy Group and a Working Group made up of state and county agencies, federal partners, academia, and community groups. The ORMP Policy and Working Groups (ORMP Group) have been collaborating since 2007 to improve the management of Hawaii’s natural and cultural resources. Each ORMP partner brings a varied set of key skills and expertise as well as relationships with community constituencies, such as stakeholder engagement, planning and facilitation, and trusted relationships with community groups for on-the-ground implementation. The members have worked hard to facilitate effective management across jurisdictional boundaries by improving communications, aligning priorities, and enhancing resource-sharing between agencies. The members have learned to trust each other and seek advice from each other. As a result, they have developed relationships that foster more frequent collaboration on projects both within and beyond the scope of the ORMP.

The existing level of collaboration within the ORMP Group will enable the continuation and advancement of future partnerships on large-scale projects. The ORMP Group remains committed to working across physical and jurisdictional boundaries to finding the most effective and sustainable ways to manage Hawaii’s coastal and ocean resources.

## **D. Data**

The ORMP is strategic, there are no spatial analyses. The Data section is in some sense irrelevant.

### ***1. What data are used?***

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical			X	X		
Geological			X	X		
Chemical						
Biological			X	X		
Economic			X	X		
Social			X	X		

### ***2. Were there clear criteria for data inclusion? If so, what were they?***

N/A.

### ***3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?***

N/A.

## **E. Participants**

### ***1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?***

The consultation process is described in detail in Appendix A of the Plan, entitled, “Planning and Public Involvement in the Development of the ORMP”.

The ORMP Policy and Working Groups, which have been meeting on a regular basis since 2007 to coordinate implementation and further development of the ORMP, are made up of the following entities:

**Federal Partners** include NOAA Office of National Marine Sanctuaries, Pacific Islands Region (ONMS); NOAA Office of Ocean & Coastal Resource Management (OCRM); NOAA Pacific Services Center (PSC); NOAA Coastal Storms Program, Pacific Islands Region (CSP), United States Army Corps of Engineers (USACE); United States Coast Guard (USCG); and United States Environmental Protection Agency (EPA).

**State Partners** include State of Hawai‘i Departments of Agriculture (DOA), Civil Defense (SCD), Health (DOH), Land & Natural Resources (DLNR), Transportation (DOT), and Office of Hawaiian Affairs (OHA).

**University of Hawai‘i Partners** include the School of Ocean & Earth Science & Technology (SOEST); the Sea Grant College Program (UH Sea Grant); the Center for Island Climate Adaptation & Policy (ICAP); and Pacific Islands Ocean Observing System (PacIOOS).

**County Partners** include County of Hawai‘i, Planning Department; County of Kaua‘i, Department of Planning; County of Maui, Department of Planning; and Honolulu Board of Water Supply (BWS).

**Community Partners** include the Marine & Coastal Zone Advocacy Council (MACZAC).

***2. Did they have equal status at all parts of the process?***

The CZM Program consulted with all relevant agency stakeholders during the planning process. State and county agency representatives helped develop the management goals and strategic actions, as well as identified current and future initiatives regarding ocean resources management. Their input was an essential element in the development of the plan. See Appendix A of the plan for more details regarding the ORMP planning process.

***3. Were stakeholders included in the planning process?***

Yes.

***4. Was there a broad public participation process?***

Yes. Updating the ORMP involved extensive outreach and input-gathering with participation of various stakeholder groups, government agencies, and the public over a period of eighteen months statewide. The culmination was the 2006 ORMP.

***5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?***

We tried to create as many opportunities for public input as possible. Please see the consultation process described in Appendix A of the Plan for more details

***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

N/A.

***7. In which parts of the process were stakeholders allowed to participate?***

Stakeholders were allowed to participate throughout the review and drafting process for the 2006 ORMP via public listening sessions, community conversations, monthly OP meetings, HOCC and MACZAC meetings, workshops, workshop evaluation forms, the CZM website, and agency reviews.

***8. What form was their participation?***

Please see Appendix A for details on public and stakeholder participation.

**F. Tools & Decision Support**

No spatial allocation decisions are made in the ORMP. The Tools and Decision Support section is in some sense irrelevant.

***1. Which decision support tools are used to inform spatial allocation decisions?***

N/A.

***2. How are key trade-off issues framed and formalized into decision support tools?***

N/A.

**3. How are trade-offs analyzed?**

N/A.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

N/A.

**5. How does the plan recognize and deal with uncertainty and risk?**

N/A.

**6. Are the decision support tools dynamic?**

N/A.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

N/A.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

N/A.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

N/A.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

The ORMP did not conduct a marine spatial planning process.

**2. What constitutes success of the plan?**

Meeting the management goals and strategic actions under each perspective.

**3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

The ORMP includes a set of results indicators for management goals and strategic actions under each perspective (see ORMP, Tables 5-7). Results indicators were also identified for specific projects in the Consolidated State Work Plan, July 2007 – June 2009, which can be downloaded on the Hawaii CZM website: <http://hawaii.gov/dbedt/czm/ormp/ormp.php>.

**4. Does the plan incorporate monitoring?**

Yes, the ORMP includes progress monitoring.

**5. Is adaptive management an explicit component?**

Yes.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

Yes, the ORMP is scheduled for a revision based on feedback and lessons learned which is scheduled to begin in July of 2011.

***7. If so, are the responses formally rule-based?***

No, unstructured at present.

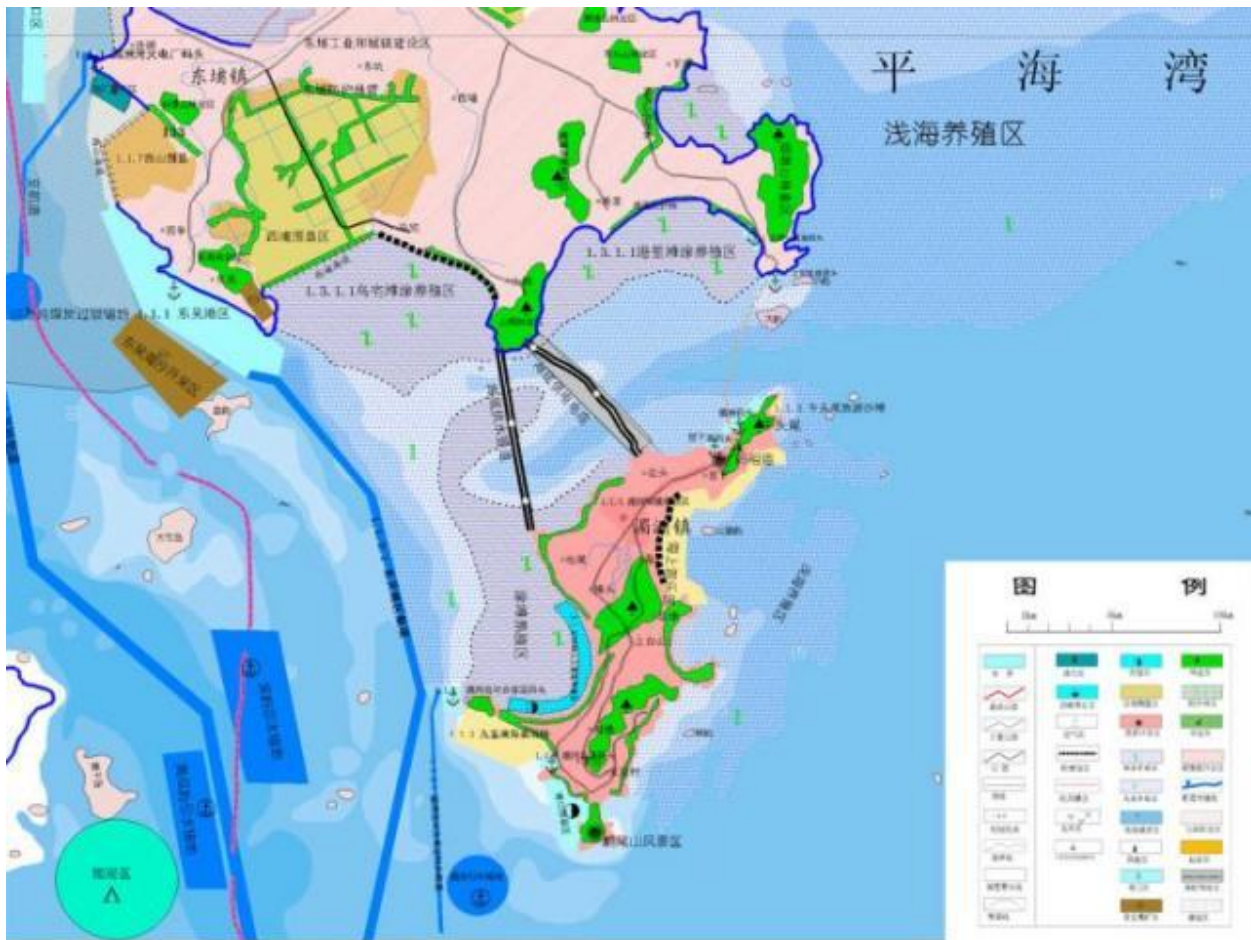
**H. References**

Hawai'i Ocean Resources Management Plan: Consolidated State Work Plan, July 2007 – June 2009. Submitted to the ORMP Policy Group by the ORMP Working Group. April, 2008.

State of Hawaii, Office of Planning, Hawaii Coastal Zone Management Program. 2006. Hawaii Ocean Resources Management Plan.

State of Hawaii, Office of Planning, Hawaii CZM Program. 2010. Orientation Packet: Hawaii ORMP Policy and Working Groups.

**QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The China Marine Functional Zoning**



Characterization: The Law on the management of Sea Area Use of the People’s Republic of China 2001 [Hereinafter Sea Use Law or SUL] sets up a framework with which to manage the territorial sea and inland waters of China [surface, water column, seabed and subsoil]. While not a plan per se, the framework allows the competent existing marine administrative department [e.g. fisheries, maritime administrative agencies], at or above the provincial [autonomous region, province, municipality] level to choose how to balance uses by creating a process of application for use of ocean space and payment of a fee for the use for exclusive activities relating to the continuous use of a specific sea area for over three months. The State maintains a Registry of these activities. These activities are subject to predesignated appropriate uses. Sectoral plans for aquaculture, salt industry, transportation, tourism, etc. are to be consistent with MFZ. In addition, the plans for utilization of coastal lands, urban planning and port planning also shall be consistent with MFZ.



## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

“The purpose of strengthening the management of sea use, safeguarding the ownership of the sea areas by the State and the lawful rights and interests of sea area users, promoting rational development and sustainable utilization of the marine areas.” (SUL Article 1)

“The formulation of the marine functional zoning plan shall be based on the following Principles:

Scientifically defining the functions of the sea area according to such natural attributes as its geographical location, natural resources and natural environment;

Making overall arrangements for the sea area use among various related sectors according to the economic and social development needs;

Protecting and improving the ecological environment, ensuring the sustainable utilization of the sea area and promoting the development of marine economy;

Ensuring the maritime traffic safety;

Safeguarding the security of national defense and guaranteeing the needs in the military use of the sea.” (SUL Article 11)

### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Conceptual, i.e., to balance among multiple uses without specifying outcomes.

### ***3. Were the objectives mandated (e.g., by legislation or executive order) or were they identified during the planning process?***

Mandated by the SUL but can be modified by Provinces, Autonomous Regions and Municipalities to meet local circumstances.

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Regulatory approach applies to all uses – must obtain a permit. All uses except the following are subject to fees:

Military use;

Reserved docks for official ships;

Non-profit transportation infrastructures such as navigation channel and anchorage;

Non-profit uses for public good such as teaching, scientific research, disaster prevention and mitigation, search and rescue at sea;

The following sea use projects shall be submitted to the State Council for examination and approval.

The sea use projects of sea filling over 50 ha;

The sea use projects of sea reclamation over 100 ha;

The sea use projects over 700 ha without altering the natural attributes of the sea area;  
 The sea use for major national construction projects;  
 Other sea use projects prescribed by the State Council.

MFZ in China divided sea areas under national jurisdictions into 10 types of functional zones.

Ports and Shipping Zones	941
Fishing and fishery resource conservation zones	1,888
Mining zones	202
Tourism and recreation zones	452
Sea water use zones	319
Ocean energy use zones	60
Construction use zones (submerged pipelines, reclamation, shore protection, bridges, etc.)	449
Marine protected areas	285
Special use zones	309
Reserved areas	451

(Zhang 2003)

**2. How long did the spatial planning process take (years)?**

Implementation of CMSP evolved over an approximately 20 year period. MFZ was initially proposed by the Chinese government in 1988. Several large scale MFZ efforts were carried out 1989-1993 and 1998-2001. Provincial level “schemes” of 11 provinces had been approved by 2001 and there were 7 remaining. Technical directives for the Division of Marine Functional Zoning were drawn up in 1997 and revised in 2006 following the passage of legislation. In 2007 the State Oceanic Administration [SOA] completed Management regulations for MFZ.

**3. Were particular steps especially demanding of time or resources?**

Unknown.

**4. How long does the plan apply? What is the planning interval for update and revision?**

Uses that occupy marine space longer than three months must apply for a permit. Cessation of a permit can happen at any time with notification. Long terms uses of the marine space in support of certain commercial enterprises have fixed terms:

- 15 years for aquaculture;
- 20 years for ship breaking;
- 25 years for tourism and recreation;
- 30 years for salt industry and mineral industry;
- 40 years for public welfare undertakings;
- 50 years for construction engineering such as port and shipyard. (SUL 2001).

**5. What was the funding structure for this project?**

Funding for this project seems to be from the State and Provincial level as a matter of marine administration. It is not clear how much of the budget was allocated to CMSP planning activities but given the number of and variety of uses subject to the legal mandate, the effort is very significant.

**6. At what spatial scale was the plan developed (km<sup>2</sup>)?**

On a nation-wide basis the plan covers several hundred thousand km<sup>2</sup>. The plan development was done at the provincial, autonomous region, and municipal levels with significant variability in spatial scale.

**7. How does plan scale match ecosystem scale?**

The application to the Territorial and Inland Seas would tend to preclude application at the regional ecosystem scale. Efforts by China, Korea, and Japan to carry out cooperative research under the World Bank Global Environmental Facility for the East China Sea should be mentioned. This complements China’s response.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

100,000s of km<sup>2</sup>.

**C. Authority**

**1. What is the legal basis for CMSP?**

Law on the Management of Sea Area Use of the People’s Republic of China 2001 [Other Chinese laws apply like the 1999 Clean Water Act administered by the EPA].

**2. Which level(s) of government is (are) driving the spatial plan?**

National.

**3. What institutional change, if any, was made as part of creating the plan?**

Relatively little change was required to implement this plan through a centrally planned economy and administration.

**4. What governance and institutional arrangements are used to implement the plan?**

Plan development by Provinces or other institutions and approval by the National program.

**D. Data**

**1. What data are used?**

Existing documents in English do not address data inputs specifically. However, it is clear that all forms were used at least qualitatively.

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical			X			
Geological			X			
Chemical			X			
Biological			X			
Economic			X			
Social			X			

**2. Were there clear criteria for data inclusion? If so, what were they?**

Not reported. Plan based on applications and not a systematic data collection exercise.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

Not reported.

## **E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The PRC State government is in charge of setting the framework and reviewing the plans developed by Provinces, Autonomous Regions and Municipalities. Sector regulatory agencies are part of the process. There does not appear to be a mechanism for other science advisors or stakeholders in the conventional Western sense.

**2. Did they have equal status at all parts of the process?**

Government entities have a hierarchical status with direction from the State to provinces, autonomous regions and municipalities who propose plans to be approved by the State

**3. Were stakeholders included in the planning process?**

Apparently not.

**4. Was there a broad public participation process?**

No.

**5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?**

So far the process is opaque to outside observers.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

Aside from applying for permits and paying fees, users were not part of the process to develop the CMSP/Functional Zoning Plan.

**7. In which parts of the process were stakeholder allowed to participate?**

Apparently none.

**8. What form was their participation?**

If any, it was through the application process.

## **F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

Unclear how any tools were used [based on English language literature].

**2. How are key trade-off issues framed and formalized into decision support tools?**

No formal mechanism identified. Planning entities could use auctions to identify those willing to pay the highest fee but this approach is not documented in English.

**3. How are trade-offs analyzed?**

Politically at the provincial level with some emphasis on economic value of fees paid.

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

No, although the law recognizes ecological value.

**5. How does the plan recognize and deal with uncertainty and risk?**

No formal recognition of uncertainty and risk.

**6. Are the decision support tools dynamic?**

No.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Not explicitly stated.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Formal conflict resolution processes are specified. The owner of a permit is able to appeal and in certain cases to sue.

**9. What mechanisms are used to attempt to achieve the objectives (e.g., zoning, market-based instruments, etc.)? Are these mechanisms included as part of the decision support system?**

To a limited extent market based mechanisms are used to allow bidding to obtain highest lease value.

## **G. Monitoring and performance measures**

**1. What are the products of the marine spatial planning process?**

Provincial plans approved by the State.

**2. What constitutes success of the plan?**

Success is not identified in performance measures. Getting the plan in place could be seen as a success. Ostensibly revenue from use of ocean space is the benefit.

**3. Does the plan incorporate monitoring?**

Monitoring is indirect in terms of following the terms of the permit. Monitoring in the conventional sense of regularly checking on indicator values is not explicitly included.

**4. Have formal metrics of success of the plan (i.e., indicators and reference targets) been adopted? If so, what are they?**

None adopted.

**5. Is adaptive management an explicit component?**

No.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

No.

**7. If so, are the responses rule-based?**

No.

## **H. References**

Li, H. 2006. The impacts and implications of the legal framework for sea use planning and management in China. *Ocean and Coastal Management* 49:717-726.

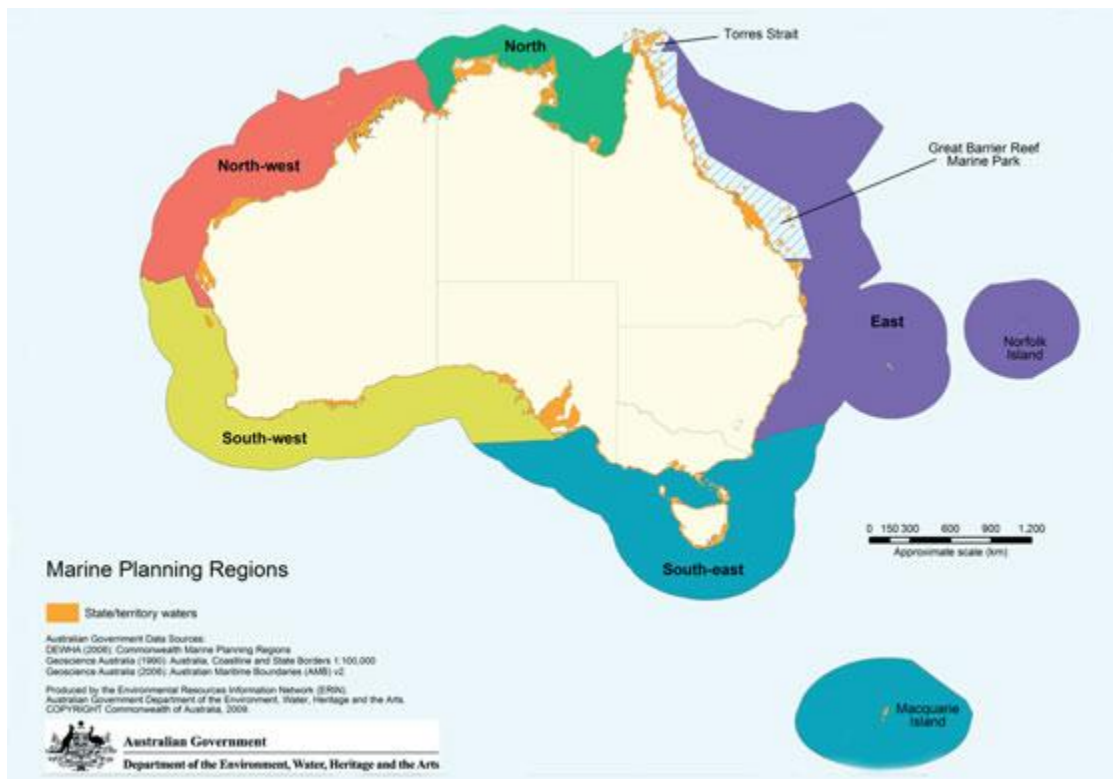
PRC 2001. Law on the Management of Sea Area Use of the People's Republic of China.

Peng, B, D. Jin, and R. Burroughs. 2009. Regional ocean governance in China: An appraisal of the Clean Bohai Sea Program. *Coastal Management* 37:70-93.

Xu. X, H. Peng, Q. Xu, H. Xiao, G. Benoit. 2009. Land use changes and conflicts coordination in coastal urbanizations: a case study of the Shandong Peninsula in China. *Coastal Management* 37: 54-69.

Zhang, R, Q. Fang, L. Zhang and H. Hong. 2011. Marine functional zoning in China: Experience and prospects. Submitted to *Coastal Management Journal*.

## **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: Australia National Marine Bioregionalisation**



### **A. Objectives**

#### ***1. What are the stated objectives of the plan, if any?***

Rather than objectives, the plan offers applications. National Marine Bioregionalisation (NMB) describes spatial patterns in the benthic and pelagic environments in Australia's Marine Jurisdiction (EEZ) at scales appropriate to regional marine planning. It contributes to an understanding of the marine environment and provides spatial information that can be used to infer patterns in the distribution of biodiversity, ecosystem structure and ecological processes. The National Marine Bioregionalisation complements existing national near-shore (<50 m depth) and continental shelf (<200 m depth) regionalisations that were completed as part of Interim Marine and Coastal Regionalisation of Australia (IMCRA). These have now all been combined into IMCRA 4.0.

#### ***2. Are the objectives conceptual (e.g. conserve biodiversity) and/or operational (e.g. protect 15% of the coastline)?***

Conceptual. The core of Australia's Oceans Policy [1998] is the development of regional marine plans (RMPs). The NMB plan is conceptual, supporting an established regional-scale program of planning and stewardship embodied in RMPs. RMPs adopt an ecosystem approach and, consequently, a key component of regional marine planning is to determine and understand ecosystem boundaries and ecological processes within marine regions. Additionally, in pursuing management that is focused on ecosystems, the Australian Government has endorsed the development of a National Representative System of Marine Protected Areas (NRSMPA). Australia's Oceans Policy is a Commonwealth (or Federal) Government initiative; the States

generally cooperate with it but have not formally adopted it as a National (Commonwealth plus States and Territories) Policy. However, in pursuing management that is focused on ecosystems, all Australian Governments (Commonwealth and each of the States and Territories) have endorsed the development of a National Representative System of Marine Protected Areas (NRSMPA).

***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

The NMB is a product of Australian legislation/policy. A biogeographic or regional ecosystem classification was first developed by relevant Commonwealth, State and Territory management agencies in 1985, and was endorsed by the Council of Nature Conservation Ministers (CONCOM) as a basis for planning the development of a system of marine protected areas in each jurisdiction (CONCOM 1985). The regionalization delineated and described the major coastal and marine regions at a provincial scale and led to the Interim Marine and Coastal Regionalisation for Australia (IMCRA). Development of the National Marine Bioregionalisation described here was managed by the National Oceans Office with advice from a Bioregionalisation Working Group that was established in August 2002. The purpose of the working group was to advise specifically on scientific issues, to provide a review of the program (including projects initiated under the framework of the national bioregionalisation program) and to assist in the development and preparation of the final summary report.

**B. Scope**

***1. Does the plan consider all uses or just selected sectors?***

Yes, the NMB considers all uses and sectors in the broad context of providing support for finer-scale regional and local planning.

***2. How long did the spatial planning process take (years)?***

The NMB was formally initiated in 2002 and released in 2005. However, the NMB builds upon the IMCRA for which work began in 1992 (Ver. 3.3 was dated 1998), and the Large Marine Domains, published in 1998; the most recent incarnation is IMCRA 4.0 (2006.) IMCRA 4.0 combines the NMB with the previous characterizations. So, essentially the NMB is the 4<sup>th</sup> generation of the IMCRA process.

Added by Alan Butler, expert reviewer:

Excerpt from (Butler et al. 2010), concerning the bioregionalisation history.

**Biogeographic subdivisions**

A biogeographic analysis, or “bioregionalisation,” of nearshore waters was undertaken in 1998 by the Interim Marine and Coastal Regionalisation for Australia (IMCRA) Technical Group [4]. The available data were limited and methods used for the IMCRA process differed somewhat between states. In 2005, the National Oceans Office commissioned the National Marine Bioregionalisation of Australia (NMB) for waters beyond the shelf [5]. Data on bathymetry, demersal fish, sponges and sediments, and oceanographic data, were used to identify a suite of unique seafloor bioregions comprising 41 provinces, three depth-related biomes on the continental slope, and geomorphic units that represent clusters of geomorphic features around the EEZ. Physical properties of the water and satellite estimates of primary productivity were used



separately to describe 25 different water masses in Australia's oceans, identified by different circulation regimes and oceanographic features.

IMCRA Version 3.3 and the NMB have been combined to create IMCRA Version 4.0 [6], where the 'I' now stands for "Integrated." IMCRA 4.0 identifies provinces, mesoscale regions, and geomorphic units.

IMCRA will continue to be refined. Recently, the range information on short-ranging demersal fish species on the continental shelf (which had not been included in the NMB) has been examined by Lyne et al. [7] as a project within the Commonwealth Environment Research Facilities (CERF) Australia's Marine Biodiversity Hub (<http://www.marinehub.org/>). Thus, a refinement of the regionalization is now available, including depth-related biomes on the continental shelf. (*NOTE INSERTED 1/4/11: this is now about to appear as (Last et al. 2011)*). At about the same time, O'Hara [8, 9] prepared a bioregionalisation based on brittle stars (Ophiuroidea), which can now be compared with the findings for fish. A survey off Western Australia found that the bioregionalisation based on fish was coincident with patterns in six sampled invertebrate phyla [10]. ....

For waters beyond the continental shelf, a subdivision of the Australian EEZ into 13 Large Marine Domains (LMDs) was developed by the Division of Marine Research of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) [11] and these have been used in support of regional marine planning under Australia's Oceans Policy [12]. These LMDs were used in Large Marine Ecosystems of the World 2002 [13] and by Spalding *et al.* [14] as the province level in their hierarchical scheme of Marine Ecoregions of the World. We note that in Australia, for biogeographic and planning purposes, the LMDs have largely been superseded by the NMB and now by IMCRA 4.0,

### ***3. Were particular steps especially demanding of time or resources?***

The National Marine Bioregionalisation, itself, was developed through six data collation projects that involved the creation and analysis of national datasets on key marine attributes, along with two integration projects which combined the relevant data to form each of the pelagic and benthic regionalisations.

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

Not specified for the NMB, however there are/will be rules for update and revision in the regional plans.

### ***5. What was the funding structure for this project?***

The work for the NMB itself was largely funded by the Commonwealth Environment Department (then called *Environment Australia*).

### ***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

The NMB extends the regionalization of Australia's marine jurisdiction from the continental shelf break (> 200 m depth) to the edge of the EEZ, a spatial scale on the order of 10 million km<sup>2</sup>. Data were collected at multiple scales and the resulting database has a structure that incorporates information about patterns and processes that occur at progressively finer scales (described in detail in the documents).

**7. How does plan scale match ecosystem scale?**

There are two key components of the National Marine Bioregionalisation: a benthic bioregionalisation and a pelagic regionalisation. The benthic bioregionalisation describes spatial patterns on or near the sea floor for 41 Provincial Bioregions/Transition Zones. The pelagic regionalization describes structure within the water column of 25 Water Masses in Australia’s oceans.

**8. What is the spatial scale for implementation (km<sup>2</sup>)?**

The NMB provides higher-level support for finer-scale regional and local planning. Provincial Bioregions range from 24,040 km<sup>2</sup> to 774,120 km<sup>2</sup>, typically 100-200 thousand km<sup>2</sup>. Pelagic water masses range from 0.57 to 22.71 million km<sup>3</sup>.

**C. Authority**

**1. What is the legal basis for this plan?**

Australia’s Ocean Policy of 1998. Subsequently, Regional Marine Planning was brought under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

**2. Which level(s) of government is (are) driving the spatial plan?**

National.

**3. What institutional change, if any, was made as part of creating the plan?**

No institutional changes have been made to date.

**4. What governance and institutional arrangements are used to implement the plan?**

Structure and process associated with Australia’s Ocean Policy. See Appendix 1; there was a National Oceans Office; now the process is administered by the Commonwealth Environment Department, currently called the Department of Sustainability, Environment, Water, Population and Communities.

**D. Data**

**1. What data are used?**

Benthic Regionalisations:

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical		X	X	X		
Geological		X	X	X		
Chemical		X	X	X		
Biological	X	X	X	X		
Economic						X
Social						X

Pelagic Regionalisations:

Data type	Quantitative time series	Quantitative “snapshot”	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	X		

Geological		X	X	X		
Chemical	X	X		X		
Biological			X	X		
Economic						X
Social						X

**2. Were there clear criteria for data inclusion? If so, what were they?**

Full details of the derivation and limitations of each of the datasets are contained in the relevant National Marine Bioregionalisation project reports and within IMCRA 4.0 (which includes the NMB) – see <http://www.environment.gov.au/coasts/mbp/publications/imcra/imcra-4.html>.

**3. Were there QA/QC standards for “expert opinion” and qualitative information? If so, what were they?**

The NMB and components were subjected to peer review and public comment.

**E. Participants**

**1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?**

The National Marine Bioregionalisation was developed collaboratively by the National Oceans Office, CSIRO Marine Research and Geoscience Australia, with input from Australian museums and international and national scientific experts. Development of the National Marine Bioregionalisation was managed by the National Oceans Office with advice from a Bioregionalisation Working Group that was established in August 2002. Membership of the Bioregionalisation Working Group is provided in Appendix 1 of the NMB Final Report.

**2. Did they have equal status at all parts of the process?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**3. Were stakeholders included in the planning process?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship. The planning process, which has involved a range of kinds of stakeholder engagements over the years, is the Regional Marine Planning (later “Marine Bioregional Planning”) process described at <http://www.environment.gov.au/coasts/mbp/index.html>

**4. Was there a broad public participation process?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***5. To what extent were economic and social data capturing affected individuals and communities that were not represented by stakeholders?***

Not applicable, economic and social data not included. That being said, at least some of the species for which data have been included almost certainly have been surveyed because of their market value. Note: The MBP process that is supported by this regionalization *does* have social and economic considerations.

***6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***7. In which parts of the process were stakeholders allowed to participate?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***8. What form was their participation?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**F. Tools & Decision Support**

***1. Which decision support tools are used to inform spatial allocation decisions?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***2. How are key trade-off issues framed and formalized into decision support tools?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***3. How are trade-offs analyzed?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?***

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

***5. How does the plan recognize and deal with uncertainty and risk?***

The NMB in itself is not a plan to manage any specific place or resource. The analyses did consider uncertainty and missing data in constructing the GIS and deriving the regionalization.

**6. Are the decision support tools dynamic?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups).**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

Not applicable. The NMB differs from CMSP developed for specific places, resources, sectors, or stakeholders. Instead, the NMB describes a spatial analysis process developed at a national scale intended to support finer-scale regional and local planning and resource stewardship.

**G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

The products of the NMB are datasets, project reports, and GIS available through the National Oceans Office either as hard copy, on DVD or online at [www.oceans.gov.au](http://www.oceans.gov.au).

**2. What constitutes success of the plan?**

The NMB in itself is not a plan to manage any specific place or resource. The NMB could be considered a success if it is used as a foundation for finer-scale regional or local planning activities.

**3. Have formal metrics of success of the plan (e.g. indicators and reference targets) been adopted? If so, what are they?**

The NMB in itself is not a plan to manage any specific place or resource.

**4. Does the plan incorporate monitoring?**

Specific resource use and/or management actions are not part of the NMB.

**5. Is adaptive management an explicit component?**

Specific resource use and/or management actions are not part of the NMB.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

Specific resource use and/or management actions are not part of the NMB.

### 7. If so, are the responses formally rule-based?

Specific resource use and/or management actions are not part of the NMB.

#### **Appendix 1. (inserted by Alan Butler, local expert).**

##### **Regional Marine Planning history:**

This is not a “history” but a few notes. If it is really the *planning* process, rather than the bioregionalisation, that is your focus, then I’d suggest following up some of the references here, and the department’s website, for an authoritative account.

*Australia’s Oceans Policy* was released in 1998 (12). The National Oceans Office (NOO) was established about then to implement the policy, particularly through *Regional Marine Planning*, based on the identified Large Marine Domains (11). The South-east RMP was released in 2004 (NOO 2004; <http://www.environment.gov.au/coasts/mbp/publications/south-east/sermp.html>). In 2005 the programme of regional marine planning was brought directly under section 176 of the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and the NOO was subsumed into the Commonwealth Environment Department. The present status, procedures and publications of bioregional marine planning are to be found at <http://www.environment.gov.au/coasts/mbp/index.html>. The aim is to develop RMPs for five regions: South-west, North, North-west, East and South-east (that first plan will be reviewed). Subsequent RMPs have been done more quickly and in less detail than the original South-east RMP, but I’m unsure which ones have actually been finished and published. The emphasis in Bioregional Marine Planning has become focussed more on the establishment of the National Representative System of Marine Protected Areas (Australia is committed to achieving this by 2012) than on implementing the whole vision of “ecosystem based planning and management”, though that vision is still maintained.

#### **H. References**

- NOO (2004) South-east Regional Marine Plan. Implementing Australia’s Oceans Policy in the South-east Marine Region. National Oceans Office, Hobart. ISBN 1-877043-35-4.
- Butler, A. J., A. Rees, P. Beesley, and N. J. Bax. 2010. Marine Biodiversity in the Australian Region. PLoS One 5:e11831.
- Last, P. R., W. T. White, D. C. Gledhill, J. J. Pogonoski, V. Lyne, and N. J. Bax. 2011. Biogeographical structure and affinities of the marine demersal ichthyofauna of Australia. Journal of Biogeography.

<http://www.environment.gov.au/coasts/mbp/publications/east/pubs/fs-mbp.pdf>

<http://www.environment.gov.au/coasts/mbp/publications/imcra/imcra-3-3.html>

<http://www.environment.gov.au/coasts/mbp/imcra/nmb.html>

<http://www.environment.gov.au/coasts/mbp/publications/imcra/imcra-4.html>

<http://www.environment.gov.au/coasts/mbp/index.html>

[http://www.gbrmpa.gov.au/\\_data/assets/pdf\\_file/0016/10591/Zoning\\_Plan.pdf](http://www.gbrmpa.gov.au/_data/assets/pdf_file/0016/10591/Zoning_Plan.pdf)

**References** inserted by Alan Butler.

- IMCRA (Interim Marine and Coastal Regionalisation for Australia) Technical Group. (1998) Interim Marine and Coastal Regionalisation for Australia: an ecosystem-based classification for marine and coastal environments. Version 3.3. Canberra: Environment Australia, Commonwealth Department of the Environment. 101 p.
- Commonwealth of Australia (2005) National marine bioregionalisation of Australia. Hobart: Department of the Environment and Heritage – National Oceans Office, Geoscience Australia and CSIRO Marine Research. (DVD).
- Commonwealth of Australia (2006) A guide to the Integrated Marine and Coastal Regionalisation of Australia Version 4.0. Canberra: Department of the Environment and Heritage. 16 p.
- Lyne VD, White WT, Gledhill DC, Last PR, Rees T, et al. (2008) Analysis of Australian continental shelf provinces and biomes based on fish data. Hobart: CSIRO Marine and Atmospheric Research. ISBN 978-1-921605-01-7 (printed version); ISBN 978-1-921605-02-4 (pdf version). 40 p.
- O'Hara T (2008) Bioregionalisation of Australian waters using brittle stars (Echinodermata: Ophiuroidea), a major group of marine benthic invertebrates. Report to Department of the Environment, Water, Heritage and the Arts, 2008. ISBN 978-0-642-55464-2 (<http://environment.gov.au/coasts/mbp/publications/imcra/brittlestars-australia.html>)
- O'Hara T (2008) Bioregionalisation of the waters around Lord Howe and Norfolk Islands using brittle stars (Echinodermata: Ophiuroidea). Report to Department of the Environment, Water, Heritage and the Arts, 2008. ISBN 978-0-642-55462-8 (<http://environment.gov.au/coasts/mbp/publications/imcra/brittlestars-lord-howe.html>)
- Williams A, Althaus F, Dunstan PK, Poore GCB, Bax NJ, et al. (in press) Scales of habitat heterogeneity and megabenthos biodiversity on an extensive Australian continental margin (100–1,000m depths). *Mar Ecol Prog Ser* (in press).
- Lyne V, Last P, Scott R, Dunn J, Peters D, et al. (1998) Large Marine Domains of Australia's EEZ. Hobart: Unpublished CSIRO Marine Research report to Environment Australia.
- Commonwealth of Australia (1998) Australia's Oceans Policy. Volumes 1 & 2. ISBN 0 642 54592 8
- Large Marine Ecosystems of the world 2002 (<http://www.lme.noaa.gov/Portal/>)
- Spalding MD, Fox HE, Allen GR, Davidson N, Ferdana ZA, et al. (2007) Marine ecoregions of the World: a bioregionalisation of coastal and shelf areas. *Bioscience* 57(7): 573–583.

# **QUESTIONS FOR REVIEW OF MARINE SPATIAL MANAGEMENT PLANS PERTAINING TO: The Great Barrier Reef Marine Park Zoning Plan**

## **A. Objectives**

### ***1. What are the stated objectives of the plan, if any?***

These are the objectives as stated from the Great Barrier Reef Marine Park Act 1975:

1. The conservation of the Great Barrier Reef (GBR);
2. The regulation of the wise use of the Marine Park so as to protect the GBR while allowing the reasonable use of the GBR Region;
3. The regulation of activities that exploit the resources of the GBR Region so as to minimize the effect of those activities on the GBR;
4. The reservation of some areas of the GBR for its appreciation and enjoyment by the public; and
5. The preservation of some areas of the GBR in its natural state undisturbed by man except for the purposes of scientific research.<sup>193</sup>

There are also stated objectives in the GBRMP Zoning Plan 2003 for each of the eight (8) zones created by the 2003 Plan. (Example: Section 2.2.2 Objective for General Use Zone: “The objective of this Zoning Plan for the General Use Zone is to provide for the conservation of areas of the Marine Park, while providing opportunities for reasonable use.”)<sup>194</sup>

### ***2. Are the objectives conceptual (e.g., conserve biodiversity) and/or operational (e.g., protect 15% of the coastline)?***

Operational. “The *Great Barrier Reef Marine Park Zoning Plan 2003* is the primary planning instrument for the conservation and management of the Marine Park.”<sup>195</sup>

### ***3. Were the objectives mandated (e.g. by legislation or executive order) or were they identified during the planning process?***

Mandated. The zoning plan was prepared “as the primary planning instrument for the conservation and management of the Marine Park in accordance with Section 32 of the [Great Barrier Reef Marine Park Act 1975].”<sup>196</sup>

The zoning plan builds off an existing framework of zoning plans established over a fifteen-year period.<sup>197</sup> The first section of the Marine Park was declared in 1983.<sup>198</sup> “The Far Northern Section, the Cairns Section, the Central Section and the Mackay/Capricorn Section were progressively declared to be parts of the Marine Park between 1983 and 1989. In 1998 the Gumoo Woorabdee Section was declared to be a part of the Marine Park, and a further 28 new coastal Sections were declared to be parts of the Marine Park in 2000 and 2001.”<sup>199</sup> “The Act require[d] a zoning plan to be prepared for the new areas ‘as soon as practicable’ after an area has been included in the Marine Park”<sup>200</sup> The result is this zoning plan; thirty-three (33) sections

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<sup>193</sup> Report on the GBRMP Zoning Plan 2003, p. 1. *See also* Regulatory Impact Statement, p. 4.

<sup>194</sup> GBRMP Zoning Plan 2003, p. 16.

<sup>195</sup> GBRMP Zoning Plan 2003, p. 1.

<sup>196</sup> Report on GBRMP Zoning Plan 2003, p. 1.

<sup>197</sup> Regulatory Impact Statement, p. 15.

<sup>198</sup> GBRMP Zoning Plan 2003, p. 2.

<sup>199</sup> GBRMP Zoning Plan 2003, p. 2.

<sup>200</sup> Regulatory Impact Statement, p. 6.



of the Marine Park were amalgamated to form the Amalgamated Great Barrier Reef (AGBR) Section, which was subsequently divided into four (4) management areas for administrative purposes.<sup>201</sup>

## **B. Scope**

### ***1. Does the plan consider all uses or just selected sectors?***

Selected sectors. It covers all allowable uses in the marine park, including environmental conservation, tourism, commercial fishing, recreational fishing, aquaculture, traditional uses, scientific research, and addresses shipping lanes. No operations for the recovery of minerals are allowed in the marine park. Oil drilling and exploration are not allowed in the Marine Park.

### ***2. How long did the spatial planning process take (years)?***

About 2 years.

May 7, 2002—Aug. 7, 2002: Community Participation Phase (CP1)

June 2, 2003—Aug. 4, 2003: Release of Draft Zoning Plan and additional public comment

Nov. 26, 2003: GBRMPA made the Zoning plan

Dec. 3, 2003: Presented to Minister for the Environment and Heritage for presentation to the legislature

July 4, 2004: Zoning plan approved by legislature.<sup>202</sup>

### ***3. Were particular steps especially demanding of time or resources?***

Collection and analysis of response forms from the community seemed particularly demanding of time and resources. Over 360 public meetings and information sessions were held along the GBR coast.<sup>203</sup> Over 31,500 submissions were received, coded, and analyzed. “A team of 18 officers from the GBRMPA were involved in the comprehensive analysis of the public submissions in a three-stage process.”<sup>204</sup>

### ***4. How long does the plan apply? What is the planning interval for update and revision?***

5 year planning interval for update and revision.

“Early in the history of the GBRMPA, a policy decision was made to review zoning plans as soon as practicable after they had been in operation for five years (Policy No. 2002/245). This policy intends that improvements in the Zoning Plans be based upon zoning reviews and information gathered in the intervening period.”<sup>205</sup>

### ***5. What was the funding structure for this project?***

Funding appears to be joint federal and state. “Field-based, day-to-day management of the Marine Park is jointly funded by both the State and Commonwealth Governments.”<sup>206</sup>

### ***6. At what spatial scale was the plan developed (km<sup>2</sup>)?***

344,400 km<sup>2</sup>.<sup>207</sup> Stretches 2,300 km along Australia’s north-eastern coastline, from the tip of Cape York Peninsula, south to Baffle Creek north of Bundaberg, out to open waters up to 100-300 km offshore.<sup>208</sup>

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<sup>201</sup> Report on GBRMP Zoning Plan 2003, p. 8.

<sup>202</sup> Report on GBRMP Zoning Plan 2003, p. 2; figure 1, p. 8.

<sup>203</sup> Report on GBRMP Zoning Plan 2003, p. 34.

<sup>204</sup> Regulatory Impact Statement, p. 34.

<sup>205</sup> Regulatory Impact Statement, p. 44.

<sup>206</sup> Report on GBRMP Zoning Plan 2003, p. 4.

### **7. How does plan scale match ecosystem scale?**

Matches ecosystem scale.

### **8. What is the spatial scale for implementation (km<sup>2</sup>)?**

344,400 km<sup>2</sup>. Broken down into four (4) management areas: Far Northern Management Area, Cairns/Cooktown Management Area, Townsville/Whitsundays Management Area, and the Mackay/Capricorn Management Area.

## **C. Authority**

### **1. What is the legal basis for CMSP?**

Legislative. The Great Barrier Reef Marine Park Act 1975.

“In addition to this Zoning Plan, regard should be had to the *Great Barrier Reef Marine Park Act 1975*, the [*Great Barrier Reef Marine Park Regulations 1983*], and any plans of management or policies of the GBRMPA in force from time to time. Additional restrictions or requirements may also apply with respect to a particular use or entry of a place or conduct of an activity under another law of the Commonwealth or under a Queensland law.”<sup>209</sup>

### **2. Which level(s) of government is (are) driving the spatial plan?**

Federal Government. My impression is that the Great Barrier Reef Marine Park Authority (GBRMPA) drove the zoning plan, as mandated by the Great Barrier Reef Marine Park Act, to prepare a zoning plan "as soon as practicable" after the addition of the 28 coastal areas between Aug. 2000 and July 2001.

Australian (federal) and Queensland (state) governments have historically maintained complementary zoning plans. It appears that the Queensland Environmental Protection Agency was the state agency in charge of considering the federal zoning plan and supporting it (Regulatory Impact Statement, p. 32). The "drive" of the spatial plan though, seemed to come from GBRMPA.

### **3. What institutional change, if any, was made as part of creating the plan?**

Australian and state government bodies remained the same for the 2003 Plan. It is unknown what changes were made inside government agencies to accommodate the new zoning and management plans.

### **3. What governance and institutional arrangements are used to implement the plan?**

Federal and state government agencies.<sup>210</sup>

### **4. What governance and institutional arrangements are used to implement the plan?**

Federal and state government agencies. It appears that implementation was/is a collective effort between the two levels of government and respective agencies. Government agencies include: The Great Barrier Reef Marine Park Authority (GBRMPA), The (Australian) Department for the Environment and Heritage, Australian Maritime Safety Authority (AMSA), Australian Hydrographic Office (AHO), and (Australian) Department of Defense, The Queensland Environmental Protection Agency (EPA), Queensland Fisheries Service (QFS), and Maritime

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<sup>207</sup> Report on GBRMP Zoning Plan 2003, p. 3.

<sup>208</sup> Report on GBRMP Zoning Plan 2003, p. 3.

<sup>209</sup> GBRMP Zoning Plan 2003, p. 6.

<sup>210</sup> Regulatory Impact Statement, pp. 31-33.

Safety Queensland (MSQ) (3). "Day-to-day management (DDM) of the GBRWHA (which includes the Marine Park, State marine parks and island nation parks) is achieved through an agreement between the Australian and Queensland Governments. DDM is predominately delivered by the other State and Commonwealth agencies including the Queensland Boating and Fisheries Patrol, Queensland Water Police (3)," Queensland Parks and Wildlife Service, Australian Federal Police, Australian Customs Service (Coastwatch and the National Marine Unit), Australian Quarantine Inspection Service, and the Australian Maritime Safety Authority.<sup>211</sup>

## **D. Data**

### ***1. What data are used?***

Data type	Quantitative time series	Quantitative "snapshot"	Qualitative information	Expert opinion	Not available	Not applicable
Physical	X	X	X	X		
Geological						
Chemical						
Biological	X	X	X	X		
Economic	X	X	X	X		
Social	X	X	X	X		

### ***2. Were there clear criteria for data inclusion? If so, what were they?***

Yes. An independent Scientific Steering Committee developed a set of Biophysical Operating Principles (BOPs). There was also an independent Social, Economic and Cultural Steering Committee, which developed operational principles for assessing social, economic, and cultural impacts and management feasibility to complement the BOPs.

"The GBRMPA collated the very best available data and expertise to describe the variety of life in the GBR system."<sup>212</sup>

"The GBRMPA has also collated the best available economic, social and cultural advice . . . and information to maximize positive and minimize negative impacts, while still implementing the scientific recommendations to the greatest extent possible."<sup>213</sup>

### ***3. Were there QA/QC standards for "expert opinion" and qualitative information? If so, what were they?***

Yes. "The membership of the [Scientific Steering Committee] was decided by the GBRMPA after consultation with over 70 of Australia's senior scientists with expertise in the GBR region. The SSC developed a set of Biophysical Operating Principles (BOPs) to guide the implementation of RAP."<sup>214</sup> [details of the BOPs are in the Regulatory Impact Statement, pp. 11-12]. "Best available knowledge of the Great Barrier Reef ecosystem and general principles of reserve design were applied, as far as practicable, during the [Representative Areas Program] RAP and rezoning process."<sup>215</sup>

<sup>211</sup> Report on GBRMP Zoning Plan 2003, p. 4.

<sup>212</sup> Regulatory Impact Statement, p. 13.

<sup>213</sup> Regulatory Impact Statement, p. 15.

<sup>214</sup> Regulatory Impact Statement, p. 11.

<sup>215</sup> Report on GBRMP Zoning Plan 2003, p. 129.

## **E. Participants**

### ***1. What entities and regulatory authorities are part of the plan process (State, Provincial governments, regulatory agencies, science advisors, stakeholders)?***

Federal and State politicians, Federal and state government agencies, science advisors, conservation groups, local councils, and stakeholders.

“Natural science expert committees assisted the process of classifying the biological and physical diversity of the Great Barrier Reef World Heritage Area into 70 ‘bioregions’... The bioregions were developed using the best available information and input and advice provided, including from fishers, scientists and other experts, on the boundaries and habitat types found within the Marine Park”<sup>216</sup>

“The independent Scientific Steering Committee (SSC), comprising scientists with expertise in the GBR Region, provided advice to the GBRMPA on scientific issues relevant to the selection of representative areas of biodiversity.”<sup>217</sup>

### ***2. Did they have equal status at all parts of the process?***

It does not appear that they had equal status at all parts of the process. The GBRMPA maintained authority and sought advice and comment from other entities/authorities/stakeholders/advisory committees.

### ***3. Were stakeholders included in the planning process?***

Yes. The GBRMPA included “affected groups” in the planning process, including representatives from the tourism, recreational fishing, and commercial fishing sectors, indigenous people, and the coastal Queensland communities.

### ***4. Was there a broad public participation process?***

Yes. There were two (2) phases of “Community Participation” (May 7, 2002--August 7, 2002 and June 2, 2003—August 4, 2003) that were very extensive. “GBRMPA staff attended over 360 meetings and information sessions along the GBR coast in some 90 centres with local communities, conservation groups, commercial and recreational fishing organizations, Traditional Owners, tourism operators, local councils, and State and Federal politicians.”<sup>218</sup>

### ***5. To what extent were larger-scale economic and social data represented in the planning process, reflecting affected individuals and communities not represented by stakeholders?***

Large extent. Social, cultural and management feasibility operational principles were developed by the independent steering committee to guide, as far as practicable, the rezoning process.<sup>219</sup> A significant proportion of submissions received during the public consultation phases included detailed site-specific information and important social and cultural attributes.<sup>220</sup>

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<sup>216</sup> Report on GBRMP Zoning Plan 2003, p. 11.

<sup>217</sup> Report on GBRMP Zoning Plan 2003, p. 12.

<sup>218</sup> Report on GBRMP Zoning Plan 2003, p. 34.

<sup>219</sup> Report on GBRMP Zoning Plan 2003, p. 13.

<sup>220</sup> Report on GBRMP Zoning Plan 2003, p. 13.

**6. How were stakeholders defined and what standards were used to determine which stakeholders had legitimate standing?**

The term “stakeholders” is not used in the plan. The Regulatory Impact Statement identifies “affected groups.” Affected groups include Australian public, Indigenous people including Traditional Owners, Coastal Queensland communities, Other recreational users, Tourism industry representatives, Tourism operators, Tourists, Conservation, All fisheries generally, Recreational fishing, Charter fishing, Otter Trawl (commercial), Beam Trawl (commercial), Offshore Line fishery (commercial), Inshore net and line fishery (commercial), Blue swimmer and mud crab fishery (commercial), Spanner crab fishery (commercial), Sea cucumber fishery (commercial), Trochus fishery (commercial), Tropical rock lobster (commercial), Aquarium fish and coral (commercial), Shipping, Defense, Research, Education, and Coastal developments.<sup>221</sup>

It does not appear that there were any standing limitations on who could comment on the zoning and draft plans. Rather, GBRMPA actively sought broad comment from all affected groups.

**7. In which parts of the process were stakeholder allowed to participate?**

There was stakeholder participation at the two (2) Community Participation phases: the creation of the Draft Zoning Plan, and subsequent review and comment on the Draft Zoning Plan.

**8. What form was their participation?**

Formal meetings, face-to-face engagement with agency representatives, phone calls, submission response forms to the agency.<sup>222</sup>

“The GBRMPA implemented a communication strategy to promote awareness, understanding, and to share with the community the issues regarding impacts on the Marine Park, to explain the rezoning process, and to encourage broad community involvement.”<sup>223</sup>

**F. Tools & Decision Support**

**1. Which decision support tools are used to inform spatial allocation decisions?**

“The GBRMPA considered all submissions received during both phases of Community Participation, commercial and recreational datasets, together with the known uses and values of the Marine Park. Considerable effort was made to maximize the positive and minimize the potential negative impacts on known and future uses of the Marine Park.”<sup>224</sup>

GIS. “The desirability of a coordinate-based approach to zone boundaries in offshore areas has long been recognized. Recent advances in mapping and Global Positioning System (GPS) technology have enabled this approach to be applied in the establishment of offshore zone boundaries in the revised Zoning Plan.”<sup>225</sup>

“An [O]racle database with a Microsoft Access interface” was used to manage the “submission response forms” from the public.<sup>226</sup>

Social, economic, cultural and management datasets including: Existing GBRMPA zoning, Queensland Government Fisheries Closures, Queensland Government adjacent National Parks, Australian Maritime Safety Authority shipping lanes, Australian Maritime Safety Authority ship reports, GBRMPA Spill risk map, Ports, Land Use Characteristics, Coastal developments, Native

<sup>221</sup> Regulatory Impact Statement, Table 10, pp. 29-30.

<sup>222</sup> Report on GBRMP Zoning Plan 2003, p. 34.

<sup>223</sup> Report on GBRMP Zoning Plan 2003, p. 34.

<sup>224</sup> Report on the GBRMP Zoning Plan 2003, p. 55.

<sup>225</sup> Regulatory Impact Statement, p. 15.

<sup>226</sup> Report on GBRMP Zoning Plan 2003, p. 36.

Title claims, Key informant recreational fishing information, Boat ramps, Suntag-fish tagging data, Recreational fishing diary and logbook data, 6 minute and 30 minute commercial crab-pot/net fishing/reef line/rawl/harvest/charter data, Historic shipwrecks, National Estate, Museum specimen sampling sites, Anchorage and mooring data, More than 30,000 public submissions to GBRMPA on the rezoning process.<sup>227</sup>

Biophysical Operational Principles (BOPs) and Social, Economic, Cultural and Management Feasibility Operational Principles guided the Representative Areas Program in the identification and selection of no-take areas.<sup>228</sup>

The RAP planning process used a variety of analytical planning tools including ‘MARXAN’, ReST and TRADER (Australian Institute of Marine Science, Dr Glenn De’ath). These helped to apply the key operating principles, and in conjunction with other GIS-based spatial analysis tools, were vital to the systematic integration of biophysical, social and economic values.<sup>229</sup>

## **2. How are key trade-off issues framed and formalized into decision support tools?**

Key trade-off issues were framed and formalized by the Biophysical Operating Principles (BOPs),<sup>230</sup> Social, economic, cultural impacts and management feasibility, operational principles, identification of affected groups, and responses from community participation.

## **3. How are trade-offs analyzed?**

“[Zone Placement] Guidelines were used, together with the information gathered, to assist the placement of the zones. One general guideline was to build upon, or at least maintain, the existing levels of protection. Specific guidelines considered in the placement for each of the zones are discussed in [sections 7.1 to 7.8]”<sup>231</sup>

“Potential zoning networks that met the biophysical operational principles were identified, including a minimum of 20% no-take protection per bioregion, and consideration of such aspects as special/unique sites, advise on dugong habitat, etc. The [Draft Zoning Plan] implemented the operational principles as far as was possible, and incorporated social, economic, cultural and management feasibility principles to maximize complementarity of people’s uses and values with the proposed zoning.”<sup>232</sup>

“Known uses of the Marine Park were important in guiding the placement of zones and the development of the Zoning Plan.” Tourism, recreational use, and commercial fisheries data “were essential in placing the zones to minimize the impact on known Marine Park uses.”<sup>233</sup>

“An oracle database with a Microsoft Access interface was used to manage the analysis of the submissions. This database linked the scanned image of the submission (in PDF) with the contact details and analytical information of each submission.”<sup>234</sup>

“The Biophysical Operational Principles (BOPs) were recommended by the Scientific Steering Committee (SSC), with input from other experts, to guide the establishment of a new network of no-take areas that would achieve the objectives of the [Representative Areas Program] RAP. The BOPs were developed using best available knowledge of the GBR ecosystem and general

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<sup>227</sup> Regulatory Impact Statement, Appendix 1, p. 51.

<sup>228</sup> Report on GBRMP Zoning Plan 2003, p. 129.

<sup>229</sup> [http://www.gbrmpa.gov.au/corp\\_site/management/zoning/planners\\_info](http://www.gbrmpa.gov.au/corp_site/management/zoning/planners_info)

<sup>230</sup> See Regulatory Impact Statement, Table 2, p. 11.

<sup>231</sup> Report on GBRMP Zoning Plan 2003, p. 55. See pp. 56-59 for Zone placement guidelines.

<sup>232</sup> Regulatory Impact Statement, p. 34.

<sup>233</sup> Report on GBRMP Zoning Plan 2003, p. 13.

<sup>234</sup> Report on GBRMP Zoning Plan 2003, p. 36.

principles of reserve design, and were applied, as far as practicable, during the RAP and rezoning process.”<sup>235</sup>

Qualitative and quantitative Cost Benefit Analysis of affected groups.<sup>236</sup>

“The revised Zoning Plan has focused on placing the least cost on the users, such as fishers, while satisfying the biological operational principles.”<sup>237</sup>

**4. Does the tradeoff analysis consider market and non-market (e.g. ecosystem service value) economic components?**

“Ecosystem services” is not explicit in the plan. However, the Regulatory Impact Statement Section 5.2 includes a discussion of “Direct values,” “Indirect Use Values,” and “Non-use values,”<sup>238</sup> and the responses from affected groups as to how they value the Great Barrier Reef (which include market and non-market values) when analyzing the expected costs and benefits of feasible options across affected groups.<sup>239</sup>

**5. How does the plan recognize and deal with uncertainty and risk?**

Uncertainty and risk are not explicit in the zoning plan. Regulatory Impact Statement discusses Risk assessment, Risk identification, Risk analysis, and Risk evaluation,<sup>240</sup> and states that “[a] risk management approach to the threats facing the GBR suggest that regulatory action [with the new zoning plan] is warranted to insure the GBR against . . . impacts.”<sup>241</sup> But it is not apparent that such a risk management approach was applied systematically in the 2003 plan.

**6. Are the decision support tools dynamic?**

Not explicitly, but there are established agency policies for plan review, which would allow for change.

**7. Is there a strategy for updating and improving the decision support tools based on monitoring and evaluation?**

Yes. “The GBRMPA will continue to monitor the health of the reef including the effects of implementing different management regimes such as [Representative Areas Program]. The Zoning Plan will be reviewed consistent with the GBRMPA policy for regular review of zoning.”<sup>242</sup>

**8. How are conflicts resolved? (e.g., formal examination of alternatives, advisory committee, unstructured compromise among user groups)**

Unknown. Conflict resolution is not addressed in the zoning plan or supporting documents. Presumably, this means that the existing authorities are seen as sufficient for addressing conflict. “Where there are valid individual or community impacts in the short term, the Australian Government has undertaken to consider structural adjustment assistance.”<sup>243</sup>

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<sup>235</sup> Report on GBRMP Zoning Plan 2003, p. 12.

<sup>236</sup> See Regulatory Impact Statement, pp. 16-32.

<sup>237</sup> Regulatory Impact Statement, p. 33.

<sup>238</sup> Regulatory Impact Statement, pp. 16-17.

<sup>239</sup> See Regulatory Impact Statement, pp. 17-30.

<sup>240</sup> Regulatory Impact Statement, pp. 7-9.

<sup>241</sup> Regulatory Impact Statement, p. 10.

<sup>242</sup> Regulatory Impact Statement, p. 10.

<sup>243</sup> Regulatory Impact Statement, p. 31.

**9. What mechanisms are used to attempt to achieve the objectives (e.g. zoning, market based instruments, etc.)? Are these mechanisms included as part of the decision support analysis?**

The primary planning instrument for the conservation and management of the Marine Park is the zoning plan. “As well as zoning plans, a range of other management ‘tools’, including permits, education and plans of management, used to control and mitigate impacts associated with human use of the Marine Park.”<sup>244</sup>

## **G. Monitoring & Performance Measures**

**1. What are the products of the marine spatial planning process?**

Creation of the Great Barrier Reef Marine Park Zoning Plan 2003.

**2. What constitutes success of the plan?**

There are no defined targets in the zoning plan. It is assumed that “success” is meeting the stated objectives for the zones and designated areas.

**3. Does the plan incorporate monitoring?**

Monitoring is not explicitly discussed in the zoning plan, per se, but “the GBRMPA will continue to monitor the health of the reef including the effects of implementing different management regimes such as the [Representative Areas Program]. The Zoning Plan will be reviewed consistent with the GBRMPA policy for regular review of zoning.”<sup>245</sup>

**4. Have formal metrics of success of the plan (e.g., indicators and reference targets) been adopted? If so, what are they?**

No. Indicators and reference targets were not in the zoning plan. “The Act requires the zoning plans to define the purposes for which areas of the Marine Park may be used or entered.”<sup>246</sup> It is possible that indicators and reference targets have been established by the GBRMPA, but are stated in a different management plan or document.

**5. Is adaptive management an explicit component?**

No. Adaptive management is not an explicit component in the 2003 zoning plan or supporting documents. However, there are established agency policies, which likely allow for change.

**6. Is the adaptive management formally structured around response to feedback from monitoring?**

No. It is not an explicit component in the 2003 zoning plan; this may indicate that it is already in practice and addressed in a different GBRMPA plan, document, or regulation.

**7. If so, are the responses formally rule-based?**

N/A since the answer to question 6 is “no”.

## **H. References**

Great Barrier Reef Marine Park Authority. (2005). *Report on the Great Barrier Reef Marine Park Zoning Plan 2003*. Townsville, Queensland, Australia: Great Barrier Reef Marine Park Authority.

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<sup>244</sup> Regulatory Impact Statement, p. 4.

<sup>245</sup> Regulatory Impact Statement, p. 10.

<sup>246</sup> Regulatory Impact Statement, p. 4.



Great Barrier Reef Marine Park Authority. (2004). *Great Barrier Reef Marine Park Zoning Plan 2003*. Townsville, Queensland, Australia: Great Barrier Reef Marine Park Authority.

Great Barrier Reef Marine Park Authority. (2003). *Zoning Plan for the Great Barrier Reef Marine Park: Regulatory impact statement*. Townsville, Queensland, Australia: Great Barrier Reef Marine Park Authority.

[http://www.gbrmpa.gov.au/corp\\_site/management/zoning/planners\\_inf](http://www.gbrmpa.gov.au/corp_site/management/zoning/planners_inf)

## APPENDIX 3. SUMMARY TABLE OF RESPONSES

**Table A. Objectives**

<i>Spatial Plan</i>	<i>1. Stated objectives of the plan (paraphrased)</i>	<i>2. Conceptual and/or Operational?</i>	<i>3. Mandated or identified during process?</i>
<b>Barents Sea, Norway</b>	<ul style="list-style-type: none"> <li>a. Sustainable use of the area and its resources;</li> <li>b. Ensure that activities do not threaten the natural resource base;</li> <li>c. Harvesting of living marine resources to the benefit of the country;</li> <li>d. An ecosystem approach to the management of living marine resources;</li> <li>e. Petroleum activities will promote value creation and benefit the country;</li> <li>f. Profitable production of oil and gas within environmental standards;</li> <li>g. Safe, secure, and effective maritime transport.</li> </ul>	Both, the operational components are spelled out in previous and later plan elements	Set by government to be consistent with national guidelines and practices.
<b>German Exclusive Economic Zone in the North Sea and Baltic Sea</b>	<ul style="list-style-type: none"> <li>a. Securing and strengthening maritime traffic;</li> <li>b. Strengthening economic capacity;</li> <li>c. Promotion of offshore wind energy;</li> <li>d. Long-term sustainable use of the EEZ; and</li> <li>e. Securing natural resources by avoiding disruptions to and pollution of the marine environment</li> </ul>	Both	Objectives came from international conventions, EU directives and national objectives
<b>Baltic Sea Action Plan</b>	<ul style="list-style-type: none"> <li>a. Baltic Sea unaffected by eutrophication;</li> <li>b. Baltic Sea with life undisturbed by hazardous substances;</li> <li>c. Maritime activities carried out in an environmentally friendly way;</li> <li>d. Favorable conservation status of Baltic Sea biodiversity.</li> </ul>	Both	Identified during the planning process
<b>Wadden Sea Plan</b>	<ul style="list-style-type: none"> <li>a. A natural ecosystem, its functions and characteristic biodiversity;</li> <li>b. Resilience to climate change and other impacts;</li> <li>c. Maintenance of the landscape and cultural heritage;</li> <li>d. Sustainable use as defined by the CBD and the Habitats Directive;</li> <li>e. Public support for the protection of the Wadden Sea.</li> </ul>	Conceptual	Mandated by the Joint Declaration on the Protection of the Wadden Sea
<b>Netherlands</b>	<ul style="list-style-type: none"> <li>a. Sustainable economic development that is in balance with the marine ecosystem;</li> <li>b. Additional emphasis on setting aside sand extraction sites for coastal and flood protection purposes;</li> <li>c. Additional emphasis on setting aside space for large-scale renewable energy.</li> </ul>	Both	Identified during the planning process
<b>Belgium Part of the North Sea</b>	<ul style="list-style-type: none"> <li>a. Consideration of the process, procedure and methodology underlying the preparation of a plan;</li> <li>b. To produce several scenarios and proposals for a spatial plan;</li> <li>c. Provide a starting point for discussion on forms of decision-making and public participation within the context of a marine spatial structure plan.</li> </ul>	Conceptual, with intent to make operational	Identified during the planning process

<i>Spatial Plan</i>	<i>1. Stated objectives of the plan (paraphrased)</i>	<i>2. Conceptual and/or Operational?</i>	<i>3. Mandated or identified during process?</i>
<b>Shetland Isles</b>	<ul style="list-style-type: none"> <li>a. Ensure a high quality, fully functioning marine and coastal ecosystem for the benefit and prosperity of local communities;</li> <li>b. Protect and enhance areas where there are locally, nationally or internationally important marine species and habitats whilst taking account of natural changes;</li> <li>c. Identify areas with differing priorities for sustainable use (such as fishing, aquaculture, recreation &amp; tourism, oil, nature conservation etc.); and</li> <li>d. Ensure that stakeholders can take advantage of development opportunities in a sustainable way.</li> </ul>	Conceptual	Suggested by the Scottish Sustainable Marine Environmental Initiative [SSMEI] of the Scottish Government.
<b>Canada Oceans Act: ESSIM and Beaufort Sea IOMP</b>	<ul style="list-style-type: none"> <li>a. Sustainable development, that is, development that meets the needs of the present without compromising the ability of future generations to meet their own needs;</li> <li>b. The integrated management of activities in estuaries, coastal waters, and marine waters;</li> <li>c. Healthy, clean, and productive marine ecosystems;</li> <li>d. The precautionary approach, that is, erring on the side of caution.</li> </ul>	Conceptual; made more operational in the regional plans.	Highest-level conceptual objectives taken from the Oceans Act
<b>Massachusetts Ocean Management Plan</b>	<ul style="list-style-type: none"> <li>a. Balance and protect the natural, social, cultural, historic, and economic interests of the marine ecosystem through integrated management;</li> <li>b. Recognize and protect biodiversity, ecosystem health, and the interdependence of ecosystems;</li> <li>c. Support wise use of marine resources, including renewable energy, sustainable uses, and infrastructure; and</li> <li>d. Incorporate new knowledge as the basis for management to address changing social, technological, and environmental conditions.</li> </ul>	Conceptual, although the driver was offshore renewable energy (wind turbines)	The plan was mandated by the Massachusetts Ocean Act of 2008
<b>Rhode Island Ocean Special Area Management Plan</b>	<ul style="list-style-type: none"> <li>a. Foster a properly functioning ecosystem;</li> <li>b. Promote and enhance existing uses;</li> <li>c. Encourage marine-based economic development;</li> <li>d. Build a framework for coordinated decision-making.</li> </ul>	Both	Identified at the start of the planning process
<b>Maryland Oyster Management Plan</b>	<ul style="list-style-type: none"> <li>a. An abundant, self-sustaining native oyster population in Chesapeake Bay;</li> <li>b. A private aquaculture industry to complement the wild oyster fishery.</li> </ul>	Conceptual	Identified as part of the plan
<b>St. Kitts and Nevis</b>	<ul style="list-style-type: none"> <li>a. Sustainable recreation and tourism development</li> <li>b. Sustainable fisheries</li> <li>c. Conservation</li> <li>d. Secure transportation</li> </ul>	Both, mainly conceptual, a few operational	Developed by Steering Committee, which included Government reps, Fishers, NGOs, Business reps

<i>Spatial Plan</i>	<i>1. Stated objectives of the plan (paraphrased)</i>	<i>2. Conceptual and/or Operational?</i>	<i>3. Mandated or identified during process?</i>
<b>California Marine Life Protection Act</b>	<ul style="list-style-type: none"> <li>a. To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.</li> <li>b. To help sustain, conserve, and protect marine life populations;</li> <li>c. To improve recreational, educational, and study opportunities;</li> <li>d. To protect marine life habitats for their intrinsic value;</li> <li>e. MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.</li> <li>f. MPAs are designed and managed as a component of a statewide network.</li> </ul>	Conceptual	Mandated in the MLPA
<b>Hawaii Ocean Resources Management Plan</b>	<ul style="list-style-type: none"> <li>a. Careful and appropriate use of the land is required to maintain the diverse array of ecological, social, cultural, and economic benefits we derive from the sea.</li> <li>b. A vibrant and healthy ocean environment is the foundation for the quality of life valued in Hawai‘i and the well-being of its people, now and for generations to come.</li> <li>c. Working together and sharing knowledge, experience, and resources will improve and sustain our efforts to care for the land and sea.</li> </ul>	Conceptual	Identified during the planning process
<b>China Marine Functional Zoning</b>	<ul style="list-style-type: none"> <li>a. Scientifically defining the natural attributes of the sea area;</li> <li>b. Making overall arrangements for the sea area use among various related sectors according to the economic and social development needs;</li> <li>c. Protecting and improving the ecological environment, ensuring the sustainable utilization and promoting the development of marine economy;</li> <li>d. Ensuring the maritime traffic safety;</li> <li>e. Safeguarding the security of national defense and guaranteeing the needs in the military use of the sea.” (SUL Article 11)</li> </ul>	Conceptual, i.e., to balance among multiple uses without specifying outcomes.	Mandated by the SUL but can be modified by Provinces, Autonomous Regions and Municipalities.
<b>Australia National Marine Bioregionalization</b>	<ul style="list-style-type: none"> <li>a. To describe spatial patterns in the benthic and pelagic environments;</li> <li>b. Understanding of the marine environment;</li> <li>c. To infer patterns in the distribution of biodiversity, ecosystem structure, and ecological processes.</li> </ul>	Conceptual	Product of Australian legislation and policy
<b>Great Barrier Reef Marine Park Zoning Plan</b>	<ul style="list-style-type: none"> <li>a. The conservation of the Great Barrier Reef (GBR);</li> <li>b. The regulation of the wise use of the Marine Park so as to protect the GBR while allowing the reasonable use of the GBR Region;</li> <li>c. The regulation of activities that exploit the resources of the GBR Region so as to minimize the effect of those activities on the GBR;</li> <li>d. The reservation of some areas of the GBR for its appreciation and enjoyment by the public; and</li> <li>e. The preservation of some areas of the GBR in its natural state undisturbed by man except for the purposes of scientific research.</li> </ul>	Operational. The document is the primary planning instrument for the conservation and management of the Marine Park	Mandated by the GBR Marine Park Act of 1975

**Table B. Scope**

<i>Spatial Plan</i>	<i>1. All sectors considered?</i>	<i>2. How long did it take? Year started</i>	<i>3. Most demanding steps</i>	<i>4. Planning interval</i>	<i>5. Funding structure</i>	<i>6. Spatial scale of plan</i>	<i>7. Plan &lt; = &gt; ecosystem</i>	<i>8. Implementation scale</i>
<b>Barents Sea, Norway</b>	Yes	3 years, 2003	Unknown	2-year updates	Federal, private, NGOs	1.2 million km <sup>2</sup>	=	= same as plan
<b>German Exclusive Economic Zone in</b>	No, no selected sectors	5.5 years, 2004	Data collection and assessment, report writing	No planning interval for revision	Not stated	North Sea: 28,600 km <sup>2</sup> Baltic Sea: 4,500 km <sup>2</sup>	<	= same as plan
<b>Baltic Sea Action Plan</b>	Yes, all human activities	2 years, 2005	Unknown	Until at least 2021	EU, member-states, private, non-profits	415,266 km <sup>2</sup>	=	= same as plan (by country)
<b>Wadden Sea Plan</b>	Yes	19 years, 1991 (2 <sup>nd</sup> gen)	Ecosystem targets	6 years	Common Wadden Sea Secretariat, 700k € per year	11,000 km <sup>2</sup>	=	= same as plan (by country)
<b>Netherlands</b>	Yes	2 years, 2008 (2 <sup>nd</sup> gen)	Search area for wind energy	Until 2015	Federal government	~ 57,000 km <sup>2</sup>	< North Sea	= same as plan
<b>Belgium Part of the North Sea</b>	Yes, all uses Comprehensive	2 years, 2003	Unknown	NA, no final plan	Belgian Science Policy (Federal office), private, EU	3,600 km <sup>2</sup> Belgian part of the NS	< North Sea	= same as plan
<b>Shetland Isles</b>	All sectors that would require a permit	3-4 years, 2006	Data compilation and synthesis	5 years, with review at 2-3 years	Federal and private £144,000	10,580 km <sup>2</sup>	<	= same as plan

<i>Spatial Plan</i>	<i>1. All sectors considered?</i>	<i>2. How long did it take? Year started</i>	<i>3. Most demanding steps</i>	<i>4. Planning interval</i>	<i>5. Funding structure</i>	<i>6. Spatial scale of plan</i>	<i>7. Plan &lt; = &gt; ecosystem</i>	<i>8. Implementation scale</i>
<b>Canada Oceans Act: ESSIM and Beaufort Sea IOMP</b>	Yes	ESSIM: 10+, 2002; IOMP: 3 yr, 2006; Canada Oceans Act 1997	IOMP: Complex legal context in Beaufort, collection of traditional knowledge	5 years	Federal government; 100 million CAD for all activities related to the Oceans Act	ESSIM: 325,000 km <sup>2</sup> . IOMP: 175,000 km <sup>2</sup>	>	= same as plan, with many provisions for more local community-based actions
<b>Massachusetts OMP</b>	Yes, all uses and sectors	1.5 years, 2008	Public hearings	5-year review	State and private	5,500 km <sup>2</sup>	< LME	= same as plan
<b>Rhode Island Ocean SAMP</b>	Yes	2 years, 2008	Stakeholder engagement	ongoing	Federal and state, \$6.6 million	3,800 km <sup>2</sup>	<	< state and federal waters
<b>Maryland Oyster Management Plan</b>	No	2 years, 2008	Unknown	5+ years	No new funding	> 10,000 km <sup>2</sup>	<	= same as plan
<b>St. Kitts and Nevis</b>	Yes, all major sectors	2 years, 2008	Stakeholder workshops, data development, particularly fisheries data	2 years	USAID, \$700,000	~260 km <sup>2</sup> National coastal waters	< Though it does contain all the coral reef eco-systems of these islands	= same as plan
<b>California MLPA</b>	No	10+ years, 1999 (3 <sup>rd</sup> gen)	Stakeholder engagement, data collection	5 years	State and private: \$19 million over four years	14,347 km <sup>2</sup>	<	< by region
<b>Hawaii ORMP</b>	Yes	1.5 years, 2006	Substantial consultation	30 years, 5-year review	Federal grant	11,671 km <sup>2</sup>	=	< “management units”
<b>China Marine Functional Zoning</b>	Yes, all uses	20 years, 1988	Unknown	15-50 years	Federal and provincial	879,666 km <sup>2</sup> (EEZ)	>	< by region
<b>Australia NMB</b>	Yes	14 years, 1992 (4 <sup>th</sup> gen, 3 years, 2002)	Data collation	Not stated	Federal government	8.5 million km <sup>2</sup> (EEZ)	>	< by region

<i>Spatial Plan</i>	<i>1. All sectors considered?</i>	<i>2. How long did it take? Year started</i>	<i>3. Most demanding steps</i>	<i>4. Planning interval</i>	<i>5. Funding structure</i>	<i>6. Spatial scale of plan</i>	<i>7. Plan &lt; = &gt; ecosystem</i>	<i>8. Implementation scale</i>
<b>Great Barrier Reef Marine Park MPZP</b>	No, selected sectors	29 years, 1975 (2 <sup>nd</sup> gen, 2 yr, 2002)	Response forms from community	5-year planning interval	Federal and state	344,400 km <sup>2</sup>	=	< there are 4 management areas

**Table C. Authority**

<i>Spatial Plan</i>	<i>1. Legal basis for CMSP</i>	<i>2. Level of government driving the Plan</i>	<i>3. Institutional changes</i>	<i>4. Governance arrangements to implement the Plan</i>
<b>Barents Sea, Norway</b>	National government (Storting) endorsed the ecosystem approach	National government, with provincial involvement	None 3 new bodies established in 2006	Government ministries and scientific institutions will implement the plan, 3 new working groups do most of the coordinating
<b>German EEZ</b>	Federal Spatial Planning Act	National government	None	Maritime and Hydrographic Agency is responsible
<b>Baltic Sea Action Plan</b>	Helsinki Convention (HELCOM)	National governments of member countries	None	Implementation is at the national, member state level
<b>Wadden Sea Plan</b>	Relevant EU directives; the Plan is a legally non-binding document.	National ministries responsible for nature protection	None	Decisions are made within the Trilateral Wadden Sea Cooperation
<b>Netherlands</b>	National Government, consistent with EU directives and OSPAR	National government ministries	New National Water Plan	Government ministries will implement the plan with a system of permits
<b>Belgium Part of the North Sea</b>	No legal basis	Belgium Science Policy	None, no changes	Plan not implemented
<b>Shetland Isles</b>	Marine [Scotland] Act in 2010	Government of Scotland	None	Planning and permit cooperation between government and non-government organizations
<b>Canada Oceans Act: ESSIM Beaufort Sea IOMP</b>	Canada Oceans Act 1997	National government; Minister of Fisheries and Oceans	None, however a new sector of DFO was created to implement the Oceans Act	Implementation relies on the cooperation of over 20 federal departments and agencies to use their existing powers and resources.
<b>Massachusetts OMP</b>	Massachusetts Ocean Act of 2008	Massachusetts state government	None	EEA Ocean Team is charged with implementation
<b>Rhode Island Ocean SAMP</b>	Rhode Island Coastal Program (adopted by NOAA)	State: RI Coastal Resources Management Council	None	CRMC will apply to NOAA for extended jurisdiction for the entire SAMP (state and federal)
<b>Maryland Oyster Management Plan</b>	State legislation	State: Governor's office and DNR	None	DNR leasing and enforcement
<b>St. Kitts and Nevis</b>	None, the plan was developed by an NGO	International aid agency, national government	None	There no formal arrangement to implement. The required arrangements



<i>Spatial Plan</i>	<i>1. Legal basis for CMSP</i>	<i>2. Level of government driving the Plan</i>	<i>3. Institutional changes</i>	<i>4. Governance arrangements to implement the Plan</i>
		steering committee, Ministry of Agriculture and Marine Resources (St. Kitts) and Ministry of Agriculture and Fisheries (Nevis)		and policies were identified during the process.
<b>California Marine Life Protection Act</b>	State legislation: CA MLPA 1999	State: DFG and Fish and Game Commission	DFG focus on ecosystem-based management, creation of MPA Monitoring Enterprise	Partnerships between MOU, OPC, DFG, and state parks
<b>Hawaii ORMP</b>	Statewide plan mandated by Hawai'i Revised Statutes	State Coastal Zone Management	None	Coordination and implementation by the Hawai'i Coastal Zone Management Program
<b>China Marine Functional Zoning</b>	Law on the Management of Sea Area Use	National	Relatively little change was required	Plan development by Provinces and National approval
<b>Australia NMB</b>	Australia's Ocean Policy of 1998	National	None	Structure and process associated with Australia's Ocean Policy
<b>Great Barrier Reef MPZP</b>	GBRMP Act 1975	Federal government	None, unknown changes in agencies	Day-to-day management by Queensland agencies

**Table D. Data**

<i><b>1. Data type</b></i>	<i><b>Quantitative time series</b></i>	<i><b>Quantitative “snapshot”</b></i>	<i><b>Qualitative information</b></i>	<i><b>Expert opinion</b></i>	<i><b>Not available</b></i>	<i><b>Not applicable</b></i>
<b>Physical</b>	1,2,4,5,6,8A,8B,9,16,17	1,4,9,10,12,13,16,17	1,2,4,6,12, 13,14,15,16,17	1,4,8A,8B,10,12,13,14,16,17		7
<b>Geological</b>	1,2,4,6,8A,8B	1,4,5,9,10,12,13,16,	1,2,4,6,12, 13,10,14,15,16	1,4,8A,8B,10,12,13,14,16		7
<b>Chemical</b>	1,2,3,4,5,6,8A,8B,16	1,4,13,16	1,2,4,6,12, 15,16	1,4,8A,8B,10,12,16		7,9
<b>Biological</b>	1,2,3,4,5,6,8A,8B,9,10,11,16,17	1,4,9,10,12,13,16,17	1,2,4,6,9,10,13,14,15,16,17	1,4,8A,8B,9,10,12,13,14,16,17		7
<b>Economic</b>	1,4,5,6,8A,8B,11,17	1,4,9,10,12, 13,17	1,4,6,8A,8B,9,10,12,13,14,15,17	1,4,8A,8B,9,10,12,13,14,17		7,16
<b>Social</b>	1,4,5,6,8A,8B,11,17	1,4,10,12,17	1,4,6,8A,8B,9,10,12,13,14,15,17	1,4,8A,8B,9,10,12,13,14,17		7,16

<i><b>Spatial Plan</b></i>	<i><b>2. Criteria for data inclusion</b></i>	<i><b>3. Standards for expert opinion and qualitative information</b></i>
<b>1. Barents Sea, Norway</b>	No clear criteria	No particular standards were set
<b>2. German EEZ</b>	Scoping by authorities and associations	Unknown
<b>3. Baltic Sea Action Plan</b>	Best available techniques	Unknown
<b>4. Wadden Sea Plan</b>	Data collection guided by trilateral targets	Expert judgment
<b>5. Netherlands</b>	National Oceanographic Data Committee	Expert agreement and stakeholder acceptance
<b>6. Belgium Part of the North Sea</b>	Methods used were readily ascertainable	Available literature and expert judgment
<b>7. Shetland Isles</b>	This is not explicitly addressed in the plan	This was not apparent in the plan documentation

<i>Spatial Plan</i>	<i>2. Criteria for data inclusion</i>	<i>3. Standards for expert opinion and qualitative information</i>
<b>8A. Canada Oceans Act ESSIM</b> <b>8B. Canada Oceans Act Beaufort Sea IOMP</b>	ESSIM: Protocols for peer review of all ecological data and analyses; Beaufort Sea IOMP: Quality assurance of narrative data	All information was reviewed according to the standards and protocols found on the CSAS website for peer review, including expert opinion;
<b>9. Massachusetts OMP</b>	MORIS was the source of data	Users encouraged to report errors
<b>10. Rhode Island Ocean SAMP</b>	Data were peer reviewed	Peer review and public comment
<b>11. Maryland Oyster Management Plan</b>	No criteria apparent	Unknown
<b>12. St. Kitts and Nevis</b>	Steering Committee reviewed data	Internal technical review, expert review, committee review, stakeholder comment
<b>13. California MLPA</b>	Very clear criteria for data inclusion. Data sets were reviewed by the Science Advisory Team (SAT)	Quality standards were provided by the SAT.
<b>14. Hawaii ORMP</b>	NA	NA
<b>15. China Marine Functional Zoning</b>	Not a systematic data collection exercise	Not reported
<b>16. Australia NMB</b>	Details of the data set are available in the IMCRA 4.0 plan	Peer review and public comment
<b>17. Great Barrier Reef MPZP</b>	Yes, there is a set of Biophysical Operating Principles (BOPs)	Best available knowledge of the GBR ecosystem

**Table E. Participants**

<i>Spatial Plan</i>	<i>1. What entities are part of the plan?</i>	<i>2. Did they have equal status?</i>	<i>3. Were stakeholders including in planning?</i>	<i>4. Was there public participation?</i>	<i>5. External social and economic data?</i>	<i>6. How were stakeholders defined?</i>	<i>7. In which parts did stakeholders participate?</i>	<i>8. What form was their participation?</i>
<b>Barents Sea, Norway</b>	National ministries, provinces, Sami parliament	No, but roles were clearly defined	Yes, ample opportunity for stakeholder involvement	Yes, public reviews; written comments	Extensive economic and social data gathering	Stakeholders were self-selected	Scientific basis, assessment of impacts, integration	Public comment and written reviews.
<b>German Exclusive Economic Zone</b>	National ministries	It does not appear so	Yes, two participation rounds	Yes, in two participation rounds	Not apparently included	Stakeholders are not defined	Review of reports and draft plan	Oral and written statements
<b>Baltic Sea Action Plan</b>	Government & regional organizations, business, academia, NGOs	No, it does not appear that they had equal status	Yes, at two stakeholder conferences in 2006 and 2007	It does not appear that there was public participation in the planning	Larger-scale economic and social data not apparently used.	National authorities, politicians, business, academia, NGOs	Annual stakeholder conferences	As conference participants
<b>Wadden Sea Plan</b>	Government authorities	Consultation process for the final draft	The Wadden Sea Forum was established in 2002	Draft plan was open to public comment	Unknown	All organizations in or near to the WS	Unknown	Delivery of items to be covered plus comments on final draft.
<b>Netherlands</b>	National Ministries	No, but roles were clearly defined	Yes, there was an extensive stakeholder process	Public comment and public meetings	Extensive economic and social data gathering	Stakeholders were government ministries	Oral and written comments, advisory teams	Oral and written comments, advisory teams

<i>Spatial Plan</i>	<i>1. What entities are part of the plan?</i>	<i>2. Did they have equal status?</i>	<i>3. Were stakeholders including in planning?</i>	<i>4. Was there public participation?</i>	<i>5. External social and economic data?</i>	<i>6. How were stakeholders defined?</i>	<i>7. In which parts did stakeholders participate?</i>	<i>8. What form was their participation?</i>
<b>Belgium Part of the North Sea</b>	Primarily academia and a consulting firm	Interdisciplinary team of experts, working together	Yes, to a limited extent	No public participation at this stage	The plan evaluates socio-economic impacts	Representatives of all activities in the BPNS	Stakeholder workshop was held in 2005, with 45 participants	Presentations followed by interactive discussion on “decision rules”
<b>Shetland Isles</b>	Government and non-government groups	Yes	Yes, as advisors to the Scottish Sustainable Marine Environmental Initiative	Yes, public comments were invited at several points	There was very little quantitative data displayed in the process	Not defined, all were invited to participate	Development of plan by local steering group, and public comments by public	Public comment through verbal and written statements; interviews with fishermen
<b>Canada Oceans Act: ESSIM and Beaufort Sea IOMP</b>	All sectors and stakeholders	No, federal and provincial agencies retain authority	Yes	Yes	Economic and social data were used as available	All ocean sectors and government agencies	Development of vision, goals, and strategic direction. Review of plan.	Forums and Stakeholder Advisory Council
<b>Massachusetts Ocean Management Plan</b>	State and federal agencies, tribal government, Mass Ocean Partnership	All of the entities had input to the plan via the Ocean Team	Yes,	18 open public hearings, written comments	Unknown	There were six stakeholder working groups	Providing input to the development of the plan.	Working groups and public hearings; MOP was also included in planning
<b>Rhode Island Ocean Special Area Management Plan</b>	CRMC, DEM, URI, BOEM, NOAA, FWS, ACE, Coast Guard	CRMC was lead; BEOM and ACE federal partners	Yes, there is a complete list of stake-holders	Yes	Significant amounts of socio-economic data	By application	All public meetings, and learning events; review of all chapters	Regular monthly meetings on key topics

<i>Spatial Plan</i>	<i>1. What entities are part of the plan?</i>	<i>2. Did they have equal status?</i>	<i>3. Were stakeholders including in planning?</i>	<i>4. Was there public participation?</i>	<i>5. External social and economic data?</i>	<i>6. How were stakeholders defined?</i>	<i>7. In which parts did stakeholders participate?</i>	<i>8. What form was their participation?</i>
<b>Maryland Oyster Management Plan</b>	State agencies and science advisors	No	Yes	No	Unknown	Unknown	Meetings	Public comment
<b>St. Kitts &amp; Nevis</b>	Government departments, dive boat operators, National Trust. Fishers Co-ops	Yes	Yes	Yes	Significant economic and social data gathering	Via govt. agencies with authority to manage components of marine areas and local	Development of goals and data, review of plan	Steering Committee and public workshops
<b>California Marine Life Protection Act</b>	State and federal agencies, scientists, stakeholders	No, but roles were clearly defined	Extensive stakeholder involvement	Yes	Emphasis on fisheries data, areas of importance to fishing interests	Formal representative committees, nominated and approved	Meetings, stakeholders came up with regional goals and objectives and design of plan alternatives	Marine spatial plan design alternatives
<b>Hawaii Ocean Resources Management Plan</b>	State and federal agencies, university, county, non-profits	No, federal, state, and county government agencies had higher status	Yes	Yes	Not	NA	Public listening sessions, community conversations, OP, HOCC and MACZAC meetings, workshops, and agency reviews.	Public listening sessions, community conversations, OP, HOCC and MACZAC meetings, workshops, and agency reviews.

<i>Spatial Plan</i>	<i>1. What entities are part of the plan?</i>	<i>2. Did they have equal status?</i>	<i>3. Were stakeholders including in planning?</i>	<i>4. Was there public participation?</i>	<i>5. External social and economic data?</i>	<i>6. How were stakeholders defined?</i>	<i>7. In which parts did stakeholders participate?</i>	<i>8. What form was their participation?</i>
<b>China Marine Functional Zoning</b>	National government, provinces, autonomous regions, and municipalities	No, government agencies have a hierarchical status	Apparently not	No	So far the process is opaque to outside reviewers	Users were not part of the process	Apparently none	If any, it was through application process and paying fees
<b>Australia National Marine Bioregionalization</b>	CSIRO, National Oceans Office, museums, scientists	NA	NA	NA	NA	NA	NA	NA
<b>Great Barrier Reef Marine Park Zoning Plan</b>	Politicians, government agencies, scientists, conservation groups, local councils, stakeholders	No, the GBRMPA maintained authority and sought advice	Yes, the GBRMPA included “affected groups” in the planning process	Yes, there were two phases of Community Participation	Large extent. Submissions included detailed social and cultural attributes	GBRMPA actively sought comment from all “affected groups”	In the two Community Participation phases	Formal meetings, phone calls, and submission of response forms

**Table F. Tools and Decision Support**

<i>Spatial Plan</i>	<i>1. Which decision-support tools?</i>	<i>2. How are trade-offs framed?</i>	<i>3. How are trade-offs analyzed?</i>	<i>4. Are economic components considered?</i>	<i>5. Are uncertainty and risk considered?</i>	<i>6. Are decision tools dynamic?</i>	<i>7. Are tools updated based on monitoring?</i>	<i>8. How are conflicts resolved?</i>	<i>9. What mechanisms are used?</i>
<b>Barents Sea, Norway</b>	Negotiated agreement	This is a longer-term goal	Qualitative analysis	Economic components are implicit	Not yet, but this is recognized as a need	Decision-making is not yet formalized	Yes, a resounding positive on this.	Negotiated agreement	Designation of zones for use
<b>The German Exclusive Economic Zone</b>	No explicit tools	Priority uses designated	Other uses prohibited if incompatible	Ecosystem services are not mentioned	Not explicitly except for data gaps	Not explicitly	Not explicitly stated in the plan	Not addressed in the plan	Priority uses designated
<b>Baltic Sea Action Plan</b>	MSP principles, GIS	Unknown	Cost-benefit and cost-efficiency analyses	Ecosystem goods and services	Yes, risk assessment and “aware” of uncertainty	Not explicitly	Yes, monitoring will inform management	Negotiation, mediation, tribunal, courts	Best available practices
<b>Wadden Sea Plan</b>	Expert groups	Not addressed	Best expert judgment	No, only by the WSF	Not explicitly	Yes	Yes	By the Wadden Sea Board	Zoning regulations
<b>Netherlands</b>	No official tools used	Criteria for assessing new permits	Qualitative and quantitative analysis	Yes	No, whether a plan was likely to meet its objectives or not.	EIAs are still required for new permits	Permitting process will allow updating over time	Permits, contracting, and negotiation	Permits in dominant use zones
<b>Belgium Part of the North Sea</b>	GIS layers and structural maps	3 key values determine the suitability of each use	Analysis of six scenarios for future management of the BPNS	Yes, non-market components are included (e.g. landscape)	Risks associated with marine activities and storms were considered	NA, but there is recognition that the plan should be dynamic	NA, but there is recognition that continuous monitoring is needed	Conflict resolution is not addressed in the plan	NA, the methods are left to the government to decide



<i>Spatial Plan</i>	<i>1. Which decision-support tools?</i>	<i>2. How are trade-offs framed?</i>	<i>3. How are trade-offs analyzed?</i>	<i>4. Are economic components considered?</i>	<i>5. Are uncertainty and risk considered?</i>	<i>6. Are decision tools dynamic?</i>	<i>7. Are tools updated based on monitoring?</i>	<i>8. How are conflicts resolved?</i>	<i>9. What mechanisms are used?</i>
<b>Shetland Isles</b>	Marine Atlas	Not addressed	By managers who make permitting decisions	Not explicitly, but these values are considered in permitting	Risk is recognized in a qualitative sense but not quantified	No, the Marine Atlas is a snapshot of current use	Not explicitly	Not addressed	Spatial mapping; permitting and licensing
<b>Canada Oceans Act: ESSIM and Beaufort Sea IOMP</b>	GIS-based planning tools with geo-referenced data on human activities	Next round of planning; Approaches still being discussed	Next round of planning; Still being discussed;	Yes; non-market values are recognized but there is no framework for bringing them into trade-off analyses	Focus on uncertainty in data sources with moderate attention to uncertainty in future states of nature.	Not at this point	Yes, there will be regular performance evaluation	ESSIM: Multi-sector forums and through a facilitator. IOMP: Still being discussed	Cooperation among government agencies
<b>Massachusetts Ocean Management Plan</b>	GIS, compatibility assessments	Citing & performance standards	Public benefit determination is required	Identify and minimize potential economic impacts	Proponents required to demonstrate that damage is avoided	Not explicitly	Not the decision support tools, per se	Permitting that is consistent with the ocean plan	
<b>Rhode Island Ocean SAMP</b>	TDI, ESVI	Public process	Public process	In some cases	Not explicitly	Yes	Yes	Discussion and dialogue	Leasing
<b>Maryland Oyster Management Plan</b>	GIS	Fishery impacts	No formal analysis	Unknown	No	No	Monitoring will be applied to all oyster restoration projects	Unknown	Zoning
<b>St. Kitts &amp; Nevis</b>	Mar-Zone	There are spatial goals for each of the four main sectors	Zoning scenarios are developed to jointly meet all goals as best as possible	Economic components are implicit in fisheries and tourism data and targets	No	Yes, moderately, though not in real time	Not yet	Steering Committee	Analysis of Marzone outputs and then negotiation

<i>Spatial Plan</i>	<i>1. Which decision-support tools?</i>	<i>2. How are trade-offs framed?</i>	<i>3. How are trade-offs analyzed?</i>	<i>4. Are economic components considered?</i>	<i>5. Are uncertainty and risk considered?</i>	<i>6. Are decision tools dynamic?</i>	<i>7. Are tools updated based on monitoring?</i>	<i>8. How are conflicts resolved?</i>	<i>9. What mechanisms are used?</i>
<b>California MLPA</b>	MarineMap	Through the SAT	Informally, and bioeconomic models	In some cases, but informally	Informally discussed	Not with respect to future	Not really	SAT and public meetings	Marine-Map
<b>Hawaii ORMP</b>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>China Marine Functional Zoning</b>	Unclear how any tools were used	No formal mechanism identified	At the provincial level with emphasis on fees paid	No, although the law recognizes ecological value	No formal recognition of uncertainty and risk	No	Not explicitly stated	The owner of a permit is able to appeal and to sue	Market based mechanisms are used
<b>Australia NMB</b>	No decisions are made	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Great Barrier Reef MPZP</b>	GIS, Marxan, etc.	Framed by BOPs	Cost-benefit analysis	Yes, non-use values considered	Not explicitly	Not explicitly	Yes, there is monitoring of the reef	Unknown, not addressed	Zoning plan and permits

**Table G. Monitoring and Performance Measures**

<i>Spatial Plan</i>	<i>1. What are the products of the spatial plan?</i>	<i>2. What constitutes success of the plan?</i>	<i>3. Are there formal metrics of success?</i>	<i>4. Does the plan incorporate monitoring?</i>	<i>5. Is adaptive management an explicit component?</i>	<i>6. Is there feedback from monitoring to management?</i>	<i>7. Are management responses to monitoring rule based?</i>
<b>Barents Sea, Norway</b>	Report to the Storting	Meeting the objectives	No, except for 3 target areas	Yes, it instigates new monitoring	Yes, it envisions a 2-year cycle	Yes, feedback will occur on a 2-year cycle	No, responses are not formally rule based
<b>The German EEZ</b>	Legal enactment	Legally binding plan	No	Yes, impact monitoring	No	No	No
<b>Baltic Sea Action Plan</b>	Creation of marine spatial plans	Good environmental status by 2021	Yes, there are four categories of metrics	Yes, the entire plan incorporates monitoring	Yes, the plan will pursue adaptive management	It is not explicitly stated, but yes.	No
<b>Wadden Sea Plan</b>	National policies and regulations	If Targets are achieved	No quantified metrics	Yes, Trilateral Monitoring	Yes	Yes, monitoring data are the basis for QSRs	Partly, there is a general response to monitoring
<b>Netherlands</b>	A national spatial plan	If Targets are achieved	Yes, target areas for renewable energy and sand	Yes, a “Water-balans” will be made	No, passive adaptive management only	Feedback from monitoring will be incorporated in the next 6- year plan.	No. It will become part of the data for next plan.
<b>Belgium Part of the North Sea</b>	A spatial planning structure	Support by government	No, this plan does not have targets	No, monitoring is not part of this plan	No, adaptive management is not part of this plan	NA	NA
<b>Shetland Isles</b>	The Plan with a Delivery Plan, a Marine Atlas, a Strategic Environmental Assessment	Achieving the objectives	Performance indicators have been identified but targets have not been set	Yes, significant marine monitoring is underway; gaps are identified in the Plan	Implied, the plan calls for revisions based on new information in 2 to 3 years	Not formally	No
<b>Canada Oceans Act: ESSIM and Beaufort Sea IOMP</b>	Development of the plan	Implementation constitutes success	No	Yes, uses existing monitoring plans	No, but adaptive management is a core component of DFOs	Yes, through the regular review	No

<i>Spatial Plan</i>	<i>1. What are the products of the spatial plan?</i>	<i>2. What constitutes success of the plan?</i>	<i>3. Are there formal metrics of success?</i>	<i>4. Does the plan incorporate monitoring?</i>	<i>5. Is adaptive management an explicit component?</i>	<i>6. Is there feedback from monitoring to management?</i>	<i>7. Are management responses to monitoring rule based?</i>
					Ecosystem Approach		
<b>Massachusetts OMP</b>	Unknown	Unknown	Performance indicators	Yes	Yes	Yes	Unknown
<b>Rhode Island Ocean SAMP</b>	SAMP is a regulatory document	Application of the policies	Yes, Orders of Out-comes tool	Yes	Yes, the SAMP is an adaptive tool	Yes	No, there are no formal rules
<b>Maryland Oyster Management Plan</b>	4 zones for different uses	Restore 20 Bay tributaries with oysters by 2025	No, but they are under development by 15 March 2011	Yes, common monitoring of all oyster restoration projects in the Bay	5-year review of plan	Unknown	Unknown
<b>St. Kitts &amp; Nevis</b>	Draft zoning map & policy analysis	Implementation of at least some zones	No	Not yet	Not Yet	No	No
<b>California MLPA</b>	3 different types of MPAs	Accepted and implemented MPAs	Indicators and priority efforts	Yes	Yes, 5-year review of MPAs	Yes	Still under development
<b>Hawaii ORMP</b>	The plan document	Meeting the management goals	Results indicators	Yes, monitoring of progress	Yes	Yes, the ORMP is scheduled for revision	No, unstructured at present
<b>China Marine Functional Zoning</b>	Provincial plans	Getting the plan in place	None adopted	Not explicitly, monitoring is indirect	No	No	No
<b>Australia NMB</b>	Data sets, reports and GIS maps	If it is used for planning	No	No monitoring	No management	NA	NA
<b>Great Barrier Reef MPZP</b>	GBRMP Zoning Plan	Meeting the stated objectives	No indicators or targets are in the plan	Continue to monitor the GBR	No, it is not an explicit component	No, it is not an explicit component	NA

## APPENDIX 4. DECISION SUPPORT TOOLS PRIMER

In this section we construct a typology of decision-making frameworks and decision support tools. This typology ranges from comprehensive benefit-cost analysis implemented with a variety of computer based analysis tools to negotiated outcomes from a descriptive set of data.

### A. Benefit-cost analysis of alternative spatial plans, policies or resource-use mechanisms

Benefit cost analysis (BCA) is a decision support framework that provides a structured evaluation of alternative plans or strategies (policies) in monetary units. Using the theoretical foundation of welfare economics, BCA involves the assessment of the net benefits of alternative plans or actions relative to a baseline plan or policy framework. BCA can evaluate alternative strategies over time and space and provide a description of who is affected (which party benefits and which group loses as a result of the policy change). BCA examines alternatives by comparing the net benefits in common measurement units. In addition, BCA can incorporate market and non-market aspects. In the case of CMSP, many elements will be non-market in nature, as information about their economic value is not revealed through markets (e.g. recreation, aesthetics, values associated with threatened species, etc.).

BCA, in principle, includes values associated with all individuals who are affected by the change in policy or strategy and thus provides a broad based set of evaluations of alternative actions. In practice, however, benefits and costs are often computed for the groups most likely to be significantly impacted by the decision (The decision on the groups for which to quantify benefits should be made in consultation with stakeholders and policymakers). Partial BCA frameworks can provide important information to policymakers. For example, a likely scenario is that the net benefits (benefits minus costs) can be positive even when many of the benefits are not quantified. In a case for which that is not true, analysts can get important information on what the magnitude of the omitted benefits would need to be to make the decision have positive net benefits.

While BCAs can provide insights into the benefits and costs of alternate plans and policies, there are also several limitations associated with this approach. The most notable of these is the need for causal linkages between biological and economic systems that inform the (marginal) analysis required for benefit-cost analysis. There are often gaps in knowledge of relationships between human actions (e.g. harvest rates), policies, biological populations and ecosystem services. (The same critique is made in evaluating environmental/public health rulemaking, for which there is a significant amount of uncertainty on the nature of the dose-response curves.) Some of these concerns can be alleviated by the use of expert opinion and other approaches, but the outcomes of the analyses will be limited by the lack of knowledge. These key uncertainties, however will most likely be highlighted in the process of doing a BCA and can help guide future research efforts.

Another limitation that can arise in benefit cost analysis is that information on economic values is often unavailable. In particular, economic values of nonmarket goods and services, or ecosystem services, can be difficult, and/or expensive to measure. In some cases analysts have used value estimates from other regions or for similar nonmarket goods and services (referred to as “benefits transfer”). These may be poor approximations of the actual

nonmarket values in that specific place and context and caution is in order when using them to make a final decision. Calculating the net benefits with these transferred values, however, can provide data on the potential relative magnitudes of the benefit and costs and thus are still useful for informing trade-off analysis.

#### B. Cost Effectiveness Analysis

Cost effectiveness analysis (CEA) is a mechanism to determine the least cost way to achieve a pre-determined objective, such as some percentage of areas set-aside as marine reserves. CEA can be used to present tradeoffs across various levels of an objective by varying the target level (e.g. population of a threatened species), and calculating the costs of meeting the different target levels. These costs and target levels are the basis for generating a trade-off frontier that describes the (least) cost of achieving a range of environmental and/or social targets. In this way, CEA illustrates the tradeoffs in terms of costs of achieving alternate target levels. CEA does not suggest a “best” combination of costs and environmental outcomes and leaves the choice to the decision making process. However, the cost frontier can provide useful insights into the implications of alternative environmental targets. The analysis can also be extended to consider multiple environmental goods.

While CEA can be used to develop cost or tradeoff frontiers, the choice of the level of the objective or the preferred location on the trade-off frontier needs to be specified externally or chosen with some other process (potentially including stakeholder or expert evaluation as discussed below).

#### C. Economic Impact Analysis (EIA)

EIA is a commonly used decision support tool that provides descriptions of the impact of alternative strategies, policies or plans on economic activity (regional employment levels, regional economic activity levels, job, etc.). Economic impact analysis focuses on flows of economic activity or measures of employment (jobs) and thus does not capture net economic benefits. For example, expansion of economic activity may also generate adverse effects (pollution, etc.) that are not included in the calculations. In general, economic activity does not equal economic benefit. Nevertheless, EIA is a widely used tool to examine the impacts of policy change on traditionally measured economic activities in a region and can provide easily understood information to policymakers.

#### D. Stakeholder evaluation and negotiation – informal BCA.

Formal or informal stakeholder evaluation and negotiation systems can be thought of as an informal approach to BCA. Evaluation of options or plans by stakeholders allows for the values and positions of the stakeholders to be reflected in the determination of spatial plans. For example, many of the spatial plans in Europe rely on planning principles to obtain negotiated agreement among affected groups, informed by GIS maps. Stakeholder processes may also be used to assess trade-off curves or cost frontiers but all relevant values may not be reflected in this process either.

One limitation with stakeholder processes is that there is no guarantee that the relevant values (benefit and costs) have been systematically examined in such a process. For example, research has shown that stakeholder processes in U.S. commercial fisheries management, which involves voluntary participation, often draw individuals with viewpoints at the tails of the distribution (Turner and Weninger 2005). Poorly mediated stakeholder processes also can be dominated by influential groups, such as large industry.

#### E. Expert evaluation – informal CBA

Expert evaluation of options can also be viewed as an informal approach to trade-off analysis in that the experts play the role of assessing the outcomes of the options and placing value judgments on the merits of the various options. Multi-attribute analysis (MAUT) is a formal decision-theoretic approach that uses expert judgments, for example, to develop the relative weights to place on different benefits and costs (Holland et al. 2010). In MAUT, however, the beneficial impacts and costs associated with the CMSP are still required. The difference between BCA and MAUT is that rather than using economic prices/values as the weights to put on each benefit and cost, the experts assign the weights.

Informal approaches are also possible where expert judgment is used to develop a ranking of the benefit and costs. As in the case of stakeholder evaluation, experts may not systematically assess or reflect all relevant values nor will they necessarily be able to assess the tradeoffs in a manner consistent with BCA. Formal methods to evaluate expert judgment processes have been used in invasive species management (Finnoff et al) and in understanding the relative impacts across the ocean (Halpern et al.).

#### F. Mixed methods

Combinations of the methods and frameworks outlined above can be used in decision making processes. For example, stakeholder evaluation and negotiation can be informed by simulation models, CEA or tradeoff curves. Even in the case of BCA, a governance structure is required to evaluate the analysis and choose from the alternatives – which may or may not be the alternative with the highest net benefit.