



**BACKGROUND DOCUMENT SUMMARISING EXPERIENCES WITH RESPECT
TO ECONOMIC ANALYSIS TO SUPPORT MEMBER STATES WITH THE
DEVELOPMENT OF THEIR PROGRAMME OF MEASURES FOR THE MARINE
STRATEGY FRAMEWORK DIRECTIVE**

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Disclaimer:

This document has been developed by the contractor ARCADIS through a collaborative way of working involving the European Commission, all EU Member States, the Accession Countries, and Norway, international organisations, including the Regional Sea Conventions and other stakeholders and Non-Governmental Organisations. The document should be regarded as presenting an informal consensus position on practices and experiences put forward by all partners. However, the document does not necessarily represent the official, formal position of any of the partners. Hence, the views expressed in the document do not necessarily represent the views of the European Commission.

1

Introduction

The implementation of the Marine Strategy Framework Directive (MSFD; 2008/56/EC) requires Member States to establish and implement programmes of measures (PoMs), designed to achieve or maintain good environmental status, at predetermined moments in time. In the MSFD, economic analysis is considered as an important tool to select and prioritise measures for the PoM.

The purpose of this document is to list experiences in relation to the economic analysis already applied as part of the prioritisation and/or development of the first PoM. Cost-effectiveness analysis, cost-benefit analysis and impact assessment methods and their implementation illustrated here are based on existing Member State practices, and highlight potential issues and solutions when applied in an MSFD context. Further on, attention is given to other criteria that may play a role in the PoM development process, such as links with other policy areas and transboundary cooperation.

The timing of this paper did not allow for a full overview of all existing experiences, since a lot of Member States are still in the preparation phase of their first PoM. However, as there is no shared document available at the moment assisting Member States on how CEA and CBA should be executed, an exchange high-level experiences is considered useful at this moment. There is an opportunity to update this document as soon as more experiences become available.

In order to understand the context of this document, one should realise that the background paper provides a snapshot in time of practices available. The idea of the document is to deliver an exchange of experiences to the Member States and not a full guidance document describing all possible methodologies of CEA and CBA application.

2

Background and objectives

2.1

Legal requirements of the MSFD

The MSFD enters an important phase of implementation. The next major milestone is the establishment of PoMs by 2015 and their entry into operation by 2016. This is referred to in Art 13.3 of the MSFD as reported below.

Art 13.3 of the MSFD.

When drawing up the programme of measures pursuant to paragraph 2, Member States shall give due consideration to sustainable development and, in particular, to the social and economic impacts of the measures envisaged. To assist the competent authority or authorities referred to in Article 7 to pursue their objectives in an integrated manner, Member States may identify or establish administrative frameworks in order to benefit from such interaction.

Member States shall ensure that measures are cost-effective and technically feasible, and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of any new measure.

This is a crucial requirement of the Directive for new measures, where a common understanding and exchange of experiences is needed to better perform impact assessments (IA) of measures, including cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA) when new measures are envisaged.

New measures (following Art 13.3) are further defined in the PoM Recommendation paper as follows (European Commission; 2014b) :

- Category 2.a: Additional measures to maintain and achieve GES which build on existing implementation processes regarding other EU legislation and international agreements but go beyond what is already required under these;
- Category 2.b: Additional measures to maintain and achieve GES which do not build on existing EU legislation or international agreements.

2.2

Definitions CEA/CBA/Impact assessment

As defined in the PoMs recommendation paper, a “measure” in the MSFD should be considered as any action on a national, European or international level with a view to achieving or maintaining GES and with reference to the environmental targets.

It is not proposed here to further classify measures by typology, however it is recognised that they may have different modes of action, including:

- ‘technical’: An actual action that one can see (and measure) in the field. In principle a wide range of measures have a primarily technical mode of action.
- ‘legislative’: Adapting or supplementing national environmental law and other national legislation influencing the marine environment to implement environmental targets and to achieve/maintain GES.
- ‘economic’, such as economic incentives that provide financial motives to stimulate a desired behaviour or discouraging an unwanted behaviour. Financial instruments are often aimed at the uptake of technical measures. For example, a subsidy for beach resorts of 20 Euros for each additional garbage bin they place.
- ‘policy driven’: Policy instruments can be economic incentives, but also other instruments, such as voluntary agreements with stakeholders communication strategies, awareness raising, and education. For example, the government launches an information campaign to make the beach resorts aware of the new subsidy they can get for placing more garbage bins, or beach resorts informing their customers where the litter bins are located, or teachers telling children it is fun to collect waste and put it in a litter bin and gives you a clean beach as well.

Research activities/ research references could be submitted as a supplementary list to the PoM but do not need to be aligned to specific environmental targets. Therefore, for such activities there is no need to carry out cost-benefits and/or cost-effectiveness assessment.

Often, measures are not taken in isolation, but as part of a set of supporting measures implemented in order to increase the chance for success or to make a measure more effective in working towards the GES targets. E.g. awareness raising of litter at beach sites and enforcement actions regarding litter disposal on beach sites could be part of one overall project/investment.

When drawing up the programme of measures, Member States need to give due consideration to sustainable development and, in particular, to the potential social and economic (and implicitly wider environmental) impacts of the new measures envisaged (Art 13.3). An impact assessment allows decision-makers to weigh the additional advantages/positive impacts and disadvantages/negative impacts of potential policy measures to different societal actors relative to the ‘no action’ or baseline option . Specifically in relation to the MSFD, the impact assessment should consider the scenario with new individual and/or sets or programmes of measures versus the baseline (as defined in the Initial

Assessment which includes future scenarios as determined by ongoing policy and implemented measures – see WG ESA guidelines (WG ESA; 2010)).

The Commission has published Impact Assessment Guidelines¹ on how to perform an IA and indicates three relevant tools for comparing options: cost-effectiveness analysis (CEA), cost-benefit analysis (CBA) and multi-criteria analysis (MCA).

CEA is used to establish the “least cost solution” to achieve a certain predetermined output. A CEA is an analysis of the costs of alternative individual and/or sets or programmes of measures designed to meet well specified objective (quantified in physical terms). It can be used to identify the highest level of a physical benefit given available resources (e.g. delivering the maximum reduction in risk exposure subject to a budget constraint), as well as the least-cost method of reaching a prescribed target (e.g. a given concentration level of nitrogen in coastal waters at least costs).

CEA is used when measurement of benefits in monetary terms is difficult, or in any other case when any attempt to make a precise monetary measurement of benefits would be redundant due lack of scientific evidence and/or open to considerable dispute, or where associated uncertainties are high. In the case of multiple objectives a more sophisticated weighted CEA is required, which gives weights to objectives to measure their priority scale (European Commission; 2013)..

In a CEA, the focus lies in first instance on the direct costs² i.e. the cost of investment and operation associated with the implementation of measures. However if the measure is a policy instrument, an estimation would be necessary of the indirect costs as well. Typically a CEA mainly looks into the financial compliance costs; sometimes a rough estimation of (part of) the administrative costs is made but external costs are rarely known and usually not used.

CBA is a method for comparing policy measures against the baseline situation in terms of their advantages (benefits) and disadvantages (costs). This essentially involves estimating all of the negative and positive economic, social and environmental impacts, including items for which the market does not provide an observable measure of value, accruing to all affected societal parties. According to the EC Impact Assessment Guidelines, a CBA can be done at various levels, depending on data availability. It can be either a full CBA when the most significant part of both costs and benefits can be monetised utilising economic values derived through various economic techniques (e.g. market, revealed and stated preference-based methods); or a partial CBA in cases where only a part of the costs and benefits can be quantified and/or monetised.

In case more information is needed on the definitions of the economic tools included, one could refer to the CIS WATECO guidance (European Commission; 2003).

A useful tool for presenting the full range of benefits could be Multi-Criteria Analysis (MCA). The term MCA covers a wide range of techniques that share the goal of combining positive and negative impacts into a single framework to allow easier comparison. Participation of the decision-makers in the process is a central part of the approach (European Commission; 2013). Essentially, MCA applies cost-benefit thinking to cases where there is a need to present impacts that are a mixture of qualitative, quantitative and monetary data, and where there are varying degrees of certainty. This mixture of units in which impacts are expressed is a typical feature in the MSFD context.

¹http://ec.europa.eu/smart-regulation/impact/commission_guidelines/docs/iag_2009_en.pdf

²The direct cost is the cost of investment and operation associated with the implementation of measures. Indirect costs are costs associated with the policy instruments and their implementation and the policy's impact on other environmental targets and on other sectors in the economy.

An **impact assessment** not only focuses on additional financial costs to different sectors but also takes into account other extra economic costs (e.g. loss of market share) and wider economic impacts (e.g. increased competitiveness) associated with the new proposed measures,. Overall, an impact assessment identifies the direct and indirect costs and the benefits of implementing a measure, involving several societal actors and also including non-monetary items. In the context of the PoMs it is therefore not always necessary to submit Impact assessments if no new measures are envisaged since it is expected that GES targets are delivered.

When looking into the impacts of a measure in a societal context, it may become clear that it is beneficial for society as a whole but has positive and negative impacts that are spread unevenly across society, and over time. Ideally, the impact assessor needs to identify who is affected by the impacts (and when), who implements the measures, who bears the costs, who incurs the burdens and who benefits.

Attributing the costs and benefits to these sectors will help structuring the stakeholder consultation process (e.g. negotiations on future implementation of measures) and when possible identifying the need for introducing economic instruments such as financing to address e.g. affordability issues.

A core principle of the impact assessment guidelines is that the depth and scope of the impact assessment analysis is determined by the expected size of the impact of the measure, reflecting the 'principle of proportional analysis'. This proportionality principle should be applied to the whole impact assessment process: identification of options and delivery mechanisms, assessment methodology and depth of analysis of impacts, data collection efforts and stakeholder consultation, arrangements for monitoring and evaluation, etc.

Costs

Costs of new measures will differ depending on whether they refer to technical measures or policy instruments. In case of technical measures, additional costs mainly consist of direct investment and operational costs. However, the costs associated with the policy instruments and their implementation are indirect costs:

- Administrative costs for the regulator: research, information and meeting costs, enactment and lobbying costs, design and implementation costs and administration, monitoring and prosecution costs. Most of these costs are costs of labour time for researchers, court staff, legislators, government staff etc.
- Compliance costs for the regulated: investment in abatement equipment or additional costs related to changed behaviour, administrative costs e.g. costs of applying for permits, monitoring costs;
- External costs: environmental and resource costs.

Benefits

The benefits from new measures can be described by identifying use and non-use values. The use values can be separated into direct use values such as fishery production and recreation and indirect use values such as values of environmental functions or the effects on living conditions. Non-use values capture the less tangible values derived from the implementation of the measure within the MSFD.

A number of the expected benefits (both environmental and socio-economic ones) associated with new measures can be presented for Impact assessments. These can be either fully monetised or -in certain circumstances due to scale of uncertainties- given for illustrative purposes only.

This exercise, and particularly for the environmental benefits, normally requires to carry out a literature review of available studies in the area of the proposed policy and verify whether economic estimates can be adopted in that context. There are areas where economic benefits are easier to ascertain (for example financial savings associated with the proposal or recreational and tourism benefits) whereas for others it might be more challenging due to many scientific and economic uncertainties (e.g. ecosystem services valuation, health effects, etc.). It is good practice to explain at minimum in qualitative term what the benefits associated with the extra measure are.

2.3 Complexity of the marine environment

The complexity of the marine environment and the difficulty in applying marine policy measures is stressed in various documents, including the ARCADIS 2012 study (European Commission; 2012). The specificities of such a marine environment are:

- a. Open access –this may affect the effectiveness of policy instruments that target particular types of users of marine space, as other users may move into these areas.
- b. Transboundary pollution movement – this raises particular issues when the impacted population is not in the same jurisdiction as the pollution source.
- c. Mixing and cumulative pollutants/impacts – mixtures of pollutants/impacts affect marine organisms and it is difficult to entangle a single impact of a pollutant/disturbance on the marine ecosystem components. From that perspective, one will find difficulties in linking the impact of a single or set of measures on a marine ecosystem component, as at the same moment many different pollutants and impacts are existing and determine jointly the condition of the marine ecosystem.
- d. Complexity – marine systems are by nature more complex than riverine systems. The scientific complexity poses important questions for appropriate policy setting – where the impact of pollution is affected by factors such as differing levels of salinity, different rates of mixing in the water column and water temperature. The base of scientific knowledge on the seas is generally considered to be lower than that on limnetic and riverine systems

One could say that this complexity also makes it more difficult to determine the:

- Effectiveness of measures
- Benefits of measures.

This “starting point” on the complexity of the marine ecosystem will trigger certain issues which this document will refer to in the following sections.

2.4 Purpose of this document

Several efforts have been made to ensure a common understanding and exchange of experiences in relation to PoM and more specifically the socio-economic analysis to be performed. These include:

- Drafting of a Recommendation paper (prepared by a Drafting group with CIS GES, ESA and DIKE WG members): “Programmes of Measures under the MSFD - Towards recommendations for establishment / implementation and related reporting”
- EC DG ENV contract: “Exchange of good practices for cost-effective marine measures” (by ARCADIS and EUCC). Under this contract, support has been given through: (1) inventory of practices including policy discussions and practices on economic analysis in the marine and related policy areas (2) input in the Drafting group for the PoM recommendation paper, drafting an overall agreed text on the interpretation of economic analysis requirements for the PoM development, (3) organisation of a workshop on CEA/CBA best-practices focusing on both WFD

and MSFD practices and issues encountered and (4) which is this document, an experiences exchange document on CEA and CBA applications.

The idea on this background document is to document and discuss experiences of Member States and NOT a full guidance document describing all possible methodologies of CEA and CBA application. The idea is that at this stage countries would benefit from illustrations of practices, as not many data and information on the economic analysis are available at the moment in Member States, and also data is disaggregated. This background document could also contribute to the consistency in approaches applied by Member States. A set of key questions which this document will aim to answer have been discussed with WG ESA and the Commission and these are the following:

- How to assess the effects, effectiveness and benefits of measures?
- What does the impact assessment requirement imply ?
- What are the practical issues we have to deal with when applying CEA/CBA following the Art 13 requirement and taking into account the PoM recommendation guidelines
- What are the practical approaches / experiences already available and lessons learned?
- How to consider a possible link between the economic analysis and the initial assessment (including the baseline)?
- How could one apply/interpret the outcome of the results of the economic analysis and how to deal with uncertainty?
- How to embed the economic analysis into decision making? Which other criteria are of importance? (e.g. stakeholder involvement)
-

This document has been structured as follows. First, the MSFD cycle and requirements regarding economic analyses are presented, followed by the stepwise approach of CEA and Impact Assessment including CBA. Next, some key aspects of the MSFD cycle and the marine measures, that largely determine the approach on CEA/CBA, are considered e.g. the definition of the baseline scenario and links with other Directives. Then, some more examples on the CEA and CBA application will be provided, including the embedment of the economic analysis into the overall decision-making.

For each of these different chapters, the following approach is applied:

- | |
|--|
| <ul style="list-style-type: none">• Where relevant, a brief description is given of the economic concept• Discussion of relevant methodological and practical issues• Problem / Opportunity: What is the specific problem that Member States may have? Or what is the specific opportunity here?• Experiences: Is any practical experience available, from a Member State, a Regional Sea Convention (RSC), a region, a study?• Recommendations/suggestions: can we draft any suggestions related to the issue or opportunity, are there any lessons learned or points of attention that we can pass on to a Member State or Regional Authority? |
|--|

In order to understand the context of this document, one should realize that the document provides a snapshot in time of experiences available. In the WG ESA, initial discussions on economic analysis were held, and the European Commission decided to contract the development of a document on

experiences with respect to the application of economic analysis for the MSFD PoM development. The European Commission contracted ARCADIS to organise a workshop in order to facilitate an exchange of practices between the Member States and discuss issues, barriers and a way forward. Simultaneously, a document should be developed including experiences of Member States in relation to the economic analysis in the PoM development. The main goal of this document is to facilitate the exchange of practices and to highlight possible issues and practicalities of the applied approaches in the Member States. An inventory of practices was done by ARCADIS based on the available literature and by means of requesting information from each individual Member State on the application of the economic analysis. This consultation was done through WG ESA. Further on, the document also includes practices and outcomes of discussions from the CEA/CBA workshop held April 1 2014, organized by ARCADIS. Specific cases (often non-published material) were presented at this workshop or delivered by the Member States following a request for information by the contract (as part of the same contract). The workshop presentations and report (ARCADIS, 2014) are available on CIRCABC WG ESA. These different sources of information, practices and illustrations are used to develop this document and include further discussions in terms of practicalities, way of implementation, issues, and where possible some recommendations. The idea of this document is to have it as a living document, documenting further experiences when these will become available further in the MSFD cycle.

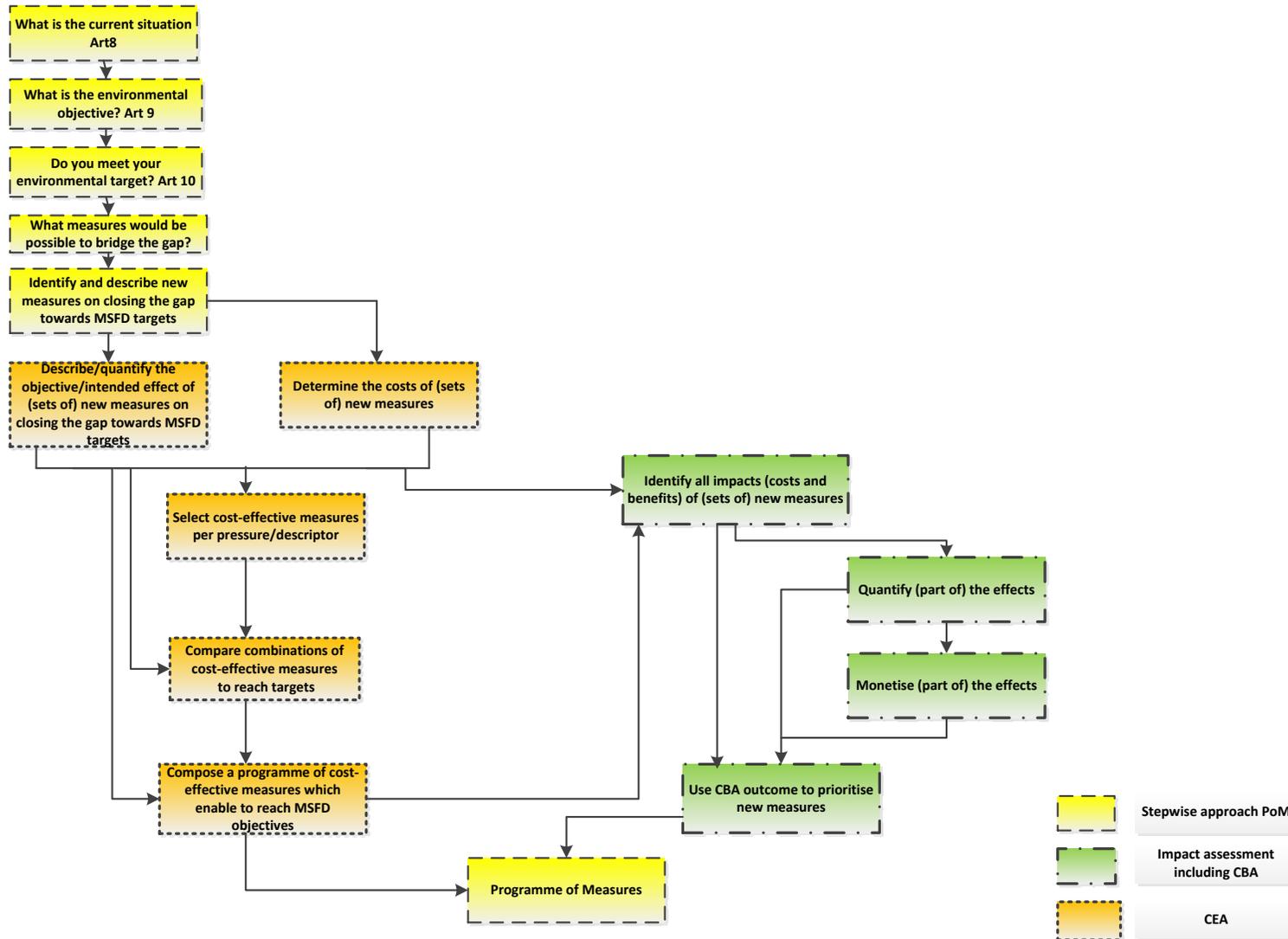
3 Starting points: MSFD CYCLE

3.1 Stepwise approach – CEA and CBA application

The following section explains the stepwise approach that can be taken in order to include CEA and CBA application as part of the programmes of measures development.

It is based on the flowchart as included under Figure 1.

Figure 1. Stepwise approach PoM development (including economic analysis)



*A note should be made that the order of CEA/CBA steps as indicated in the graph may change. Various experiences have been identified, such as the national/regional regulatory process requiring to the execution of a CBA in the first place. Measures which turned out not to be cost-effective may still be

integrated in the public consultation supporting the CBA. Different approaches may also depend upon the type of measures e.g. while a comparison of technical measures may be more easily subject to a CEA, the comparison of sets of measures combining technical, spatial, etc. measures may be rather the subject of a CBA. It is also possible that in the framework of the gap analysis, other benefits of measures may have already been taken into account e.g. their positive contribution to other policy objectives. This shows that in practice, the process may not follow exactly the steps linear visualised in the graph.

After the gap analysis, a list of potential new measures should be identified, which could close the gap towards the achievement of the MSFD targets. Individual new measures can be either mutually exclusive, implying that a choice would need to be made between measures, or they can form part of a set of individual measures supporting each other towards a specific target. As the targets are steering the identification process of new measures, the new measures will be identified starting from the primary MSFD target they aim at.

The first task in the stepwise approach is to identify the contribution of the potential new measures to the specific MSFD target. They can be qualitatively described or, if possible, quantified. Once the contribution of the potential measures has been established, the costs of the measures should be assessed. In case of physical measures, costs mainly consist of direct investment and operational and maintenance costs. However, the costs associated with the policy instruments and their implementation are indirect costs (administrative costs, compliance costs, external costs). In CEA, the focus lies in first instance on the direct costs i.e. the cost of investment and operation associated with the implementation of measures. Typically a CEA mainly looks into the compliance costs, sometimes a rough estimation of (part of) the administrative costs is made but external costs might be rarely known and sometimes not assessed.

The costs can be assessed for individual measures (specifically needed in case measures are mutually exclusive) and/or the costs can be grouped for sets of measures supporting each other in their contribution to an MSFD target. Attention should also be given to whether combining measures can have conflicting or reinforcing effects.

The combination of costs and the primary effect of (sets of) measures provides useful information for executing a cost-effectiveness assessment at various levels. Looking at a specific target, the individual and sets of measures potentially capable of closing the gap are compared in terms of their cost-effectiveness. In this way, individual mutually exclusive measures can be ranked according to cost-effectiveness. The cost-effectiveness of individual measures can then be further compared to the cost-effectiveness of sets of measures which support each other to reach an MSFD target e.g. by combining legislation, enforcement capacity and social instruments. This exercise results in an order/ranking of (individual and/or sets of) measures which indicates the (sets of) measures which should be implemented with higher or less priority. depending on prioritised according to the degree to which they can achieve a specific target at a relatively lower or higher cost (various criteria can be set for expressing least cost priorities). In this way, the least-cost way can be found of achieving a target. Once a prioritisation of measures is available to reach individual targets, a CEA can also help achieving as many of the predefined targets as possible at least cost.

It is considered useful that aspects of impact assessment are already taken into account when assessing the long-list of potential new measures which can close the gap towards the MSFD targets. Impact assessment refers to the analysis of additional positive (benefits) and negative (costs) social, economic and environmental impacts incurred by the (sets of) measures throughout the whole society, compared to the baseline situation ("no additional MSFD measures" option). Impacts should be identified for individual (e.g. mutually exclusive) measures or for a set of measures grouped in order to reach the predefined effect. The assessor also needs to identify who may be affected by the impacts e.g. business sectors, users/non-users of the marine environment, governments. Finally, it should also be indicated in which period of time the costs and benefits will occur. Typically, the largest cost share is most often spent in the first years of the implementation of the measure, whereas the benefits may only start to occur after a substantial period of time.

Various types of impacts can be identified:

- Economic impacts: financial and other economic impacts (e.g. change in profitability) on businesses, wider impacts on economies, impacts on administrations (e.g. additional enforcement resources, educational campaigns), etc.; but also potentially wider knock-on impacts
- Social impacts: impacts on wider society and communities;
- Environmental impacts: impacts principally on the marine environment but also potentially wider knock-on impacts.

According to the EC Impact Assessment Guidelines, a CBA can be done at various levels: it can be either a fully quantified and monetized CBA, however often in the cases at hand only a part of the costs and benefits can be quantified and monetised.

As a result, the selection of (sets of) new measures for the draft Programme of Measures will not only take into account their degree of cost-effectiveness but also significant positive and negative social, economic and environmental impacts the measure may incur.

In the decision making process with respect to the selection or prioritisation of measures also other evaluation criteria may play a role, such as financing opportunities and acceptance by stakeholders. During the stakeholder consultation, more information about socio-economic impacts of measures will be gained, which is also linked with stakeholder acceptance, and about availability of resources to finance the measures. Depending on the timing of stakeholder consultation, these evaluation criteria will have an impact earlier or later on in the selection or prioritisation process. The impact analysis may provide relevant information to support this type of discussions.

3.2

Baseline scenario (BAU) in function of CBA/CEA

3.2.1

Definition of a baseline scenario

In the WG ESA Initial Assessment guidelines (WG ESA; 2010) and the Annex 4 of the EC Communication (draft Common Understanding of (Initial) Assessment, Determination of Good Environmental Status & Establishment of Environmental Targets; 2008), it is clearly described that a baseline or a Business As Usual (BAU) scenario refers to the anticipated evolution in the environmental, social, economic and legislative situation in a marine environment over a certain time horizon in the absence of the policy under consideration (i.e. if the MSFD is not implemented).

The role of BAU scenarios in the Initial Assessment is to provide projections of how the marine environment might evolve over time, given potential trends in uses of marine waters and the existing legislative and regulatory framework governing those waters. The BAU scenario plays a key role in the gap analysis, as it can be used to illustrate the potential difference between GES and the situation that might occur in the absence of MSFD measures. BAU scenarios may therefore also have a role in setting the context for the development of MSFD measures to contribute towards achieving GES.

In the Impact Assessment guidelines (European Commission; 2009), the aim of the baseline scenario is to explain how the current situation would evolve without additional MSFD measures. A clear baseline scenario also provides the basis for comparing policy options. To develop the baseline scenario, it is important to consider a wide range of factors other than EU intervention, these include:

- Member State policies/regulations in place
- Actions already decided or proposed by third countries, industries and other parties

- Evolution of relevant markets
- Recent trends in the problem and likely changes to the causes of those trends
- Climate change, demographic trends and other external influencing developments.

It is important for the CEA/CBA analysis that both (1) existing measures and (2) future scenarios are included in the baseline and form the basis for comparing options/measures. However, the recent Commission Analysis (European Commission; 2014) pointed out that the current levels of environmental status have mainly been assessed qualitatively. Often limited new data is available and the socio-economic analysis showed many gaps in the availability of information. In the following years Member States will start from a different level of baseline development, once they have gained further insight on the “baseline” and “distance to target”..

Further guidance on how to establish BAU scenarios can be found in Chapter 3 of the guidance document on Economic and social analysis for the MSFD Initial Assessment (EC-DGE; 2010).

3.2.2 Degree of reaching the aims/objectives of other Directives

It is recognised that there is uncertainty surrounding the effectiveness of existing management measures and legislation. For the UK baseline scenario for example, it has been assumed that all existing UK legislative commitments and established policies (both national and international) will be met and their goals achieved. Existing legislative commitments are documented in the baseline scenario. For example, it might be assumed that the Water Framework Directive will achieve Good Ecological Status and Good Chemical Status in coastal waters (ABPmer; 2012). In other MS, such as Denmark, a similar approach has been followed.

Even if it can be assumed that the intended objectives will be met, the BAU analysis may show that (existing) policies and legislation may not always be entirely successful and deliver the full range of outputs and outcomes expected. This issue was also included as part of the Initial Assessment WG ESA guidance³, in which the recommendation is made to undertake a sensitivity analysis which will help to underpin BAU scenario's based on best available information.

Experiences:

Baltic Sea – GES-REG project⁴

In the Baltic Sea region, in 2013 a study was conducted on the analysis of existing policies for BAU development. Among the outputs of the study is an Excel tool (database) covering around 60 existing and till 2020 forthcoming international policy frameworks with an impact on the marine environment. The database includes detailed information about each policy framework (called “Baseline policies”) and requirements/measures prescribed by it. In addition, the measures are assessed in terms of their:

- legal status (mandatory/agreed/voluntary);
- implementation status in light of the BAU timeframe till 2020 (existing/anticipated), including reviewing obstacles hindering the implementation;
- specification of measures (prescribed by a policy framework directly, or to be set nationally).

³ Chapter 3. Business as usual” scenarios (3.2.3 The Legislative and Regulatory Framework)

⁴ Project “Good Environmental Status through Regional Coordination and Capacity Building” (GES-REG).

The assessments are specified for Latvia and Estonia (partly completed also for Finland and Sweden). These assessments are used to assess overall certainty of implementation of the measures (in the BAU timeframe) (e.g. high/moderate/low) (GES-REG; 2013).

→ The database and study report is available at <http://gesreg.msi.ttu.ee/en/results>.

UK

The UK provides a baseline scenario for each GES descriptor to compare policy options. The UK, in its initial assessment and proposal for measures, proposes either one or two policy options with differing levels of uncertainty for achieving GES. A baseline scenario, 'Option 0', describes the expected outcome should no action be taken. The study provides a baseline scenario that describes the potential state of the UK's marine environment in 2020 and 2030 based on current environmental trends and existing policy drivers. The baseline scenario includes further details on the assumed apportionment and reasoning behind it are given. The apportionment differs per descriptor and activity and Policy. The baseline scenario used in the UK is based on a study carried by ABPmer (2011), assessing the consequent change in environmental state as a result of the information on pressures and components of GES, from which the impacts on the state of ecosystem services was deduced.

→ Link to the report:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17775&FromSearch=Y&Publisher=1&SearchText=ME5104&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description>

4 Economic evaluation

4.1 Relevant guidance documents

- Economic analysis in general:
 - *WATECO Guidelines (2003)*, Annex D: Methodological tools for undertaking the economic analysis.

→Link to the guidance:

http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

- Costs:
 - KnowSeas Deliverable D4.4 “Recognising Cost in the Assessment of Management Strategies and Options”(2013)⁵; Available via

→Link to the guidance: <http://www.msfd.eu/knowseas/deliverables.html>

- Cost-effectiveness analysis:
 - *WATECO Guidelines (2003)*: Section 4: preparing for the cost-effectiveness analysis

→Link to the guidance

http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

- Cost-benefit analysis: valuation methods:
 - *Guidance document for Economic and social analysis for the initial assessment for the MSFD (2010)*, heading 4.4. Valuation methods applicable to each of the approaches.

→Link to the guidance:

<https://www.havochvatten.se/download/18.64f5b3211343cffddb2800021986/1348912772375/final-report-wg-esa-guidance-document-no-1.pdf>

- Cost-benefit analysis: indicators for marine ecosystem services
 - *Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020 (EC; 2014)*, heading 5.4. Marine Services⁶

→Link to the guidance:

http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/2ndMAESWorkingPaper.pdf

⁵ This study gives guidance on cost types and approaches of integrating costs into CBA (total, average and marginal costs, discounting, real vs nominal costs);

⁶ The second MAES report presents indicators that can be used at European and Member State's level to map and assess biodiversity, ecosystem condition and ecosystem services according to the Common International Classification of Ecosystem Services (CICES v4.3).

4.2

CEA

4.2.1

Availability of cost data

Member States tend to be able to find relevant (quantitative) information on costs of new MSFD measures. Costs of already implemented measures can be extrapolated from the initial assessment. Both the Business as Usual scenarios and the analysis of the cost of degradation form a useful source of cost data. Lessons learned within the WFD CEA process indicate that more information tends to be available on costs, but that there are uncertainties and data problems regarding effects (Interviews; 2014).

Experiences with information on costs

UK:

In 2012 DEFRA finalised an impact assessment on designating MCZs (Marine Coastal Zones) in English Inshore Waters and English, Welsh and Northern Irish Offshore Waters. A specific approach for assessing costs of implementation, enforcement and surveillance has been worked out. The estimated additional costs to the public sector have been provided for both regulatory and non-regulatory management measures, where it is appropriate for each MCZ. This has been determined through site-specific discussions with IFCA's and MMO⁷.

To implement a byelaw, for example, the following actions have been combined with unit cost assumptions (necessary nr of hours and £ per hour):

- Planning,
- Writing
- Take to committee,
- Consultation,
- Dealing with objections,
- Approval and sign-off,
- Advertisement

Also enforcement costs have been estimated, based on extra surveillance via patrols (boat rate and officer rate £ per hour). Cost of pursuing prosecution were given, although no clear view on the number of prosecutions was available (Finding Sanctuary et al.; 2012)

→ Link to the report: <http://publications.naturalengland.org.uk/publication/1940011>

NL: First overview of potential measures, related costs and effects of implementing the Marine Strategy (DHV; 2011)

The major focus of this CEA is to define measures that need to be considered for the implementation of the MSFD. The study describes a long-list of potential measures aimed at various drivers. From this list, a short-list of 40 measures has been selected and submitted for a preliminary analysis of costs and effects. This initial overview of measures and related costs and effects will help to define the need for additional assessments and studies.

Regarding cost data, the following pragmatic approach has been applied:

⁷ Inshore Fisheries & Conservation Authorities (IFCA's), Marine Management Organisation (MMO)

- Additional measures of similar character that come down to intensifying existing measures are mainly based on the actual costs figures for these activities.
- Additional measures that are entirely new have been estimated on the basis of the information available.

→ Link to the report:

[http://www.noordzeeloket.nl/images/Measures%20for%20the%20Marine%20Strategy%20Framework%20Directive%20\(DHV,%202010\)_837.pdf](http://www.noordzeeloket.nl/images/Measures%20for%20the%20Marine%20Strategy%20Framework%20Directive%20(DHV,%202010)_837.pdf)

NL: Socio-economic analysis (SEA) on marine litter (Rijkswaterstaat; 2013)

This report provides the main results of various studies on the socio-economic analysis of possible additional measures in the field of reducing marine litter. It also describes the results of a representative survey among the Dutch population which investigates the public opinion on marine litter.

Several relevant cost data of measures were extracted from the Initial Assessment. NL applied the cost-based approach within the analysis of the cost of degradation. The cost-based approach is using existing quantitative data on costs of measures currently implemented to prevent degradation of the marine environment. In this way a lower bound (but widely accepted monetary) value of the cost of degradation could be obtained. Care should although be taken when contributing shares of cost of degradation to isolated (sets) of measures: Do the measures coincide with the same spatial area, do they have the same nature and scale as the measures described in the cost of degradation?

→ Link to report: [via CIRCA](#)

In addition to the cost data presented in the Initial Assessment, NL has performed a number of additional studies to collect data on costs of measures. To get a more detailed picture of the costs, in 2012 a further analysis was carried out looking into the practice and costs of cleaning up litter on and along the Dutch beaches (Ecorys; 2012).

→ Link to the report:

http://www.noordzeeloket.nl/images/Cleaning%20Costs%20Marine%20Strategy%20Framework%20Directive%20-%20Damage%20from%20marine%20litter%20to%20nets%20and%20screws_3257.pdf

EU: KnowSeas: (Knowledge-based Sustainable Management for Europe's Seas)

KnowSeas (Knowledge-based Sustainable Management for Europe's Seas) is an FP7 project started in 2009 and ended June 2013. Its overall objective was to build a comprehensive scientific knowledge base and give practical guidance for the application of the Ecosystem Approach to the sustainable development of Europe's regional seas. The work included examining and modelling the causes and consequences of ecosystem change, costs and benefits and institutional and social aspects. KnowSeas has worked on the two geographical scales: the Regional Sea Scale and Member State Economic Exclusive Zones. (<http://www.knowseas.com>)

- Case Study Application: North East Atlantic Deep Water Coral Reefs - Management of Impacts from Fishing and Ocean Acidification
- Case: Recognising Costs in the Assessment of Fisheries' Management Scenarios

→ Link to the report: <http://www.msfd.eu/knowseas/deliverables.html>

Mediterranean area: indicative cost estimation of measures implementation (UNEP-MAP; 2013).

The “Background document on marine litter regional plan” contains a list of proposed measures by the Regional Activity Centre as well as a list of implementation of measures of the regional plan on marine litter management. Based on input from a survey, indications are given for:

- Costs to clean-up litter
- Structure of costs associated with marine litter management
- Cost per km of coast cleaned
- Cost per person to control litter
- Cost associated with fishing gear retrieval
- Damage from marine litter
- Cost to agriculture and aquaculture
- Costs to harbours, power stations, shipping, vessels
- Cost associated with tourism
- Cost associated with fishing and invasive species

→ [Link to the report: via CIRCA](#)

4.2.2

Knowledge gaps in the driver-pressure-effect relations of MSFD measures

The specific problem with the assessment of MSFD measures is the lack of a clear causal relationship between a measure and its effects (driver-pressure-effect relationship). In the introductory section of this document, this complexity of the marine environment was already highlighted. The effects of measures can be predicted mainly in terms of changes in relevant pressures, but it is difficult to define their effect on the level of descriptors. For the ranking of measures on the basis of cost-effectiveness, the following needs to be known with respect to effects:

- the functional relation between a driver and a pressure,
- the functional relation between a pressure and a descriptor,
- the functional relationship between a measure and its expected impact on a descriptor or pressure.

Several approaches dealing with this issue of gap in environmental effects have been encountered, going from using expert judgment to semi-quantitative assessments. Quantitative assessments were not found.

Experiences:

- **Qualitative, based on expert judgment;**

NL: CEA & CBA for the MSFD (LEI; 2012)

The Dutch Ministry of Infrastructure and the Environment has commissioned a study to elaborate a cost-effective set of measures and a preliminary CBA for all 11 MSFD GES Descriptors. For the assessment of various potential measures, the opinion of experts, civil servants and scientists was collected during workshop settings and interviews. During this project the Dutch Marine Strategy Program of Measures has been fine-tuned.

Within the Dutch CEA, the contribution of each measure to the GES indicators has been assessed based upon a description of the primary effect of the measure. The physical effects of potential

measures could be identified but not quantified. An example of such a descriptive approach is illustrated in the following table (for GES 10 Marine litter):

Figure 2 : Example of qualitative assessment of effectiveness of measures within the MSFD, for GES descriptor 11 Marine Litter (source: LEI; 2012)

| Measures | Effect |
|--|--|
| Additional fishing for litter | Negative effect: decreased seafloor integrity |
| Additional beach cleaning on non-bathing beaches (once a year) | Less litter on the beach |
| Adding individually recognisable markers to fishing nets and wires | Reduce illegal or improper spill of nets (the first source of litter on the beach) |

→ Link to report: <http://edepot.wur.nl/199888>

- **Semi-quantitative: expert judgment within classes** (1 to 5)

NL& BE:

The Netherlands have developed a useful semi-quantitative approach for the CEA of marine measures (DHV; 2011). This approach is useful to overcome the difficulty of knowledge gaps into driver-effect-pressure relations. The approach has also been applied for the current Belgian PoM CEA. The illustration on the use of the Dutch approach for the marine measures to be applied in the Belgian Part of the North Sea is given below.

The Belgian approach uses effectiveness at the site level (similar to the Dutch approach) and further includes the geographical dimension, which determines the overall effectiveness score. Information is gathered through consultations with policy makers and scientists. By means of a cross-table linking drivers-pressures-descriptors and measures, a cost-effectiveness score is obtained. More information is given in the Figure below.

Figure 3. Effectiveness calculation – Belgian approach

Effectivity

The effectiveness is determined in two steps:

Step 1: Effectiveness on site

For each measure, the expected reduction on different pressures has been estimated by means of the following classes:

1. Low = less than 5% intensity
2. Moderate = between 5 and 15% intensity
3. High = between 15 and 30% intensity
4. Very high = more than 30% intensity or recovery measures

The expected reduction of the pressure is based on (1) the importance of the use of the Belgian part of the North Sea by the drivers, (2) the link between driver and pressure and (3) the expected impact of the measure (e.g. prohibition versus awareness raising).

For each pressure, the relation (and importance) for each individual descriptor (and indicator) is given. For some descriptors, there is a one to one relation e.g. marine litter.

Effectivity

However, other descriptors are linked to multiple pressures. The importance of a pressure becomes smaller when several pressures determine the condition of a descriptor.

The following classes are determined for the importance of a pressure for a certain descriptor:

1. Low = descriptor linked to > 5 pressures
2. Moderate = descriptor linked to 4 or 5 pressures
3. High = descriptor linked to 2 or 3 pressures
4. Very high = one to one relation between pressure and descriptor

When a measure is linked to many descriptors, with different intensities for the pressure for each descriptor, the highest class is taken.

Multiplying the expected reduction in pressure with the importance of a pressure for a certain descriptor gives the on-site effect for a certain measure (displayed on a scale 1 to 5)

Step 2: Extrapolation to the Belgian part of the North Sea (scale)

The pressures are scored according to their geographic dimension, using the following classes:

1. Low = less than 35 km², around 1 % of the Belgian part of the North Sea (e.g. sand extraction, dredging and dumping activities)
2. Moderate = between 35 and 500 km², around 1 to 15 % of the Belgian part of the North Sea (e.g. offshore wind parks)
3. High = between 500 and 2.000 km², around 15 to 60 % of the Belgian part of the North Sea (e.g. Natura 2000-areas, underwater noise by navigation)
4. Very high = more than 2.000 km², around more than 60 % of the Belgian part of the North Sea (e.g. commercial fishery activities, measures in relation to water quality)

Multiplying the on-site effect (step 1) and scale of the effect (step 2) gives the effectiveness of the measure. The effectiveness is expressed in the following scores:

1. Very low = 1 to 5
2. Low = 5 to 10
3. Moderate = 10 to 20
4. High = 20 to 30
5. Very high = more than 30

Combining the semi-quantitative results for cost and effects leads to the following cost-effectiveness matrix:

Figure 4 : Semi-quantitative approach for cost-effectiveness analysis

| | | Effectiveness | | | | |
|------|---|---------------|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 |
| Cost | 1 | 3 | 3 | 2 | 1 | 1 |
| | 2 | 3 | 3 | 3 | 2 | 1 |
| | 3 | 4 | 4 | 3 | 2 | 2 |
| | 4 | 5 | 4 | 3 | 3 | 3 |
| | 5 | 5 | 5 | 4 | 3 | 3 |

→ [Link to the report: ongoing, to be published](#)

France:

For the analysis of the cost-effectiveness of the new measures proposed under the MSFD, four levels of cost-effectiveness are defined:

- cost-effective measures
- moderate cost-effective measures
- low cost-effective measures
- non cost-effective measure

This analysis is also based on three levels of evaluation of the environmental effectiveness (strong, potentially strong, uncertain) and three categories of implementation costs:

- low - less than € 100,000;
- moderate - between 100,000 and € 300,000
- high - above € 300,000. (Acteon et al ; 2014)

→ [Link to report: via CIRCA](#)

- **Semi-quantitative: expert judgment with scales („+++” to „---”)**

EU: “Economic assessment of policy measures for the implementation of the MSFD” (Arcadis et al; 2012a)

This study consists of an inventory of possible measures, their assessment according to a set of criteria (e.g. cost, effectiveness, benefits, feasibility) and the identification of key success / limiting factors for each measure or group of measures. The approach includes two stages:

- a “quick scan” with an assessments of all 140 measures, and
- an in-depth analysis/assessment of 5 specific measures within case studies⁸

The collected evidence could support Member States to compile a set of measures suited for their own implementation of the MSFD.

The database integrates information regarding the measure and its implementation status, the pressure and relation with GES and information on the effects. Within this quick scan of measures, impacts of measures on each Descriptor have been assessed via a scale from „+++” to „---”, per GES indicator⁹.

→ [Link to the report and database: http://ec.europa.eu/environment/enveco/studies.htm#4](http://ec.europa.eu/environment/enveco/studies.htm#4)

⁸ NOx-tax and NOx Fund (Norway), Aggregate tax / Levy (UK), No Special Fee system (Baltic Sea), Temporary / real time closures (Scotland), MPAs (Medes Islands)

⁹ Regarding the costs, quantitative evidences/illustrations are provided where available or they are described qualitatively.

4.2.3

Recommendations

With respect to the MSFD, the lack of clear quantitative relationships between measures and their effects on the marine environment means that CEA (and CBA) remains largely qualitative in nature, and is mainly based on expert judgment. Despite the more qualitative character, the main objective of a CEA remains to provide a distinction between, on the one hand, measures that are expected to have much impact at limited costs, and on the other hand measures that are costly and will have little effect. In situations where quantitative information is hardly available, capturing this type of information can already be very helpful to support the decision-making process.

Experiences in the Netherlands and Belgium have shown that it is possible to make a distinction between measures that are likely to be not cost-effective (e.g. because they are far more expensive compared to alternative measures and have no additional positive effects) and more cost-effective measures (e.g. because they have much impact at limited cost). A “database approach” such as in the EC 2012 project (Arcadis et al; 2012a) seems to be practically useful. A similar listing of measures and effects at MS level could be relevant as a knowledge base (tool to summarise information) and as a tool to collect assessments from various disciplines. Another advantage of this approach is that it can be built gradually.

Regarding cost assessment, finding relevant cost figures for new measures is often a challenge. Further on, for several types of measures (e.g. policy implementation, international agreements) it is difficult to attach cost figures. For that reason, it can be helpful to use or integrate the cost of degradation and/or further extrapolate costs of existing measures.

4.3

Impact assessment including CBA

4.3.1

Identification of benefits

One of the main issues with applying CBA for the MSFD, is the lack of knowledge on the links between potential measures, improvement of marine ecosystems and corresponding economic and social value. Similar to the CEA issue on effects (see section 4.2.2), individual and cumulative impacts of different pressures on the status of the marine environment are not yet well understood. Specifically related to CBA, information is limited on how these impacts translate into changes in human welfare (i.e. the benefits derived from the ecosystem or the changes in ecosystem goods and services which affect human welfare). This issue has been encountered in several Member States (UK NL, DE, FR¹⁰).

The UK CBA for the MSFD (CEFAS; 2012) attributes this lack of information to the difficulty in translating environmental responses into welfare effects (e.g. how will increased fish stocks affect the value of fish landings?). Also the conclusion of the STAGES workshop on social economic analysis (JRC; 2013) highlighted the limited knowledge of ecosystem functioning and the link between pressures and impacts.

Notwithstanding these difficulties, some good practices have been found, trying to find an answer to quantification of the benefits of new measures within the MSFD.

Experiences:

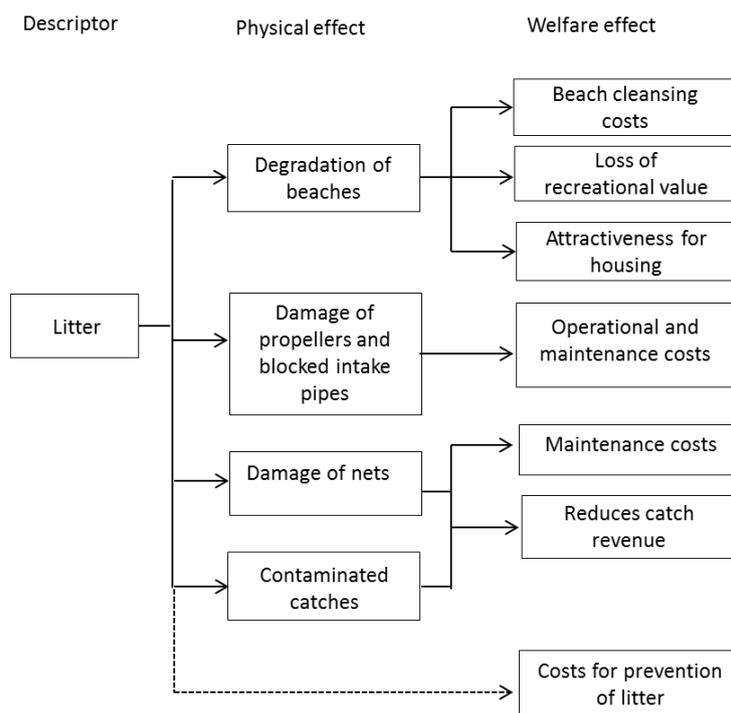
NL: Logical Diagrams of Impact (LDI)

Following the CEA & CBA for the MSFD (LEI; 2012), the effects resulting from a change in environmental status of the Dutch part of the North Sea have been calculated through a provisional societal cost-benefit analysis. The aim of this provisional CBA is to elaborate the CBA methodology for the MSFD and to get a grip on available data and the level of missing information.

In this Dutch CBA, the relation between measures, physical effects and welfare changes have been described and summarised by LDIs, Logical Diagrams of Impact. For example, measures to reduce litter may lead to cleaner beaches and may enhance their recreational value. The physical effects of these measures may have various (and possibly conflicting) welfare effects.

¹⁰ CEFAS, 2012; Rijkswaterstaat, 2013; German MoE, 2013; Aires-Marines, 2011;

Figure 5 : LDI for GES descriptor 10: litter (source: LEI; 2012)



→ Link to report: <http://edepot.wur.nl/199888>

EU: Linkage framework via the ODEMM research project

ODEMM (Options for Delivering Ecosystem-Based Marine Management) is a European FP7 project that aims to create a database on regional assessments of the environmental characteristics and the major marine sectors. A main work task of the project is to develop a set of fully-costed ecosystem management options that would deliver the objectives of the MSFD, the Habitats Directive, the European Commission Blue Book and the Guidelines for the Integrated Approach to Maritime Policy. Within the ODEMM research project, a decision support tool has been developed linking marine activities to ecosystem services (via the flow activities ⇒ pressures ⇒ descriptors ⇒ ecological characteristics ⇒ ecosystem services). The ODEMM linkage framework builds on the DPSIR approach (Driver-Pressure-State-Impact-Response), which systematically organises information in order to assess which management responses might help to reduce impacts on the state of the environment. The ODEMM approach moves beyond DPSIR so that the aspirations of the Marine Strategy Framework Directive in particular can be considered (Koss et al; 2011).

→The ODEMM linkage table is accessible via <http://www.liv.ac.uk/odemmm/data/>

DE: Development of a socioeconomic valuation scheme

The identification, scoping and further planning of measures for the German MSFD is an ongoing decision process that is being accompanied by the German national economic working group (Arbeitsgruppe Sozioökonomie). The programmatic approach for measures in Germany contains measures at very different planning levels. Since the majority of measures have not yet reached a sufficient level of detailed planning for the application of economic valuation methods, a general socioeconomic valuation scheme (following the idea of the procedural approach applied for WFD in Germany) is being developed. The scheme displays meta criteria for the collection of information and data for the performance of a CEA, an impact assessment and a CBA (personal communication from Ann Kathrin Buchs, Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz).

4.3.2

Feasibility and limitations of potential methods to monetise effects

Valuation methods such as Choice Experiments can be used to estimate a willingness to pay value of benefits both from changes to the marine environment and other EU Directives related to the environment. Within several attempts to quantify benefits of MSFD measures, a lack of valuation data has been encountered, especially for indirect and non-use values. The economic value of ecosystem services is not always known (e.g. how does society value the conservation of marine biodiversity?). This is a particular problem for many marine ecosystem services, which (unlike fish stocks) are not traded in markets, and, for which market price data are therefore not available to assess their value to society. This leads to challenges of non-market valuation approaches. Recently, several projects/studies/cases have been elaborated, increasing this knowledge base.

Experiences with application of valuation methods

DE: “How to choose the right valuation technique?” (German MoE; 2013)

Within the 2013 German study on methodologies regarding Economic and Social Analyses and Impact Assessments, a table has been created which links pressures (e.g. physical damage –siltation-, ...) with sectors (fisheries, industry, ...) and values (direct use values, option values, ...). This table helps selecting the appropriate valuation method for each pressure and sector.

Figure 6 : Benefits of pressure reductions: linking pressures and sectors with use and non-use values (example for physical loss & damage).

| Pressure | | Use Values | | | | | | | | | | Non-use values |
|-----------------|----------------------|---------------------------------|---------|-------------|-------------------------------------|------------|----------|----------|---------------------|-------------|----------------------|--------------------------------------|
| | | Direct use values (consumptive) | | | Direct use values (non-consumptive) | | | | Indirect use values | | Option values | Altruistic/existence/heritage values |
| | | Fisheries | Angling | Aquaculture | Tourism | Recreation | Shipping | Industry | Health | Agriculture | All affected sectors | Society |
| Physical loss | Smothering | | | | | | | | | | | |
| | Sealing | ✓ | ✓ | | (✓) | (✓) | | | | | ✓ | ✓ |
| Physical Damage | Siltation | (✓) | (✓) | | | | | | | | ✓ | ✓ |
| | Abrasion | ✓ | ✓ | | | | | | | | ✓ | ✓ |
| | Selective Extraction | ✓ | ✓ | | (✓) | (✓) | | | | | ✓ | ✓ |

In the Kiel Working Paper on the Environmental Effectiveness of the MSFD, Bertram et al (2012) worked out a similar graph linking pressures to valuation techniques (direct, indirect, option values). Figure 2 on page 13 provides a detailed overview of ecological eutrophication effects and their interaction with human activities and benefits via an alteration of the provisioning of ecosystem

services. The complex interactions sketched in the figure also illustrate the implications for CBA required by the MSFD if an ecosystem-based approach is to be followed.

→ Link to the report:

http://www.umweltbundesamt.de/sites/default/files/medien/419/dokumente/project_summary.pdf

UK: Link Initial Assessment

Within the UK CBA (CEFAS; 2012), a regulatory impact assessment of the potential measures necessary to achieve the proposed targets has been undertaken. The economic analysis assesses both the costs and the benefits of achieving GES under the MSFD. A previously held project workshop informed the analysis. Uncertainties and gaps, the overlaps between measures, and their potential monitoring costs were explicitly considered.

The analysis of the cost of degradation as done as part of the Initial Assessment can constitute a basis for the cost-benefit analyses of measures. In the UK CBA for the MSFD, benefits are assessed as evidence on the possible costs of degradation. Using this approach, the analysis identifies the ecosystem services¹¹ and associated benefits, which are potentially lost if the environment is negatively affected. In this CBA, the potentially lost benefits of not achieving GES might be considered as benefits of reaching MSFD targets by implementing the Programme of Measures.

→ Link to the report:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=16817>

Sweden: Link Initial Assessment (OSPAR Commission; 2013 ; GES-REG; 2013)

Sweden uses the Ecosystem Services Approach to assess which activities in Swedish marine waters are dependent on marine ecosystem services, and how these activities affect the ecosystems ability to provide the same services. The ecosystem services that are affected by the most activities in Swedish marine waters are selected for further analysis. In addition, the report gives an assessment of the cost that can be expected as a result of a continued degradation of the marine environment

→ Link to report:

http://www.ospar.org/documents/dbase/publications/p00611/p00611_ospar_esa_final_report.pdf

¹¹In the WG ESA Initial Assessment Guidance, three approaches to the analysis of the cost of degradation are considered: the ecosystem services approach, the thematic approach and the cost-based approach.

Experiences through marine case studies

DE: Valuation/case studies in the frame of a Practitioner's Guidebook: (German MoE; 2013) :

In Germany, two valuation studies have been carried out in the context of cost benefit analysis for the MSFD:

- Case Study 1: Marine Litter
- Case Study 2: Eutrophication

Based on the experience gained with these case studies, the following recommendations were issued to be included in the Practitioner's Guidebook:

- Not to use WTP-studies (or other CVM studies), or at least in a very limited way. If such studies are to be used, then it is recommended to only use local surveys, customized for an utilisation in the context of MSFD benefit evaluation.
- Instead, to use more studies based on assessments of avoided damages or market prices.
- To reduce the amount of research necessary to obtain specialized data (e.g. on profiting sectors), the creation of a database customized for the purpose of MSFD benefit evaluation.

→Link to the project:

http://www.umweltbundesamt.de/sites/default/files/medien/419/dokumente/project_summary.pdf

BALTIC: Ecosystem service valuation (Swedish EPA; 2008)

The Swedish Environmental Protection Agency has carried out a project to gather information about the economic impacts of the human influence on the Baltic Sea and the Skagerrak environment. The project, based on already existing material, attempted to compare the implementation of further measures to a situation where this would not be the case. The countries around the Baltic Sea have been invited to participate in the project. The goal of the project is to provide decision makers with the information available regarding the economic benefits of ecosystem services, the cost of measures required to protect these services, as well as the estimated costs of non-action.

→Link to the project: <http://www.naturvardsverket.se/Documents/publikationer/978-91-620-5874-6.pdf>

Latvia and Estonia: Economic valuation studies on benefits of reaching GES in the frame of the GES-REG project (Pakalniete K., et al; 2013b)

In 2013, two economic valuation studies on valuing benefits of reaching MSFD targets have been carried out in Latvia and Estonia. The objective of the studies is to value national benefits of reaching GES in relation to the most relevant marine environmental problems. The studies applied a stated preference method (Choice Experiment) including surveys to derive the economic values. In addition, a valuation study on the value of a marine protected area versus an offshore wind park was conducted in Estonia as part of the project.

→Link to the project: The Latvian study: <http://gesreg.msi.ttu.ee/download/WP5%20GES-REG%20WT5.3%20Valuation%20study%20LV%20Report.pdf>; the Estonian MSFD study and the MPA and WP study: <http://gesreg.msi.ttu.ee/en/results> .

IE: Report on estimating the cost of degradation of the marine environment if Ireland was to fail to implement the MSFD (SEMUR, sd)

In Ireland, a choice experiment (CE) approach has been applied to attempt to value the 'Cost of Degradation' of the marine environment as set out in the MSFD. The results presented in this report demonstrate that the Irish population attach a high value to changes that may occur under future

marine policy scenarios. The study assesses the welfare impact on the Irish public of changes in a range of marine ecosystem services that align with the 11 marine environmental descriptors outlined in the Directive. The Irish CE therefore contributes both to the expansion of marine valuation literature and the implementation of the MFSD, since it was designed specifically with the Directive in mind. However, the following limitations are worthwhile mentioning:

- the effect of attitudes on choice decisions shows a great heterogeneity (some of the respondent's utility are quite large relative to the means)
- valuing the benefits of programmes of measures (PoM) that affect more than one GES descriptor require further consideration.
- the scope of the valuation should be extended to the regional seas level, as the drivers and pressures acting on the marine environment extend well beyond a countries own coastal zone¹².

→ [Link to the report: via CIRCA](#)

Mediterranean: economic study of impacts of marine and coastal protected areas (Mangos A, et al; 2013)

The objective of the economic impact study was to highlight the links between environmental protection and local development in the specific case of Marine and Coastal Protected Areas. The effects of protection on the socio-economic situation have been qualified and quantified by observing changes in ecosystem services provided in five Mediterranean sites.

→ [Link to the project: http://planbleu.org/sites/default/files/publications/cahier_13_amp_en_0.pdf](http://planbleu.org/sites/default/files/publications/cahier_13_amp_en_0.pdf)

NL: Recreational benefits of reductions of litter in the marine environment (Eftec et al; 2012)

The study reviewed the literature on the link between litter and recreation values. The search found 458 sources, although evidence on the local economic impact due to changes in litter (and associated changes in visitor numbers) was limited. While it appears clear that reductions in marine litter can lead to changes in visitor numbers and therefore visitor expenditures, there is no hard evidence that would allow estimation of the numerical impacts. Of the few economic valuation studies that were found, most did not fully separate litter from other more general environmental quality issues, and this seriously reduces their suitability for value transfer to evaluation of a policy specifically focused on litter reductions.

→ [Link to the project:](#)

http://www.noordzeeloket.nl/images/recreational%20benefits%20of%20reductions%20of%20litter%20in%20the%20marine%20environmen_844.pdf

EU: KnowSeas project

KnowSeas (knowledge-based sustainable management for Europe's seas) is a European Commission funded research project (funded by the EC's Framework 7 Programme, ended June 2013). WP 4 of the project (Analysis of Costs and Benefits) was divided into the following deliverables:

- D4.2: Aggregate assessment of benefits and costs
- D4.3: Assessment of future benefits
- D4.4: Recognising Cost in the Assessment of Management Strategies and Options

Deliverable 4.2 dealt with the calculation of estimates at the aggregate, i.e. EU level of annual benefits (and potential costs) associated with the exploitation of Member State Exclusive Economic Zones

¹² It may be more appropriate for a CE to be conducted across member states sharing a coastline at a regional sea level.

(EEZ). The objective of Deliverable 4.3 was to extend this perspective, estimating the future benefits that might be expected from the continued exploitation of Europe's seas. Its aim was to enhance the scope of economic analysis envisaged in the Marine Strategy Framework Directive (MSFD) for economic analysis of the use of marine waters.

→Link to the project: <http://www.msfd.eu/knowseas/deliverables.html>

EU: overview of valuation studies via WG ESA

Annex C of the Guidance document for Economic and Social Analysis for the Initial Assessment for the MSFD (2010) gives an overview of several economic studies, mainly focusing on benefits. The relevance of economic concepts is briefly discussed for each study.

→Link to the guidance:

<https://www.havochvatten.se/download/18.64f5b3211343cffddb2800021986/1348912772375/final-report-wg-esa-guidance-document-no-1.pdf>

Experiences through Ecosystem Service Valuation in other policy domains

EU : MAES project (Mapping and Assessment of Ecosystems and their Services)

Following the adoption of an analytical framework, the Working Group MAES, which steers the implementation of Action 5 of the Biodiversity Strategy¹³ decided to test the framework based on the outcomes of six thematic pilots, of which 1 marine pilot. In these pilots, EU services worked hand in hand with Member States to make a review of national and European data and indicators to assess the condition of ecosystems, to quantify biodiversity and to map and assess their services.

The pilot studies contributed indicators, which can be used for mapping and assessing biodiversity, ecosystem condition and ecosystem services according to the Common International Classification of Ecosystem Services (CICES v4.3) (European Commission, 2014c).

→Link to the project:

http://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/pdf/2ndMAESWorkingPaper.pdf

EU: ESAWADI project (Ecosystem Services Approach for Water Framework Directive Implementation)

The project partners of the ESAWADI project (2010-2013) developed a common framework of analysis, implemented case studies in France, Germany and Portugal and analysed results on the added-value of the Ecosystem Services approach. One of the most important lessons learned is that effects of measures are often difficult to predict or quantify and therefore effects of measures can better not be monetised. On the other hand, ESS is a useful approach to convey the message that doing something good for the environment may be worthwhile, even if you cannot present everything in (monetary) numbers.

→Link to the project: <http://www.esawadi.eu/?lang=en>

¹³ Action 5 of the EU Biodiversity Strategy to 2020 foresees that Member States will, with the assistance of the Commission, map and assess the state of ecosystems and their services in their national territory by 2014.

4.3.3

CBA result –uncertainty

In order to include uncertainty, it is recommended to assess benefits within a wide range (minimum and maximum values) due to scientific uncertainty and to work with both a pessimistic and optimistic scenario. Also, the sources of uncertainty within the analysis should be identified, and the analysis should test the assumptions used in order to reflect some of this uncertainty.¹⁴

Experiences

UK: ranges of cost and benefit data (Defra; 2011)

This impact assessment looks at the potential impacts of establishing UK targets and indicators of GES. These targets and indicators are intended to guide progress towards GES and inform the development of future monitoring programmes and management measures. For the IA, a range of illustrative management measures has been chosen by experts and policy makers. Wherever possible, costs and benefits have been monetised. The final measures for achieving GES will be subject to a full cost-benefit analysis and impact assessment process until 2015. (ongoing)

The UK Impact Assessment of MSFD (Defra; 2011) applies a range for both the costs and benefit assessment. A summary table is presented with for each of the 11 GES descriptors on the left side an overview of the monetized costs/benefits and on the right side a column with a qualitative description of costs and benefits which could not be monetized.

→Link to the project:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82627/msfd-consult-final-ia-20121220.pdf

UK: approach to assign certainty within ecosystem service assessment (UNEP-WCMC et al; 2011)

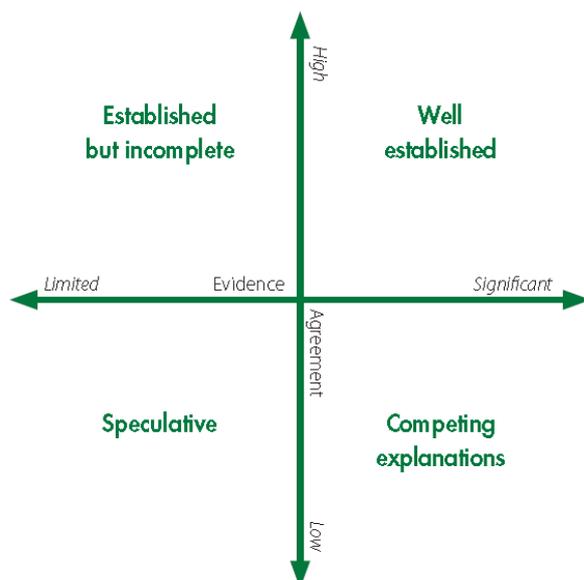
The UK National Ecosystem Assessment (UK NEA) was the first analysis of the UK's natural environment in terms of the benefits it provides to society and continuing economic prosperity. Part of the Living With Environmental Change (LWEC) initiative, the UK NEA commenced in mid-2009 and reported in June 2011. It was an inclusive process involving many government, academic, NGO and private sector institutions. Findings of the interdisciplinary research conducted under the UK NEA Follow-on Phase were released 26 June 2014. These reports are also available to download from <https://www.gov.uk/ecosystems-services>

The UK National Ecosystem Assessment includes an indication of the level of scientific certainty. The 'uncertainty approach' of the UK NEA consists of a set of qualitative uncertainty terms derived from a 4-box model and complemented, where possible, with a likelihood scale¹⁵ (UNEP-WCMC, Cambridge University; 2011). Estimates of certainty are derived from the collective judgment of authors, observational evidence, modeling results and/or theory examined for this assessment.

Figure 7 : 4 box model to include uncertainty in the analysis of Ecosystem Services

¹⁴ However, if expected costs are orders of magnitude higher than expected benefits, uncertainty analyses may be less relevant since the results are not likely to change the decision at hand.

¹⁵ The likelihood scale assigns a letter to the analysis (from a to g), with a. "Virtually certain" and g. "Exceptionally unlikely"



→Link to the project: <http://uknea.unep-wcmc.org/Resources/tabid/82/Default.aspx>

Baltic

In the Latvian economic evaluation of ‘supplementary’ measures for the WFD PoM, the prioritisation and selection of measures has been based on an MCA. Within this MCA approach, the “certainty of the effectiveness and costs’ assessments for measures” was considered as one of the 10 criteria for evaluation. Chapter 4.10 of the study explains this indicator in relation to the analysed measures. Via a 5-category scale (from 1 very low to 5 very high certainty), the (un)certainty for each measure is taken into account in the (multi-criteria) evaluation of measures. For instance, the CE¹⁶ of a measure can be assessed as “high”, but if the certainty of this assessment is “low”, the measure can obtain a lower overall assessment (Pakalniete K., et al; 2013b).

→Link to the project: http://gauja.balticrivers.eu/files/wp3_report_economic_evaluation_lvpdf

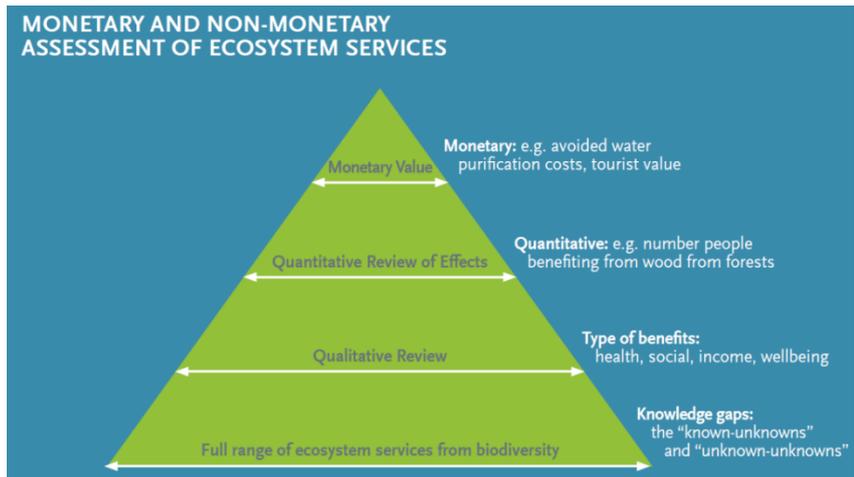
4.3.4

On alternatives for CBA to be included in the Impact Assessment

If benefits can be monetised, often only a small proportion of the likely benefits of achieving the proposed GES targets can be monetised. In the UK CBA for the MSFD, for example, useful benefits could only be provided for some descriptors (e.g. D3 – Commercial Fish and Shellfish and D10 - Marine litter) (CEFAS; 2012). Other measures could only be assessed qualitatively. These data gaps make it very difficult to reach firm conclusions on monetized benefits. Within the field of ecosystem service research, this issue is well known. The so-called “value pyramid” visualises the situation of partial monetary assessment:

Figure 8 : The valuation pyramid (Ten Brink; 2008)

¹⁶ CE = Cost effectiveness



Experiences:

France: The impact of proposed measures as part of the development of a PoM in the frame of the MSFD (Acteon et al; 2014)

Within the French impact assessment of MSFD measures, a first priority of new measures is made via a multi-criteria analysis based on 4 criteria:

- the cost-effective nature of the measures,
- their socio-economic and environmental impact,
- their (technical) feasibility and
- possible interactions between the new measures..

The economic impact is analysed mainly qualitatively by identifying the activities impacted by the proposed measures **and the environmental targets**, followed by an analysis of the nature and duration of the impacts. Quantification on parts of potential changes in turnover or value added are also elaborated, wherever possible. Various information is included in this database which can be regarded as an identity card of measures.

The social impact of the measures are perceived via employment, health and distributional impacts for a given sector or geographical area. Special attention has been provided to the most vulnerable population and sectors. Regarding environmental impacts, the study assesses only the impacts on the marine environment, in relation to descriptors of good environmental status (GES). In addition, the measures included in the PoM in the frame of the WFD are assessed regarding the cost-recovery principle.

→Link to the report: [via CIRCA](#)

Latvia: Database of "additional" measures, from CEA to "multi-criteria" assessment and evaluation of the measures (for WFD) (Pakalniete K. et al ; 2013b)

In Latvia, a study is conducted which tested possibilities to improve the economic analysis of measures for the next River Basin Management Plans (RBMPs). The study included the development of a database of "additional" measures (focusing on measures addressing nutrients' pollution and hydro-morphological pressures from agriculture and forestry). The database aims to provide information and assessments on all relevant characteristics and impacts of the measures. Besides information about

effects (primary and multiple), costs (financial, economic, administrative) and the cost-effectiveness assessment (incl. certainty of this assessment), the information about measures is grouped as follows:

- general characteristics of measures,
- application and implementation¹⁷,
- financial and socio-economic implications¹⁸,

The assessments of the socio-economic impacts and relevant implementation aspects of measures has been done via a broad range of criteria (11). The results were used afterwards for (multi-criteria) evaluation and prioritisation of measures, aiming to support the selection of measures for the WFD PoM.

→Link to the project: http://gauja.balticrivers.eu/files/wp3_report_economic_evaluation_lv.pdf

EU: Economic assessment of policy measures for the implementation of the MSFD; (EC;2012a)

A limited set of measures from the database developed in the study has been assessed ex ante according to the following set of criteria:

- The (environmental) effectiveness of the policy;
- Costs and benefits (Cost-effectiveness analysis; Cost-benefit analysis)
- Suitability (Status of marine waters; Geographical scale)
- Social and institutional context: (Capacity; Legal basis; Equity and fairness)
- Flexibility and adaptability;
- Timing issues

The ex-ante assessment has been based upon expert judgment and a review of relevant literature. Moreover, key success and limiting factors that would be needed for (a mix of) measures to be cost-effective and flexible have been identified for each (group of) measures. The ex-ante evaluation criteria have been tested and the anticipated success and limiting factors are discussed, based on evidence found in 5 case studies covering policy measures already in place in Europe.

→ Link to report and database: <http://ec.europa.eu/environment/enveco/studies.htm#4>

EU: study Marine litter 4 regional seas (Arcadis, et al; 2012b)

The main objective of this project is to pinpoint the major possible sources of marine litter in four study-sites, indicative for each of the four European seas. The case studies illustrate the process of litter and waste entering the marine environment. They indicate the main loopholes in the local material and waste cycles and identify which economic sectors or actors are the main sources of marine litter.

Furthermore, the study designs a set of feasible measures to address the loopholes. Based on multi-criteria analysis four sites are selected¹⁹: The following selection of evaluation criteria has been used in the feasibility assessment for marine litter related measures (next to cost-effectiveness):

- Possibilities for cost recovery
- Support by stakeholders
- Administrative capacity
- Community added value (related to impact of a measure on employment)

¹⁷incl. for instance listing relevant stakeholders and assessment of stakeholders' acceptance, assessment of enforcement schemes/practices

¹⁸ Incl. assessments of measures concerning their indirect costs and wider negative socio-economic impacts (incl.. distributional impacts), socio-economic benefits from environmental improvements, funding availability

¹⁹ Riga (Latvia-Baltic Sea), Oostende (Belgium-North Sea), Barcelona (Spain-Mediterranean) and Constanta (Romania-Black Sea).

- Time lag (time needed to implement a measure)
- Monitorability

This broad range of evaluation criteria made it possible to evaluate and rank measures to prevent litter in the 4 European seas, given the difficulties to assign costs and effects to these measures.

→ Link to report and database: <http://www.kenniswijzerzwerfafval.nl/document/pilot-project-4-seas-plastic-cycle-and-marine-environmental-impact>

4.3.5

Recommendations

In conclusion, it has become clear that an approach to economic valuation of benefits of measures in the frame of the MSFD strongly focusing on detailed monetisation does not seem feasible due to a lack of scientific knowledge and associated uncertainties. Only benefits whose evaluation can be grounded on good and reliable data should be assessed quantitatively. Yet, when possible, they can be expressed indicatively in qualitative terms.

Despite these challenges, analysis of benefits (positive impacts) of potential measures can reveal useful information to decision-makers. It helps indicating the expected direction and scale of changes to human welfare and the level of confidence in the assessment. Therefore, sufficient efforts should be done to qualitatively or semi-quantitatively describe the benefits.

Regarding valuation of benefits, the ecosystem service approach (ESS) seem to offer a good framework for valuing marine benefits of additional measures. The ESS practices included in this exchange of experiences document show that there are still limitations to the use of this approach in the marine context. The ecosystem service approach is a study field in development, characterised by several ongoing studies and research initiatives. Therefore it is recommended to base decisions for the first cycle on the currently best available knowledge. Thus, Member States could rely on qualitative/semi-quantitative assessment approaches and expert judgment to compensate the knowledge gaps in the short run. From the second PoM cycle onwards, it may be recommended to investigate more intensively the potential of (especially monetary) valuation of benefits. As more data will become available and experience is gained throughout the EU on the link between measures and ecological impacts, a more reliable analysis may become possible. The Guidelines on Economic and social analysis for the Initial assessment (EC-DGE; 2010) noted that while value transfer was used for undertaking economic studies needed for the WFD, the use of value transfer for MSFD benefit analysis may be limited. At the time of publication (2010), not enough literature related to the marine ecosystem service valuation was available. Given this expanding marine valuation literature in the frame of the MSFD (e.g. initial assessment, development of PoM), a common database would contribute to the comparison of the costs and benefits of regional sea level marine policies across EU Member States.

Given the difficulties in valuation, impact assessment based on CBA should fully include the effects that cannot be given a monetary value. This can be quantitative or qualitative, depending on data and knowledge available. The key point is to ensure that all impacts are covered in the reporting stage, and in particular to ensure that the fact that no monetary value has been applied does not mean that the value is zero. The CBA should provide a rationale about why it is necessary to implement measures (gap analysis), what measures one wants to implement, why (benefits) and at what cost. This story can be illustrated by numbers, but also by other types of information. The wider (multi-criteria type) analysis of the measures is seen as a useful approach to support the evaluation of measures. Even if the approach is largely qualitative, it has an advantage of incorporating various relevant evaluation criteria and can be applied for various environmental problems.

Moreover, integrated modeling will be of utmost importance to link bio-geophysical and socio-economic systems and to trace the effects of changes in the marine environment to their impact on benefits. This will require multidisciplinary cooperation between ecologists and economists, and it might in the long term represent a useful tool to aid complex assessments.

In any case, it is important to ensure transparency of the analysis: limitations (what is accounted and what not) should be clearly indicated and presented to stakeholders and decision makers. In relation to improving knowledge and quantification of the effectiveness of measures, monitoring is expected to enable Member States to evaluate the “extent of success” of (sets of) measures and the progress they entail towards achieving MSFD targets. This also supports very much the idea of adaptive management.

5 Embedding economic analysis in the decision-making

As was highlighted in Section 3.1 as well as the PoMs Recommendation, cost-effectiveness and cost-benefit analysis can have different functions in the PoM development process²⁰, and this also depends on each individual Member State decision-making process. Both CEA and CBA can be part of the prioritisation of measures process, in collaboration with stakeholders at various stages. Further on, the impact assessment including cost-benefit analysis ensures that all economic, social and environmental impacts of a measure are analysed in advance of taking a decision on implementing a measure, ensuring that the PoM is overall sustainable.

It should be clear that, next to the cost-effectiveness and cost-benefit considerations for PoM development, also other criteria are of importance such as technical feasibility, stakeholder support, the precautionary approach, availability of funding, etc. These “other” criteria of relevance when developing a Programme of Measures are briefly touched upon in the following section.

5.1 Stakeholder involvement

The participation of interested parties in the implementation of the MSFD is one of its key requirements and the Directive places in Article 19(1) substantial emphasis on the need for the wider public to be informed and consulted. This Article provides, ‘... Member States shall ensure that all interested parties are given early and effective opportunities to participate in the implementation of this Directive, ...’.

Stakeholder involvement is relevant through the entire MSFD PoM development including the economic analysis. This involvement is key to stakeholders because:

- Stakeholders may wish a wider array of measures is looked at (all options to be considered);
- Maintaining/reaching uniformity (level playing field) in the PoM is a major concern of stakeholders;
- Sometimes more research into cause-effect relations and (pollution) routes is needed. A precautionary approach can be questioned e.g. a measure may indeed end up being not cost-effective in case uncertainty is too large.....;
- For some measures, stakeholders are / will be actively involved in the implementation or financing of the measure (e.g. plastic industry) – does cost-effective approach still apply?
- Disproportionality per sector is of concern to stakeholders.

During the stakeholder consultation, information will be gained about socio-economic impacts of measures e.g. on economic business sectors, other users or non-users of the marine environment. Depending on the phase during which the stakeholder consultation is organized, information brought in by stakeholders may have a different effect in the process. In case the stakeholder consultation is organized early in the process, this information can feed into the impact assessment by providing information on socio-economic and environmental impacts. Information brought in by stakeholders about potential resources available for financing specific measures may influence the selection of measures in the PoM.

²⁰ See also van der Veeren (2010) for an overview of experiences with various CBAs for the WFD in the Netherlands.

Information on the current and future financing structure will be useful for the analysis of who is currently paying how much, and how the additional burden could be shared among the economic actors. This gives insight in the existing and potential future financing structure for the protection of the marine environment (in much a similar way as the cost recovery issue in Art. 9 of the Water Framework Directive gave insight in the financing structures for the WFD-related activities).

Experiences:

NL: stakeholder process within the MSFD cycle

There are three types of participants to the participatory process for establishing the Marine Strategy Part I:

1. stakeholders
2. citizens
3. public participants

Involved stakeholders²¹ are officially represented in several consultative bodies, of which a MSFD core group. This core group meets on average 4 times a year to discuss the progress, products and policy of the Marine Strategy. Where necessary, bilateral consultations are held with individual stakeholders, specifically targeted to the development of measures such as regarding litter and new MPAs. As an example, some of the litter measures are developed in teams with stakeholders leading towards “Green Deals” on voluntary packages of measures.

Citizens are represented by The Kust Zee association, a collaborative venture of the Dutch and Belgian members and member organisations of the European Coastal Marine Union (EUCC). Public participants have the opportunity to submit their opinion on the Marine Strategy via public consultation rounds. This step in the decision making process is followed by a “document of answer” which is the formal answer to the public consultation. Finally the draft Marine Strategy goes for final agreement to the board of ministers. (Dutch MoE; 2011 & personal communication from Rob van der Veeren, Rijkswaterstaat)

→Link to the project:

http://www.noordzeeloket.nl/en/Images/Marine%20Strategy%20for%20the%20Netherlands%20part%20of%20the%20North%20Sea%202012-2020%2C%20Part%201_683.pdf

FR: stakeholder process within the MSFD cycle

France spends much time on stakeholder consultation. Their procedure is intertwined by meetings with stakeholders, which can be illustrated by the 2013 planning history (French MoE; 2014):

- 1st half of 2013: inventory of existing measures
- June: workshop to discuss how they contribute to GES
- July: ideas of new measures and local discussions
- September and October: workshop on technical and legal feasibility of new measures
 - December: proposal of new measures by Marine sub-regions (lists submitted by “conseils maritime de façade” -Marine region councils- which involve administrations, elected representative, stakeholders and public)

→Link to the project: via CIRCA

²¹ The stakeholders represent all of the North Sea sectors: fisheries, shipping, nature and the environment, hydraulic engineering, the offshore industry and leisure activities.

BE: stakeholder process within the MSFD cycle

In Belgium, stakeholders are involved within the gap analysis and the draft of possible new measures. Stakeholders are also consulted for specific information/expertise on new measures and their costs.

UK: selection of measures via stakeholder workshop

Previously to the Cost Benefit Analysis for the MSFD (CEFAS; 2012), the economics of a range of illustrative potential management measures to achieve GES have been analysed, based on a workshop organised by Cefas and Eftec .

→ Link to the report:

<http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=16817>

UK: Coordination of marine science research via MARG (Marine Assessment and Reporting Group)

The Marine Assessment and Reporting Group (MARG) is a partnership of government departments, devolved administrations, environment agencies and research bodies involved in funding and marine science in the UK. It brings together senior managers with responsibility for marine monitoring, observation and assessment from UK public bodies. MARG identifies ways of carrying out assessments to meet policy needs, with existing resources and scientific knowledge. It also directs the implementation of suitable programmes, reviews assessments and recommends changes to monitoring programmes as needed.

→ Link to the report: <http://www.defra.gov.uk/mscc/groups/uk-marine-monitoring-and-assessment-strategy/>

UK (Scotland): stakeholder process within Business and Regulatory Impact Assessments (BRIA)

Since 2012, research projects were carried out that examined the potential economic and social effects of the proposed suite of Nature Conservation MPAs in Scottish offshore and territorial waters. Stakeholders and the public have been engaged in order to refine the analysis via the following actions:

- public consultation roadshow
- bilateral engagement with industry stakeholders throughout the process
- displacement roadshow with fishermen which has helped to refine the fishing inner management zones.

Marine Scotland received over 14.000 consultation responses, and 70 substantive replies on socio economics issues. These helped to inform and update partial BRIAs into final BRIAs (Ross, E.; 2014) .

→Link to the project: [workshop presentation via CIRCA](#)

UK & Ireland: initiatives to bring stakeholders together

- **PISCES** (Partnerships Involving Stakeholders in the Celtic Sea Ecosystem)

The PISCES project has brought together stakeholders from the Celtic Sea to develop a practical guide on implementing the ecosystem approach in the context of the Marine Strategy Framework Directive. It has been supported and recognized by the UK & Irish governments (DEFRA & DECLG) as particularly useful mechanism for engaging groups of stakeholders in the process development of the MSFD. The guide provides important key messages regarding the stakeholders engagement

actions needed to achieve stakeholders consensus on issues, measures and solutions which cross national boundaries.

→ Link to the project: <http://www.projectpisces.eu/guide/>

- **CSP** (Celtic Seas Partnership)

The Celtic seas partnership (CSP) is the successor project to the PISCES project and is supported by the UK, Irish & French Governments, OSPAR and the EU. The Celtic Seas Partnership is a pioneering project that will bring together sea users, industry, governments and the scientific community across the Celtic Seas for them to find ways of working together that will help achieve healthy and sustainable seas. The focus of the project will be key European legislation that aims to conserve and protect Europe's seas while allowing sustainable use of our natural marine resources. The project is in process at present.

→ Link to the project: <http://celticseaspartnership.eu/about-us/about-the-project/>

NL: stakeholder involvement within data gathering

Within the Dutch Socio-economic analysis (SEA) marine litter (Rijkswaterstaat; 2013), costs of measures for marine litter reduction were based on interviews with stakeholders. Because cost findings from studies abroad could not easily be transferred to the Dutch situation, a specific NL study was executed to determine damage costs. Several stakeholders were interviewed, amongst them:

- organisations for shipping, fisheries, recreation, marine nature protection
- individual fishermen, shipping companies, ship yards, ship repairers, freight organisations, cargo companies

These stakeholders had a role in the identification/quantification of impacts, cost data and cost-effectiveness of measures. Furthermore they gave relevant input on distribution of costs and benefits across sectors: who implements measures/who bears costs/who incurs burdens/who benefits.

→ Link to the project: via CIRCA

5.2 Other criteria of relevance for PoMs development

5.2.1 Public perception of civil society

Public perception of civil society in the decision-making process is – in addition to other activities for stakeholders engagement – quite relevant and can provide good insight about the feasibility of a selected measure. Experience with several valuation studies focusing on marine ecosystems show a great unawareness amongst the public. People are mostly unaware of such issues, as marine ecosystem services are much less tangible than terrestrial ecosystem services. This issue is also important for determining the benefits of improving environmental conditions in open waters. At the moment, few projects could be found focusing on the awareness issue of marine ecosystems. Examples are being gathered under the ongoing project MARLISCO (FP7 2012-2015) regarding descriptor 10 marine litter and a Dutch survey on citizens' perception of the North Sea.

Experiences

EU: MARLiSCO project: Marine Litter in European Seas - Social Awareness and Co-Responsibility

Understanding how people perceive the problem of marine litter and promote their thinking about the solutions proves to be crucial to effectively tackle this problem. The MARLiSCO project has conducted an extensive survey²² to gather information on the level of awareness of European society in terms of characteristics of marine litter, its sources, consequences and attribution of responsibilities. The results provide a baseline of awareness, attitudes and barriers in respect to understanding the issue and taking action, and how these vary between countries and across stakeholder groups.

The results indicate that the majority of Europeans seem to be concerned about marine litter and perceived it as posing several negative impacts. Nevertheless, there seems to be some important gaps in terms of knowledge, as respondents seem to underestimate considerably both the plastic fraction that typically composes marine litter and the contributions of land-based sources.

→ Link to the project: <http://www.marlisco.eu>

NL: survey on citizens' perception of the North Sea

In the Netherlands, a survey has been conducted on citizens' perception of the North Sea. The study *Perception of the North Sea, a quantitative consultation of Dutch citizens regarding the North Sea* surveyed 600 citizens, whose knowledge of and affinity with the North Sea were examined in a random sample. They were also presented with various environmental problems and asked to prioritise possible solutions and their consequences. (Dutch MoE; 2011)

→ Link to the project:

http://www.noordzeeloket.nl/en/Images/Marine%20Strategy%20for%20the%20Netherlands%20part%20of%20the%20North%20Sea%202012-2020%2C%20Part%201_683.pdf

5.2.2

Technical feasibility and continuation/reinforcement of existing measures

Following art. 13 § 3, marine measures should also be technically feasible. Further on, measures can build further on existing measures such as those that ensure the implementation of the Maritime Spatial Plan, reinforcement measures, improved inspection etc.

Experiences

BE

In the Belgian approach, four categories are used in the prioritisation process in relation to determining the (technical) feasibility of a measure.

| |
|--|
| Best Available Technique (BAT) |
| Multiple application, comprehensive experience/proof of good practice. |
| Applied; limited experience/ uncertainty |
| New development |

²² A total of 3748 respondents completed the survey across 12 EU countries.

Measures with only limited experience, or new developments, have currently a more limited technical feasibility than measures for which already exists some more experience. Such measures have a potentially lower risk of fluent and successful implementation. This does however not mean that the implementation of these measures is considered as impossible.

→ [Link to the project: ongoing study, to be published](#)

5.2.3 Transboundary cooperation

The transboundary nature of the main European seas adds to the complexity of the development of the programme of measures and the economic analyses, e.g. due to the danger that benefits that occur outside of national territories are neglected.

Another relevant factor that will support and the achieve common and feasible measures is the transboundary cooperation in particular regarding marine planning and management. The Regional Sea Conventions do play an important role here, and exchange of measures and results on economic analysis is done through these bodies. Though this is quite recent, the promotion of cooperation across borders can ensure the coherence of national maritime spatial plans, standards and processes towards the implementation of measures. This approach can provide a bilateral platform for communication, as well as transnational joint regional processes and plans (Fernandes et al; 2013). Some initiatives of transboundary marine planning have been experienced within European context such as the ones in the North Sea (MASPNOSE), Baltic Sea (BaltSea Plan and PlanBothnia) and Mediterranean Sea (UNEP/MAP).

Experiences

EU level:

On marine litter, transboundary collaboration is done through the Regional Sea Conventions or by EC studies. The following references are relevant here, referring also to the costs and benefits of marine litter measures:

- EC DG ENV Pilot project “4 Seas” – plastic recycling cycle and marine environmental impact; Case studies on the plastic cycle and its loopholes in the four European regional seas areas²³
→ [Project available at \[http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm\]\(http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm\)](http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm)
- EC DG ENV Marine Litter Removal Project – ongoing (MARELITT)
→ [Project available at \[http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm\]\(http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm\)](http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm)
- EC DG ENV Economic assessment of policy measures for the implementation of the Marine Strategy Framework (2012)²⁴ –
→ [Report and database available at \[available at <http://ec.europa.eu/environment/enveco/water/>\]\(http://ec.europa.eu/environment/enveco/water/\)](http://ec.europa.eu/environment/enveco/water/)

²³ Measures are evaluated based on different criteria and discussed at a regional basis.

²⁴ The outcome of this study should help streamlining discussions between Member States of the same region and between Member States and the Commission on what direction to take in developing such a program of measures (by 2015).

- UNEP MAP. Background document on Marine Litter Regional Plan Measures and Indicative Cost Estimation of Measures Implementation
→ [Link to report: Report to be requested at UNEP-MAP](#)
- OSPAR Marine Litter Action Plan²⁵
→ [Project available at](#)
http://www.ospar.org/html_documents/ospar/html/marine_litter_unep_ospar.pdf
- Baltic area: MSFD GES-REG project (2011-2013) to support coordinated implementation of MSFD in C&N-E basins of the Baltic Sea (EE, FI, LV, SE).

Baltic Sea:

- BaltSeaPlan Project

Experience in the Baltic Sea within BaltSeaPlan Project demonstrated that it is necessary to have in place a functional geographic information system which broke down the traditional divisions between different thematic approaches (socio-economic statistics and environmental monitoring, for instance). This functional system served as a regionally compiled geo-referenced data on various topics related to several distinct aspects of human use, e.g. maritime traffic, fisheries, pipelines and cable routes or protected areas. The existence of such a system will support the selection of measures in the process of the MSFD. Another advantage found in this experience was the similarity in planning systems and the existence of a regional infrastructure and the informal status of working at the transboundary level.

→ [Link to the project: http://www.baltseaplan.eu/](http://www.baltseaplan.eu/)

- Plan Bothnia project

The Plan Bothnia Project has tried out the strategic transboundary spatial planning approach in the Bothnian Sea, between Sweden and Finland. The project is coordinated by HELCOM. The main challenges experienced were the difficulties in combining the planning and permitting of granting systems, national datasets, planning traditions and procedures from both countries. At the end, this project provided also the opportunity to consider on the planning implications of the ecosystem approach and the related definitions of good environmental status.

→ [Link to the project: http://planbothnia.org/](http://planbothnia.org/)

North Sea:

- MASPNOSE project (Maritime spatial planning in the North Sea)

In the North Sea project MASPNOSE two different case studies have been selected: one between the Belgian and Dutch borders and the other between the United Kingdom, Denmark, The Netherlands and Germany. Via these case studies, it was possible to establish some main conclusions regarding administrative and legal issues, such as the need to agree on who has the power to decide (coordination body) and the importance to have a good connection among key persons for maritime spatial planning in the different Member States. Essentially in the initial phases of planning, informal contacts were considered more important than formal ones. Also, another relevant conclusion of this project was the clear differentiation among front-stage transparency (to the entire public) and back stage transparency (between a group of key stakeholders).

→ [Link to the project: http://www.wageningenur.nl/nl/show/Maspnose-Maritime-spatial-planning-in-the-North-Sea.htm](http://www.wageningenur.nl/nl/show/Maspnose-Maritime-spatial-planning-in-the-North-Sea.htm)

²⁵ See also the study "Strategic Support for the OSPAR Regional Economic and Social Analysis" (OSPAR Commission; 2013)

- The Dutch approach

The Netherlands tries to achieve harmonisation of different measures, both within OSPAR (the regional sea convention in which the countries around the North Sea cooperate) and within different European working groups. Examples are:

- The Netherlands have taken the initiative to start a discussion for further harmonisation on the way waste is collected and processed in international harbours, by preparing a discussion document
→ http://www.noordzeeloket.nl/images/Discussion%20document%20Managing%20undesirable%20Oship%20generated%20waste%20discharges%20in%20Marine%20Environments_1288.pdf
- The Netherlands have been actively involved in the exchange of knowledge, information and experiences providing all reports and information in English and publish them on the internet. This made it possible for other Member States to benefit from the experiences and information gathered by the Netherlands e.g. http://www.noordzeeloket.nl/projecten/europese-kaderrichtlijn-mariene-strategie/stand-van-zaken/nationaal/econom_analyses_2010/economische-analyse-krm-2011.aspx
- Within OSPAR, the Netherlands works closely with Germany to further shape the OSPAR Regional Action Plan on Marine Litter by including regional measures
- → see http://www.ospar.org/content/news_detail.asp?menu=00600725000000_000023_000000 .

5.2.4

Considerations of the links with other policy areas

There is the need to check the potential impacts of measures in other European policies. Negative impacts may be anticipated from measures in other sectors, e.g. waste management strategies which may increase the incentives to illegally dump if price for waste collection increases. It is important that other objectives of EU policy be implemented consistently with the MSFD – and indeed that potential “win-win” measures be identified when implementing e.g. the Water Framework Directive or agricultural policy (CAP). From this, it would be very much relevant if the economic analysis (and aspects linked to that e.g. reporting, methodologies, data) are linked up.

Directives/policy areas to consider specifically are the following:

- Water Framework Directive (WFD) (via the RBMPs)
- Birds and Habitats Directives (BHD) (via the prioritized action frameworks)
- EU Biodiversity Strategy (BDS)
- Maritime Spatial Planning Directive (MSP)

A more elaborate summary of the relevant Directives is given in Annex I of the PoM Recommendation paper. This annex covers the relevant EU legislation that contributes to achieving MSFD GES.

Experiences:

EU: integrating policy initiatives

The European Commission has launched an initiative bringing together MSFD, WFD and Nature/biodiversity policy areas. During the workshop on integration EU directives (21/05/14), a link has been made to the Project MAKE IT WORK (roadmap for future EU environmental regulation).

Regarding ecosystem services, the MAES process (Mapping and Assessment of Ecosystems and their Services, see 4.3.2) will complement the data collection and reporting activities under the MSFD, the WFD and other nature legislation (not to mention the various Regional Sea Conventions).

UK: Common database DEFRA Marine MSFD – WFD

Future work is planned by DEFRA to develop a common knowledge base on costs and effectiveness of measures, encouraging standard approaches and appropriate locally-specific application, without being prescriptive.

FR: coordination of MSFD-WFD measures

France is addressing how to coordinate the measures taken under the WFD and those to be taken for the MSFD. The following approach is prescribed:

- Set milestones for both directives to the same calendar,
- Review existing measures including those from the MSFD (are existing targets (e.g. for trawlers) sufficient to achieve GES in 2020 or not)
- Determine where the pressures occur in transitional or marine waters
- Assess which targets are adequate and which ones are not - determine together with ecologists and economists which targets are sufficient

5.3 Recommendations

The feasibility and sustainability of measures in the PoM will not only depend on the net difference between costs and benefits, but also on how these are distributed between stakeholders, and on stakeholders' willingness to be involved in the initiative. For this reason, a focus on stakeholders can deepen and enrich economic analysis.

Without ignoring the risks that may accompany stakeholder engagement, the process tends to make CBA/CEA outcomes better match reality and is likely to lead to a reduced regulatory burden, increased certainty of investment and fairer or more affordable measures. It should be an integral part of any impact assessment procedure and it is indispensable when performing an economic analysis at society level. Early involvement of stakeholders is recommended, as this will increase acceptance of the results. It is recommended to critically review the information delivered to ensure an objective integration in the assessment.

For environmental policies to be effective and efficient, international cooperation is an important prerequisite. Transboundary cooperation with regard to the Programme of Measures is not only essential to increase the effectiveness of measures, but also to ensure a level playing field for different sectors. If various Member States perform analyses on the same topic, there may be an opportunity to perform certain parts of the analysis together (e.g. underwater noise;

http://ec.europa.eu/environment/marine/pdf/MSFD_reportTSG_Noise.pdf) and use each other's data (thereby also reducing resources). Some recommendations can be made:

- Identifying common environmental problems and looking for possible joint solutions for developing the socioeconomic assessments.
- The creation of a data and information system that holds relevant data to be used by Member States at a regional or EU-wide scale
- Further knowledge and experience sharing at groups like WG ESA and Regional Sea Conventions.

A common level of economic analysis for different policy areas would help including all relevant information into the CBA/CEA. Given the close linkage between several Directives (e.g. WFD, Habitats Directive), coordination and integration with the MSFD is highly recommended. This would ensure mutual/multiple benefits and the development of a cost-effective Programme of Measures. Both at EU level and at Member State level the opportunity to develop common guidelines, discussions and/or a database for economic analysis between these policy domains should be fully explored.

6

References

- ACTeon, Eftec et Créocéan. (2014). Etude d'incidence des projets de mesures dans le cadre de l'élaboration des programmes de mesures pour la mise en oeuvre de la Directive Cadre Stratégie pour le Milieu Marin (DCSMM). Rapport principal SRM GdG/MC, Version finale
- ARCADIS (2014). Marine Strategy Framework Directive Programme of Measures workshop on cost-effectiveness and cost-benefit analysis. Study commissioned by EC.
- ABPmer (2012) Business as Usual Report 2011, 'Business as Usual Projections of the Marine Environment: to inform the Implementation of the Marine Strategy Framework Directive'
- Aires-Marines. (2011). Economic and social analysis of the cost of degradation of the marine environment - French position issued during the WG ESA meeting, Paris, March 31st 2011
- Arcadis, Bath University, EUCC (2012a). Economic assessment of policy measures for the implementation of the MSFD. Final report of a study for the EC DG ENV (Project No 11601).
- Arcadis, Milieu, EUCC. (2012b). Pilot project '4 Seas' – plastic recycling cycle and marine environmental impact. Case studies on the plastic cycle and its loopholes in the four European regional seas areas
- Bertram, C. & Rehdanz, K. (2012). On the Environmental Effectiveness of the EU Marine Strategy Framework Directive. Kiel Working Paper No. 1760 | February 2012
- CEFAS. (2012). Proposed UK Targets for achieving GES and Cost-Benefit Analysis for the MSFD
- DEFRA.(2011). Impact Assessment of MSFD – targets and indicators for Good Environmental Status. Department for Environment, Food and Rural Affairs. London
- DHV (2011). Measures for the Marine Strategy Framework Directive. First overview of potential measures, related costs and effects of implementing the Marine strategy
- Dutch MoE. (2011). Marine Strategy for the Netherlands part of the North Sea 2012-2020, part 1. Published by Ministry of Infrastructure and the Environment in cooperation with Ministry of Economic Affairs. Den Haag (NL)
- Draft Common Understanding of (Initial) Assessment, Determination of Good Environmental Status (GES) & Establishment of Environmental Targets (Articles 8, 9, 10 MSFD), (2008), Proposal by co-lead Germany & drafting group (GIN, FR, GR, RO, SE & UK). Status 28.10.2011.
- ECORYS. (2012). Cleaning Costs Marine Strategy Framework Directive. Damage from marine litter to nets and screws
- Eftec, Enveco, Intersus. (2012). Recreational benefits of reductions of litter in the marine environment. Final report for Rijkswaterstaat Waterdienst
- European Commission (2003). Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance document n.o 1. Economics and the environment. The implementation challenge of the Water Framework Directive. Available online: <http://ec.europa.eu/environment/water/water-framework/economics/pdf/Guidance%201%20-%20Economics%20-%20WATECO.pdf>
- European Commission. (2009). Impact assessment guidelines. Available online: http://ec.europa.eu/smart-regulation/impact/commission_guidelines/commission_guidelines_en.htm

- European Commission DG ENV. (2010). Working group on economic and social assessment: Economic and social analysis for the Initial assessment for the marine strategy framework directive: a guidance document. WG ESA, CIRCA BC.
- European Commission. (2013). Evalsed Sourcebook: Method and Techniques, Regional Policy. Available online: http://ec.europa.eu/regional_policy/information/evaluations/guidance_en.cfm
- European Commission. (2014a). Programmes of measures under MSFD; Recommendations for establishment / implementation and related reporting, Draft, 27 May 2014
- European Commission. (2014b). Commission staff working document- Annex Accompanying the document Commission Report to the Council and the European Parliament; The first phase of implementation of the Marine Strategy Framework Directive (2008/56/EC) –
- European Commission. (2014c). Mapping and Assessment of Ecosystems and their Services (MAES). Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020. Technical Report - 2014 - 080
- Fernandes et al. (2013). Establishment of a Guidance Framework for Cross-border Maritime Spatial Planning.
- Finding Sanctuary, Irish Seas Conservation Zones, Net Gain and Balanced Seas. (2012). Impact Assessment materials in support of the Regional Marine Conservation Zone Projects' Annex H9 Approach for assessing costs of management measure implementation, enforcement and surveillance
- French MoE. (2014). Assessing impacts of measures : first feedback of french approach. Ppt prepared for the WG ESA workshop 1/4/2014. Ministère de l'Écologie, du Développement durable, des Transports et du Logement. Paris
- German MoE. (2013). Methodologies regarding Economic and Social Analyses and Impact Assessments of Measures including Cost-Benefit-Analyses in the context of the Marine Strategy Framework Directive- Summary -. Commissioned by the German Federal Environment Agency
- GES-REG. (2013). Workshop on Economic analysis for the MSFD Program of measures; 10-11 December 2013, Stockholm; Report on results of the workshop
- HM Government. (2012) Marine Strategy Frame Directive consultation: UK Initial Assessment and Proposals for Good Environmental Status
- Interwies, E. (2014). Lessons learned from CEA/CBA in WFD and outlook. Presentation during WG ESA 1/4/2014
- JRC. (2013). STAGES (Science and Technology Advancing Governance of Good Environmental Status) Workshop Report on research needs with regard to the socio-economic analysis under MSFD (9-11 October 2013). Joint Research Centre of the European Commission
- Koss, R.S., Knights, A.M., Eriksson, A. and L.A. Robinson. (2011). ODEMM Linkage Framework Userguide. ODEMM Guidance Document Series No.1. EC FP7 project (244273) 'Options for Delivering Ecosystem-based Marine Management'. University of Liverpool
- LEI. (2011). Measures for the Marine Strategy Framework Directive. First overview of potential measures, related costs and effects of implementing the Marine strategy
- LEI. (2012). Cost-effectiveness and cost-benefit analysis for the MSFD Framework for the Netherlands
- Mangos A., Claudot M.-A. (2013). Economic study of the impacts of marine and coastal protected areas in the Mediterranean. Plan Bleu, Valbonne
- OSPAR Commission. (2013). Strategic Support for the OSPAR Regional Economic and Social Analysis

- Pakalniete K., Fedorovica K., Muraško A. (2013a). Valuing benefits of reaching MSFD targets by applying “Choice Experiment” method . GES-REG WP 5 Task. 5.3 (Coordinating methodologies and improving information base for the cost of degradation analysis.)
- Pakalniete K., Muraško A. (2013a). Database-tool on “baseline policies” for the MSFD Program of measures. Output of the project of the Central Baltic INTERREG IV A Programme 2007-2013 “Good environmental status through regional coordination and capacity building” (GES-REG). AKTiivS Ltd.
- Pakalniete K., Murasko A. (2013a) Harmonising the ‘business-as-usual scenario’ development of the MSFD: A study on the ‘baseline policies’. A study report. Report of the GES-REG project. AKTiivS Ltd.
- Pakalniete K., Fedorovica K. (2013b). Economic evaluation of ‘supplementary’ measures for the WFD programs of measures in Latvia. Latvian study report.” Report of the project “Towards joint management of the transboundary Gauja/Koiva river basin district”
- Ten Brink P. (2008). Workshop on the Economics of the Global Loss of Biological Diversity, 5-6 March 2008, Brussels
- Rijkswaterstaat. (2013). Economic and social analyses for the MSFD. Part 2: Program of measures - Theme marine litter. Draft version for distribution and consultation within EIHA and WG ESA
- Ross, Ed. (2014). Lessons learned in designating Scotland’s MPA network, presentation at the WG ESA workshop 1/4/2014. Marine Analytical Unit, Marine Scotland
- SEMRU. (sd). Report to the MSFD Technical Working on estimating the cost of degradation of the marine environment if Ireland was to fail to implement the MSFD. Socio-Economic Marine Research Unit (SEMRU). J.E. Cairnes School of Business & Economics, Galway
- Swedish EPA. (2008). The economic value of ecosystem services provided by the Baltic Sea and Skagerrak. Existing information and gaps of knowledge. Commissioned by Swedish Environmental Protection Agency.
- UNEP-MAP. (2013). Background Document on Marine Litter Regional Plan: Measures and Indicative Cost Estimation of Measures Implementation. Meeting of the MAP Focal Points. Athens, 10-12 September 2013
- UNEP-WCMC, Cambridge. University. (2011) The UK National Ecosystem Assessment: Chapter 12: Marine.
- Van der Veeren, R. (2010). Different cost-benefit analyses in The Netherlands for the European Water Framework Directive. Water Policy 12 (2010) 746–760
<http://test.iwaponline.com/wp/01205/0746/012050746.pdf>

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