Monitoring and Evaluation of Spatially Managed Areas

APPLICATION OF THE MESMA FRAMEWORK.

CASE STUDY: BELGIAN PART OF THE NORTH SEA

ILVO MEDEDELING nr 138

september 2013

Ellen Pecceu (1)
Kris Hostens (1)
Jan Vanaverbeke (2)
Marijn Rabaut (2)

(1) Institute for Agricultural and Fisheries Research
(2) Ghent University, Biology Department, Marine Biology Research Group

Application of the MESMA Framework.

Case Study: Belgian Part of the North Sea

Ellen PECCEU
Institute for Agricultural and Fisheries Research
Animal Sciences Unit
Bio-Environmental Research
Ankerstraat 1, 8400 Ostend, Belgium

Kris HOSTENS
Institute for Agricultural and Fisheries Research
Animal Sciences Unit
Bio-Environmental Research
Ankerstraat 1, 8400 Ostend, Belgium

Jan VANAVERBEKE
Ghent University
Biology Department
Marine Biology Research Group
Krijgslaan 281 (S8), 9000 Gent, Belgium

Marijn RABAUT
Ghent University
Biology Department
Marine Biology Research Group
Krijgslaan 281 (S8), 9000 Gent, Belgium

ILVO MEDEDELING nr 138

september 2013

ISSN 1784-3197

Wettelijk Depot: D/2013/10.970/138

Grant Agreement number: 226661
Project acronym: MESMA
Project title: Monitoring and Evaluation of Spatially Managed Areas
Funding Scheme: Collaborative project
Project coordination: IMARES, IJmuiden, the Netherlands

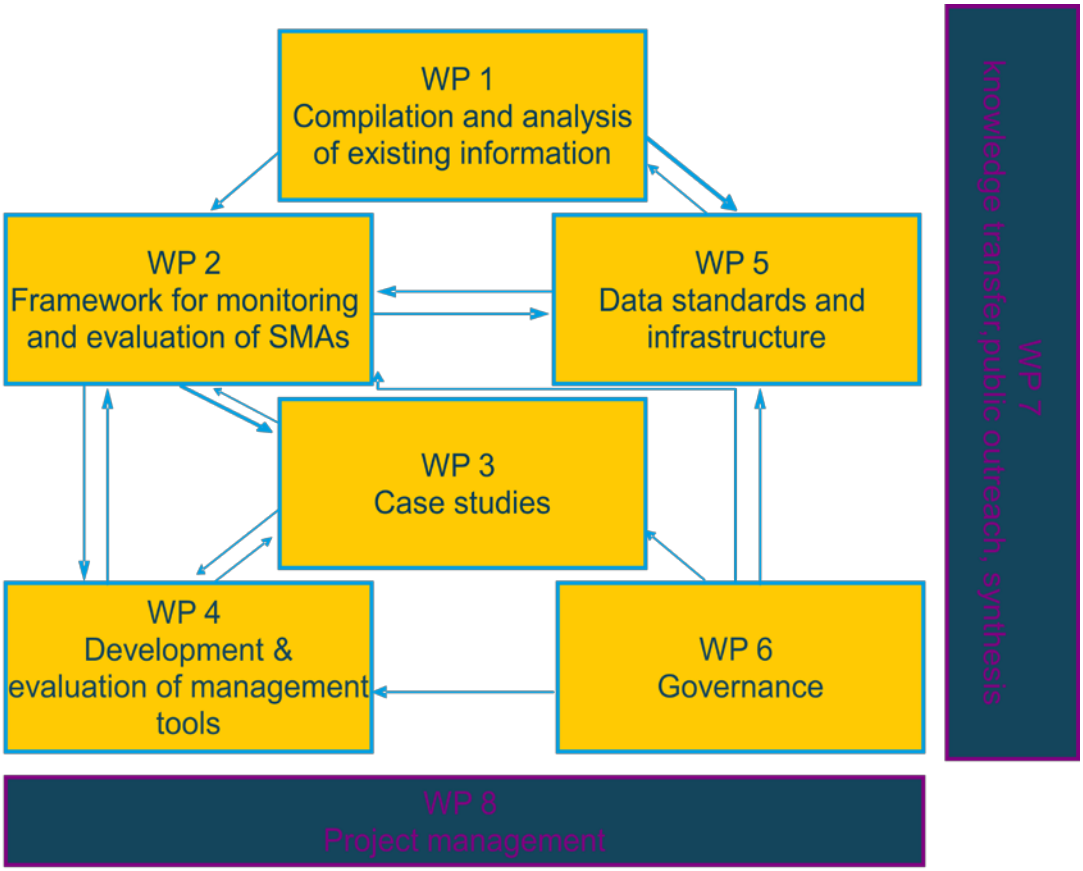
Acknowledgements
This work was funded by the EU-FP7 project
"Monitoring and Evaluation of Spatially Managed Areas - MESMA"
(Grant Agreement number 226661).

TABLE OF CONTENTS

THE MESMA PROJECT

MESMA (Monitoring and Evaluation of Spatially Managed Areas, 2009-2013) is a 4-year European FP7 project and the main tasks are information analysis, the development of a generic framework, the testing and evaluation of this framework through case-studies and the development of management tools that contribute to the sustainable use of European seas.

All these actions are tackled in different work packages (WPs)



This report is part of work package 3, case studies. This WP aims to test the MESMA concepts, strategies and methodologies in a coherent way using newly developed case studies (and sub case studies) representing the different geographical regions of the EU marine waters, existing human pressures, spatial claims and representative habitats. The comparison of many human activities in the different regions will provide a better insight on the full scope of the methodologies required to enhance a good EU-policy instrument for the Monitoring and Evaluation of the Spatially Managed Areas. The case studies will further be used to assess how balanced governance can be achieved by an analysis of the potential of different incentives to address conflicts between top-down and bottom-up priorities.

The MESMA case studies will contribute to the general aim of identification of best practices in spatial management aimed at implementing ecosystem-based management and reducing the negative impacts of human activities. The selected case studies are:

1) The Southern North Sea Case study which consist of 4 sub case studies:

   a. **The BPNS**

b. Skaggerak

c. Dogger Bank

d. Wadden Sea

2) The Pentland Firth and Orkney Waters Case study

3) The Barents Sea Case Study

4) The Celtic Sea Case Study

5) The Basque country (SE Bay of Biscay) Continental Shelf Case Study

6) The Strait of Sicily Case Study

7) The Inner Ionian Archipelago – Patraikos and Korinthiakos Gulfs Case Study

8) The Black Sea Case Study

9) The Baltic Sea Case Study

In the Belgian case study, the MESMA framework/tools were used to analyze and evaluate the Belgian marine policy.

There is no integrated spatial management yet, so we used the existing sectoral plans that are in use in the area. Because of the lack of SMART operational objectives in the majority of the plans, we also used the document "Description of the Good Environmental Status and the settlement of the environmental goals for Belgian Marine Waters[1]". This document is not really a plan in *sensu strictu* but it sets clear environmental objectives to obtain GES. In the WP2-framework test, we particularly focused on answering the question: "Is it possible to obtain a Good Environmental Status in the SAC "Vlaamse Banken" without additional management measures?"

A risk analysis was executed for each of these environmental goals in the SAC "Vlaamse Banken".

In the last steps of the framework, we give some recommendations for future management.

More information can be found on www. MESMA.org.

[1] In duth: "Omschrijving van Goede Milieutoestand en vaststelling van Milieudoelen voor de Belgische mariene wateren (2012)" http://www.health.belgium.be/eportal/Environment/Inspectionandenvironmentalrigh/Environmentalrights/PublicConsultations/MMEvalStateObj/index.htm?&fodnlang=nl

THE APPLICATION OF THE GENERIC FRAMEWORK (GENERAL)

The rationale of the developed framework is outlined in D2.1. It is essential that this document is used in conjunction with this manual. It provides further details as well as key references for the information drafted in this deliverable. The preparatory work and the sequence of steps and related tasks are described in detail in this deliverable.

Before starting with the actual assessment, each case study should describe the way in which the MESMA framework will be applied. For instance, in some cases the single steps are processed, while in other cases the framework will be used to evaluate the process of implementing current spatial management plans. Thus each case study should outline how the framework is going to be used and what the expected outcomes are. Each step gives clear guidance on suggested methods and tools to be used to conduct the respective analysis under the single steps.

In Figure 1, the practical implementation of each framework step is described, taking into account data availability and the related variation of activities under each task. Underneath each step a number of actions are defined based on the results of the WP2 workshops. Guidance has been provided to reflect the data available; actions are described with clear guidance on the methods and tools to be used where a conclusion has to be drawn or a map has to be created from GIS based information, expert knowledge and/or qualitative information.

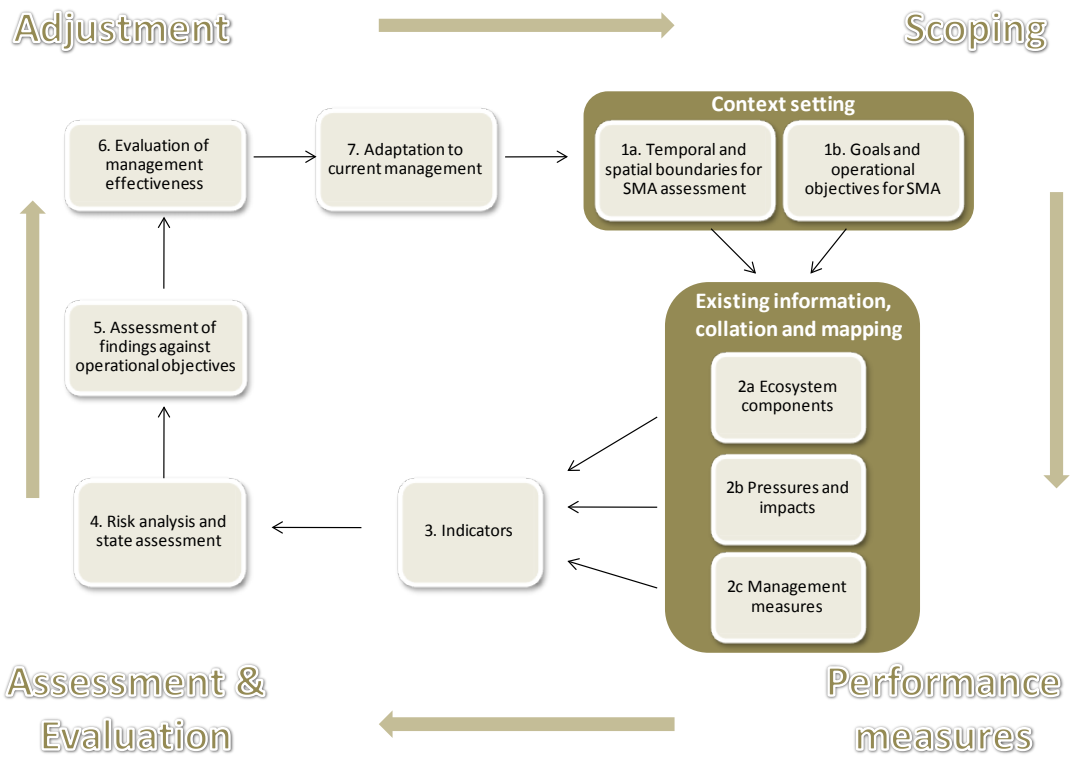


Figure 1. Proposed MESMA framework outlined in detail in D2.1.

WHAT CAN THE MESMA FRAMEWORK DELIVER FOR THE CASE STUDIES?

With the help of a few standardised questions, each case study can assess how the MESMA framework is used for the particular case and what the expected outcomes are:

i) Give a brief (150 words) description of the case study, highlighting the main issues regarding its spatial management.

The Belgian Part of the North Sea (BPNS) is a shallow coastal area including various types of valuable habitats and being intensely used for several human activities, including shipping, fisheries and the production of wind energy. The increased demand for space for the construction of wind mills, potentially conflicts with other existing activities (e.g. fisheries, shipping), the designation of nature conservation areas (Natura 2000) and/or environmental standards.

The BPNS has a coastline of about 65 km and extends about 87 km offshore from the coast. Despite its small size (only 3600 km²), the BPNS is characterized by several valuable habitats, partly related to the presence of a complex system of sandbanks. This almost unique sandbank area stretches out from Zeeland to Calais.

In the GAUFRE[2] project, a first attempt is made to produce an optimal spatial planning on the BPNS. The first section in the report (Maes et al.,2005) gives a detailed description of the legal, geophysical and ecological zonation and the infrastructure on the BPNS.
The boundaries of the BPNS with France, the Netherlands and the UK were established in several treaties.

ii) Describe the relative position of the case study within the scheme in Figure 2 (for a detailed description see D2.1).

Is there a spatial management plan in place?

Partly Yes: Masterplan 2003

This Master Plan is not really a plan in the sense of a book or a map, but it is a combination of several decisions in the federal council of Ministers, which are executed by a number of Royal Decrees and a change of the Marine Environment law. The development of the Master Plan was inspired by the GAUFRE research initiative (cf. for example: "A spatial structure plan for the Belgian part of the North Sea"[3]).

Despite the lack of a legal basis for MSP in Belgium, the Master Plan provides a translation of current and future objectives of various sectors into a spatial vision. Currently the relevant governmental ministries are taking steps toward a marine spatial plan (legal basis, description of the procedure,...)

Defined objectives, indicators and benchmarks?

NO. There are no clear objectives and/or indicators defined yet.

Proposed objectives, indicators and benchmarks

Yes, some defined objectives are a result of the management plan (2003). F.e.: A policy plan for sustainable gravel & sand extraction (Royal Decree 07/10/2004)

Clear objectives to obtain Good environmental status with related indicators and benchmarks have recently been defined in the framework of the MSFD implementation process.

[2] GAUFRE project website: http://www.vliz.be/projects/gaufre/index.php

[3] http://www.unesco-ioc-marinesp.be/uploads/documentenbank/b29ecdecdd3c1025c24b1f6473656633.pdf

Existing monitoring programs

No.

There are several monitoring programs but they haven't been defined in the Master plan. They are all regulated on sectoral basis.

Review of available monitoring data and gap analysis.

Recommendations to support EBM and risk analysis.

In Belgium, management and monitoring activities are in place but they are not directly linked to the Master Plan, i.e., the marine spatial policy.

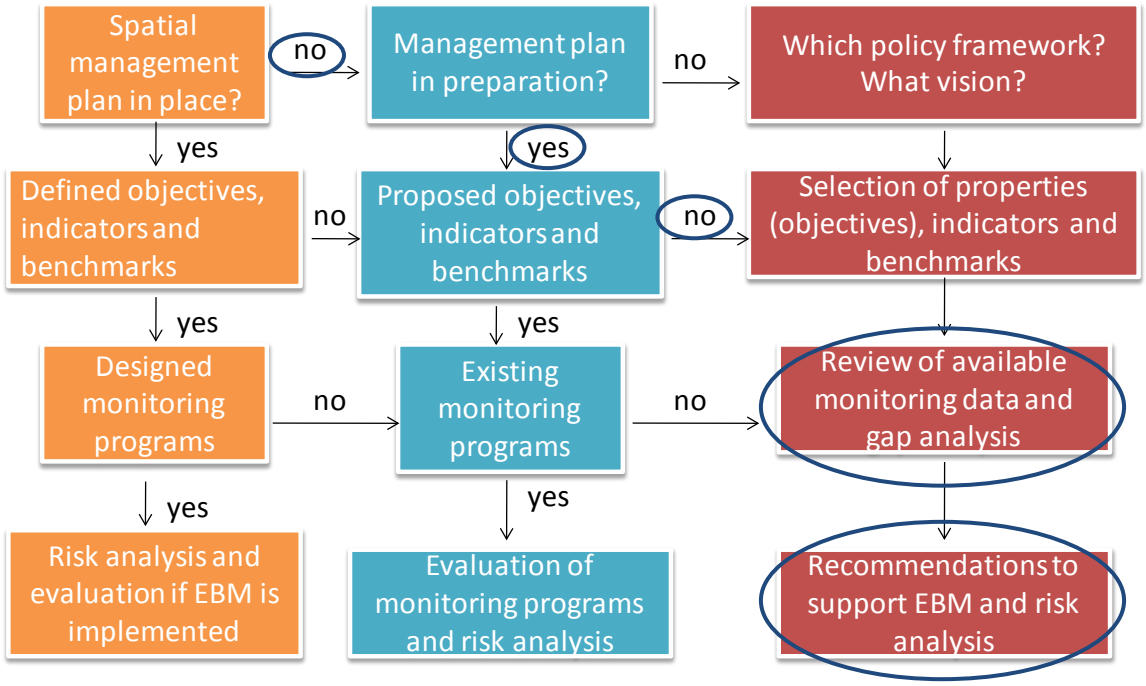


Figure 2. Conceptual flow diagram which relates the maturity of a given spatial management in a SMA together with the available data to expected assessment outcomes.

ii) How will the MESMA framework be used for the case study?

We want to analyse the current management in the Belgian Part of the North Sea. At the same time we want to answer the following question:

"Is it possible to obtain a Good Environmental Status in the SAC "Vlaamse Banken" without additional management measures?"

iii) What are the expected outcomes of the application of the MESMA framework?

We will provide a risk analysis and give recommendations to the policy.

STEP BY STEP GUIDANCE ON THE APPLICATION OF THE GENERIC FRAMEWORK

Step 1 Context Setting

The first question in step 1 is designed to allow the user some flexibility in collation of information depending on whether or not they are evaluating a single integrated marine spatial management plan. If a single management plan is being evaluated, the user should complete actions 1a.5 and 1b.8 to collate the information on the boundary and objectives of the plan (assuming that this information is readily available).

If there is not one single spatial management plan under evaluation then the user should undertake step 1a (actions 1a.1 to 1a.4) to define the boundary and step 1b (actions 1b.1 to 1b.7) to define the operational objectives. Steps 1a and 1b should be carried out together. Both steps use different pieces of information (from existing sources) to complete subsequent actions, in order to set the context for evaluation throughout the rest of the manual.

It is worth noting that this section links to section 1.3 in the Governance Analytical Structure, accepting that from a governance perspective, the boundaries have already been defined by the existing initiative upon which the governance analysis is focused.

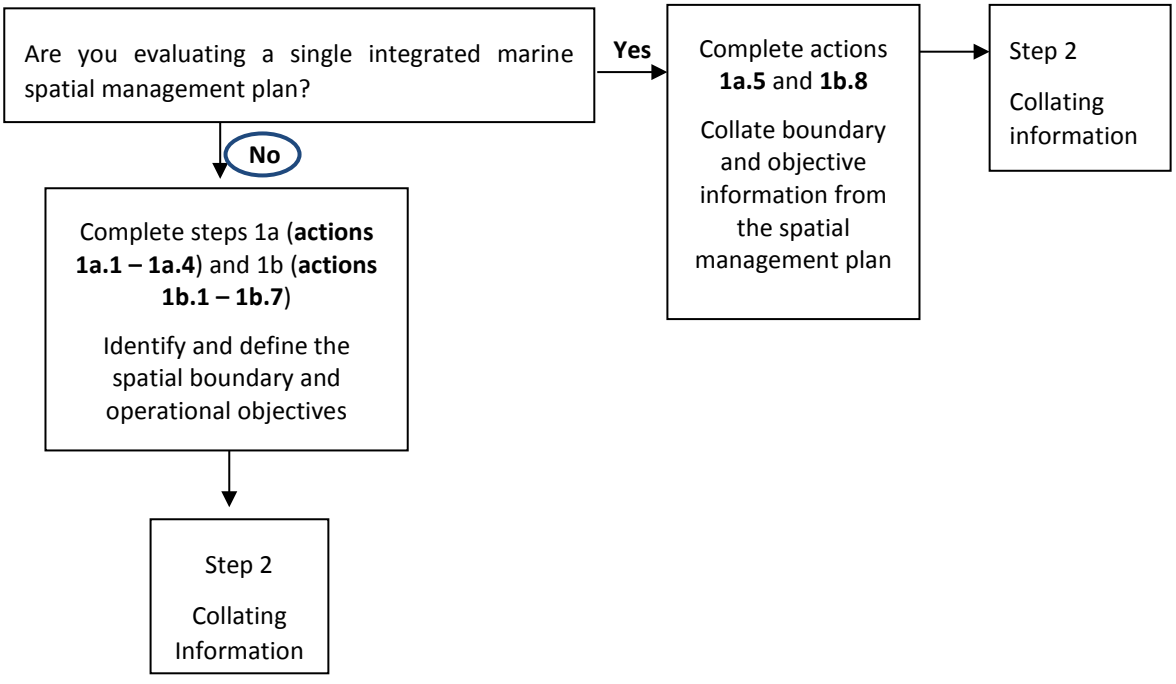


Figure 1.1. Work flow for step 1.

Consult the following bullet points for direction to the appropriate step:

- Single integrated marine spatial management plan available – go to action 1a.5.
- Single integrated marine spatial management plan not available – go to action 1a.1.
- One or more existing management initiatives (with spatial elements) e.g. sectoral management plans – go to step 1a.1.

Step 1a Set spatial and temporal boundaries for SMA assessment

Step 1a should be carried out in conjunction with step 1b; together they should set the context for the physical area involved as well as the overarching aims of the plans for the SMA. Having decided which objective will be the focus of the MESMA framework evaluation, there may be several different spatial boundaries that are specified in the relevant legal and policy documents; these should be the boundaries that are used in the MESMA case study research, recognising that these boundaries may themselves be a focus for disputes. In this way, the case study research is based on actual, real policy initiatives and related conflicts, rather than hypothetical scenarios. Conflicting objectives such as conservation objectives and other local and sectoral objectives will also be considered through the governance research analyses, particularly in section 1.3 of the Governance Analytical Structure; although from a Governance perspective, the boundaries will have already been defined by the existing initiative that WP6 is focused on.

Step 1a begins by identifying and mapping existing management plans, sectors and activities which have a spatial boundary and the relevant institutional landscape. This information is then used to finalise the spatial boundaries using a flow diagram which prioritises boundaries to ensure the best information available is used to inform decisions. For many of the MESMA case studies where the boundaries are already defined, this step can be used to evaluate the chosen boundaries and to suggest future changes. The output from step 1a is a finalised spatial boundary which, alongside the output from step 1b (which is a summarized list of policy goals and objectives relevant to the SMA), will feed into step 2 to ensure that all information collated is at the relevant spatial scales.

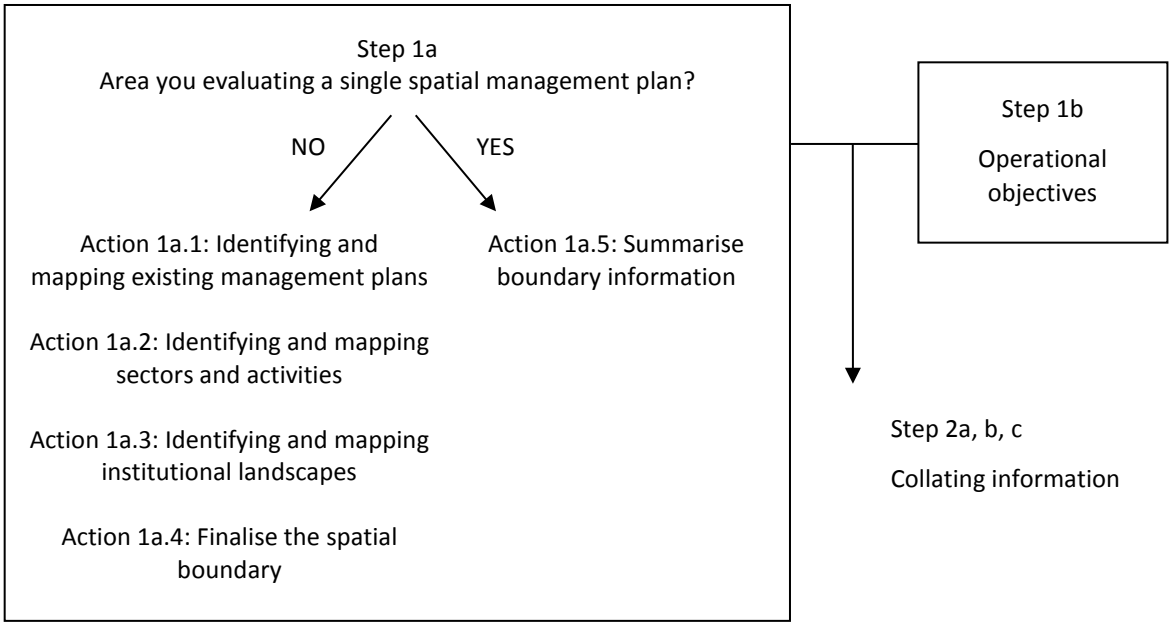


Figure 1a. Work flow for step 1a.

Action 1a.1 Identifying and mapping existing management plans

Identify which management plans or initiatives are applicable to the SMA. Check the management plans or initiatives for their proposed spatial and temporal limits.

The spatial scale of all management plans should be mapped using GIS software. This may be illustrated with a basic polygon of the area under management or may be a more complex map of the separately

managed areas. The metadata, i.e. precise information about the GIS data used to produce the maps, should be included in the MESMA Geonetwork metadata catalogue.

Complete table 1a.1.

Where there are no management plans in place move to action 1a.2.

Table 1a.1. Management plan spatial and temporal limits.

Operational level (local/national etc)	Plan name	Date of implementation	Review cycle (years)	Describe spatial boundary
National level (federal government)	Master Plan	2003	Not defined	BPNS
National level (flemish government)	Operational program for the execution of the National Strategic Plan for the Belgian fisheries	2007	2013 (every 6 years)	BPNS
National level (federal government)	Policy plans for marine protected areas in the Belgian Part of the North Sea	2009	Not defined	BPNS
National level (federal government)	'Stroomgebiedsbeheerplan' for the Belgian coastal waters for the implementation of the European Water Framework Directive (2000/60/EC)	2009	Not defined	BPNS
National level (federal government)	National action plan for Renewable Energy	2010	Not defined	BPNS
National level (federal government)	**Description of the Good Environmental Status and the settlement of the environmental goals for Belgian Marine Waters	2012	2018 (every 6 years)	BPNS

** This is not really a marine spatial plan but this document contains clear environmental objectives so we decided to take this objectives into account.

Action 1a.2 Identifying and mapping sectors and activities

Compile a list of sectors and activities present in your area and indicate whether they are active and if they have a spatial management initiative. This can be achieved by completing columns 1 to 4 of table 1a.2, which was adapted from the MarLIN table of sectors and activities. Please note this is an example of a table that could be used to complete this action and can be further modified to reflect the sectors, drivers and activities relevant to the SMA. For an alternative list of sectors and activities, it may be helpful to refer to the suite of Linkage Tables[4] and associated Guidance[5] produced as part of the 'Options for Delivering Ecosystem-Based Marine Management ' (ODEMM) EU FP7 Project.

[4] http://www.liv.ac.uk/odemm/data/
[5] http://www.liv.ac.uk/odemm/guidancedocuments/

Next, compile GIS layers of the spatial extent of the different sectors (and communicate information about the metadata to WP5). These layers will be used in subsequent steps for estimating cumulative pressures and impacts on ecosystem components.

For those sectors and activities which have a spatial management initiative, fill out columns 5 to 10 of table 1a.2. If there is little or no information on sectors and activities, omit this section and move on to action 1a.3.

Table 1a.2. Adapted MarLIN table of sectors and activities in your SMA.

1. Sector/Driver	2. Activity	3. Active? (Tick)	4. Spatial management initiative? Y/N	5. Operational level (local, national etc)	6. Spatial extent within region	7. Seasonality	8. Plan name	9. Date of implementation	10. Length of initiative? E.g. 10 year plan
Aquaculture	Fin-fish								
	Macro-algae								
	Predator control								
	Shellfisheries	**Y**	**N**						
Climate change	Current change	**Y**							
	Sea level change	**Y**							
	Temperature change	Y							
	Weather pattern change	**Y**							
Coastal defence	Barrage								
	Beach replenishment	**Y**	**Y**						
	Groynes	**Y**							
	Sea walls/ breakwaters	**N**							
Collecting	Bait digging	**Y**							
	Bird eggs								
	Curios								
	Higher plants								
	Kelp & wrack harvesting								
	Macro-algae								
	Peelers (boulder turning)								
	Shellfish	**Y**							
Development	Construction phase	**Y**							
	Artificial reefs	**Y**							
	Communication cables	**Y**							
	Culverting lagoons								
	Dock/port facilities	**Y**							
	Land claim	**Y**							
	Marinas	**Y**							
	Oil & gas platforms								
	Urban								
Dredging	Capital dredging	**Y**							
	Maintenance dredging	**Y**							
Energy generation	Nuclear power generation								
	Power stations								

	Renewable (wind/tide/wave)	**Y**							
Extraction	Maerl								
	Rock/ minerals (coastal quarrying)								
	Oil & gas								
	Sand/ gravel (aggregates)	**Y**							
	Water resources (abstraction)								
Fisheries/ shellfisheries	Benthic trawls	**Y**							
	Netting (e.g. Fixed nets)	**Y**							
	Pelagic trawls	**Y**							
	Potting/ creeling	**Y**							
	Suction (hydraulic) dredging								
Recreation	Angling	**Y**							
	Boating/ yachting	**Y**							
	Diving/ dive site	**Y**							
	Public beach	**Y**							
	Tourist resort								
	Water sports	**Y**							
Uses	Animal sanctuaries								
	Archaeology	**Y**							
	Coastal farming								
	Coastal forestry								
	Education/ Interpretation	**Y**							
	Military	**Y**							
	Mooring/ beaching/ launching	**Y**							
	Research	**Y**							
	Shipping	**Y**							
Wastes	Fishery & agriculture wastes	**Y**							
	Industrial effluent discharge	**Y**							
	Industrial/ urban emissions (air)	**Y**							
	Inorganic mine and particulate wastes								
	Land/ waterfront runoff	**Y**							
	Litter and debris	**Y**							
	Nuclear effluent discharge	**Y**							
	Sewage discharge	**Y**							
	Shipping wastes	**Y**							
	Spoil dumping								
	Thermal discharges (cooling water)								
Other	Removal of substratum								

Action 1a.3 Assessing institutional landscapes

The assessment of the institutional landscape for a given case study will compile information on regulatory bodies, national maritime jurisdictions, sectoral legislation, policies etc. This will also be explored through the WP6 governance analysis, particularly in section 1.3 of the Governance Analytical Structure.

Where appropriate, compile GIS layers to illustrate any identified boundaries or areas to which any policies or legislation are applicable.

Action 1a.4 Finalise the spatial boundary

Using the information collected in previous steps and the GIS layers available, develop a spatial boundary for your SMA. The decision tree below (figure 1a.4) provides guidance on how to use your information to define the spatial boundary of your SMA.

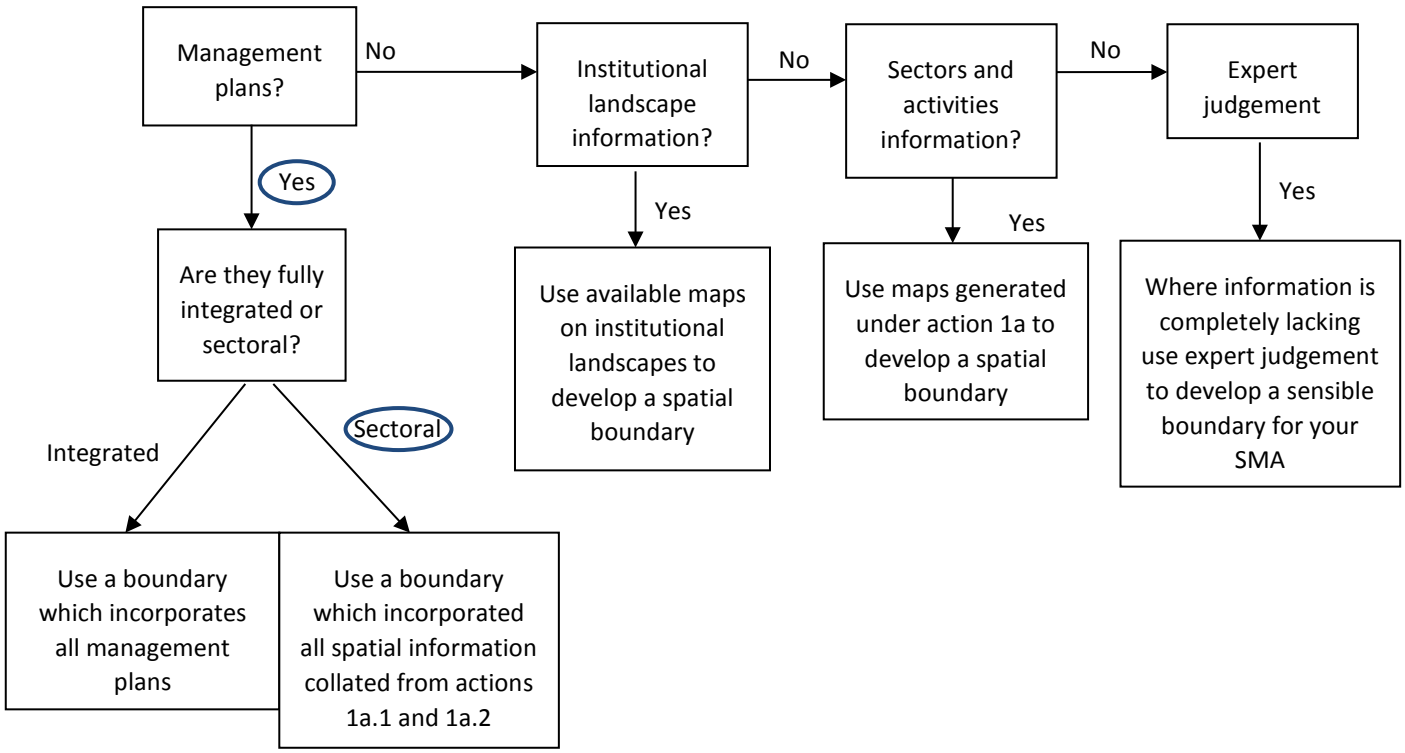


Figure 1a.4. Flow chart to help define the spatial boundary.

Create a GIS layer to display the final SMA spatial boundary. Provide a brief textual description of this boundary and a summary of the reasons for its selection.

Step 1b Goals and operational objectives for the SMA

This step aims to set the context of the SMA by defining the goals and operational objectives. **It is carried out alongside step 1a,** as together they provide details of the physical area as well as the overarching goals and objectives to be evaluated. Step 1b uses similar literature and approach to step 1a. The first actions include identification of the existing or proposed management initiative and collection of objectives which may come from legal obligations. In order to assess operational objectives they should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound). The validity of the goals and objectives and whether they are SMART will be evaluated from a scientific perspective through the MESMA framework, focusing on how well they address the need to contribute to a healthy and functioning ecosystem. An example would be achieving good environmental status as requested in the Marine Strategy Framework Directive.

The output is a list of clearly defined operational objectives for the SMA and a paragraph describing any potential compliance issues with respect to laws in the SMA. The list of goals and operational objectives is then used in step 3 to choose indicators, step 5 to assess if these objectives have been achieved or are likely to be achieved, step 6 to identify reasons why operational objectives were or were not met, and finally in step 7 to identify adaptive management needs. An additional output from step 1b is a list of sectoral interests and stakeholders in the SMA; information gathered in the governance analysis may assist in completion of this step.

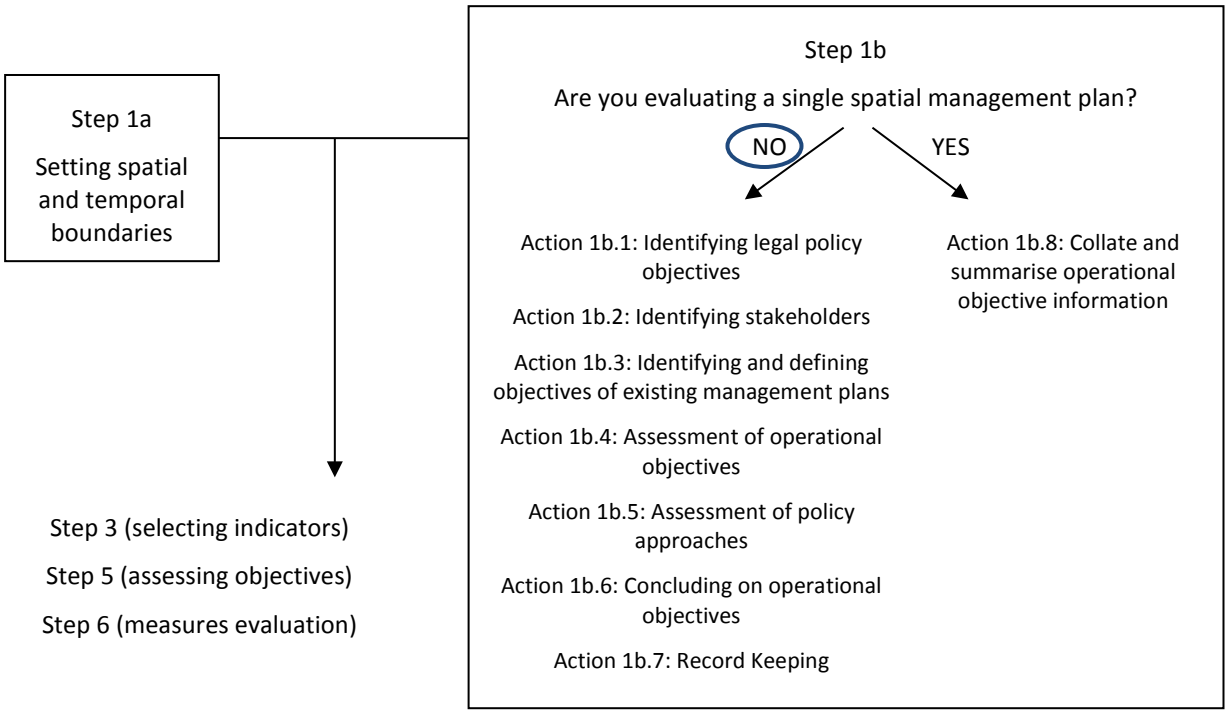


Figure 1b. Work flow for step 1b.

Action 1b.2 Identifying sectoral interests

Identify the relevant sectoral interests and stakeholders in the SMA. Some of the main sectors and the interests amongst their representatives in the area, will be explored through the governance analysis in

WP6. It may be helpful to refer to action 1a.2 of this framework and section 1.1 of the Governance Analytical Structure to complete this action.

Stakeholder participation at this stage may also help to identify the main sectoral interests in the SMA, as there may not be a comprehensive list of stakeholders identified through the governance analysis.

➔ Governance analysis

Action 1b.3 Identifying and defining objectives of existing management plans

Using the list of management plans under action 1a.1, complete the table below with information regarding their objectives. Categorise objectives into environmental, socio-economic or mixed/other objectives. You may wish to draw on information from the governance analysis to complete this action; the balance between ecological and socio-economic objectives will be evaluated through the WP6 governance analysis, which draws on institutional settings and the views and perspectives of stakeholders with an interest in the SMA.

Where there are no proposed management plans or management plans in place, move straight to action 1b.4.

In some of the plans no clear objectives were set.

Table 1b.3. Objectives of existing management plans.

Plan name*	Plan objectives	Are the objectives ecological (E) / socio-economic (SE) / mixed or other (O)?	Area for which the objective is relevant (whole region / part of the region)	Objective deadline	Conflicts between other management plans / objectives
Operational program for the execution of the National Strategic Plan for the Belgian fisheries	To achieve a sustainable, competitive, profitable and marked-oriented fisheries by 2013.	mixed	BPNS	2013	
Operational program for the execution of the National Strategic Plan for the Belgian fisheries	By 2012, the capacity of the Belgian fishing fleet must be decreased by at least 20% in the GVS, type Beam trawl.	Ecological	BPNS	2012	
Operational program for the execution of the National Strategic Plan for the Belgian fisheries	By 2010, there must be more than 1491 days at sea with the alternatives for classical beam trawls than in 2007.	Ecological	BPNS	2010	

Operational program for the execution of the National Strategic Plan for the Belgian fisheries	By 2010, the aquaculture production should be up to 3000 tons, growing of 2 new species and the establishment of new aquaculture businesses. By 2015, a production of 4500 tonnes of aquaculture production, 5 new aquaculture enterprises and 8 commercially farmed aquaculture species in Belgium.	Economic	BPNS	2010 and 2015	
Operational program for the execution of the National Strategic Plan for the Belgian fisheries	To reduce the average fuel consumption per caught fish by 2010	Economic	BPNS	2010	
Operational program for the execution of the National Strategic Plan for the Belgian fisheries	To create or retain 80 new jobs due to the implementation of the selected local development strategy	Socio-economic	BPNS	2015	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Conversion of the European MSFD (by 2020) and the WFD (by 2015) into the Belgian legislation	Ecological	BPNS	2015 and 2020	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Agreement between the Ministry of Environment, the port authorities and other relevant authorities to avoid pollution of the marine environment from the ports	Ecological	BPNS	2011	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Continuation and development of the project 'fishing for litter'	Ecological	BPNS	2009	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Structural cooperation and agreements between the responsible federal and regional governments and the industry to reduce the negative impacts of fishing on the habitat types and	Ecological	BPNS	2011	

	species for which the Natura2000 areas were set.				
Policy plans for marine protected areas in the Belgian Part of the North Sea	Space, peace and food for the protected seabirds by providing optimal integration with human activities	Ecological	BPNS	2010	
Policy plans for marine protected areas in the Belgian Part of the North Sea	The formulation of operational conservation objectives for marine protected areas	Ecological	BPNS	2009	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Establish a monitoring program for both EU Nature Directives	Ecological	BPNS	2010	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Towards operational monitoring of the enforcement of the regulations in marine protected areas	Ecological	BPNS	2011	
Policy plans for marine protected areas in the Belgian Part of the North Sea	To establish a scientific and socio-economic advisory committee	Ecological	BPNS	2009	
Policy plans for marine protected areas in the Belgian Part of the North Sea	The development of a communication strategy	Ecological	BPNS	2009	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Cooperation with the users of the marine protected areas	Ecological	BPNS	2009	
Policy plans for marine protected areas in the Belgian Part of the North Sea	Towards a designation of new marine protected areas	Ecological	BPNS	2011	
Policy plans for marine	Coherent regulations for the protection of the	Ecological	BPNS	2010	

protected areas in the Belgian Part of the North Sea	marine biodiversity in the BPNS				
Description of the Good Environmental Status and the settlement of the environmental goals for Belgian Marine Waters	For each descriptor several environmental goals are formulated. (They can be found in detail in Step 4, risk analysis)	Ecological	BPNS	2018	

*Use relevant policy objectives from table 1a.1.

Action 1b.4 Assessment of operational objectives

Operational objectives should be SMART (Specific, Measurable, Achievable, Realistic and Time-bound):

- **Specific –** Objectives should be clearly defined.
- **Measurable –** It should be possible to quantify the objectives.
- **Achievable –** Targets should be achievable in practice.
- **Realistic –** Defined targets should be achievable in the given time frame.
- **Time-bound -** A timeline should establish the deadlines for the fulfillment of defined targets.

Filling out table 1b.4.1 will show which objectives are not SMART. Where an operational objective is considered not to be SMART this information should be retained as you may wish to include these as a part of your assessment at a later date or as part of a subsequent iteration. They should also be recorded and presented in the reporting phase during step 7.

Table 1b.4. Assessing operational objectives against SMART criteria.

Operational objective	Specific (yes or no)	Measurable (yes or no)	Achievable (yes or no)	Realistic (yes or no)	Time-bound (yes or no)	Comments on quality of data available (e.g. none / poor / intermediate / good)
To achieve a sustainable, competitive, profitable and marked-oriented fisheries by 2013.	No	No	To be seen	To be seen	Yes	-
By 2012, the capacity of the	Yes	Yes	tbs	tbs	Yes	+

Belgian fishing fleet must be decreased by at least 20% in the GVS, type Beam trawl.						
By 2010, there must be more than 1491 days at sea with the alternatives for classical beam trawls than in 2007.	No	No	tbs	tbs	yes	-
By 2010, the aquaculture production should be up to 3000 tons, growing of 2 new species and the establishment of new aquaculture businessess. By 2015, a production of 4500 tonnes of aquaculture production, 5 new aquaculture enterprises and 8 commercially farmed aquaculture species in Belgium.	No	yes	tbs	tbs	yes	+-
To reduce the average fuel consumption per caught fish by 2010	no	no	no	no	yes	-
To create or retain 80 new jobs due to the implementation of the selected local development strategy	no	no	tbs	tbs	yes	-

All operational objectives of the Policy plans for Marine protected areas in the BPNS	No	No	Yes	Yes	+-	Not smart
All objectives from Description of the Good Environmental Status and the settlement of the environmental goals for Belgian Marine Waters	Yes	Yes	To be seen	Yes	Yes	SMART ecological objectives

Action 1b.5 Assessment of policy approaches

Policy approaches can be top-down (imposed by government), bottom-up (meeting popular demands from end users), or a combination of the two. The balance between these policy approaches will give an indication of how likely end-users will be to follow enforcement laws in the SMA. The discussions through section 4 of the Governance Analytical Structure are particularly relevant to this; use this information to provide a short written assessment of the policy approaches.

➔ Governance analysis

Action 1b.6 Concluding on operational objectives

Using table 1b.4, fill in table 1b.6.1 below to give an overall view of the goals and operational objectives. When filling in the table, if possible, put linked legal obligations, policy goals, operational objectives or management goals on one line. Where a legal obligation, policy goal or operational objective is additional to a management plan or where a management plan does not exist this column will remain empty.

The defined area, time scale and review period may not be equal for different legal obligations, policy and management goals and operational objectives. In this case, use the specifics of the management plan, as this is a SMART tool for management of the Marine Area.

Next a prioritisation exercise should be undertaken to consider the relative importance of ecological, socio-economic and other operational objectives, depending on the higher level goals of the SMA. (This exercise could be done with the help of stakeholders.) Prioritisation of the most important objectives provides a focus for further assessment and facilitates easier progression though the remaining steps of the framework.

Populate table 1b.6.2 with information about the objectives. Indicate in table 1b.6.2 which objectives will be carried forward for further assessment and state the reason for your conclusions.

Consideration could be given to:

- High-level political goals – what political processes and policies are there in place?
- Other Drivers
  - Environmental, social, political and economic drivers
  - Standards set – for example MSFD targets
  - Stakeholders – who is involved and why?
  - Conflicts between objectives and between stakeholders
- Geography
  - Spatial extent – which objectives have the widest spatial influence?
  - Inshore versus offshore

- Sub-regional, regional and national differences
- Trans-boundary issues

- Objective characteristics
  - Status of the objective and trend information – for example, has the objective been met or is it at risk of failing?
  - Does the objective overlap with any other objectives?
  - How many components are covered by one objective?
- Data availability/accessibility

Table 1b.6.2. Prioritisation of operational objectives.

Ecological operational objective	Reasons why important	Focus for assessment? Y/N
All objectives from Description of the Good Environmental Status and the settlement of the environmental goals for Belgian Marine Waters	Clear environmental goal and SMART objectives We will focus on the following question: " is it possible to obtain GES in "Vlaamse Banken" without additional management measures?	Yes
Socio-economic operational objective	Reasons why important	Focus for assessment? Y/N
By 2012, the capacity of the Belgian fishing fleet must be decreased by at least 20% in the GVS, type Beam trawl.	Not relevant for the above question. In chapter 6 this objective is taken into account.	No
Other/Mixed operational objective	Reasons why important	Focus for assessment? Y/N
To achieve a sustainable, competitive, profitable and marked-oriented fisheries by 2013.	Not relevant for the above question. In chapter 6, this objective is taken into account.	No

Step 2 Existing information collation and mapping

Step 2a Identify ecosystem components

The aim of step 2a is to identify the ecosystem components in the SMA which are relevant to the objectives that have been set in step 1b. Ecosystem components can be divided into natural (biophysical) components (e.g. marine mammals) and socio-economic components (e.g. a wind farm). A list of natural ecosystem components taken from the MSFD Annex iii has been provided to give guidance on identifying the relevant ones. This is not an exhaustive list and it can be added to and expanded depending on the SMA that is being evaluated. Once ecosystem components are identified for the area, they should be mapped using GIS tools. Mapping should be done using the appropriate scale for each component (e.g. larger scales for marine mammals which are distributed over wide areas) and the GIS maps should aim to cover the entire SMA. The output from step 2a should be a list of relevant ecosystem components along with GIS maps of their coverage (where possible).

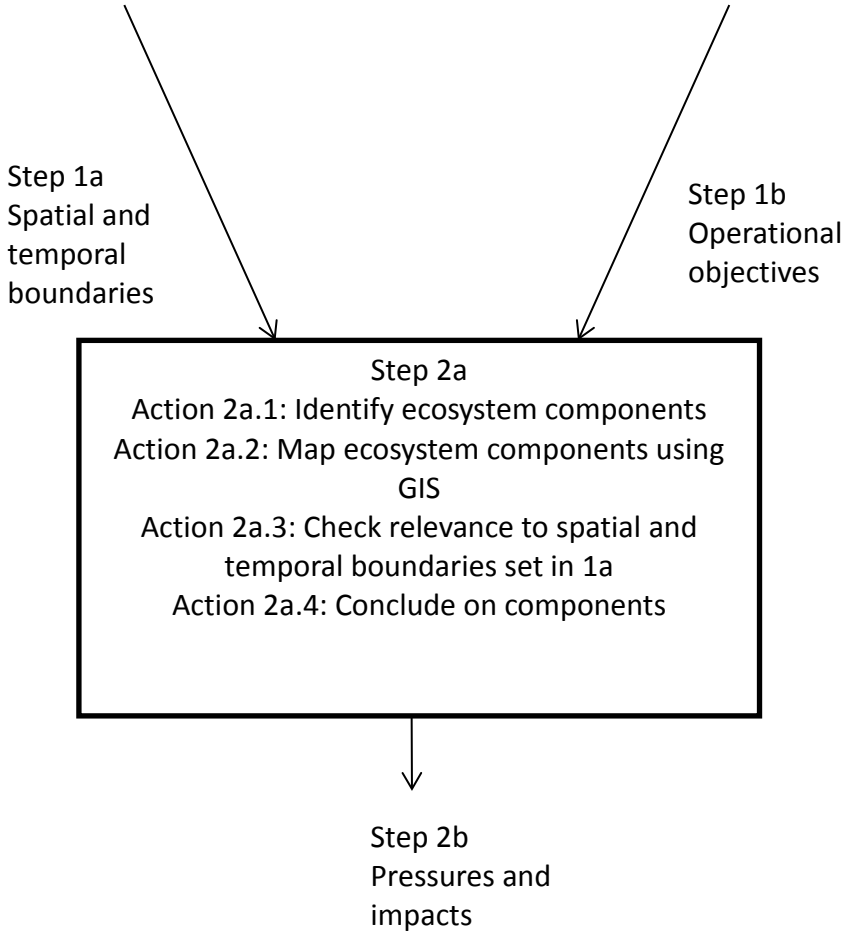


Figure 2a. Work flow for step 2a.

Action 2a.1 Using table 2a.1.1 provided identify the ecosystem components relevant to the SMA and the objectives defined in 1b.

Table 2a.1.1 provides a list of ecosystem components taken from the MSFD Annex iii. This list can be amended to reflect the SMA under evaluation.

Table 2a.1.1. MSFD list of ecosystem components (from MSFD Annex iii).

Type	Ecosystem component
Physical and chemical	Topography and bathymetry of the seabed
	Temperature regime, current velocity, upwelling, wave exposure, mixing characteristics, turbidity and residence time
	Salinity
	Nutrients
	Marine acidification
Habitat types	Predominant habitat types
	Special habitat types
	Identification of habitats in special areas
Biological features	Biological communities including phytoplankton and zooplankton communities
	Angiosperms, macro-algae and invertebrate bottom fauna
	Fish populations
	Marine mammals and reptiles
	Seabirds
	Protected species
	Exotic species
Other features	Chemicals
	Any other features or characteristics typical of or specific to the SMA

Fill out table 2a.1.2 with the relevant ecosystem components in the SMA (columns 1 and 2). Indicate where these have been taken from table 2a.1.1 or where they have originated from another source (column 3). Indicate which operational objective listed in step 1b the component is relevant to (column 4). Please note the table should be populated with information that is both available and relevant to your case study and objectives; it may not be necessary to complete the entire table and it should be amended to suit your case study.

Table 2a.1.2.*

Note: NR = Not relevant

1. Type	2. Ecosystem component	3. Reference	4. Relevant objective(s)	5. Spatial coverage (good/poor)	6. Temporal coverage (good/poor)	7. GIS Layer File Name
Physical and chemical	Topography and bathymetry of the seabed	MSFD	GES	Good	Good	**
	Temperature regime	MSFD	GES	Poor	Good	**
	Current velocity	MSFD	GES	Poor	Good	**
	Upwelling	MSFD	GES	NR	NR	**
	Wave exposure	MSFD	GES	Poor	Good	**
	Mixing characteristics	MSFD	GES	NR	NR	**
	Turbidity	MSFD	GES	Good	Good	**
	Residence time	MSFD	GES	Good	Good	**
	Salinity	MSFD	GES	Good	Good	**
	Nutrients	MSFD	GES	Good	Good	**
	Marine acidification	MSFD	GES	Poor	Poor	**
Habitat types	Predominant habitat types	MSFD	GES	Good	Poor	**
	Special habitat types	MSFD	GES	Good	Poor	**
	Identification of habitats in special areas	MSFD	GES	NR	NR	**
Biological features	Biological communities including phytoplankton and zooplankton communities	MSFD	GES	Good	Good	**
	Angiosperms	MSFD	GES	NR	NR	**
	Macro-algae	MSFD	GES	NR		**
	Invertebrate bottom fauna	MSFD	GES	Good	Good	**
	Fish populations	MSFD	GES	Good	Good	**
	Marine mammals (and reptiles→NOT)	MSFD	GES	Good	Good	**
	Seabirds	MSFD	GES	Good	Good	**
	Protected species	MSFD	GES	Good	Good	**
	Exotic species	MSFD	GES	Good	Moderate	**
Oth	Chemicals	MSFD	GES	Good	Good	**

	Any other features or characteristics typical of or specific to the SMA	MSFD	GES	NR	NR	**

*Note this table could be expanded accordingly.

** All existing GIS layers for the BPNS are available on demand at MUMM and Flemish Marine Institute.

Action 2a.2 Collect spatial information on ecosystem components and map ecosystem components

All available data sets and GIS layers are available at MUMM and the Flemish Marine Institute.

Step 2b Identify pressures and impacts

The aim of step 2b is to analyse the spatial overlap of the relevant natural and socio-economic ecosystem components with pressures and impacts and assess potential interactions. The first action involves identification of sectors, future uses and the pressures these exert on the ecosystem components identified in step 2a. Collation of spatial information on pressures and impacts via GIS is an important next step. Data may be collected from models (e.g. current speed, wave action, tidal range, distribution of nutrients, primary production etc) or by geo-statistics based on a coarse sampling program (sediment, biota etc). Finally, potential cumulative impacts of pressures are identified. The final output of step 2b is a list of pressures and, depending on the availability of data, GIS maps showing their cumulative impacts on ecosystem components, or a table of ecosystem component sensitivity information.

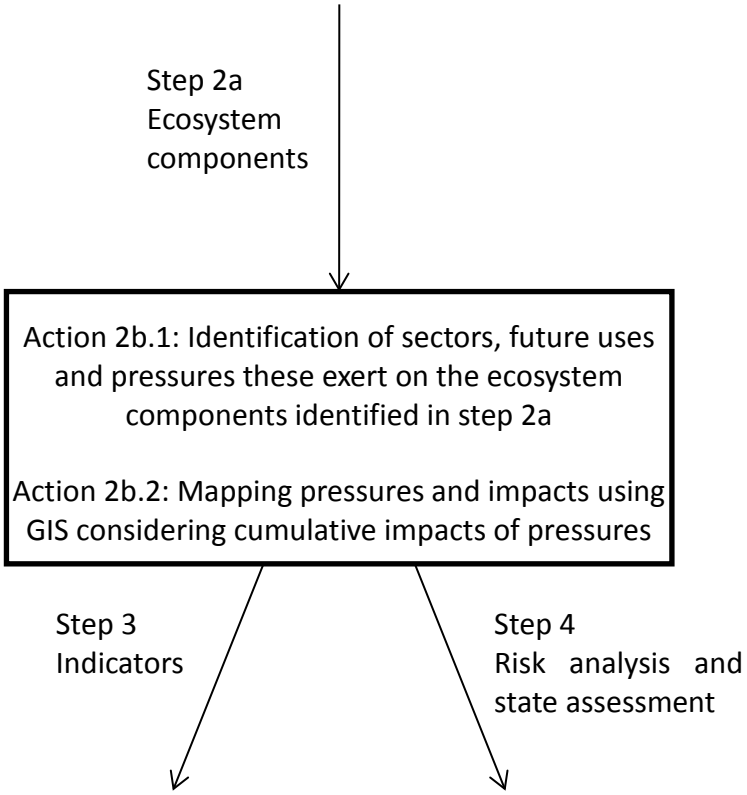


Figure 2b. Work flow for step 2b.

Action 2b.1 Identification of sectors, future uses and pressures these exert on the ecosystem components identified in step 2a.

Sectors, activities and the pressures these exert on ecosystem components in the SMA can be identified using table 2b.1.1 – this table, taken from the MarLIN initiative[6], identifies sectors, their activities and the pressures and impacts they have on the marine environment.

[6] http://www.marlin.ac.uk/maritimeactivitiesmatrix.php for the initiative
http://www.marlin.ac.uk/marinenaturaleffects.php#matrix for the matrix

Table 2b.1.1. Marlin Matrix – indicates which environmental factors are likely to be affected by different maritime activities[7].

Using information collected in step 1 of the manual:

- Identify from the first column in table 2b.1.1 the sectors that are relevant to the SMA.
- Next, identify which activities (from the second column) of each sector are carried out within the SMA.
- List the key pressures that might arise as a result of each activity from that sector in the SMA. Lists of pressures associated with various human activities can be found in the MarLIN matrix, 'Options for Delivering Ecosystem-Based Marine Management' (ODEMM) Linkage Tables[8] and associated Guidance[9] – these documents refer to sectors, activities and pressures in European Regional Seas, but the framework can be applied to any sea area.
- Indicate whether each key pressure is likely to have a possible (might happen) or probable (very likely to happen) effect as a result of activity from that sector in the SMA.

Fill out table 2b.1.2 to summarise which sectors, activities, pressures and impacts are likely to be occurring in the SMA and indicate whether the pressures associated with each activity are likely to have a possible or probable effect (an example has been provided). You may wish to refer to the completed table 1a.2 (if you are evaluating several management initiatives) or 1a.5 (if you are evaluating a single spatial management plan) for a list of sectors and activities in the SMA. The field "Sensitivity to human activities" provided for each European marine habitat in the MESMA Catalogue of European seabed biotopes (Deliverable D1.2) will assist in the completion of this step.

See table on the next page. All activities marked in yellow are present in the selected area (Vlaamse Banken) .

[7] **Available at** http://www.marlin.ac.uk/marinenaturaleffects.php#matrix
[8] http://www.liv.ac.uk/odemm/data/
[9] http://www.liv.ac.uk/odemm/guidancedocuments/

Maritime and coastal activities to environmental factors matrix

Coastal & Maritime Activities / Events	Sub-activites /events	Physical: Substratum loss	Smothering	Suspended sediment	Desiccation	Changes in emergence regime	Changes in water flow rate	Changes in temperature	Changes in turbidity	Changes in wave exposure	Noise disturbance	Visual presence	Abrasion / Physical disturbance	Displacement	Chemical: Synthetic compound contamination	Heavy metal contamination	Hydrocarbon contamination	Radionuclide contamination	Changes in nutrient levels	Changes in salinity	Changes in oxygenation	Biological: Introduction of microbial pathogens / parasites	Introduction of non-native species	Selective extraction of target species	Selective extraction of non-target species
Aquaculture	Fin-fish		R	R			R		R		P	P	R		R				R		R	R	R		
	Macro-algae		P	P			P		P		P	P							P		P	R	R	R	R
	Predator control										R	R			P										
	Shellfisheries		R	R			R		R		R	R	R		R				R		R	R	R	R	R
Climate change	Current change						R	R	R										R	P		R	R		
	Sea level change				R	R	R			R										R						
	Temperature change				R			R	R										R		R	R	R		
	Weather pattern change				R			R														R	R		
Coastal defence	Barrage	R	R	R	R	R	R		R	R	R	R	R	R	P	P	P		R	R	R				
	Beach replenishment	P	R	R	R	R	R		R	R	R	R	R	R	P	P	P		R		R				
	Groynes	P	P	R	R		R		R	R		R		P							P				
	Sea walls / breakwaters	P	P	R	R	R	R		R	R		R		P							P				
Collecting	Bait digging	R	R	R	R				R		R	R	R	R										R	
	Bird eggs										R	R	R											R	
	Curios										P	P	R	R										R	R
	Higher plants	R		R			R				R	R	R	R					R					R	R
	Kelp & wrack harvesting	R		R	R		R		R	R	R	R	R	R					R		R			R	R
	Macro-algae	R			R		R				R	R	R	R	P									R	R
	Peelers (boulder turning)		R		R	R	R				R	R	R	R										R	
	Shellfish	R	R	R	R				R		R	R	R	R										R	R
Development	Construction phase	R	R	R	R	R	R	P	R	R	R	R	R	R	P	P	P	P	R	R	R				
	Artificial reefs		P	R			R		R	R					P	P	P		R		R				
	Communication cables		P	R			R		R			R													
	Culverting lagoons			R	R	R	R	R	R	P									R	R	R				
	Dock/port facilities		R	R			R	P	R	R	R	R	R	R	R	P	R	P	R	P	R	R	R		
	Land claim	R	R	R	R	R	R		R	R									R	R	R				
	Marinas		R	R	R	P	R	P	R	R	R	R	R	R	R	P	R		R		R	R	R		
	Oil & gas platforms		R				R		R		R	R	R		R	R	R		R		R				
	Urban			R					R		R	R	R		R	R	R		R	R	R	R			
Dredging	Captial dredging	R	R	R	R	R	R		R	R	R	R	R	R	P	P	P	P	R	P	R				
	Maintenance dredging	R	R	R					R		R	R	R	R	P	P	P	P	R		R				
Energy generation	Nuclear power generation		P	R				R	R		R	R			R	P		P	R	P	R				
	Power stations		P	R				R	R		R	R			R	R	P		R	P	R				
	Renewable (tide/wave)		P	P	P	P	R		P	R	P	P			R		P				P				
	Wind farms	R					R			R	R	R	R	R	P	P	P								
Extraction	Maerl	R	R	R			R		R		R	R	R	R					R		R			R	R
	Rock/minerals (coastal quarrying)	R	R	R					R		R	R	R	R	R	R	R		R		R				
	Oil & gas		R								R	R			R	R	R		R		R				
	Sand / gravel (aggregates)	R	R	R			R		R	P	R	R	R	R	P	P	P	P	R		R				
	Water resources (abstraction)				P	P	R												R	R	R				
Fisheries/ Shellfisheries	Benthic trawls (e.g. scallop dredging)	R	R	R					R		R	R	R	R	P	P	P		R		R			R	R
	Netting (e.g. fixed nets)										R	R	R	R										R	R
	Pelagic trawls										P	P												R	R
	Potting / creeling		R								R	R	R	R										R	R
	Suction (hydraulic) dredging	R	R	R					R		R	R	R	R	P	P	P		R		R			R	R
Recreation	Angling										R	R	R	P										R	R
	Boating / yachting								P		R	R	R		R	P	R		R		R	R	R		
	Diving / dive site										R	R	R	R										R	
	Public beach										R	R	R						P						
	Tourist resort			R					R		R	R	R		R	R	R		R		R				
	Water sports										R	R	R		R	P	R								
Uses	Animal sanctuaries										P	P	P						P			P	P		
	Archaeology	R	R	R					R		R	R	R	R	P	P	P		R		R				R
	Coastal farming		R	R					R		R	R	R		R	P	R		R		R	P			
	Coastal forestry		R	R					R		R	R	R		R	P	R		R		R				
	Education/interpretation										R	R	R	R										R	R
	Military										R	R	R		P	P	P	P							
	Mooring / beaching / launching		R	R			R		R		R	R	R	R	R	P	R					P	P		
	Research	P									R	R	R	P	P	P	P		P			P	P	R	P
	Shipping		P	R					R		R	R	R	R	R	R	R	P	R		R	R	R		
Wastes	Fishery & agricultural wastes		R	R					R						R				R		R	R			
	Industrial effluent discharge		R	R					R						R	R	R		R		R				
	Industrial / urban emissions (air)			P					P						R	R	R								
	Inorganic mine and particulate wastes		R	R					R				R		P	R	P	P	R		R				
	Land / waterfront runoff		R	R					R						P	P	P		R	R	R				
	Litter and debris		R										R		P	P	P								
	Nuclear effluent discharge			R					R							R		R							
	Sewage discharge		R	R					R						R	R	R	P	R		R	R			
	Shipping wastes		P	R					R						R	R	R		R		R	R	R		
	Spoil dumping		R	R					R				P		P	P	P	P	R		R				
	Thermal discharges (cooling water)			R				R	R						R	R	P			P	R	P	P		
Other	Removal of substratum	R	R	R	P	P	P		R	P	R	R	R	R	P	P	P		R		R				

PROBABLE EFFECT . R

POSSIBLE EFFECT . P

Action 2b.2 Mapping pressures and impacts using GIS considering cumulative impacts of pressures.

This is a very relevant step in Marine spatial planning. Within the time frame it was not possible to include this step in the project.

Step 2c Identify existing management measures

The aim of this step is to identify the implemented and/or proposed management measures, using the information collected in step 1b, where the goals and operational objectives for the SMA were established. The effectiveness of any management is partly dependent on how well the management measures take into account and answer to the desired operational objectives. In successful and efficient management it is of prime importance to match the implemented or proposed management measures as exactly as possible to operational objectives. Management measures range from, for instance, national laws and policies to implement the Habitats Directive, through to codes of conduct that guide the activities of particular users in the SMA. The key focus of the review of existing management measures should be those related to the goal/objective of the SMA, including their links to and influence over other sectoral laws/policies. However, other sectoral laws/policies need not be reviewed in themselves, specifically unless it is to ascertain how they are related to the laws/policies concerning the goal/objective. Further guidance on which existing management measures should be reviewed in relation to the case study goal/objective is being developed through WP6 research and is available in the form of the document 'Guidelines for MESMA WP6 Governance Research'.

The outcome of this step will be a list of the existing or proposed management measures related to the operational objectives in step 1b. This list feeds directly into step 7 where the necessity for adaptation of the current management will be considered. Step 2c can draw on section 2 of the Governance Analytical Structure, which discusses existing management measures in relation to the priority objectives on which the governance analysis is focused.

For the chosen operational objectives (environmental objectives) there are no management measures yet.
For the other objectives (from "policy plans for marine protected areas in the BPNS" and "Operational program for national strategic plan) there are some management measures. These are treated directly in step 6 of the framework.

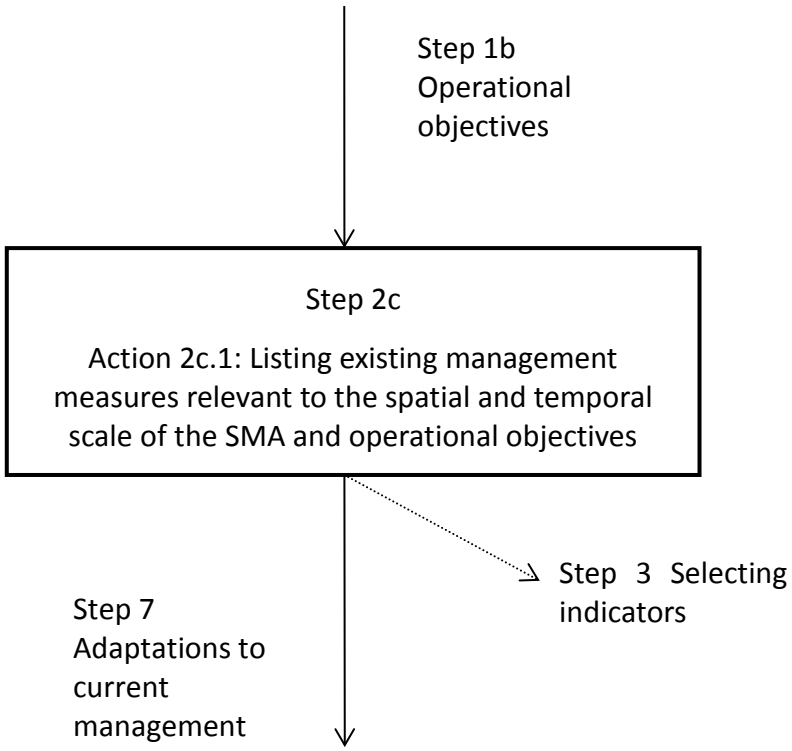


Figure 2c. Work flow for step 2c. See section 2 of the governance framework.

Action 2c.1 Using data collected in step 1b list the existing management measures relevant to the spatial and temporal scale of the SMA and the operational objectives

Generally, management measures can be grouped according to:

- Economic measures
- Interpretative measures
- Knowledge measures
- Legal measures
- Participative measures

Management measures are discussed in the governance analysis undertaken by WP6 – it will be helpful to refer to section 5 of the Governance Analytical Structure to complete this action. Please note that the WP6 analysis focuses only on one priority objective and so additional information may need to be gathered under this action to provide a comprehensive list.

Step 3 Selecting indicators and thresholds

In the Belgian document that describes GES and environmental objectives for the Belgian EEZ[10], , the Environmental Goals are directly linked to their indicators and a threshold so we will directly move to step 4.

[10] See: http://www.health.belgium.be/eportal/Environment/Inspectionandenvironmentalrigh/Environmentalrights/PublicConsultations/MMEvalStateObj/index.htm?fodnlang=nl

Step 4 Risk analysis and state assessment

After the performance indicators have been selected and their thresholds (or trends) determined (step 3), step 4 now looks into the technical characterisation of risk (step 4a) and/or state (step 4b). It is important to differentiate between the two (risk and state); both depend on the level of development of the spatial management plan. If a spatial management plan is not in place, step 4 should calculate the likelihood of meeting the operational objectives, as summarized by the indicators and their targeted thresholds or trends (i.e. risk analysis, step 4a). If a spatial management plan is in place, step 4 should (also) calculate whether or not the operational objectives were met, relative to the indicators and their targeted thresholds or trends (i.e. state assessment, step 4b). The output of step 4, the characterization of the risk or the actual state, will feed into the evaluation of meeting the operational objectives (step 5), where the interpretation of the risk analysis and or state assessment will be carried out.

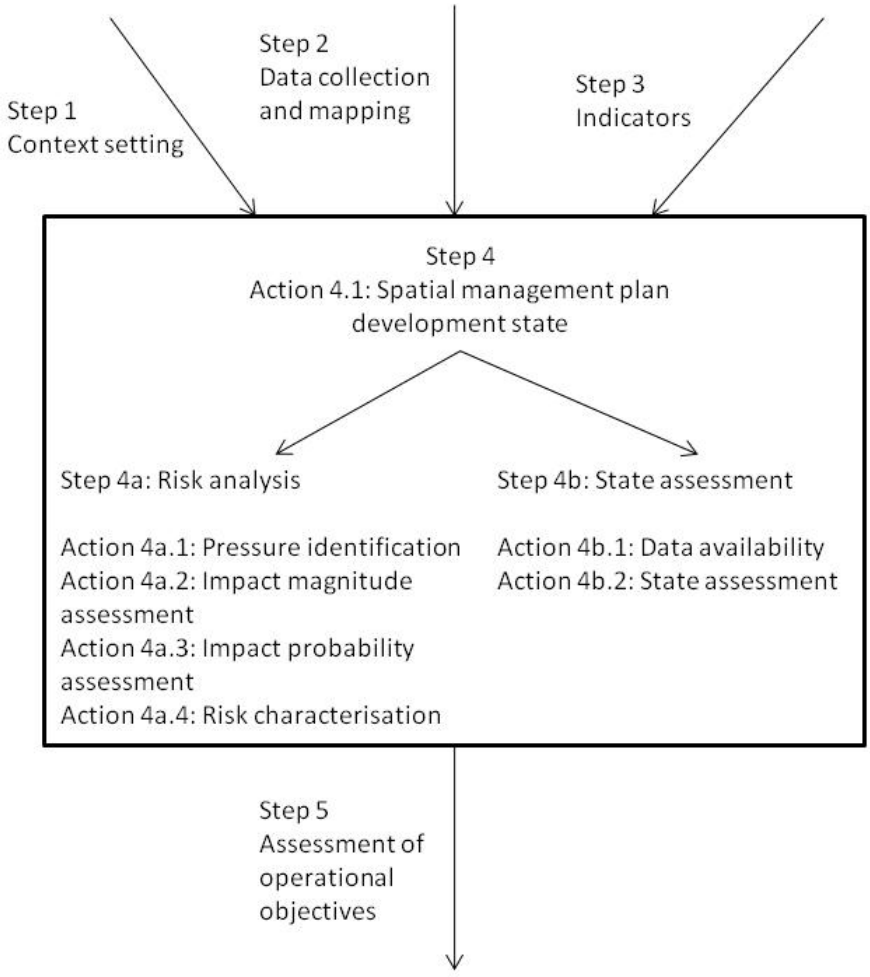


Figure 4.1. Work flow of step 4.

Spatial management plan developmental state

Depending on the stage of development of the spatial management plan or initiative considered, step 4 will pass through a risk analysis (step 4a) or a state assessment (step 4b).

Before management measures to achieve the operational objectives are implemented, several alternative spatial management scenarios, each with specific management measures, should be developed and assessed. The likelihood of each scenario achieving its operational objectives (Step 1b), (as summarized by the set of indicators and associated thresholds or trends developed in Step 3), should then be assessed and compared through a risk analysis. The actions that should be taken in order to run this risk analysis are included in step 4a. This step presents a basic, spatially explicit risk assessment framework, comprising an assessment of the level of impact of a pressure on the ecosystem components described by the respective indicator together with an estimation of the likelihood of a spatial overlap of the ecosystem component with the occurrence (in space and time) of the relevant human pressures.

When management measures to achieve the operational objectives are already implemented, the actual state, obtained through the implementation of the management plan, should be evaluated against the operational objectives (Step 1b), summarized by the suite of indicators and their thresholds or trends (Step 3). The steps to be taken to run this state assessment are included in step 4b.

It will be necessary to evaluate the spatial management plan developmental state, based on the results of Step 1. Consult the following bullet points for direction to the appropriate step:

- Spatial management plan not available - go to step 4a.
- Spatial management plan available but not implemented - go to step 4a.
- Spatial management plan implemented - go to step 4b.

Step 4a: Risk analysis

All steps from 4a will be executed at the same time.

A workshop was organised (18/06/12) at ILVO-institute with experts from different disciplines. In this workshop for each environmental goal the indicator and threshold/trend was identified. Secondly, the most relevant pressures were selected from the marlin matrix.
For each pressure the magnitude of impact and the impact likelihood was identified. Also the measure of uncertainty was added.

The pressure indicators were not taken into account here as they need another assessment.

People involved:

Jan Vanaverbeke	Ugent
Kris Hostens	Institute for Agriculture and Fisheries research, Bio- Environmental research group
Kelle Moreau	Institute for Agriculture and Fisheries research, Fisheries Biology
Jochen Depestele	Institute for Agriculture and Fisheries research, Fishing gear technology
Patrick Roose	Royal Belgian Institute of Natural Sciences (MUMM, Belgium)
Lisa Devriese	Institute for Agriculture and Fisheries research
Bavo Dewitte	Institute for Agriculture and Fisheries research
Eric Stienen*	INBO
Jan Haelters*	Royal Belgian Institute of Natural Sciences (MUMM, Belgium)
Gert Van Hoey	Institute for Agriculture and Fisheries research, Bio- Environmental research group
Elisabeth Debusschere*	Ugent/ ILVO-fisheries
Vera Vanlancker*	Royal Belgian Institute of Natural Sciences (MUMM, Belgium)
Sebastien Legrand*	Royal Belgian Institute of Natural Sciences (MUMM, Belgium)
Ellen Pecceu	Institute for Agriculture and Fisheries research, Bio- Environmental research group

*These people weren't present at the workshop but they were consulted individually.

Descriptor 1 (Biodiversity) ,4 (Marine Food Webs) and 6 (Sea floor integrity)

Because of their strong link and overlap, the administration decided to deal with them together.

Seabirds

Goals	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Seabirds: Changes in the density of nesting seabirds remain for 75% of the chosen species within the intended limits.	density (ind/km²)	Changes in the density of nesting seabirds remain for 75% of the chosen species within the intended limits.	Introduction of microbial pathogens and parasites	medium	medium	low	high	Low	Medium

Seabirds: The average density per species over a period of 5 years is not less than the average population size in the long term for 5 consecutive years for at least half of the non-scavenging seabirds	density (ind/km²)	For at least half of the non scavenging seabirds: the average density per species over a period of 5 years > or = the average population size on the long term	displacement	medium	low	high	low	High	low
	density (ind/km²)	specific for: Jan Van Gent	Selective extraction of non-target species	high	medium	medium	medium	High	Medium

Marine mammals

Goals	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Marine mammals: The annual volume bycatch of harbour porpoises *Phocoena phocoena* is less than 1.7% of the annual average number of harbour porpoises for BPNS.	density (ind/km²)	Yearly volume bycatch of harbour porpoises < than 1.7% of the yearly average number of harbor porpoises for BPNS	Selective extraction of non-targeted species	medium	high	high	low	High	Medium
			Noise	medium	high	high	low	High	Medium
			substratum loss	medium	high	high	low	High	Medium

Fish

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	uncertainty
At least 30% of the fish biomass is composed of	Length (cm)	At least 30% of the fish biomass is composed of	Selective extraction of target species	high	low	High	Medium	High	medium

fish longer than 40 cm		fish longer than 40 cm	Abrasion (of the fish)	high	medium	High	medium	High	medium

The total number of species increases.	Number of species	possitive trend	Selective extraction of target species	high	low	high	medium	High	medium
			Selective extraction of non-target species	high	high	high	medium	High	high
			suspended sediment	low	low	low	low	Low	low
			turbidity	high	low	low	low	Low	low
			Changes in nutriënt levels	high	low	low	low	Low	low
			abrasion	high	low	high	medium	Low	medium

Positive trend in the number individual stingrays *Raja clavata*	Number of individuals	Possitive trend	Selective extraction of target species	high	low	high	medium	High	medium
			substratum loss	high	medium	high	medium	High	medium
			smothering	high	low	high	low	High	low

Benthic community

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
The spatial range and distribution of EUNIS habitats Level 3 (sandy mud to mud, muddy sand to sand and gravel-containing sediment), as well as that of gravel beds changed by no more than 5% in relation to the reference state as described in the initial assessment.	surface area (m^2)	No change in spatial extend and distribution of EUNIS habitats level 3 of more than 5% compared to the reference state (from initial assessment)	abrasion	medium	high	high	low	high	medium
			smothering	low	high	medium	high	Medium	high
			substratum loss	high	low	medium	high	high	medium
soft substrate; The ecological quality coefficient as determined by BEQI uses for each of the	BEQI	Minimum 0.6 (between moderate and good)	Abrasion	high	low	medium	high	High	medium
			Substratum loss	high	low	medium	high	High	medium
			Smothering	high	low	medium	high	High	medium
			Changes in nutriënt levels	high	low	low	low	Medium	low

habitat types a minimum value of 0.6.			selective extraction of non-target species	high	low	high	medium	High	medium

Soft substrate: The median benthic bioturbation potential in spring (BPC) in the Abra alba habitat type is greater than 100.	BPc	BPc < 100	Abrasion	high	low	medium	high	High	medium
			Substratum loss	high	low	medium	high	High	medium
			Smothering	high	low	medium	high	High	medium
			Changes in nutriënt levels	high	low	low	low	Medium	low
			selective extraction of non-target species	high	low	high	medium	High	medium

Gravel beds : positive trend in median colony/ body size of sessile, long-lived and/or larger benthic species: *Buccinum unatum, Mytilus edulis, Flustra foliacea, Haliclona oculata* and *Alconium*	Colony/body size	Positive trend in a number of sessile, long-lived and/or larger benthic species	Substratum loss	high	low	medium	high	High	medium
			Selective extraction of non-target species	high	low	high	medium	High	
			Smothering	high	low	medium	high	High	medium
			displacement	high	low	high	medium	High	
			abrasion	high	low	medium	high	High	medium

digitatum									

Gravel beds: positive trend in the frequency of occurrence and median density of adults of at least half of the most important and the long-lived species *Ostrea edulis, Sabellaria spinulosa, Mytilus edulis, Buccinum undatum, Haliclona oculata, Alcyonium digitatum and Alcyonidium spp.*	Occurrence and median density	Positive trend in the frequency of occurrence and median density of at least half of the most important and long-lived species	Substratum loss	high	low	medium	high	High	medium
			Selective extraction of non-target species	high	low	high	medium	High	
			Smothering	high	low	medium	high	high	medium
			displacement	high	low	high	medium	high	
			abrasion	high	low	medium	high	high	medium

Gravel beds: No decrease or positive trend of species diversity within all important taxa hard	Species richness	no decrease or positive trend of the species richness within all important taxa	Substratum loss	high	low	medium	high	High	medium

substrates, particularly Porifera, Cnidaria, Bryozoa, Polychaeta, Malacostraca, Maxillopoda, Gastropoda, Bivalvia, Echinodermata and Ascidiacea.			Selective extraction of non-target species	high	low	high		high	
			Smothering	high	low	medium	high	High	medium
			displacement	high	low	high		High	
			abrasion	high	low	medium	high	high	medium
Within the gravel bed, the ratio of the surfaces of hard substrates (in particular surfaces that are colonised by epifauna from hard sub) with respect to the surfaces of soft sediment should not show a negative trend.	Ratio surfaces hard sub versus soft sediment	no negative trend	substratum loss	high	low	medium	high	high	medium
			abrasion	high	low	medium	high	high	medium
			smothering	high	low	medium	high	high	medium

Descriptor 2 (non-indigenous species, introduced by human activities)

Non-native species

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Introduction of new man-introduced non-native species of macrofauna and macro fauna (> 1 mm) in relation to the initial assessment of 2012 is avoided. Species which are subject to taxonomic disagreement and of which the changes are the result of permanent release (including reproduction) are negligible, are not taken into account.	number of non-native species	No increase	Introduction of non-native species	high	low	low	low	medium	low
			synthetic compound contamination	medium	high	low	high	Low	high

The relative abundance of invasive species *Ensis directus* in the muddy sand habitat type and *Crepidula fornicata* in both the soft sediment habitat and the hard sub habitat does not increase	Abundance	No increase in the abundance of Ensis directus and Crepidula fornicata	Selective extraction of non-target species	High	high	low	high	medium	high
			Abrasion	High	high	low	high	medium	high
			substratum loss	High	high	low	high	medium	high
			Introduction of hard substratum	High	high	low	medium	medium	high

Descriptor 3: commercially exploited fish

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
All commercial fish stocks are managed through the CFP, are caught in a way consistent with maximum sustainable yield. This evaluation must be conducted on the basis of regional stocks and not on a basis of national resources.	BPP/F	BPP> = B_{ref}/ F<= F ref	Selective extraction of target species	High	Low	High	High	High	High
			Selective extraction of non target species	High	Medium	High	High	High	High
All commercial fish and shellfish stocks are within safe biological limits with a			Selective extraction of target species	High	Low	High	High	High	

distribution by age (if available) and by size (for lack of data about the age) that indicate a healthy situation in different stocks, where the stocks on long term were fished within the safety limits while retaining the full reproductive capacity.			Selective extraction of non-target species	High	Medium	High	High	High	
The values of fishing mortality and biomass of the spawning populations are within the safe biological limits. (F < or = the reference points of mortality), BPP > or = than the reference points for the biomass of the spawing stock)	Biomass		Selective extraction of target species	High	low	High	High	High	High
			Selective extraction of non-target species	High	medium	High	High	High	High

or exhibit a positive or stable trend in density studies and an increasing or stable trend in VPEI studies.									

Descriptor 5: Human-induced eutrophication

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
The 90 percentile of the chlorophyll a concentration (in the growing season and over a period of 6 years) is less than 15 µg/l	concentration cholorofyl a (µg/l)	The 90 percentile of chlorophyll a concentration is < than 15 µg/l	Changes in temperature	medium	high	medium	high	Medium	high
			Changes in nutriënt levels	high	low	low	low	Medium	low
			Changes in oxygenation?	low	low	low	low	Low	low
If the above objective is achieved: less than 17% of the monthly samples contain more than 10^6 Phaeocystis	Number of *Phaeocystis* cells/l	Less than 17%of the samples of one month contain more than 10^6 *Phaeocystyscells*/l	Changes in temperature	medium	high	medium	high	medium	high
			Changes in nutriënt levels	high	low	low	low	medium	low

cells/l.			Changes in oxygenation?	low	low	low	low	low	low

The winter DIN concentrations are less than 12 µmoles / l (at sea) or 15 µmoles / l (coastline) and winter DIP concentrations are smaller than 0.8 µmoles / l.	DIN & DIP (µmoles/l) in winter	DIN < 15 µmoles/l (coastal zone); DIN < 12 µmoles/l (sea); DIP < 0.8 µmoles/l	Changes in nutriënt levels	high	low	low	low	medium	low

Descriptor 7: Hydrographical conditions

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems			Changes in substratum loss					Unknown	High
			Changes in emergence regime					Unknown	High
			Changes in waves exposure					Unknown	High

			Abrasion and physical disturbance					Unknown	High

Descriptor 8: concentrations of contaminants

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Water: The concentrations of these substances under the WFD are equal to or less than their EQS	Concentrations (µg/l)	Concentrations of pollutants = or < than their EQS	input of synthetic compound contamination	high	low	medium	medium	high	medium
			input of heavy metal contamination	high	low	low	low	Medium	low
			input of hydrocarbon contamination	high	low	high	low	high	low

Biota: The concentrations Hg, hexachloroben zene and hexachlorobut adiene are equal to or smaller than their EQS.	Concentration(µg/l)	Concentrations pollutents = of < than their EQS	*Input of synthetic chemicals*	*high*	*low*	*medium*	*medium*	High	medium
		Hg	Input of heavy metals	high	low	high	low	High	low
		Hexachloorben zeen	Input of synthetic chemicals	high	low	low	low	medium	low
		Hexachloorbut adieen	Input of synthetic chemicals	high	high	low	high	medium	low

Eggs: No difference between measured Hg concentrations in bird eggs from affected and non-industrialized areas	Concentrations Hg	No difference between measured Hg concentrations in bid eggs from affected and non-industrialized areas	Input of heavy metal contamination	high	low	low	low	medium	low

Eggs: Concentrations of PCB, DDT, HCB and HCH in eggs is equal to or less than their OSPAR thresholds	Concentrations (ng/g)	concentrations = of < OSPAR thresholds	synthetic compound contamination	Specified below:					
		PCB	synthetic compound contamination	high	low	high	low	High	low
		DDT	synthetic compound contamination	high	low	high	low	High	low
		HCB	synthetic compound contamination	high	low	high	low	High	low
		HCH	synthetic compound contamination	high	low	medium	low	High	low

Biota and sediment:Pollu ents for which OSPAR created ecotoxicolgical assessment criteria, even on provisional basis, have concentrations	Concentrations	Concentrations < of = EAC's	Input of synthetic compound contamination	high	medium	medium	medium	high	medium
			Input of heavy metal contamination	high	low	high	low	high	low

equal to or less than their EAC's.									
Biota and oil: the average proportion of oiled guillemots (*Uria aalge*) is less than 20% of the total number of individuals found dead or dying on the beach.	number of individuals	The average proportion of oiled guillemots (*uria aalge*) is less than 20% of the total number of individuals found dead or dying on the beach.	Input of levels of hydrocarbons	high	low	low	low	medium	low
Effects: The average content imposex corresponds to an exposure to concentrations of TBT which is smaller than the EAC.	TBT concentrations	TBT concentraties in biota < dan EAC	Input of synthetic compound contamination	high	low	medium	low	high	low
Effects: for externally visible fish diseases, the fish disease index below the environmental	Fish disease index (FDI)	For each fish disease: FDI < OSPAR Index	Abrasion	high	low	high	medium	high	medium
			Introduction of microbial pathogens and parasites	high	low	high	high	high	medium
			Input of chemical substances	medium	high	medium	high	medium	high

criteria (EAC) as stated in the OSPAR JAMP recommendations relating to the guidances on the integrated monitoring and evaluation of contaminants.			changes of nutrients	high	low	low	low	medium	low
			"electric pulses"	high	medium	low	high	medium	high

Effects: The EROD (ethoxyresorufin-O-deëthylase) induction is smaller than the remanent assessment level as defined in the OSPAR JAMP recommendations relating to the Guidelines on the integrated monitoring and evaluation of pollutants	EROD introduction	EROD introduction < OSPAR threshold	synthetic compounds contamination	high	medium	low	low	medium	medium

Descriptor 9: contaminants in fish and seafood

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
All measured pollutants in fish and shellfish for human consumption showing concentrations lower than the statutory levels	concentration pollutants	Concentrations must be lower than the statutory levels	Changes in levels of heavy metals	high	low	low	low	medium	low
			Changes in levels of synthetic chemicals	high	low	low	low	medium	low

Descriptor 10: Marine Litter

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty
Negative trend in the annual evolution of quantities of waste washed ashore, according to the guidelines on the Monitoring of marien litter on the beaches	quantities of waste washed ashore	Negative trend	synthetic compound contamination-waste	high	low	medium	high	high	medium

Goal	Indicator	Threshold/ Trend	Pressure	Magnitude of Impact	Measure of uncertainty	Impact likelihood	Measure of uncertainty	Risk characterisation	Uncertainty

Less than 0.1g plastic in less than 10% of the fulmars (*Fulmarus glacialis*)	quantities of plastic (g)	Less than 0.1g plastic in less than 10% of the fulmars (*Fulmarus glacialis*)	synthetic compound contamination	high	low	high	low	high	low

negative trend in the annual evolution of the amount of fished litter	amount of fished litter	Negative trend	synthetic compound contamination-waste	high	low	medium	high	high	medium

Step 5 Assessing findings against operational objectives

The aim of step 5 is to look at the results of the risk analysis and/or state assessment and interpret these results in terms of whether the operational objectives have been achieved or failed and by how much, together with their relative importance in terms of future management adaptations. Several actions are proposed in order to achieve the aims of this step. First, a summary of the state or potential state of the indicators and how these are linked to the operational objectives is completed. Secondly, an overall table listing the operational objectives and indicating if these have been achieved or failed, how successful or unsuccessful they were, how important operational objectives were to each other and how they can be weighted to inform future management (step 7). Finally, there is an opportunity to revisit the evaluation of indicators (step 3) to assess if the indicators used in step 4 were appropriate for analysis.

The outputs from step 5 will be:

- Table 5.2 assessing the operational objectives which will feed into step 6 and step 7.
- A second table (5.3) highlighting whether indicators used for analysis were appropriate. This will also feed into step 7.

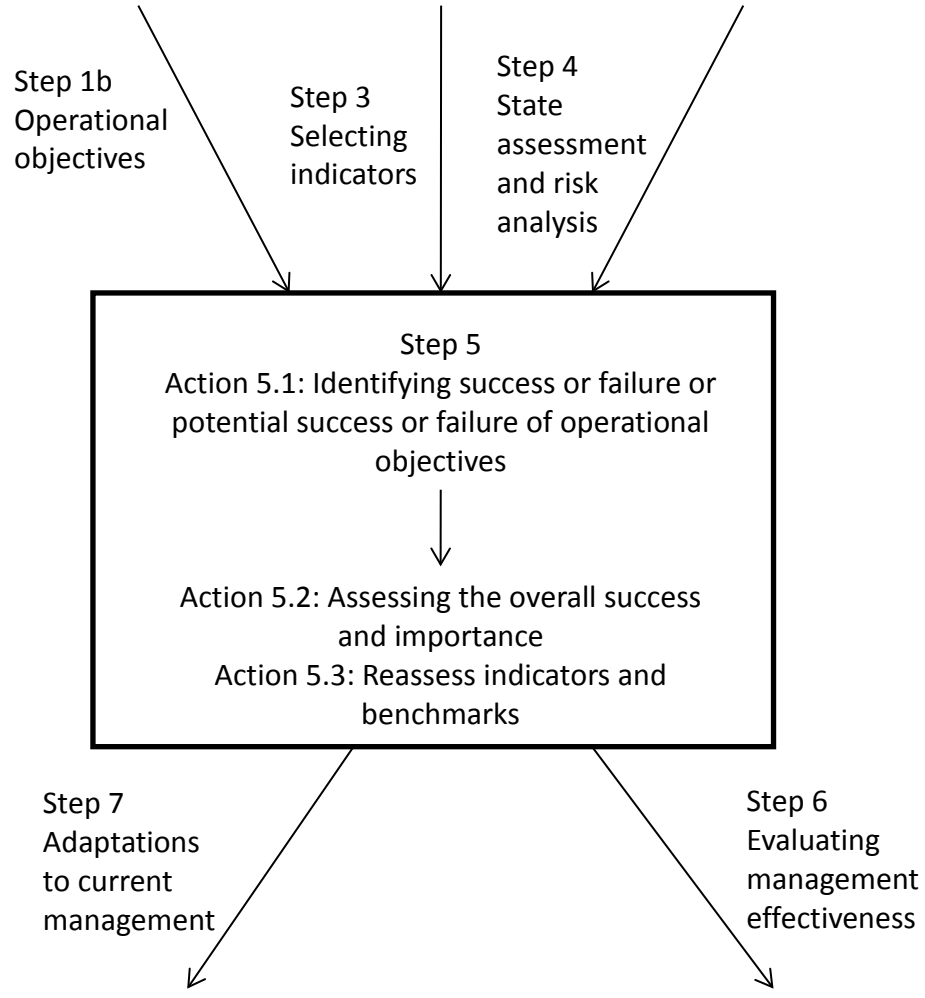


Figure 5.1. Work flow for step 5.

Action 5.1 Identifying success or failure or potential success or failure of operational objectives

Action 5.2 Assessing the level of success and importance

This action requires confirmation of whether the operational objectives have been achieved or failed and completion of a weight assessment of their importance for the development of future management options. As part of this action you should:

- Indicate in table 5.2 whether the operational objective has been achieved (A) or has failed (F), based on the results summarised in tables 5.1.1 - 5.1.3.
- Describe why the operational objective was assessed as having been achieved or failed (e.g. because the trend was positive, or the state was too low); underpin the assessment by stating the reason for the outcome of the assessment.
- Give objectives a weighting based on their need for future management and the higher level goals of the SMA, where 1 is not relevant (e.g. objective is met, so no adaptations to management are needed) and 5 is very relevant (e.g. failure to meet an important operational objective for a high level goal of the SMA so adaptation of current management regime is important).
- Include the reasoning behind the assigned weighting.

Complete table 5.2 to summarise outputs of the actions described.

Operational objective	Global Risk Characterisation	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
Seabirds: Changes in the density of nesting seabirds remain for 75% of the chosen species within the intended limits.	Low	Not known	Current status is unknown. Comment: the most important pressure does not occur in the marine protected area. Most important for this goal is to have management measures in the areas protected under the birds directive.	High	the goal will not be obtained unless there are management measures in the breeding spots.
Seabirds: The average density per species over a period of 5 years is not less than the average population size in the long term for 5 consecutive years for at least half of the non-scavenging seabirds	High	Not known	Initial assessment for the operational objective needed. High risk because a lot of pressures occurring in that region.	High	Areas needed without bottom disturbing activities. → Possible management measures in the area
Marine mammals: The annual volume bycatch of harbour porpoises *Phocoena phocoena* is less than 1.7% of the annual average number of harbour porpoises for BPNS.	High	Not known	Initial assessment for the operational objective needed. High risk because a lot of pressures occurring in that region.	High	These animals are protected under the habitats directive.
At least 30% of the fish biomass is composed of fish longer than 40 cm	High	Not known	High risk because there are a lot of pressures in the area. Initial assessment needed.	High	Measures needed
The total number of species increases.	High	Not known	For some pressures there is a high risk, for some others low risk. Pressures caused by fisheries are high.	High	Fisheries management measures are needed.
Positive trend in the number individual stingrays *Raja clavata*	High	Not known	Initial assessment for the operational objective needed.	High	Rays are treated in general on European level.

The spatial range and distribution of EUNIS habitats Level 3 (sandy mud to mud, muddy sand to sand and gravelcontaining sediment), as well as that of gravel beds changed by no more than 5% in relation to the reference state as described in the initial assessment.	Failed	Unknown	Medium to high risk for not achieving this goal. Not: also medium to high uncertainty. This means that more scientific data is needed.	High	
Soft substrate; The ecological quality coefficient as determined by BEQI uses for each of the habitat types a minimum value of 0.6.	Failed	Unknown	Medium to high risk not achieving this goal. Magnitude of impact for all activities high, impact likelihood medium to high. Current status not known	High	
Soft substrate: Positive trend in the mean density of adults (or frequency of occurrence) of at least one species within the long-lived and/or slow-breeding species and the major structuring benthic species groups in mud to mud-bearing sands and pure fine to gravel bearing sand	Failed	Unknown	High risk. Very sensitive to the pressures (magnitude is high).	High	
Soft substrate: The median benthic bioturbation potential in spring (BPC) in the Abra alba habitat type is greater than 100.	Failed	Unknown	High risk. Very sensitive to the pressures (magnitude is high).	High	

Gravel beds : positive trend in median colony/ body size of sessile, long-lived and/or larger benthic species: *Buccinum unatum, Mytilus edulis, Flustra foliacea, Haliclona oculata* and *Alconium digitatum*	Failed	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	High	Very relevant. Gravel beds are protected under the habitats directive
Gravel beds: positive trend in the frequency of occurence and median density of adults of at least half of the most important and the long-lived species *Ostrea edulis, Sabellaria spinulosa, Mytilus edulis, Buccinum undatum, Haliclona oculata, Alcyonium digitatum* and *Alcyonidium spp.*	Failed	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	High	Very relevant. Gravel beds are protected under the habitats directive
Gravel beds: No decrease or positive trend of species diversity within all important taxa hard substrates, particularly Porifera, Cnidaria, Bryozoa, Polychaeta, Malacostraca, Maxillopoda, Gastropoda, Bivalvia, Echinodermata and Ascidiacea.	Failed	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	High	Very relevant. Gravel beds are protected under the habitats directive
Within the gravel bed, the ratio of the surfaces of hard substrates (in particular surfaces that are colonized by epifauna from hard sub) with respect to the surfaces of soft sediment should not show a negative trend.	failed	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	High	Very relevant. Gravel beds are protected under the habitats directive

Descriptor 2

Operational objective	Global risk characterization	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
Introduction of new man-introduced non-native species of macrofauna and macro fauna (> 1 mm) in relation to the initial assessment of 2012 is avoided. Species which are subject to taxonomic disagreement and of which the changes are the result of permanent release (including reproduction) are negligible, are not taken into account.	Medium	Unknown	Medium risk for an introduction of non-native species. Low risk for synthetic compound contamination (but with high uncertainty).	High	There are already several management measures (f.e. in relation to ballast water)
The relative abundance of invasive species *Ensis directus* in the muddy sand habitat type and *Crepidula fornicata* in both the soft sediment habitat and the hard sub habitat does not increase	Medium	Unknown	magnitude of impact is high but the impact likelihood is low → medium risk Note: high uncertainty	Medium	

Descriptor 3

Operational objective	Global risk characterization	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
All commercial fish stocks are managed through the CFP, are caught in a way consistent with maximum sustainable yield. This	High	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	medium	This is treated on a higher level

evaluation must be conducted on the basis of regional stocks and not on a basis of national resources.					
All commercial fish and shellfish stocks are within safe biological limits with a distribution by age (if available) and by size (for lack of data about the age) that indicate a healthy situation in different stocks, where the stocks on long term were fished within the safety limits while retaining the full reproductive capacity.	High	Unknown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	medium	This is treated on a higher level
The values of fishing mortality and biomass of the spawning populations are within the safe biological limits. (F < or = the reference points of mortality), BPP > or = than the reference points for the biomass of the spawing stock) or exhibit a positive or stable trend in density studies and an increasing or stable trend in VPEI studies.	High	Unkown	High risk. Very sensitive to the pressures. Impact likelihood medium to high.	medium	This is treated on a higher level

Descriptor 5

Operational objective	**Global risk characterization**	**Achieved or Failed**	**Describe why it has been achieved/failed**	**Weighting of relevance for future management**	**reasons**

The 90 percentile of the chlorophyll a concentration (in the growing season and over a period of 6 years) is less than 15 µg/l	Medium	Unknown	Most important pressure is changes in nutrient level. Magnitude is high but impact likelihood is rather low.	Medium	There are already a number of management measures. This must be treated on a higher level (European-international)
If the above objective is achieved: less than 17% of the monthly samples contain more than 10 6 Phaeocystis cells/l.	Medium	Unknown	Most important pressure is changes in nutrient level. Magnitude is high but impact likelihood is low	Medium	There are already a number of management measures.
The winter DIN concentrations are less than 12 µmoles / l (at sea) or 15 µmoles / l (coastline) and winter DIP concentrations are smaller than 0.8 µmoles / l.	Medium	Unknown	Medium risk. Magnitude of impact is high but impact likelihood is low	Medium	there are already a number of management measures.

Operational objective	Global risk characterisation	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems	Unknown	Achieved	The experts are aware of the pressures and without new activities they think this objectives will be achieved.	medium	This must be taken into account when new activities occur but at the moment it's not highly relevant.

Descriptor 8

Operational objective	Global risk characterisation	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons

Water: The concentrations of these substances under the WFD are equal to or less than their EQS	High	Failed	Currently still above the threshold	High	High input of synthetic compound contamination. This must be treated on a higher level (European-international)
Biota: The concentrations Hg, hexachlorobenzene and hexachlorobutadiene are equal to or smaller than their EQS.	High	Unknown	Medium to high risk not achieving this goal	High	This must be treated on a higher level (European-international)
Eggs: No difference between measured Hg concentrations in bid eggs from affected and non-industrialized areas	Medium	Unknown	Medium risk not achieving this goal	Low	Not so relevant for management in this site. Eggs are collected outside our area.
Eggs: The concentrations PCB, DDT, HCB and HCH in eggs is equal to or less than their OSPAR thresholds	Failed	Unknown	High risk for not achieving this goal. Both magnitude of impact and impact likelihood are high	Low	Not so relevant. Eggs are collected outside our area.
Biota and sediment:Contaminants for which OSPAR created ecotoxicolgical assessment criteria, even on provisional basis, have concentrations equal to or less than their EAC's.	Failed	Unknown	concentrations are to high		This must be treated on a higher level (European-international)
Biota and oil: the average proportion of oiled guillemots (*uria aalge*) is less than 20% of the total number of individuals found dead or dying on the beach.	Medium	Unknown	Impact likelihood is low but magnitude of impact is high	Medium	Not so relevant for the area. This must be treated on a higher level (European-international)

Effects: The average content imposex corresponds to an exposure to concentrations of TBT which is smaller than the EAC.	Failed	Unknown	Magnitude of impact is high, impact likelihood medium	Medium	This must be treated on a higher level (European-international).
Effects: for externally visible fish diseases, the fish disease index below the environmental criteria (EAC) as stated in the OSPAR JAMP recommendations relating to the guidance on the integrated monitoring and evaluation of contaminants.	Failed	Unknown	Medium to high risk for not achieving this goal. Remark: uncertainty high for some pressures → more research needed	High	Monitoring & management measures needed for this pressures
Effects: the Erod (ethoxyresorufin-O-deëthylase) induction is smaller than the remanent assessment level as defined in the OSPAR JAMP recommendations relating to the Guidelines on the integrated monitoring and evaluation of pollutants	Medium	Unknown	Magnitude of impact is high but the impact likelihood in the area is low.	Medium	

Descriptor 9

Operational objective	Global risk characterisation	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
All measured pollutants in fish and shellfish for human consumption showing concentrations lower than the statutory levels	Medium	Unknown	magnitude of impact of the pressures is high but the impact likelihood in the area is low	Medium	There are already management measures taken. What about toxic algae?

Descriptor 10

Operational objective	Global risk characterisation	Achieved or Failed	Describe why it has been achieved/failed	Weighting of relevance for future management	reasons
Less than 0.1g plastic in less than 10% of the fulmars (*Fulmarus glacialis*)	Failed	Unknown	lots of synthetic compound contamination. Both impact likelihood and magnitude of impact is high	High	Management measures needed to reduce the pressure.
Negative trend in the annual evolution of the amount of fished litter	Failed	Unknown			

Action 5.3 Reassessing indicators and thresholds

In Belgium we didn't reach this step yet for the descriptors of the MSFD.

Step 6 Evaluate management effectiveness

The aim of step 6 is to evaluate the success of existing or planned management measures in terms of achieving the operational objectives (implemented or recommended). Where there is no management plan in place, existing management measures can be evaluated to ascertain how they might contribute to achieving operational objectives. This will identify possible gaps where new management measures might be needed.

Step 6 involves assessment of the success of the management measures (as defined in step 2c) in light of the objectives (step 1b) and discussion about why individual management measures were or were not successful in achieving operational objectives (as listed in step 5). The output of this step will be a table showing which management measures were/were not/were partly successful in meeting their objectives. The table will be accompanied by explanatory text that focuses on the objectives that have not or only partly been met and will consider possible reasons for these outcomes, with respect to management measures in place.

It is important to recognise that management effectiveness in achieving the goal/objectives for each SMA will be evaluated on a scientific basis and this evaluation will examine the key pressures from particular sectoral activities, identified through previous steps of the MESMA framework. To complement this scientific evaluation, it is important to understand the views of different stakeholders (governance, management, operational and others) on the validity of objectives and effectiveness of existing management measures in achieving those environmental goals/objectives. It is also important to understand the process by which those stakeholders interact with each other. To some extent this is explored through WP6 governance research. The Governance Analytical Structure will include discussions of the effectiveness of existing governance approaches and incentives used. The final output of this step should identify where adaptation to current management is needed and this will feed into step 7.

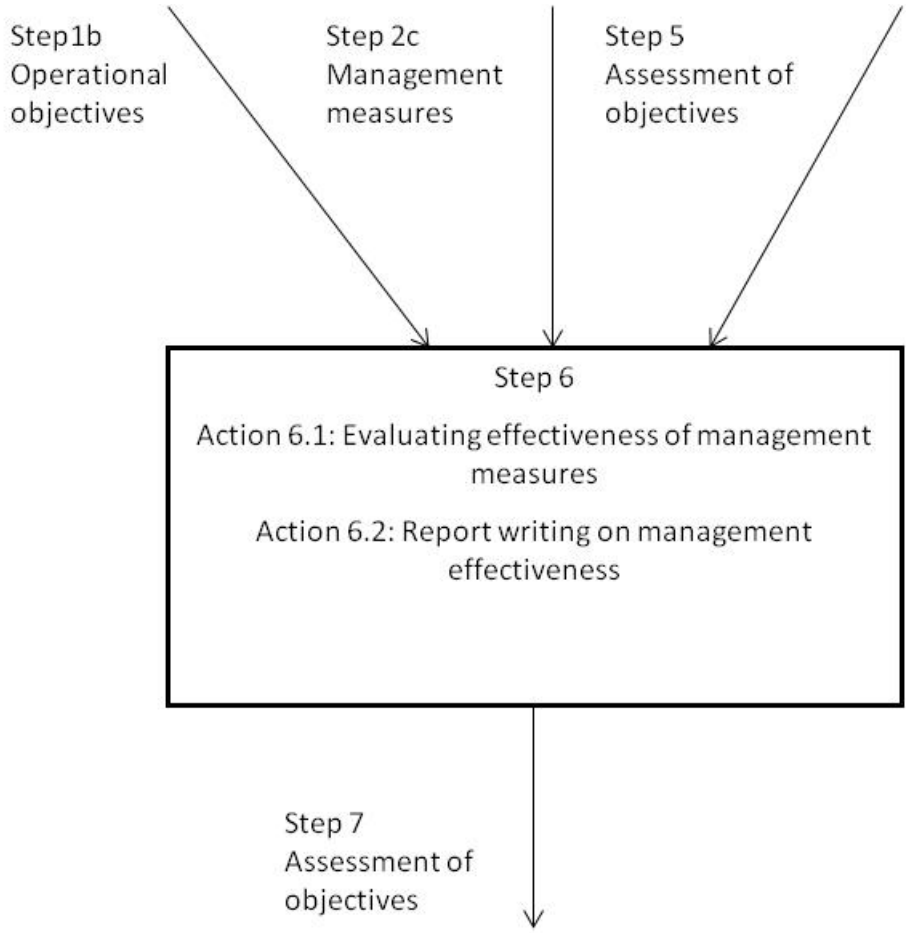


Figure 6.1. Work flow for step 6.

Action 6.1 Evaluate effectiveness of management measures

Using the outputs from steps 1b, 2c and 5, summarise the management measures that are being used to help achieve the respective operational objectives. Where a management plan or initiative exists, populate table 6.1 with the relevant management measures and operational objectives. Where there is no management plan or initiative in place and no measures are set for specific objectives, enter information about existing management measures in table 6.1 and link these to how they might contribute to the operational objectives. You may wish to amend the table to accommodate any additional information.

Table 6.1.

Note that management measures are currently being developed by the Belgian ministries. Only for few objectives, measures have been developed so far.

Operational objective	Management measure	Useful? yes/no/partly	Achieved yes/no/partly
To achieve a sustainable, competitive, profitable and marked-oriented	Operational objectives below	Not known	Not known

fisheries by 2013.			
By 2012, the capacity of the Belgian fishing fleet must be decreased by at least 20% in the GVS, type Beam trawl.		Not known	Not known
By 2010, there must be more than 1491 days at sea with the alternatives for classical beam trawls than in 2007.		Not known	Not known
By 2010, the aquaculture production should be up to 3000 tons, growing of 2 new species and the establishment of new aquaculture businesses. By 2015, a production of 4500 tonnes of aquaculture production, 5 new aquaculture enterprises and 8 commercially farmed aquaculture species in Belgium.		Not known	Not known
To reduce the average fuel consumption per caught fish by 2010		Not known	Not known
To create or retain 80 new jobs due to the implementation of the selected local development strategy		Not known	Not known
Conversion of the European MSFD (by 2020) and the WFD (by 2015) into the Belgian legislation	MS: Transposition of the Directive into the federal government in 2012, initial assessment of the current environmental status and the environmental impact of human activities in 2012. In 2013 a program of spatial management measures in Natura2000 areas. WFD: establish a program of management measures in 2012	Yes	MS: Yes, or planned WFD: to be seen
Agreement between the Ministry of Environment, the port	Consultation with partners	yes	Yes (remark: Federal plan but this is a Flemish

authorities and other relevant authorities to avoid pollution of the marine environment from the ports			competence)
Continuation and development of the project 'fishing for litter'	To investigate the costs and benefits of the different options. Further development of the project	yes	partly
Structural cooperation and agreements between the responsible federal and regional governments and the industry to reduce the negative impacts of fishing on the habitat types and species for which the Natura2000 areas were set.	Consultation with the competent services of the Flemish region and the fishing industry. Consensus around management measures to reduce the negative effects of fisheries in Natura2000 areas	Yes	No. There is still no cooperation on a structural basis but on a more ad hoc basis. Management measures in the Natura2000 sites are not set yet.
Space, peace and food for the protected seabirds by providing optimal integration with human activities	Consultation with defence concerning military exercises. Consultation with relevant regional and federal administrations to evaluate and if needed optimize the existing spatial planning on the BPNS	Yes	On going
The formulation of operational conservation objectives for marine protected areas	They executed a study to formulate the environmental goals	Yes	Study has been executed, but there are still no formal conservation objectives or management measures in the BPNS.
Establish a monitoring program for both EU Nature Directives	To establish a monitoring program	Yes	No. First the operational objectives must be set.
Towards operational monitoring of the enforcement of the regulations in marine protected areas		Yes	No. Important issue for management measures
To establish a scientific and socio-economic advisory committee	To establish a scientific and socio-economic advisory committee	Yes	Yes
The development of a communication strategy	The development of a communication strategy	Yes	On going

	and a new website		
Cooperation with the users of the marine protected areas	Renew the user agreements until the next policy plan	Yes	Yes
Towards a designation of new marine protected areas	New MPA's	Yes	Partly Yes. A new SAC has been designated (Vlaamse Banken). But f.e. there was also the desirability to designate a small area around wrecks in order to optimally protect marine biodiversity
Coherent regulations for the protection of the marine biodiversity in the BPNS		Yes	Yes

Where the effectiveness of an existing management plan or initiative is evaluated, table 6.1 should be used to discuss for each operational objective which management measures have contributed most to the success or failure of an objective. This exercise is largely based on expert judgement, so it is important to select individuals with the relevant background and expertise (and it may be helpful to keep a record of who is completing the evaluation). It is also important to integrate expert opinion with stakeholder views to give a full picture of the effectiveness of each management measure, together with their distributional effects. Since stakeholders' views and perspectives on the effectiveness of management measures are explored through governance research, please refer to section 5.1 in the Governance Analytical Structure. This section, in particular, summarises the key incentives that have been applied to promote the achievement of the priority operational objective and addresses related conflicts in the existing initiative under evaluation; also included is an indication of how a particular individual or combination of incentives has been particularly effective or ineffective. The exercise lists and elaborates on the incentives drawn from Appendix III of the 'Guidelines for MESMA WP6 Governance Research'. However, only incentives that are applicable / relevant to the initiative under evaluation are listed and evaluated. Note that in WP6, the effectiveness of incentives may be determined from expert judgement, interviews with stakeholders or other information.

In cases where no existing management plan is evaluated the assessor should list the suggested management measures in relation to the assessed operational objectives and provide some narrative as to why certain management measures are expected to be successful. This narrative should be directly extracted from the results of the risk analysis (step 4a).

Step 7 Recommend adaptations to current management

General

The monitoring and evaluation of our spatially managed area, i.e. the Belgian part of the North Sea (BPNS), is based on the spatial management anno 2012, which is largely based on sectorial plans and management measures. However, several 'new' actions are emerging in the field of marine spatial planning in Belgium. The government is working out the legal basis for an integrated marine spatial management plan (including clear management measures) and informal consultation rounds with the different sectors and stakeholders are ongoing. Hopefully, the results and recommendations from the present MESMA framework run will be useful for these ongoing and future management processes.

Generally, we recommend that stakeholders should be closely involved at all developmental stages of the management plan, and particularly with the implementation of specific management measures, like those related to the conservation goals in Marine Protected areas (MPAs). Also after an integrated marine spatial plan is established, it is necessary that the management of the plan is supported and monitored on a regular basis. For example, In the Waddensea area, there is an independent platform for stakeholders – besides the official body for cooperation on ministerial level – and the existence of such a stakeholder body can contribute to advanced collaboration on all levels and ultimately to sustainable development.

Specific recommendations for the BPNS from the framework

In Belgium, we do not have a single integrated marine spatial management plan yet. We gathered information on all available (sectorial) plans for the region anno 2012, and thoroughly reviewed these plans and existing management measures. This was not easy as it was not always clear where the plans could be found; due to the fact that the sectors are regulated at different governmental levels; plans are developed in different departments and by different types of management bodies. In several cases management plans have been developed on an ad hoc basis.

➔ **RECOMMENDATION: to aim for a clear and continuously updated overview (database) of plans, management measures and responsibilities, and to develop a single integrated marine spatial management plan.**

The existing plans for the BPNS often lack clear objectives and most of them do not contain a review cycle (cf. the six-year cycle of NA2000). Also, many plans only contain vague action points, which are difficult to follow, let stand to monitor or evaluate. In 2012, specific environmental goals were set in a management document for the BPNS and a number of indicators, trends and thresholds were established in the context of the Marine Strategy Framework Directive. This document has been delivered to the European Commission mid 2012 after a public consultation round. Although it is not really a management plan,, it does include some SMART environmental objectives. Therefore, we decided to use this 'MSFD' -document as the main source for our framework testing.

➔ **RECOMMENDATION: to establish clear environmental and socio-economic objectives according to the SMART (Specific, Measurable, Achievable, Relevant, Time bound) principle. Moreover, the marine spatial plan must include a review cycle to ensure the continuity in the monitoring and evaluation of the management plan and measures.**

In the second step of the framework, the ecosystem of the area has been analyzed. The spatial and seasonal appearance of the individual ecosystem components of the BPNS are generally well known, but

there is important information lacking on the impact of human activities on every ecosystem component. Currently, pressure and impact maps are either missing or could not yet been established, or they are rather vague (cf. the results of the WAKO and WAKO-II projects[11] Within the MESMA project there was insufficient time and resources to cope with questions in the framework like "What is the sensitivity of each ecosystem component for a certain human pressure?" or "What is the combined impact of multiple pressures?". By all means, this is a very important step in marine spatial planning.

➔ **RECOMMENDATION: to create pressure and impact maps based on existing (or newly gathered) data or on expert judgment. For this, also the intensity of a particular activity in an area must be taken into account.**

In step 3-5, we focused on the MSFD objectives. We tried to give an answer to the following question: "Is it possible to achieve a Good Environmental Status (GES) in the Natura2000 area "Vlaamse Banken" without additional management measures?" The indicators and thresholds/trends are described in the 'MSFD' document, but some of them are still under development. In the initial assessment round most of those indicators and thresholds/trends were not yet determined. Therefore, we were not able to complete the indicator analysis (Step 3) of the MESMA framework. It will be a major challenge to fill in the gaps during the first evaluation round in the MSFD process.

➔ **RECOMMENDATION: to tune the various national monitoring programs and their related indicators with each other and to determine the indicators, trends and thresholds in an integrated way. Belgium should cooperate in European or broader intercallibration programs.**

We performed a risk analysis (Step 4 of the framework) during an expert workshop. All the collected information is based on best professional judgment. The degree of uncertainty gives an indication of whether the information is based on real data/reports from the BPNS or from other areas, on scientific based 'assumptions' or pure 'gut'feeling. .For each environmental objective or goal, the pressures were identified and both the magnitude of impact and the impact likelihood were determined. For some MSFD objectives we couldn't continue, because the necessary expertise was lacking. During the workshop it became clear that many pressures are present in the selected area of the BPNS and that most ecosystem components are highly sensitive to one or more pressures. The general conclusion from the risk analysis based on expert judgment was that for many MSFD objectives there is a high risk of not reaching the environmental goals. In other words, without additional management measures, there is a high risk of not obtaining GES in the 'Vlaamse Banken' NA2000 site.

[11] WAKO I

Evaluatie van de milieu-impact van WArrelnet- en boomKOrvisserij op het Belgisch deel van de Noordzee (WAKO). Eindrapport

Depestele, J.; Courtens, W.; Degraer, S.; Derous, S.; Haelters, J.; Hostens, K.; Moulaert, I.; Polet, H.; Rabaut, M.; Stienen, E.; Vincx, M. (2008). Evaluatie van de milieu-impact van WArrelnet- en boomKOrvisserij op het Belgisch deel van de Noordzee (WAKO). Eindrapport. ILVO Visserij: Oostende. 185 pp.

WAKO II:
An integrated impact assessment of trammel net and beam trawl fisheries "WAKO II": Final Report Depestele, J.; Courtens, W.; Degraer, S.; Haelters, J.; Hostens, K.; Houziaux, J.-S.; Merckx, B.; Polet, H.; Rabaut, M.; Stienen, E.W.M.; Vandendriessche, S.; Verfaillie, E.; Vincx, M. (2012) Belgian Science Policy Office: Brussels. 233 pp.

A lot of pressures occurring in the region are linked to bottom disturbing activities namely abrasion, substratum loss, displacement,…. Also fishing activities cause high risks not obtaining several environmental objectives.

RECOMMENDATION: a partly or temporarily closure of some areas from bottom disturbing activities would be beneficial for several ecosystem components in order to reach GES in the "Vlaamse Banken" NA2000 site.

In this framework run we only 'evaluated' management measures for the MSFD objectives in Natura2000 areas. From this analysis it became clear that there is an urgent need for SMART management measures for the species and habitats which are protected under the Habitats & Birds Directives as well.

For example: Environmental objective: "Changes in the density of nesting seabirds remain for 75% of the chosen species within the intended limits". Within the Nature 2000 site the only pressure is the introduction of microbial pathogens and parasites.

But the biggest pressure for not obtaining this objectives lays outside this chosen area, namely in the area where the seabirds are nesting. This area is protected under the birds directive and management measures are also needed there.

Also, for some of the MSFD-environmental goals a cross border approach is needed, e.g. the goals related to human-induced eutrophication. These type of pressures and goals must be treated on a higher (European) level.

➔ **RECOMMENDATION: to establish management measures both inside and outside the Natura2000 areas to obtain GES in the whole BPNS. Given the transboundary nature of water, there is a clear need for a European approach for certain MSFD objectives.**

For the MSFD objectives we couldn't evaluate the success of the operational objectives nor the success of the management measures, as the whole MSFD process only recently started in Belgium. The environmental goals have been initially assessed in the first cycle, but the decision for a number of indicators and thresholds still needs to be taken.

On the other hand we were able to investigate the management effectiveness of the existing sectorial plans (Objectives from " Policy plans in the Marine Protected Areas in the BPNS" and "Operational program for the National Strategic plan for the Belgian Fisheries") in the BPNS. The main conclusion here is that it is hard to find the current state of the different action points and the results of the actions taken so far. For example, we are not aware of the current situation for the fisheries objectives. The respective administrations keep record of the state but interviews (performed under Work Package 6 in MESMA) show that no single stakeholder has been informed on the state of these action points.

➔ **RECOMMENDATION: Better communication between institutional bodies and stakeholders. To aim for a complete transparency in (sectorial) plans, objectives and management measures, and a thorough evaluation of those plans.**

GLOSSARY OF TERMS

Term	Definition
Actor	People from wider society, non-governmental organisations, user groups, regulatory agencies, corporate interests, *etc.* who interact with each other in governance processes.
Arc Marine	Arc Marine is a geo-database model tailored specifically for the marine GIS community.
Benchmark	A numerical value that gives a measure of the performance of a computer product in a specific test.
Characteristics	"… Member States shall … determine, for the marine waters, a set of characteristics for good environmental status, on the basis of the qualitative descriptors listed …"
Criteria	"distinctive technical features that are closely linked to qualitative descriptors".
Criteria and methodological standards	"to ensure consistency and to allow for comparison between marine regions or sub-regions of the extent to which good environmental status is being achieved."
Data integration	Data integration involves combining data residing in different sources and providing users with a unified view of these data.
Data quality	Indications of the degree to which data satisfies stated or implied needs. This includes information about lineage, completeness, currency, logical consistency and accuracy of the data.
Descriptors	Qualitative descriptors for determining good environmental status : 1) Biological diversity, 2) Non-indigenous species, 3) Commercial fish, 4) Foodwebs, 5) Eutrophication, 6) Sea floor integrity, 7) Hydrography, 8) Contaminants, 9) Contaminants in food, 10) Marine litter, 11) Energy including noise.
EcoQOs (Ecological Quality Objectives)	"can take the form of targets (values where there is a commitment to attain them), limits (values where there is a commitment to avoid breaching them) or indicators (values which highlight a change in the ecosystem and can trigger research to explain what is happening)."
Ecosystem approach	A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

Ecosystem approach to management	The Ecosystem Approach to Marine Management involves an integrated management of human activities based on knowledge of ecosystem dynamics to achieve sustainability of ecosystem goods and services and maintenance of ecosystem integrity.
Ecosystem Based Management	Ecosystem based management is an environmental management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation.
Ecosystem Based Marine Spatial Management	Ecosystem based marine spatial management (EB-MSM) is an approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation.
End user committee	A committee consisting of a representative range of stakeholders.
Environmental Target	"a qualitative or quantitative statement on the desired condition of the different components of, and pressures and impacts on, marine waters in respect of each marine region or sub-region."
Feature	A feature is an abstraction of a real world phenomenon. A geographic feature is a feature associated with a location relative to the Earth.
Geographic Information System (GIS)	A geographic information system (GIS) is a computer-based tool for mapping and analyzing things that exist and events that happen on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps.
GIS Web Service	GIS Web services are a constantly emerging technology that allows many divers Web based applications to interact in order to exchange geospatial data and GIS software.
Goal	Purpose, aim, or the anticipated result which guides action.
Good Environmental Status	"the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations."

Governance	The involvement of a wide range of institutions and actors in the production of policy outcomes….. involving coordination through networks and partnerships. Or Steering human behaviour through combinations of people, state and market incentives in order to achieve strategic objectives.
Governance approach	A style of governing involving a particular combination of incentives, and/or a particular allocation of authority and responsibilities between different actors, e.g. communities, governments and business corporations.
Governance analysis	Qualitative research to explore different perspectives amongst different stakeholders on the validity, legitimacy and effectiveness of different governance approaches for achieving strategic objectives through MSP in the context of specific case studies, employing a standard set of themes.
Indicator	Progress in relation to operational objectives will be measured using indicators and associated reference points and directions. An indicator is a measure, or a collection of measures, that describes the condition of an ecosystem or one of its critical components; in socio-economic objectives, indicators can be a desired outcome, f.ex. the amount of kilowatt produced by a wind park.
Incentive	Particular SMA institutions that are instrumentally designed to encourage people to choose to behave in a manner that provides for certain policy outcomes, particularly conflict management & ecosystem restoration, to be fulfilled.
INSPIRE	Infrastructure for Spatial Information in Europe.
INSPIRE Directive	The INSPIRE directive aims to create a European Union (EU) spatial data infrastructure. This will enable the sharing of environmental spatial information among public sector organisations and better facilitate public access to spatial information across Europe.
INSPIRE Portal	a geoportal provide the means to search for spatial data sets and spatial data services, and subject to access restrictions, view and download spatial data sets from the EU Member States within the framework of the Infrastructure for Spatial Information in the European Community (INSPIRE) Directive.

Institution	Very broad term covering a wide range of agreements, interactions, etc., which remain relatively stable or predictable over a certain period of time, including: Mutually agreed modes of cooperative behaviour (norms), Interactions through markets: local – distant, Government policies and programmes and Legal instruments and related obligations.
Interoperability	The ability of two or more autonomous, heterogeneous, distributed digital entities (e.g. system, applications, procedures, registries, services or data set) to communicate and interact or be used together despite their differences in language, context, format or content. These entities should be able to interact with one another in meaningful ways without special effort by the user, the data producer or consumer, be it human or machine.
ISO 19115	ISO 19115 "Geographic Information – Metadata" is a standard of the International Organization for Standardization. It defines the schema required for describing geographic information and services. It provides information about the identification, the extent, the quality, the spatial and temporal schema, spatial reference, and distribution of digital geographic data.
ISO 19119	ISO 19119 “Service” is a standard of the International Organization for Standardization. It identifies and defines of the architecture patterns for service interfaces used for geographic information and definition of the relationships to the Open Environment mode, presents a geographic services taxonomy and a list of example geographic services placed in the services taxonomy. It also prescribes how to create a platform-neutral service specification, how to derive conformant platform-specific service specifications, and provides guidelines for the selection and specification of geographic services from both platform-neutral and platform-specific perspectives.
ISO 19139	ISO-19139 “Geographic information - Metadata - XML schema implementation” is a standard of the International Organization for Standardization. It provides a XML implementation of ISO-19115 metadata standard.
Layer	A logical separation of mapped data usually representing a theme, such as roads, political boundaries, etc. Layers are all registered to one another by means of a common coordinate system.

Marine Protected Area (MPA)	Any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.
Marine Spatial Planning (MSP)	Marine spatial planning (MSP) is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process.
Metadata	Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information.
MSFD	The Marine Strategy Framework Directive (MSFD) is a high level document and requires further development and specification ('operationalisation') before it can be applied to specific regions.
Operational objective	A short-term goal, defining a clear, often measurable, outcome of a process (SMART objectives).
Pressure	Human pressures exerted by human activities.
Priority Objective	The objective on which the WP6 governance analysis is focused, recognising that this should also be a key priority in the existing initiative you are evaluating.
Protected area	A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Protocol	A set of semantic and syntactic rules that determine the behavior of entities that interact.
Replacement cost	Replacement cost and variants such as relocation cost (sometimes called shadow project) are based on the concept that the cost of replacement of a damaged environment is somehow a measure of the value of that environment.

Sea use management	Sea use management promotes sustainable development (based on achieving a balance of environmental, socio and economic objectives), uses a strategic, integrated and forward-looking framework, applies an ecosystem-approach to management, identifies and safeguards important components of marine ecosystems and uses MSP to minimise conflicts on the use of space.
Spatially Managed Areas/SMA	Areas where a marine spatial planning framework is in place or is being developed in order to conserve structure, function and processes of the constituent marine ecosystems through the management of the cumulative pressures of different sectoral activities inside or outside the area concerned, and including the threats posed by climate change and geohazards.
Stakeholder	Stakeholders relevant to the MESMA project are divided into the following categories:
Stakeholder (operational)	Operational stakeholders: groups whose core activities and economic performance is closely related to exploiting or using marine resources or marine areas, i.e. engaged in or related to fishing, mariculture, marine renewables, aggregates, oil/gas, etc. industries;
Stakeholder (indirect)	Indirect stakeholders: members of the public who passively interact, e.g. through aesthetic appreciation, with the marine area in question or have an indirect stake in it (hold existence values, bequest values, etc.);
Stakeholder (policy)	Policy stakeholders: responsible authorities or bodies who have to put forward the legal framework and policies related to strategic objectives for marine areas, e.g. national governments, EC, international bodies;
Stakeholder (regulatory)	Regulatory stakeholders: bodies or agencies that manage marine or coastal areas, e.g. management bodies of MPAs, fisheries regulatory and enforcement authorities;
Stakeholder (science & advocacy)	Science & advocacy stakeholders: engaged in research and/or advocacy, e.g. environmental NGOs, universities.
Synergistic institution	An institution that is conducive to or supportive of the achievement of a particular goal/objective.

Web-based GIS or WebGIS	Web-based GIS (Web-based geographic information system or simply WebGIS) is a distributed geographic information system across a computer network to integrate, disseminate and communicate geographic data visually on the Web. Web-based GIS refers to use of Internet technologies to distribute and delivery geospatial information in a variety of forms, including maps, images, datasets, spatial analysis operations and reports.
Water Framework Directive (WFD)	Water Framework Directive (WFD) entered into force in December 2000. The WFD is a legislative framework that rationalises and updates existing water legislation by setting common EU wide objectives for water (inland surface waters, transitional waters, coastal waters and groundwater) and introduces an integrated and coordinated approach to water management in Europe.
XML	Extensible Markup Language (XML) is a W3C-recommended general-purpose markup used for describing many different kinds of data.

Contact:

Ellen Pecceu
Wetenschappelijk onderzoeker
Instituut voor Landbouw en Visserijonderzoek ILVO
Eenheid Dier
Ankerstraat 1
8400 Oostende
Tel. +32 (0)59 56 98 76
ellen.pecceu@ilvo.vlaanderen.be

Deze publicatie kan ook geraadpleegd worden op:
www.ilvo.vlaanderen.be/pers en media/ILVO mededelingen

Pecceu E., Hostens K., Rabaut M., Vanaverbeke J. (2013) Application of the MESMA Framework.
Case study: Belgian Part of the North Sea.
ILVO mededeling 138

Instituut voor Landbouw- en Visserijonderzoek
Burg. Van Gansberghelaan 96
9820 Merelbeke - België
T +32 (0)9 272 25 00
F +32 (0)9 272 25 01
ilvo@ilvo.vlaanderen.be
www.ilvo.vlaanderen.be

ILVO Instituut voor Landbouw- en Visserijonderzoek
MESMA Monitoring and Evaluation of Spatially Managed Areas
UNIVERSITEIT GENT
Landbouw en Visserij