



WT 3.1.4 Recommendations on regional economic and social analyses for European marine areas

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Table of Contents

1 Introduction	2
2 Experiences on developing the economic and social analysis in the Baltic Sea region	3
3 Supporting regional policies for protecting the marine environment	3
4 Recommendations on regional economic and social analyses for European marine areas	5
4.1 Economic and social analysis of the use of marine waters	5
4.2 Cost of degradation analysis.....	9
4.3 International cooperation	12
4.4 Priority areas for long-term work on regional economic and social analyses	12
References	14

List of abbreviations

BAU	“Business-as-usual” scenario
ESA	Economic and Social Analysis
GES	Good Environmental Status (MSFD) and good status (HOLAS)
HELCOM	Baltic Marine Environment Protection Commission - Helsinki Commission
HOLAS	HELCOM holistic assessment
IMP	Integrated Maritime Policy
MSFD	Marine Strategy Framework Directive
MSP	Maritime spatial planning
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
SEEA-EEA	System of Environmental-Economic Accounting Experimental Ecosystem Accounting

1 Introduction

This chapter presents the background and recommendations on regional economic and social analyses (ESA) for European marine areas. The chapter summarises experiences on developing the regional ESA for the Baltic Sea region (section 2), describes how the ESA can support policies for protecting the marine environment and highlights the benefits of regional ESA (section 3). Section 4 provides the actual recommendations for the regional ESA for European marine areas.

2 Experiences on developing the economic and social analysis in the Baltic Sea region

In the Baltic Sea region, the aim has been to develop regional economic and social analyses (ESA) in general and specifically for HELCOM HOLAS II 'State of the Baltic Sea' report. In 2016, the TAPAS project developed a conceptual framework for the regional ESA with the focus on the use of marine waters and the cost of degradation analyses. The project aimed to operationalize the framework and tested it using available data sets and existing research results. Data were collected for selected countries, sectors (use of marine waters), and ecosystem services and descriptors of good environmental status (the cost of degradation). Further work on the regional ESA has been conducted as part of the SPICE project which ran until the end of 2017. The project developed the relevant elements of the regional ESA further, for instance, the use of marine waters and the cost of degradation analyses for HOLAS II, the ecosystem services approach in the regional ESA framework, business-as-usual scenario, and tools for integrated assessment of the marine environment.

The first version of the HOLAS II 'State of the Baltic Sea' report was published in June 2017¹. It will be updated based on further work and public consultations, and the updated version is planned for June 2018. The regional ESA results developed for the first version are provided in the summary report², whereas detailed results and method descriptions are available in a supplementary report on the ESA³. The ESA results in the HOLAS II build on the work of the TAPAS and SPICE projects and information exchange within the HELCOM ESA network and the EU Working Group POMESA meetings. The results also aim support the Contracting Parties in their EU MSFD Initial Assessments in 2018 with regard to the ESA of the use of marine waters and cost of degradation. The HOLAS II ESA results demonstrate the first example of regional scale economic and social analysis in the Baltic Sea area. A clear conclusion from the work is that data availability limits the analyses. The existing information determines selection of approaches for the analyses as not all marine uses can be characterized with existing statistics and economic indicators. Data issues are evident for the cost of degradation analysis, as regional value estimates are available only for few degradation themes and GES descriptors.

3 Supporting regional policies for protecting the marine environment

Regional economic and social analyses are required to fully depict the relationship between a healthy marine ecosystem and human well-being. Understanding this relationship is necessary for implementing the ecosystem approach, ecosystem-based management and supporting the sustainable use of ecosystem goods and services, such as sustainable blue economy and growth (EC 2017). Regional economic and social analyses can support the implementation of Action Plans, maritime spatial planning and assessment of ecosystem health.

Marine Strategy Framework Directive (2008/56/EC, MSFD), its Initial Assessments (Article 8) and Programmes of Measures (Article 13) either request directly or can be supported by economic and social analyses. Although there is no direct requirement for regional ESA in the MSFD, the directive refers to

¹ All related reports and data are available at <http://stateofthebalticsea.helcom.fi/about-helcom-and-the-assessment/downloads-and-data/>.

² Available at: <http://www.helcom.fi/Lists/Publications/State%20of%20the%20Baltic%20Sea%20-%20First%20version%202017.pdf>.

³ Available at: http://stateofthebalticsea.helcom.fi/wp-content/uploads/2017/07/HELCOM_Economic_and_social_analyses_Supplementary_report_first_version_2017.pdf

cooperation and coordinated development of marine strategies using existing structures, such as Regional Sea Conventions. The Initial Assessment includes two types of ESA: use of marine waters and cost of degradation analysis.⁴ The economic and social analysis of the use of marine waters illustrates importance of the marine environment to society, the contribution the marine environment makes to the well-being of citizens and to national and regional economies. The cost of degradation analysis measures the lost human well-being if the sea does not reach a good status. The Initial Assessment forms the basis for the Programme of Measures, which includes the cost-effectiveness and cost-benefit analysis of measures to improve the state of the sea. The first cycle of the MSFD implementation has shown that regional and international experience and information exchange is beneficial for the national ESA development. However, there is a need to improve the regional coherence of the ESA approaches. Further steps are taken to improve coherence of the approaches, and to develop institutional capacities and regional ESA.

ESA can support maritime spatial planning (MSP) in general and for the EU MSP directive (2014/89/EU).⁵ ESA can reveal the relative importance of marine uses and ecosystem services in economic and social terms, show trade-offs and synergies between marine uses, economic activities and ecosystem services, enhance public participation in the planning, and enable comparisons of the benefits and costs of alternative marine spatial planning solutions. Developing regional approaches is important also for MSP purposes.

Aside from MSFD and MSP, ESA can benefit the EU Biodiversity Strategy 2020⁶. The strategy aims to halt the loss of biodiversity and ecosystem services in the EU and to help stop global biodiversity loss by 2020, requires improving knowledge of ecosystems and their services in the EU (Target 2, Action 5). Action 5 involves the requirement for Member States to map and assess the state of ecosystems and their services, assess the economic value of such services and promote the integration of these values into accounting and reporting systems at EU and national level by 2020. The ESA can provide the socioeconomic characterisation and economic valuation of marine ecosystem services, and also assessment of the costs of biodiversity loss.

Moreover, ESA can contribute to the overall Integrated Maritime Policy (IMP) implementation, which aims to provide a more coherent approach to maritime issues. The Blue growth indicators are developed⁷ as part of the IMP implementation, but currently none of the indicators selected take into account environmental sustainability. Environmental sustainability can, in the long run, impact the economic performance of the blue economy and thus should be considered when monitoring the sectors making up the blue economy. The inclusion of environmental considerations alongside growth potential is a start to ecosystem approach thinking. The expert group for blue economy data should link with working groups dealing with the economic and social analyses related to marine policies, e.g. the MSFD working group POMESA.

In the Baltic Sea region, the ESA has been developed from a regional perspective taking into account needs to serve national assessments and reporting for the EU MSFD. This is achieved by following the EU recommended approaches, developing joint regional concepts and specifications of the approaches, and providing estimates for each country. To achieve synergies at regional and national levels, close cooperation is necessary. The exchange within HELCOM ESA network indicates that the regional ESA results are useful for the national work. The exchange of information and consultations have provided substantial contributions to the regional work. Continuing and developing further this cooperation between the national and regional scale is essential for further development of the ESA in the sea region.

⁴ The Initial Assessment includes also need for the “business-as-usual” scenario development, which is covered in work package 3.2 of the SPICE project.

⁵ Directive of the European Parliament and of the Council of 23 July 2014 establishing a Framework for Maritime Spatial Planning (2014/89/EU).

⁶ http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm.

⁷ Study on the Establishment of a framework for processing and analyzing maritime economic data in Europe <https://webgate.ec.europa.eu/maritimeforum/en/node/4009>; An Executive summary: <https://webgate.ec.europa.eu/maritimeforum/sites/maritimeforum/files/Executive%20summary.pdf>

4 Recommendations on regional economic and social analyses for European marine areas

The recommendations for developing the regional ESA listed in this section are based on the experiences gained in the Baltic Sea region. The recommendations cover practical considerations for the ESA of use of marine waters (section 4.1), the cost of degradation (section 4.2) of the marine environment (required by the EU MSFD Initial Assessment), and international cooperation (section 4.3), as well as priority areas for long-term work on the regional economic and social analyses in the future (section 4.4). Figure 1 lists the recommendations and the steps of implementation in brief, and sections 4.1-4.4 give a full description of the recommendations. They highlight important information gaps and suggest solutions for addressing them in the future, as well as raise relevant issues for conducting the regional ESA.

4.1 Economic and social analysis of the use of marine waters

Background

Two approaches can be used for the ESA of the use of marine waters – the marine water accounts approach and the ecosystem services approach (WG ESA 2010). So far, the marine water accounts approach is most widely used both in national and sea region assessments. The ecosystem services approach is applied in e.g. UK and Sweden, and used for complementing the regional ESA for the Baltic Sea region results of the marine water accounts approach. Advantages of the marine water accounts approach are that the economic sectors and their activities can easily be linked to the list of activities used in the MSFD and the sea region assessments, the data can be derived from existing statistical data systems allowing comparability across the countries, and the indicators used for the assessment are similar to the indicators used for other fields, for instance, to measure the Blue Economy (COGEA 2016).

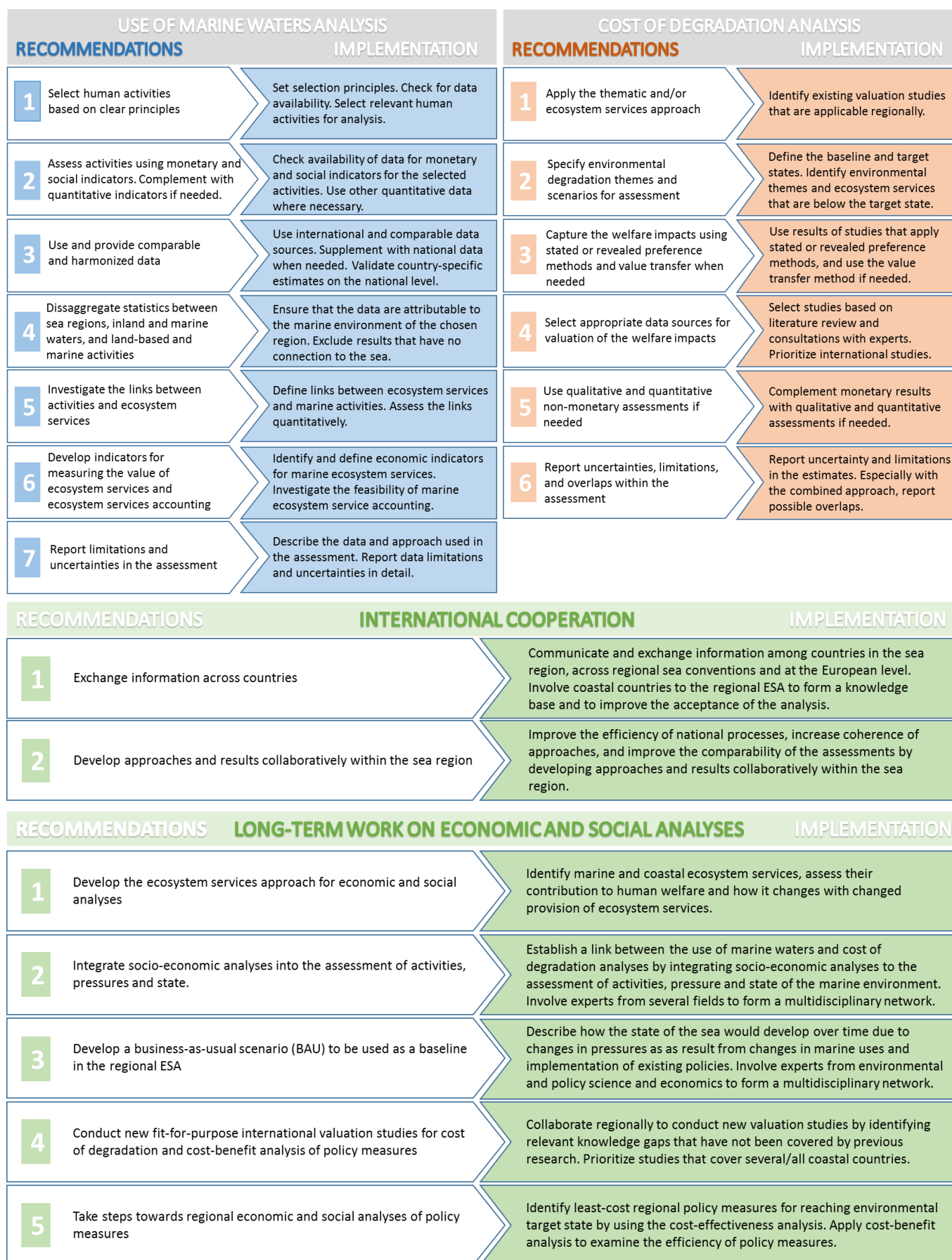


Figure 1. Recommendations and the steps for implementation of developing the regional ESA.

However, the assessment of economic values in the marine water accounts approach is limited. Statistical data only provide proxies for the economic value of the marine environment as they measure economic impact in the form of value added and employment rather than economic values. Additionally the statistical System of National Accounting excludes uses of the environment that are non-consumptive or difficult to measure using market prices. For example, the tourism sector can be described through tourist accommodation statistics, which do not describe appropriately marine and coastal recreation. To overcome this, the approach employed in the current Baltic Sea regional use of marine waters analysis is to supplement the statistical data with measures of welfare benefits from marine recreation, for which consumer surplus is used as an indicator based on a Baltic Sea wide economic valuation study. The main limitations for applying the ecosystem services approach are the current information gaps in estimating the contribution of the marine and coastal ecosystem services to human welfare.

Recommendations for developing regional use of marine waters analysis

The following issues have been identified as relevant based on the experiences in conducting the regional use of marine waters analysis and in discussions among the national ESA experts in the Baltic Sea region:

Select human activities based on clear principles. *Select and prioritize activities that (i) are relevant for the sea region, (ii) create significant pressure to, (iii) derive significant benefits from the use of, and (iv) are dependent on the state of the marine environment. Additional considerations include limiting the scope to marine-based (vs. land based) activities, data availability and future relevance of activities. The selection principles should be clearly explained. When conducting analyses to support the EU MSFD, use the revised MSFD Annex III as the basis.*

MSFD Annex III serves as a basis for the list of human activities for the EU Member States, and can be a useful reference to non-members. The list may be viewed in light of relevance of the current and future activities for a sea region. An unresolved issue is whether land-based activities impacting the marine environment should be included (e.g. agriculture, forestry, wastewater collection and treatment). The Baltic Sea regional ESA of the use of marine waters included activities which fit the criteria (i-iv) above and excluded the land based activities. Some activities and sub-activities fitting the criteria were excluded due to data limitations⁸. The exclusions can be re-considered in other ESA assessments, such as the development of the business-as-usual scenario for eutrophication.

Assess activities using monetary and social indicators, and complement the analysis with other quantitative indicators if needed. *Use monetary (e.g. gross value added, consumer surplus) and social (e.g. employment) indicators when data are available. Complement these with other quantitative indicators (e.g. number/amount of activity) when needed. Investigate additional appropriate indicators and data for selected activities (e.g. marine tourism and recreation, sectors related to marine transport infrastructure), and use of statistical accounts.*

Statistical indicators provide proxies for the socioeconomic values derived from the use of the sea. Their use is advantageous since they rely on existing statistical data. Gross value added and employment are common socio-economic indicators across the sea region for most of the sectors. However, definitions of the indicators differ for various sectors and data sources (e.g. 'gross value added' or 'value added at factor costs', 'total number of persons employed' or 'employed persons in full time equivalent'). These differences should be clearly indicated in the assessment, since they prevent comparisons and aggregation of data across sectors. When socio-economic statistical data are not available, other indicators and data characterising the activity can be used. In the Baltic Sea region, marine transport infrastructure and the production of off-shore wind energy could only be characterized using data on the extent of the activity, as no socioeconomic data were available.

⁸ Full list of activities included in the current regional ESA of the use of marine waters (for HELCOM HOLAS II ESA, 2017) include: fish and shellfish harvesting, aquaculture, tourism and recreation, off-shore wind energy production, and marine transport infrastructure and shipping.

For indicator development one could look into the Blue Economy study (COGEA 2016) for inspiration. For example, in the Baltic Sea region ESA, use of statistical data from input-output tables could be investigated to provide socio-economic indicators concerning sectors in relation to marine transport infrastructure. Citizens' expenditures on leisure trips to coastal areas could be used as an indicator for capturing the economic impact of the marine tourism and recreation on various tourism-related sectors.

Monetary indicators on marine tourism and recreation are also available from economic valuation studies that estimate the value (e.g. consumer surplus) of marine and coastal recreation. Using the economic valuation studies as the basis for monetary indicators would correspond to using the ecosystem services approach for recreation. Another option would be to utilize existing environmental economic accounts.⁹ Eurostat has plans to develop ecosystem accounts and water accounts, but no data are available yet for publication.

Use and provide comparable and harmonized data. International data sources, when available, provide comparable information, including EUROSTAT, industry associations (e.g. STECF) and sectoral regional studies. The results should be validated and supplemented through consultation with coastal countries. An additional data source is to collect comparable national data directly from the coastal countries. Combination of these approaches would yield the most comprehensive results.

ESA results can build largely on international data sources, including EUROSTAT (e.g. Structural Business Statistics), industry associations (e.g. data collected by STECF), and selected regional studies. National statistics can be used for refining country-specific estimates, when there are no international data or the data are inaccurate. Consultations with national ESA specialists on country-specific estimates and specific data availability are essential to validate and complement the results. This approach has been used in the Baltic Sea region. The alternative bottom-up approach, used e.g. in OSPAR region¹⁰, which utilises national data sources and collection, requires agreement on the data to be collected in advance to ensure comparability.

The use of a specific approach may depend on the diversity of the countries in a sea region. For the Baltic Sea region, the used top-down approach has been advantageous, in particular in the phase when also common regional concepts and approaches for the ESA need to be elaborated and tested. At the same time, national data collection from the countries is also planned for further regional scale ESA work.

Disaggregate statistics between sea regions, inland and marine waters, as well as land-based and marine activities. To arrive at estimates for the use of marine waters, it is necessary to ensure that the data presented are attributable to the marine environment. This requires presenting results that are specific to the regional sea in question, and excluding inland water or land-based activities that have no connection to the sea.

Some countries, e.g. Denmark and Germany in the Baltic Sea region, have coastlines on several marine regions. In these cases, national data related to marine uses and activities needs to be reported separately for each regional sea. In addition, some statistics are not specific to the marine environment, but cover both inland and marine waters, or land and marine areas, and thus do not represent adequately the contribution the use of the marine environment makes to the economy. This type of aggregation can lead to an overestimation of the economic benefits originating from the use of marine waters. This is relevant at least to statistics on marine fishing and aquaculture, freight and passenger marine transport, coastal and marine

⁹ The development and implementation of environmental accounts in Europe includes six compulsory accounts: 1) Air emissions accounts (AEA); 2) Economy-wide material flow accounts (EW-MFA); 3) Physical energy flow accounts (PEFA); 4) Environmental taxes; 5) Environmental goods and services sector (EGSS) accounts; and 6) Environmental protection expenditure accounts (EPEA). These accounts provide information on, for example, what environmental taxes are paid by the marine sectors for those pressures that are taxed upon, or how much finances have been used for environmental protection by those sectors to reduce the pressures from economic activities.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_accounts_-_establishing_the_links_between_the_environment_and_the_economy

¹⁰ Convention for the Protection of the Marine Environment of the North-East Atlantic. See <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/socio-economics/>

tourism, off-shore extraction of crude petroleum, natural gas and minerals, as well as off-shore wind energy production.

Further investigate the links between activities and ecosystem services. *A useful first step in the application of the ecosystem services approach for the use of marine waters analysis is to investigate the links between ecosystem services and marine activities, i.e. how activities affect ecosystem services and vice versa.*

The ecosystem services approach allows for a holistic analysis of the links between the ecosystem and human well-being, and is not limited by market-based information. Application of this approach is still quite limited due to a lack of information, and thus, it is important to start building the information base for its application in the future. A relevant first step is to link the human activities to ecosystem services, and assess the link quantitatively, as is done for the Baltic Sea as part of the SPICE project. Further investigation is needed to develop the ecosystem services approach for the use of marine waters analysis.

Develop indicators for measuring the value of ecosystem services, and develop the ecosystem services accounting for marine ecosystems. *For a wider use of the ecosystem services approach in the use of marine waters analysis, it is necessary to develop national or regional economic indicators for marine ecosystem services. Investigating the feasibility of using ecosystem services accounting for marine ecosystems would also be useful. Both approaches would allow a quantitative and coherent assessment of the contribution of the marine ecosystem services into human well-being in the future.*

The existing information is rarely in a format that supports applying the ecosystem services approach for the ESA of use of marine waters. Statistics provide information on the economic and social impacts of marine activities as outlined in the marine water accounts approach. One approach is to identify and define economic indicators for the ecosystem services provided by the sea. Such an approach describes the linkages between the marine ecosystem and human wellbeing more thoroughly, but is difficult to apply currently due to the current lack of data. Efforts are taken to develop indicator systems for the marine ecosystem (see for instance, Maes *et al.* 2016, Hattam *et al.* 2015).

The shortcomings of the system of national accounting are known and there have been several initiatives to extend the accounting system to consider the environment. For instance, the System of Environmental-Economic Accounting Experimental Ecosystem Accounting (SEEA-EEA), which is an integrated statistical framework for organising biophysical data, measuring ecosystem services, tracking changes in ecosystem assets and linking this information to economic and other human activities, and KIP-INCA - the knowledge innovation project on an integrated system of natural capital and ecosystem services accounting that is building marine ecosystem accounting (EC 2016). Such accounting for the marine ecosystem services would allow in the future assessing the marine ecosystem services in a coherent manner, making estimates available for the ESA of the use of marine waters.

Report limitations and uncertainties in the assessment. *It is important to be transparent and report the limitations and uncertainties to identify development areas.*

As other analyses, also ESA have limitations and uncertainties, which primarily come from the existing data limitations. Further work is needed for improving the data systems and availability. It is important to describe the used approaches and data, limitations and uncertainties transparently and in detail, in particular if the regional ESA results are to be used also for the national-scale assessments and reporting.

4.2 Cost of degradation analysis

Background

Three approaches are available for the cost of degradation analysis – the ecosystem services approach, the thematic approach and the cost-based approach (WG ESA 2010). So far, in the Baltic Sea region, either the ecosystem services or the thematic approach is used, or a combination of these two. This is likely due to the aim of the cost of degradation analysis to inform policies on the benefits of implementing measures and achieving environmental targets. Available information (e.g. monetary estimates from existing valuation

studies) often determines the choice of the approach, and the combination of the two approaches is used to provide more comprehensive assessment of the cost of degradation of the marine environment.

Since the values of environmental changes most often cannot be observed from markets and market prices, economic valuation studies are necessary for applying the thematic or ecosystem services approach. There are often existing valuation studies that can be used. The value transfer method, entailing the transfer of value estimates across countries, can be used to arrive at regional estimates when original studies for some countries are lacking. However, such estimates contain more uncertainty than the estimates derived from original valuation studies. Overall, the availability of data on cost of degradation is the main limitation for developing more comprehensive regional assessments.

The current results of the Baltic Sea regional cost of degradation analysis for the HELCOM HOLAS II ESA (2017) are based on combining the two approaches. The analysis provides estimates of the monetary benefits foregone for not achieving the good environmental status (GES), separately for relevant GES descriptors and ecosystem services. The approach builds on international Baltic Sea wide valuation studies covering all coastal countries to ensure comparability of estimates across countries and to allow for both national and regional estimates. Existing studies enable estimating monetary benefits in relation to eutrophication (thematic approach) and recreation (ecosystem services approach). The value transfer is used when original valuation studies are not available.

Recommendations for developing regional cost of degradation analysis

The following issues have been identified as relevant based on the experiences in conducting the regional cost of degradation analysis and in discussion with the national ESA experts in the Baltic Sea region. They relate to the necessary environmental assessments for identifying degradation themes and specifying scenarios for the assessment, cost of degradation assessment approaches and methods, data sources, uncertainties and limitations, and needs for improving information base for the assessment. These recommendations focus mainly on the thematic and ecosystem services approaches, as they are seen to have advantages in regional cost of degradation analysis.

Apply the thematic and/or ecosystem services approach for the cost of degradation analysis. *These approaches capture the lost benefits of not achieving GES, providing useful welfare estimates to support policy-making. The cost-based approach (relying on the costs of currently implemented measures to prevent degradation) does not correctly capture the welfare impacts of the degradation of the marine environment.*

It is recommended to focus on applying the thematic approach and/or the ecosystem services approach in the regional cost of degradation analysis. Although they are more information demanding than the cost-based approach, results based on these approaches are more useful to support policy making, e.g. for assessing benefits of implementing measures and achieving targets. The cost-based approach is conceptually different, as it does not estimate the lost benefits of achieving GES, and the results cannot be used when comparing the costs and benefits of measures in a cost-benefit analysis.

The main limitation for applying the thematic and ecosystem services approaches is related to availability of estimates to measure the impacts on human welfare from not achieving GES. If the cost of degradation is to be estimated in monetary terms, both approaches rely on valuation studies. Experience from the Baltic Sea region shows that although valuation studies are available within the sea region, there is limited availability of region-wide studies covering all coastal countries. More studies are available nationally, and they can be used for national scale assessments. However, their use for the regional scale assessment can be limited due to employing different valuation methods, definitions and approaches, which reduces their comparability. Hence, new international valuation studies need to be conducted to provide appropriate information base for the regional cost of degradation assessment (see section 4.4 on long-term work).

Identify environmental themes/ecosystem services with degraded state and specify environmental scenarios for the assessment. *Environmental themes and/or ecosystem services which are below the good state need to be identified for the cost of degradation analysis. The analysis also requires a clear definition of*

the baseline state and the target state, which are used as scenarios for assessing changes in human welfare to determine cost of degradation. In case these scenarios differ between the regional assessments and the valuation studies used for the cost of degradation analysis, this must be made clear.

The first step in the thematic/ecosystem services approach for the cost of degradation analysis is to identify environmental themes/ecosystem services where the current state is below the good state. This degradation can be assessed in socioeconomic terms as the cost of degradation. The degradation themes are identified based on the regional assessment of pressures, state and gap to the good state, or based on special assessments of the state of ecosystem services. These assessments can also guide the planning of new valuation studies to address the most important degradation themes/ ecosystem services for which monetary estimates are not available.

The next step requires specifying environmental baseline and target state scenarios for the assessment. In order to provide cost of degradation estimates, clear definitions of the baseline and the target state are needed for constructing the scenarios in the valuation studies. The scenarios are used for showing changes in the state of the marine environment. The cost of degradation can be estimated as the difference between the present state and the good state, or the difference between the business-as-usual scenario and good status. Common sea region definitions, preferably in a quantitative form, can be used for defining the present and target states. Concerning the business-as-usual scenario, there is on-going work in the Baltic Sea region on how to define it for the regional ESA, with the first step taken as part of the SPICE project. The current regional cost of degradation assessment does not address this issue explicitly yet.

It should be noted that when available valuation studies are used for deriving regional cost of degradation estimates, the baseline and target states used in the studies can differ from those in the regional assessment. This is unavoidable, as the studies have been conducted before the regional environmental assessments. Standardised approaches could be explored in the future regarding how to adjust available estimates for the differences. Regardless of the differences, the studies are useful for indicating the confidence level of the derived estimates. New studies should build on the best available knowledge on the baseline and target states.

Use stated or revealed preference methods to appropriately capture the cost of degradation and use the value transfer approach when needed. *As many of the welfare impacts of not achieving GES cannot be assessed based on market information, stated or revealed preference studies are recommended. When valuation studies that would cover all coastal countries are not available, value transfer can be used to arrive at regional estimates. It entails transferring the values estimated in one country to another, or values estimated in several countries to other countries.*

Many of the welfare impacts that need to be valued for the cost of degradation analysis cannot be observed from markets or market prices. Thus, the monetary valuation of the cost of degradation involves the use of valuation methods. Stated and/or revealed preference methods are recommended, as they are theoretically appropriate for capturing the lost benefits of not achieving GES. Some critique has been directed to survey-based stated preference methods, for instance, due to their hypothetical nature. However, it is recognised that use of these methods is a practical alternative in cases where values cannot be based on market behaviour and prices, which is the case for many features of the marine environment that need to be valued in the cost of degradation analysis.

The reliability of the value transfer method is considered lower than that of original valuation studies, but it can still be useful for indicative estimates of the magnitude of regional cost of degradation in cases where no original data for each country are available. It should be taken into account that countries may differ in their views and acceptance of the value transfer method.

Select appropriate data sources for the valuation of welfare impacts. *Using existing valuation studies for the cost of degradation analysis is often required. Appropriate studies can be selected based on literature reviews and consultations with national ESA experts. The principles of choosing the studies should be made clear. International studies, covering several coastal countries, should be preferred when they are available.*

Existing valuation studies form the main data source for developing the regional cost of degradation estimates. Choice of the studies depends on the environmental themes/ecosystem services, scenarios of changes and welfare impacts that need to be assessed, and also the geographical scale of the available studies. For the Baltic Sea regional assessment, the studies have been identified based on literature reviews. The reviews provide information for identifying appropriate valuation studies for use in the regional assessment. To ensure comparable information across countries, international studies covering several coastal countries are preferred. The national scale studies can provide evidence on the cost of degradation, but are not necessarily appropriate for deriving regional scale estimates.

Use qualitative and quantitative non-monetary assessments if needed. Use of the qualitative and quantitative assessment approaches could complement the monetary cost of degradation results.

Quantitative and qualitative (non-monetary) assessments can be used when monetary estimates are not available. Such results are useful for indicating degradation themes and ecosystem services for which GES is not achieved and to characterise the socioeconomic impacts on a general level.

Report uncertainties, limitations and overlaps within the assessments. It is important to be transparent and report the limitations and uncertainties to identify development areas. Overlaps in the cost of degradation estimates should be made clear.

There are several sources of uncertainty in the cost of degradation estimates (e.g. correspondence of the baseline and target state in the valuation studies and the regional assessments, use of value transfer) and there can be overlap between the cost of degradation estimates that rely on combining approaches for various GES descriptors and ecosystem services, since they overlap in terms of valued ecosystem components. The estimates cannot be summed together for an aggregate estimate of the cost of degradation. However, a combination of the approaches is a solution to provide a more comprehensive assessment of the costs of degradation. Separate estimates for various degradation themes/ecosystem services can be useful to support policy actions focusing on specific marine environmental problems.

4.3 International cooperation

These recommendations highlight the importance of international cooperation when conducting regional economic and social analyses.

Exchange information across countries. Regional ESA will benefit from exchange of information among the countries in the sea region, across Regional Sea Conventions and at the European level (e.g. EU Working Group POMESA). This will provide an opportunity for exchanging experiences, learning and improving the efficiency of the work. In addition, regional ESA requires the involvement of the coastal countries in the marine region as they can provide useful information and enhance the acceptance and understanding of the regional analysis.

Develop approaches and results collaboratively within the sea region. Regional cooperation provides a platform for sharing information and experiences across countries improving the efficiency of the national processes, and also increases the coherence of the used approaches, improving the international comparability of the data, approaches and findings. Regional ESA are also useful for developing national analyses and can provide data for national work that are comparable among the countries. Collaboration and cross-country studies can be a cost-efficient way of conducting economic and social analyses, rather than doing them separately in each country.

4.4 Priority areas for long-term work on regional economic and social analyses

This section lists the priority areas for long-term work to improve the regional ESA to appropriately assess the contribution of the marine environment to human well-being and the economically efficient ways of protecting the marine environment. In the Baltic Sea region, they can support the update of the HELCOM

Baltic Sea Action Plan and the third holistic assessment of ecosystem health (HOLAS III), with links to the EU MSFD. The analyses conducted thus far can be used as the base for this development work.

Develop the ecosystem services approach for economic and social analyses. *The ecosystem services approach would allow for a holistic analysis of the socio-ecological linkages between the economy, citizens and the marine environment.*

Applying the ecosystem services approach in the use of marine waters and of the cost of degradation requires identifying marine and coastal ecosystem services, assessing their contribution to human welfare and its changes from deteriorated provision of the ecosystem services. For future regional work, both the approaches and the information base need to be developed to support a more holistic analysis of the links between the human well-being and the state of the marine environment.

Integrate socio-economic analyses into the assessment of activities, pressures and state. *Relating the socio-economic analyses to the integrated assessment of the marine environment by accounting for linkages between activities, pressures, state of the marine environment and impact on human welfare would establish a connection between the use of marine waters and cost of degradation analyses and be useful for marine policy-making.*

Accounting for the linkages between activities, pressures, state and impact on human welfare would allow showing how the economic values of activities or ecosystem services change depending on the state of the sea, and analysing the socio-economic impacts of policy options. The first steps are taken in the SPICE project in the Baltic Sea region to fill in this gap. This work is multidisciplinary in nature, and requires the involvement of experts in several fields.

Develop a business-as-usual scenario to be used as a baseline in the regional ESA. *A regional business-as-usual scenario would be useful for the economic and social analyses, including the cost of degradation analysis and cost-benefit analysis of future policy measures.*

A regional business-as-usual scenario (BAU) describes how the state of the marine environment changes over time due to future changes in the marine uses and the implementation of the existing legislative and regulatory frameworks impacting the marine environment. When the BAU is used as a baseline in the cost of degradation analysis, the welfare losses from difference between the BAU state and GES are estimated. This estimate shows benefits of implementing additional measures for achieving GES, and can be used for the cost-benefit analysis of these measures. The BAU development is multidisciplinary in nature, and requires involvement of experts from various fields. Economic expertise is needed when assessing the future changes in marine uses and identifying the effect of existing policies on the marine environment. The involvement of economists is also helpful, as the BAU is needed for subsequent economic analyses.

Conduct new fit-for-purpose international valuation studies. *New coordinated international valuation studies should be conducted for selected degradation themes/ecosystem services to fill in the knowledge gaps, either in all coastal countries or in selected countries representing diversity of sea region countries, which will allow results to be transferred. This would improve the information base and allow more comprehensive regional cost of degradation assessment in the future, as well as support the cost-benefit analysis of policy measures.*

The identified knowledge gaps related to the cost of degradation analyses should be prioritized when planning new valuation studies. In particular, the application of the ecosystem services approach requires new, preferably international valuation studies on how changes in the state of the marine environment affects the provision of ecosystem services and human welfare. The findings of the valuation studies are needed for comparing of the costs and benefits of policy measures to improve the state of the marine environment.

Take steps towards regional economic and social analyses of policy measures. Further socioeconomic analyses of the marine environment involve cost-effectiveness and cost-benefit analyses of policy measures. The first stage ESA should support these future needs.

The cost-effectiveness analysis includes identifying a trans-boundary set of collective measures to achieve the good status of the marine environment and assessing the costs and effectiveness of such measures. The cost-benefit analysis compares the costs and benefits of policies or policy measures to improve the state of the marine environment, and allows examining the economic efficiency of such policies and measures. Both analyses would support future development of regional action plans and programmes of measures. Regional ESA of policy measures are considerable endeavours, requiring multidisciplinary approaches and substantial resources. The first stage regional economic and social analyses should be conducted keeping in mind these future needs.

References

COGEA (2016) *Study on the Establishment of a Framework for Processing and Analysing Maritime Economic Data in Europe*. Draft Final Report for the EC (Contract No EASME/EMFF/2014/1.3.1.13/S12.718095).

European Commission (2016) *Report on phase 1 of the knowledge innovation project on an integrated system of natural capital and ecosystem services accounting in the EU* (KIP-INCA Phase 1 report). URL: http://ec.europa.eu/environment/nature/capital_accounting/pdf/KIP_INCA_final_report_phase-1.pdf

Accessed 08.09.2017

European Commission (2017) *Report on the Blue Growth Strategy: Towards more sustainable growth and jobs in the blue economy*. Commission staff working document SWD (2017) 128 final.

Hattam, C., Atkins, J., Beaumont, N., Börger, T., Böhnke-Henrichs, A., Burdon, D., de Groot, R., Hoefnagel, E., Nunes, P., Piwowarczyk, J., Sastre, S. & Austen, M. (2015) *Marine ecosystem services: Linking indicators to their classification*. Ecological Indicators 49 (2015) 61-75.

HELCOM (2017) *Economic and social analyses in the Baltic Sea region - supplementary report to the first version of the HELCOM 'State of the Baltic Sea' report 2017*. Available at: <http://stateofthebalticsea.helcom.fi/about-helcom-and-the-assessment/downloads-and-data/>.

Maes, J., Liqueste, C., Teller, A., Erhard, M., Paracchini, M., Barredo, J., Grizzetti, B., Cardoso, A., Somma, F., Petersen, J., Meiner, A., Gelabert, E., Zal, N., Kristensen, P., Bastrup-Birk, A., Biala, K., Piroddi, C., Egoh, B. & Lavalle, C. (2016) *An indicator framework for assessing ecosystem services in support of the EU Biodiversity Strategy to 2020*. Ecosystem Services 17 (2016) 14-23.

WG ESA (2010) *Economic and social analysis for the Initial Assessment of MSFD: A Guidance document*. MSFD CIS.