RESPONSEABLE

Report presenting the results of WP4 and the recommendations developed

Work Package 4

Deliverable 4.4

April 2019

Project coordinator:

Project beneficiaries:

This project has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation (H2020-BG-2014-1) under grant agreement No. 652643.
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Recommendations for effective regional ocean literacy

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Introduction

WP4 of the ResponSEAble project comprised of many multifacet activities targeting Ocean Literacy issues at the regional scale, including the framework and the first activities already presented and discussed in the project's deliverables D4.1, D4.2, D4.3. It helped: (1) to establish links between the work carried out under WP1, WP2 and WP3; (2) to connect with products developed under WP5; and, (3) to contribute to the dissemination of recommendations and results relevant to regional marine policy and challenges in WP6 and 7.

While initially seen as a WP focusing only on "regional sea basin" issues, WP4 covered a much wider set of issues and activities addressing the potential role and effectiveness of OL initiatives for different scales, thematic issues/marine challenges and target groups.

This deliverable presents the results of the activities that took place in WP4 with a particular focus on regional issues and challenges. It is complemented by the results of the analysis of the main EU-wide marine policies and how OL could find a role in supporting the implementation of these policies.

The deliverable focuses then on activities and results that target the following areas:

- Ocean literacy and **existing policies** – analysis of the main marine policies to identify how ocean literacy could play a role in these policies (including identifying potential contributions in the future);
- Ocean literacy and **regional seas**: in light of the main challenges marine ecosystems face in each regional sea basin, an analysis of the OL initiatives developed for identifying possible gaps where future OL efforts should focus.

1. Linking ocean literacy and existing marine policies

In the current policy context, creating a more ocean literate society in Europe will result in increased interest in, understanding of, and engagement in marine policy. Guest *et al.*[1] explain that to ensure sustainable use of ocean resources, there is a need for both top-down and bottom-up approaches, combining responsible policies, regulations and management strategies with individual behavior changes.

According to Boyes and Eliott (2014[2]), the European Union (EU) has adopted more than 200 pieces of legislation that have an impact marine ecosystems and the management of the ocean. The overall vision of the future management of European seas is addressed in particular in the Integrated Maritime Policy (IMP) which calls for an "integrated maritime governance to ensure stakeholder engagement, coherent agendas, removal of sectoral policy thinking and creation of cross sectoral management structure"[3]. An integrated approach to the health of marine ecosystems is provided in the Marive Strategy Framework Directive (MSFD) that supports the achievement of healthy marine ecosystems.

The following paragraphs focus on the most important policies (in particular IMP, Blue Growth Strategy, MSFD, the Marine Spatial Planning Directive, the Common Fisheries Policy (CFP)…),discussing how OL is embedded in today's EU marine policy, and what are opportunities to increase its efficiency in line with the specific objectives of each policy investigated. It provides an umbrella analysis that complements the work of ResponSEAble in individual sea basins that is presented below, identifying areas where OL initiatives could take place to best support the implementation of the EU marine policy framework.

Integrated Maritime Policy[4] & Blue Growth Strategy[5] :

What is the policy about?

- The EU Integrated Maritime Policy (IMP) seeks to provide a coherent and coordinated approach to maritime issues, addressing different policy domains involved in an integrated and intersectoral manner.
- It focuses on issues that do not fall under a single sector-based policy (e.g. fisheries) and issues that require the coordination between different sectors and actors e.g. the development and strengthening of marine knowledge.

[1] Guest, H., Lotze, H. K., and Wallace, D. (2015). Youth and the sea: Ocean literacy in Nova Scotia, Canada. Marine Policy, 58: 98-107.

[2] Boyes, S. J., & Elliott, M. (2014). Marine legislation--the ultimate "horrendogram": international law, European directives & national implementation. *Marine Pollution Bulletin*, *86*(1-2), 39–47.

[3] EC (2009). The Integrated Maritime Policy for the EU –priorities for the next Commission. Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – Progress report on the EU's integrated maritime policy {SEC(2009) 1343} http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52009DC0540

[4] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52007DC0575&from=EN

[5] https://ec.europa.eu/maritimeaffairs/policy/blue_growth/

- IMP covers a range of cross-cutting policy challenges including: **Blue Growth**, Marine data and knowledge, Maritime Spatial planning, Integrated maritime surveillance, the development of Sea Basin Strategies…
- The Blue Growth Strategy (BGS), in particular, is Europe's **long-term strategy to support sustainable growth** in the marine and maritime sectors. Positioned within the framework of Integrated Maritime Policy and embedded in Europe 2020 strategy[6] as **its maritime dimension, it aims at developing the "blue economy"** while making efforts to reduce the negative environmental impacts of maritime activities, safeguarding biodiversity and protecting marine environments.

Which principles does the policy follow?

- Europe's wellbeing is inextricably linked to the sea. The policy recognizes its contribution to the economy and the potential business opportunities the sea can offer, including because of the significance of ecosystem services delivered by marine ecosystems and its recreational, esthetic and cultural value.
- To develop sectors that have a high potential to deliver sustainable growth and jobs in the blue economy, IMP builds on the implementation of a range of thematic frameworks, including the development of adequate "marine" infrastructures, job creation and labour, **public acceptance**, and good governance at the local and regional (sea basin) levels.

Where can we find Ocean literacy in the text?

- The BGS that is embedded into the IMP, is based on the concept of Ocean Literacy (OL), although the term "ocean literacy" does not explicitly appear in the text. By promoting improvements in marine knowledge as a support of its objectives, BGS provides opportunities to reinforce OL to ensure Blue Growth is sustainable.

Opportunities for Ocean literacy?

- IMP and BGS **highlight the cross-connections** between economic maritime sectors and the marine environment. Thus, it requires that *opportunities are seized to help sectors understanding the links between marine ecosystems and (their own) economic activities.*
- It requires the **build up of close cooperation between decision-makers** from different sectors at all levels, encouraging Member States to move towards more systematic collaboration: developing collaborations between sectors requires that knowledge is shared and that a common understanding between all sectors is developed. This provides *opportunities to enhance and share marine knowledge in a homogenous framework.*
- BGS recognizes the importance of **enhanced access to marine knowledge**, as well as the need for public acceptance and support. *communicating and enhancing Ocean Literacy from all sectors involved, including from the wider public, is thus essential to the success of Blue Growth. This will contribute to all involved (including consumers, citizens...) better understanding the requirements for making Blue Growth sustainable.* It requires an overall **public understanding of the ocean's influence** on society and of society influence on the ocean.

[6] Europe's response to long term challenges (climate change, pressures on natural resources, etc.): focused on smart, sustainable and inclusive growth, referring to developing an economy based on knowledge and innovation

The Marine Strategy Framework Directive (MSFD)

What is the MSFD about?

- The MSFD aims to achieve Good Environmental Status (GES) of all EU's marine waters by 2020, and to protect the resource base upon which marine-related economic and social activities depend. GES are defined in Article 3 of the MSFD as *"the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy, and productive"*
- The final objective is to protect the resource base upon which all marine related economic and social activities depend and this requires all MS to achieve GES of marine waters by 2020 at the latest (link with other policies)
- The MSFD builds on the establishment of marine regions/subregions where the management of marine ecosystems takes place. These regions/sub-regions are defined on the basis of geographical and environmental criteria.
- Member States develop and implement a program of cost-effective measures, based on different assessments including of social and economic impacts. The MSFD implementation requires the establishment of synergies with other EU policies (including land-based policies such as the Water Framework Directive , the Common Agriculture Policy….).
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What principles does the MSFD follow?

- High level of marine environmental protection is the basis to realize the full economic potential of marine resources and the delivery of ecological services that can be provided by healthy marine ecosystems.
- It builds on an ecosystem-based approach that helps characterizing the impacts of the management of human activities on the marine environment, while making explicit the ecosystem services delivered.
- It provides a coordinated and science-based approach to addressing the link between the ocean and human activities.
- It builds on stakeholder mobilization and participation.

Where can we find Ocean literacy in the text?

- The MSFD never explicitly mentions "ocean literacy". But its major principles are in line with what we defined as OL. The MFSD require Member states to define marine strategies and program of measures building on sound economic, social and environmental assessments. It requires therefore to make informed and responsible decisions on how to manage the marine environment. Thus, better knowledge, and a better understanding of the links between economic activities and marine ecosystems, are key to the achievement of the MSFD goals.
- Raising awareness or capacity building are measures proposed in the MSFD programmes of measures. This concerns as much policy makers (from the different sectors affecting marine ecosystems: maritime transport, fisheries & aquaculture, tourism, agriculture…) than professionals from these sectors or citizens and final consumers of marine products.

Opportunities for Ocean Literacy?

- The MSFD clearly calls for the active involvement of the general public in the establishment, implementation and updating marine strategies, and for the provision of public information on the different element of marine strategies: these requirements offer *opportunity for OL initiatives that aim at making European citizens ocean literate so they better support and accept the environmental framework for a better protection of marine ecosystems the MSFD provides.*
- The MSFD calls for providing the public, as well as policy makers, with understandable information about the structure and functioning of coastal and marine ecosystems: this clearly are *opportunities for OL tool development that can go much beyond traditional information and communication campaigns ministries and agencies in charge of the MSFD implement.*
- By introducing the concept of GES combined with services that marine ecosystems can deliver, the MSFD puts an emphasis on the integration between natural, physical, chemical, climatic and geographic factors, and anthropogenic impact and economic activities. This integration is rather complex, requiring specific *awareness raising activities for all parties involved including on how marine ecosystems affect citizens' daily life, and how citizens' daily lige affect marine ecosystems.*
- The MSFD refers to the need for public information in its Art. 19 as key to supporting the participation of all interested parties. In particular "*MS shall publish and make available to the public for comments, summaries of the marine strategies*". OL has a clear role here to ensure that these summaries are well understood by all sectors and citizens.

Marine Spatial Planning Directive (MSP)

What is the MSP directive about?

- Maritime Spatial Planning (MSP) provides a framework for the integrated governance of maritime activities and maritime space in order to mitigate the degradation, restore and sustain the critical monetary and social/cultural ecosystem services that marine ecosystems can deliver.
- It builds on the fact that the EU Members States with marine areas have a collective exclusive economic zone (EEZ) of 27 million km² (or about 20% of the EEZs of the world). In particular, it recognizes that the ocean's capacity to provide benefits is increasingly hampered by the degradation of the marine environment and the increasing demand for marine space, which creates conflicts among users.
- It requires Member States to draw up maritime spatial plans and Integrated Coastal Management, in order to facilitate the sustainable growth of the Blue Economy.

What principles does the MSP Directive follow?

- MSP builds on an ecosystem-based approach for developing homogenous maritime spatial plans and integrated coastal zone management
- Each country remains free to plan, analyze and organize its own maritime activities in marine areas to achieve ecological, economic and social objectives.
- MS must ensure public participation, establish cross-border cooperation and organize the collection and exchange of data and information.

Where can we find Ocean literacy in the text?

- The MSP Directive does not explicitly mention ocean literacy, although some of its principles and requirements can refer to Ocean Literacy principles. By referring to the importance of the dialogue among different stakeholders, including public authorities, economic operators and the

wider public, it stresses the importance of "sharing knowledge" and common understanding of issues, challenges and solutions. Furthermore, to be successful, stakeholders will need to be empowered to enable their full engagement, an area where ocean literacy can also play a role.

Opportunities for Ocean Literacy?

- The implementation of MSP by individual MS provides an opportunity to develop maritime sectors sustainably while achieving GES as defined by the MSFD: in that way, human activities are embedded into ecosystem processes into a larger socio-ecological system[7]. In many cases, there is limited understanding of this system, and of the complex direct and indirect interactions taking place on the maritime space: clearly, there are *opportunities for Ocean Literacy here to raise awareness of European citizens of their place and role in the global socio-ecological marine environment, and to make more explicit the different direct and indirect interactions between different (conflicting) sectors and uses of the maritime space – including policy makers, sea professionals, but also consumers.*
- MSP directive clearly refers to the need of public participation. Article 9 states that "Member states shall establish means of public participation by informing all interested parties and by consulting relevant stakeholders and authorities, and the public concerned at an early stage in the development of maritime spatial plans: thus, to ensure the information shared is well understood , there is a need for *Ocean Litracy to make Europeans aware about the issues at stake and the solutions for better sharing of maritime space, and how this might affect them – positively or negatively.*
- MSP calls for a better use of data and existing information: while the focus might often be on "more knowledge", there is clearly an issue of "better understood knowledge", thus *opportunities to develop initiatives that help accessing and understanding marine knowledge, including by encouraging citizens to take part in participative-science projects [see below about Marine Knowledge 2020 initiative]*

MARINE KNOWLEDGE 2020

MK2020 brings together marine data from different sources with the aim of helping the industry, public authorities and researchers to access data and make a more effective use of them to develop new products and services / improving our understanding on how seas behave. MK2020 works through the European Marine Observation and Data Network (EMODNET[8]), which consists of more than 100 organizations assembling marine data, products and metadata to make these fragmented resources more available to public and private users. Interestingly, EMODNET is developing the so-called check-points which are regional seas wide monitoring system assessment activity based upon targeted end-user applications. While the focus is on how best to structure and make knowledge accessible, increasing attention is given to the use of knowledge, and how it can best be "translated" to support understanding and use by a wide range of publics.

[7] Armsworth, P. R., K. Chan, M. A. Chan, G. C. Daily, C. Kremen, T. H. Ricketts, and M. A. Sanjayan, (2007) Ecosystem-service science and the way forward for conservation. Conservation Biology 21, 1383–1384.

[8] http://www.emodnet.eu/

The Common Fishery Policy (CFP) and European Maritime and Fisheries Fund (EMFF)

What is the policy about?

- The Common Fishery Policy (CFP) is a 30 year's old policy (renewed every ten years) that set rules for fishing management that are applied to all those who fish, farm or trade seafood in the EU. Its goals are to ensure high long-term fishing yields for all stocks (Maximal sustainable yield), to boost the aquaculture sector and to reduce unwanted captures and wasteful practices.
- The CFP has 4 main policy areas: fisheries management, international, market and trade, and funding.
  The European Maritime and Fisheries Fund (EMFF) is the funding mechanism for the CFP. EMFF helps fishermen to adapt to sustainable fishing, to create jobs for the sector and to diversify economic activities in coastal communities.
- The EMFF Includes a dedicated system for controlling the use of funds. However, fisheries rules are implemented by the Member States through their national authorities

What are its main principles?

- Recognizing the negative impacts of human activities on natural resources, the CFP sets rules to avoid over-fishing and the degradation of the fish stocks. It regulate fishing activities to achieve the stated goals of resources conservation, structural development and market management.
- Overall, it provides the basis for a sustainable management of fish stocks to sustain fishing and the European seafood industry.
- Vit the EMFF, it supports the modernization of the activities, and the development of practices that are coherent with environmental objectives as specified in the MSFD.

Where can we find Ocean literacy in the text?

- Although the term Ocean Literacy is not used in any the text or in any of the communication material developed for promoting the policy, the CFP has strong requirements in terms of training and capacity building of all actors of the fishing sector and sea food industry. This is essential for ensuring the European fishing industry is sustainable and does not threaten the fish population size and productivity over the long term.

Opportunities for Ocean Literacy?

- Ocean Literacy principles have emerged much later than the start of CFP (1980's). However, the concept of ocean literacy has already been incorporated and communicated through associated campaigns and media format: opportunities to promote the role of EU policies in preserving our resources, especially those from the seas, and understand the role of oceans in supporting human activities and providing food resources to an increasing number of habitants, identifying the reasons why it should be managed sustainably – and everybody's responsibility… has been the focus of different campaigns, OL initiatives,etc. And much remain to be done with the constantly evolving technology, consumer demands, and environmental challenges faced.
- Under the EMFF, the European Fisheries Areas Network (FARNET) has been developed. This network brings together FLAGs (Fisheries Local Action Group), managing authorities, citizens

and experts from the entire EU territory. FLAGs are referring to the Axis 4 of the CFP, and require creation of partnership in a local area to prepare and implement an local development strategy linked to the main objectives of the CFP. These initiatives offer opportunities for enhancing OL for all involved, fishermen, aquaculture professionals,but also local authorities (supporting local blue growth initiatives) and citizens – so the ins and outs of maritime socio-ecological systems issues at a local level, and everybody's role in this system and its sustainability, are well understood and shared.

Integrated maritime surveillance (IMS) / Common information sharing environment (CISE)

What is the policy about?

- IMS is about providing authorities interested or active in maritime surveillance with ways to exchange information and data, in order to make surveillance cheaper and more effective.
- Common Information Sharing Environment (CISE[9]) is currently being developed jointly by the European Commission and EU/EAA member states.
- IMS will integrate existing surveillance systems and networks and give all concerned authorities access to the information they need for their missions at sea.
- CISE will make different systems interoperable so that data and other information can be exchanged easily through the use of modern technology

What are its main principles?

- CISE is a voluntary collaborative process between authorities involved in maritime surveillance. It is not replacing or duplicating but building on existing information exchange and sharing systems and platforms.
- It ensures that maritime surveillance information collected by one maritime authority and considered necessary for the operational activities of others is shared and subject to multiuse
- Maritime surveillance information data covers ship positions and routing, cargo data, sensor data, charts and maps, meteo-oceanic data etc. In cases where such data identifies an individual or makes him identifiable, EU data protection instruments will have to be applied.

Ocean Literacy in the text:

- IMS & CISE are aiming to empower data exchange and contribution on maritime surveillance between EU state members. CISE information must not be just reserved to maritime authorities but could also be shared and communicated (if properly translated) to European citizens. The real-time exchange of the position of ships and information on the nature of their cargo could be knowledge of interest to increase people's awareness of their dependence on the sea and the implementation of efficient and secure maritime transport, enabling them to guarantee the daily supply of goods.

[9] https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/integrating_maritime_surveillance_en.pdf

Opportunities for Ocean literacy?

- It is clearly said in the Commission's communication about the CISE[10] that enhancing information exchange is an important condition to for "enhancing knowledge and improving maritime situational awareness. It can both enhance prevention, preparedness and response to maritime security incidents (trafficking, illegal fishing, piracy, armed robbery, terrorism), maritime safety and illegal discharges or accidental marine pollution". This could offer opportunities for OL initiatives for making people better understand the sea's role in goods transport and thus, in the social and economic system of Europe.

European Union Maritime Security Strategy

What is the policy about?

- It is an overarching maritime security strategy against all challenges from the global maritime domain that may affect people, activities or infrastructures in the EU[11].
- It seeks to increase awareness and ensure higher efficiency of sea operations.
- Its second objective is to protect EU maritime interests worldwide. The EUMSS strengthens the link between internal and external security, and couples the overall European Security Strategy with the Integrated Maritime Policy.
- The EUMSS is complemented with an Action Plan[12], a list of over 130 specific actions and a timeframe to drive the implementation of the EUMSS forward.

What are its key principles?

- The policy calls for a safe, secure and clean seas and oceans to support prosperity and peace all over Europe.
- EUMSS is organized around five key areas of cooperation: 1) External Action; 2) Maritime Awareness, Surveillance and Information Sharing; 3) Capability Development; 4) Risk Management, Protection of Critical Infrastructures and Crisis Response; 5) Maritime Security Research and Innovation, Education and Training.

Where can we find Ocean Literacy in the text?

- EUMSS serves as "comprehensive framework, contributing to a stable and secure global maritime domain, in accordance with the European Security Strategy (ESS), while ensuring coherence with EU policies", in particularly the Integrated Maritime Policy (IMP), and the Internal Security Strategy (ISS). The EUMSS never mentioned OL in the text, but by crossing and recovering all major EU maritime policies, EUMSS contributes to increase awareness of Europeans to the necessary protection of their oceans, as a major geostrategic and

[10] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0451&from=EN

[11] http://register.consilium.europa.eu/doc/srv?l=EN&f=ST%2011205%202014%20INIT

[12] https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/20141216-action-plan_en.pdf

socioeconomic domain for the EU. It is therefore another angle of attack – in addition to environmental protection – justifying the usefulness of developing Ocean Literacy, in order to raise awareness about the importance of the Oceans in the socioeconomic and political EU context, highlights the relationship that Europeans have with oceans, but also the importance of inter-European and global relations, enabled by the omnipresence of oceans on our continent.

Opportunities for Ocean Literacy?

- One of the EUMSS development axis is research and knowledge development innovation, education and training. Its chapter 5 stresses that EU Research programs should be better used in this policy development, exploiting also synergies with the programs of Member States and EU funding instruments. Clearly, there could be opportunities for OL initiatives accounting for the issues and challenges covered by this policy – for policy makers, sea professionals, and also citizens, to make them conscious about the importance – in their daily life – about having secure and safety seas. Note that OL material rarely cover this aspects, being focused very much on the ecosystem dimension of the ocean and the need to protect the ocean's health.

Sea Basin Strategy (SBS)

What is the policy about?

- The maritime policy promotes growth and development strategies that exploit the strengths and address the weaknesses of each large sea region in the EU: from the Arctic's climate change to the Atlantic's renewable energy potential, to problems of sea and ocean pollution, to maritime safety.
- When looking at the Baltic Sea, Black Sea, Mediterranean Sea, North Sea, the Atlantic or the Arctic Ocean, it is important to realise that each sea region is unique and merits a tailor-made strategy, translating wider EU policy objectives and requirements into an Action Plan specific to each sea basin or region.

What are the principles behind Sea Basin Strategies?

- The EU's Integrated Maritime Policy promotes growth and development strategies to exploit strengths and address weaknesses of each sea region in the EU
- Countries and regions around a shared sea space work together on common agreed objectives and targeted specific measures

How do SBS refer to Ocean Literacy?

- There are no text or directives which details what the strategy should be for individual sea basins, as it builds on a combination of several regional and local actions plans for management of sea regions shared by different EU (and non-EU) countries.
- SBS are specified in the Blue Growth Strategy. Because of that, and because of its local implementation, the SBS can allow European citizens to have conscious of the importance of local sea basin into their daily life and the necessity of taking into account the particulars

characteristics of each regional sea, may it be environmental or socioeconomic, in order to deploy actions corresponding to the local maritime issues.

- In some sea basins, sea basin commissions have been established to coordinate efforts at the sea basin scale. However, these commissions are mainly dealing with “technical” and policy/political matters. Information, communication and capacity building of stakeholders and citizens at the sea basin scale is given so far limited attention.

Opportunities for OL?

- Each Action Plan encourages Member States to work together in areas where they were previously working individually[13]. They will be able to share information, costs, results and best practices, as well as generate ideas for further areas of cooperation of maritime activities.
- OL initiatives could be further developed/strengthened at the scale of individual sea basins. This could be combined with strengthening stakeholder processes and peer-to-peer exchanges (e.g. between fishermen from different countries) demonstrating the links between human activities and marine ecosystems in a transboundary context. It could also help developing a sense of ownership and responsibility from all citizens sharing a sea basin.

[13] See for example : http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0279&from=EN

2. Recommendations for effective ocean literacy in the Regional Seas

Approach

To assess the specific challenges of OL at the scale of sea basins, the following activities were performed:

1. **Mapping key players** in each region**:** In each regional sea, we analysed the key players/actors which are involved in the ocean literacy activities. This was done by mapping the main actors/stakeholders, using information from regional workshops, webinars, and from desk research of websites of different organizations;

2. **Screening working documents of different organizations for each sea basin** (Regional Sea Conventions, industries, NGOs, other policy making organizations) to identify the main marine issues relevant to sea basins, stakeholders relevant to these issues, and solutions that were proposed to solve these issues;

3. **Analysing approaches in communication/awareness** /tools (based on the documents/actions in each region) to point out existing gaps in knowledge and communication – specific attention was given to how marine challenges from a given sea basin were communicated and shared (which information, channels and which target groups), and what possible gaps in OL could be;

4. **Producing regional policy briefs** and recommendations – these are presented in the paragraphs below for each sea basin.

Note that most efforts have targeted the Baltic, Mediterranean and Black seas, the challenges in mobilising stakeholders in the Atlantic/North Sea (under the responsibility of UBO) leading to replacing activities in this sea basin by additional work on EU policies (presented above) and the organisation of webinars. Still, the summary of the first efforts and critical analyses carried out for all sea basins, including the Atlantic/North Sea, are presented in annex to the present report.

Recommendations for the Baltic Sea

The Helsinki Commission (HELCOM) and the EU Strategy for the Baltic Sea Region (EUSBSR) are the cooperation frameworks for the Baltic Sea. HELCOM was ultimately established to ensure the protection of the Baltic Sea and has set up the objective to achieve a Good Environmental Status (GES) by 2021. “Saving the sea” is one of three objectives of the EUSBSR.

Eutrophication is one of the key environmental problems in the Baltic Sea. It is caused by excessive nutrient pollution load, with agriculture as the single biggest diffuse source of nutrient pollution in the region. As a result, the project ResponSEAble chose *Eutrophication & Agriculture* as the key story of the Baltic Sea region. The goal was to explore potential opportunities on how to increase ocean literacy around this well-known environmental threat and to understand the reasons why past communication efforts may not have been as successful.

Eutrophication has been recognised by policy makers of the Baltic Sea countries as well as in Europe as a major challenge. The Baltic Sea Action Plan 2007-2021 (BSAP) is a policy document containing measures to achieve the Good Environmental Status. So far, regulative measures to reduce nutrient runoff as well as the engagement with farmers to motivate them to modify their land management practises, have been the main solutions of choice to combat eutrophication.

The BSAP acknowledges the importance of public engagement and stakeholder involvement in activities that are promoting a healthy Baltic Sea and public participation in decision making. In the current BSAP, the chapter “Awareness raising and capacity building” mentions the importance of raising awareness and building capacity when tackling emerging environmental issues such as hazardous substances, marine litter and ship-generated waste discharges. However, concrete strategies for implementations are very limited.

Knowledge generation and communication

Although the D(A)PSI(W)R[14] framework assessing the causal-effect relationships is well known by environmental authorities, the approach is not often applied to the review of communications efforts or with the intent towards increasing ocean literacy.

Applying the DAPSIWR framework to assess the information & knowledge mobilised in past communication efforts about eutrophication (766 sources reviewed[15]) provided answers to the following two questions: (1) What information is being shared and communicated today? And, (2) Who transfers information – and to whom?

[14] Drivers - (Activity) – Pressure – State – Impact - (Welfare) - Response

[15] Sources very retrieved from Google, YouTube and Facebook in seven countries of the BSR (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland).

Knowledge content: Based on this review, the project determined that the knowledge transfer does not cover all components of the D(A)PSI(W)R framework (Figure 1). Instead, the knowledge shared and disseminated focuses mainly on *pressures* (nutrients' runoff from land into water), *state* (e.g., concentrations of nutrients, transparency of waters), ecological *impacts* (algal blooms, oxygen-depleted zones) and *responses* (reduction of pressures) related to agricultural activity (practices and techniques) that causes the pressure.

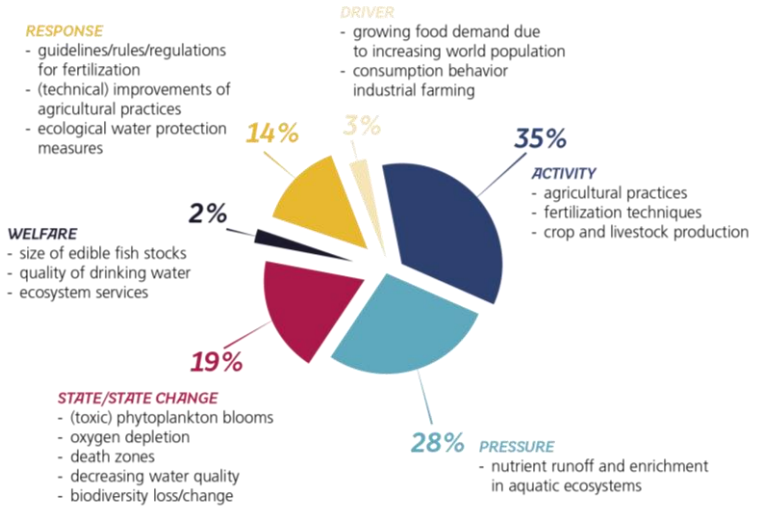

Figure 1. Communication content about eutrophication in Percent [%] of total: over 80% of the media content told the story as activity-pressure-state/state change narrative. Some media entries described (potential) responses, mainly based on technical solutions and regulative measures. Only few publications described welfare aspects or the driver "food system" as the cause and solution for eutrophication in the Baltic Sea and elsewhere.

The largest drawback in current communication efforts is the exclusion of *drivers,* which are key factors for determining agricultural activities such as the food industry and related trades and markets, and also of socio-economic impacts that are caused by the degraded state of the Baltic Sea.

Actors involved in communication efforts: The media assessment determined that the main target groups receiving information were citizens, consumers and farmers. These groups were mainly approached by NGOs, knowledge associations and scientific institutions. Farmers were additionally approached by manufacturers (e.g. fertilizer producers). However, retailers, wholesalers and policy makers were seldomly targeted.

Lessons learned: how does ResponSEAble contribute to fill the gaps?

Telling the entire story about eutrophication is crucial to understand different roles and responsibilities of the actors within the system. Globalisation mechanisms, global markets, import and export balances of agricultural products as well as consumption patterns strongly impact land use practises and the different actors that are involved in the food system. Only if these parts of the story are discussed, solutions that tackle the sources of eutrophication can be developed.

All actors must be involved in better communicating the issues around eutrophication. Actors from the different sectors of the agricultural value chain – farmers, retailers/wholesalers, consumers, policy and decision makers, knowledge institutions and environmental interest groups/NGOs – impact each other and can have direct and indirect impacts on the eutrophication state of the Baltic Sea. Figure 2 highlights which actions could be taken by the various actors.

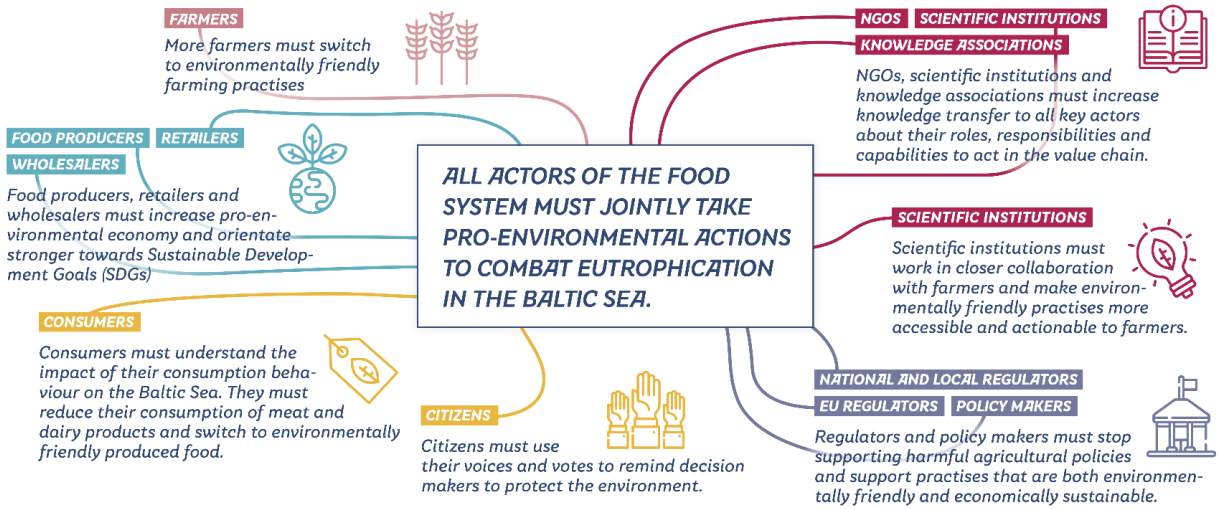

Figure 2: Actors of the agricultural value chain and actions to be taken to combat eutrophication in the Baltic Sea.

Multiple tools and communication products must be produced to launch awareness raising activities and social campaigns. In order to empower target groups to act within their circles of influences, each group should be approached with tailored information to address their particular viewpoints. Hence, the more accurately target groups are defined (e.g. their needs are known), the more specifically the tools can be designed and the more effective they can be.
The project ResponSEAble developed diverse communication tools (see list below) targeting consumers, advanced learners, educators and policy makers, and the international social media campaign #KeepTheBalticBlue. Social media as well as radio broad-casting were effective tools for reaching out to large audiences. Networking with media and educators was essential in reaching target groups. The social media campaign #KeepTheBalticBlue was a cooperation with Coalition Clean Baltic (including 17 Baltic NGOs) and took place in 8 countries of the BSR. The campaign was widely recognised: over the course of 3 weeks, it counted about 179 000 reaches.

Figure 3: Logo of the social media campaign #KeepTheBalticBlue.

Recommendations and visions for regional policy makers

HELCOM, EUSBSR and regional policy makers need to incorporate a holistic communication approach based on the DAPSIWR framework. The updated BSAP must contain a stronger strategy on raising awareness beyond the traditional angle of *pressure-state-response.*

Any **awareness raising strategy** must cover the food system and agricultural value chain and must address different key actors. Furthermore, the efforts in awareness raising in the effects of eutrophication must be accompanied by options for environmentally friendly agricultural practises.

Advisory approaches and explanations ("why" and "how" to act differently) must be made available and transparent instead of only telling farmers that they must reduce nutrient loads.

As investigated by the ResponSEAble project, **cross-sectoral communication** and cooperation are very weak in the region. A dialogue between the environmental sector and agricultural policy makers has been started just recently by HELCOM. This needs to be continued as well as expanded by involving other actors (e.g. retailers/wholesalers) of the value chain.

In 2020, a new EU Common Agricultural Policy (CAP) will be agreed upon by the Member States. Hence, HELCOM/EUSBSR must communicate more clearly and more strategically regarding their environmental goals and ambitions, to avoid contradictory policy decisions such as the intensification of agriculture versus environmental protection. Environmentally friendly practises must be further supported.

Media and educators are willing to use and distribute data and information, but these need to be tailored for the needs of the target group. As a result, HELCOM, who has the knowledge and information depository, must play a much more active role in the future to increase ocean literacy in the Baltic sea region.

Although the ResponSEAble activities for the Baltic Sea focused on the eutrophication, the same approach and needs for promoting the ocean literacy are valid concerning other environmental problems, such as plastic marine litter and hazardous substance pollution and loss of biodiversity.

Recommendations the Mediterranean Sea

In the Blue Growth context, only professional fishing and some of the land-based pollution sources are expected to decline in the Mediterranean Sea. Other activities such as oil and gas exploration and extraction, maritime transport and ports, recreational fishing, marine aquaculture, marine tourism, renewable energies, marine mining, coastal development and certain land-based pollution sources are expected to continuously grow, posing challenges for the management of this sea.

The ResponSEAble project identified 45 environmental challenges in European marine waters, of which 26 directly affect the Mediterranean Sea, including most of the above-mentioned activities. When contrasting these environmental challenges with the Regional Seas Programme Action Plans, they were summarized into eight major categories, of which the management of invasive species introduced through ballast water and the sustainable development of coastal tourism became the most highly relevant for ResponSEAble. These two challenges were selected as they could potentially be overcome or minimized with a behavioural change of key actors; which in turn could be achieved with adequate and effective media tools and communication; that is, they could be overcome with ocean literacy.

According to the COM(2009) 466 final (Towards an Integrated Maritime Policy for better governance in the Mediterranean), the *Mediterranean supports 30% of global sea-borne trade in volume from or into its more than 450 ports and terminals, and a quarter of worldwide sea-borne oil traffic, and is expected to continue*. On the coastal tourism side, with about 150 million people living at the Mediterranean coasts, the population doubles in during tourist season, leading to massive infrastructure development of coastal areas. Therefore, both challenges require ocean literacy and innovative management solutions.

Regional marine policy: Managing the invasive alien species and coastal tourism in the Mediterranean Sea can be challenging, especially when considering European legislation with apparent opposing aims. The aim of the Marine Strategy Framework Directive is to promote the sustainable use of the seas and conserve marine ecosystems. In contrast, the Marine Spatial Planning Directive aims at the sustainable growth of maritime and coastal economies and the sustainable use of marine and coastal resources. These aims should become part of a single big idea in marine management: how to maintain and protect ecological structure and functioning while at the same time allowing the system to produce sustainable ecosystem services from which we derive societal benefits, which summarizes the aim of the EU Integrated Maritime Policy.

Achieving this goal requires high level of cooperation between all EU and non-EU states encompassed by the Mediterranean Sea. This is very important for the Mediterranean, as only few coastal countries (seven) belong to the EU meaning that EU legislation do not apply to most of them, and a large proportion of the Mediterranean waters lay outside national jurisdiction, raising governance issues.

Actors and link with policy: The most important instrument for cooperation to *protect the Mediterranean marine and coastal environment while boosting regional and national plans to achieve sustainable development* is the **Barcelona Convention**, with 22 contracting parties. The Barcelona Convention, with seven objectives, protocols and action plans, consider the management of invasive species and the sustainable development of coastal zones as key issues. To manage invasive species, contracting parties of the Barcelona Convention adopted the Mediterranean Strategy on Ships´ Ballast Water Management in 2012. Furthermore, since 2018, the Ballast Water Management Convention entered into force, with the expectation that the introduction of invasive species through ballast waters will be severely reduced.

C**oastal tourism sid**e: there are several EC policies that should contribute to boosting the tourism economy in Europe but especially in the Mediterranean (the more tourism dependent area in Europe), while making it more sustainable. Such policies include “Europe, the world’s No 1 tourist destination - a new political framework for tourism in Europe” and "A European Strategy for more Growth and jobs in coastal and maritime tourism”. However, further coordination is needed with non-EU member states, and this is being carried out through different platforms such as the Union for the Mediterranean, which has assessed the status and potential of Blue economy in tourism in the Mediterranean.

Lessons learned: how does ResponSEAble contribute to fill the gaps?

ResponSEAble applied the D(A)PSI(W)R (Drivers – (Activities), Pressures- State-Impacts-(Welfare)-Responses) logical framework to gain a full understanding of where the key management issues regarding the introduction of invasive species through ballast waters and the sustainable development of coastal tourism are. Furthermore, a value chain analysis overlaying the D(A)PSI(W)R framework enabled to understand who the main actors are in each of these two challenges. Some of the actors involved are responsible for most of both positive and negative contributions to solve or enhance the environmental problem. Those are the actors that require ocean literacy that could boost their behavioral change. Interviews with key actors (at the SINAVAL

maritime fair), media analysis, a Mediterranean regional workshop and a webinar helped identifying key tools and communication means that could could trigger behavioral change.

With the implementation of the **Ballast Water Management Convention**, it is on professionals of the maritime transport sector that are obliged and responsible for the implementation of ballast water treatment system and adoption of guidelines. It is on better acceptancy of this new policy that professional courses could contribute to this sector having a better attitude towards this change. In this sense, the ResponSEAble project developed a course for professionals that was implemented and tested in the Netherlands and Spain, showing in the effectiveness analysis, to have led to changes in the perception of the topic. In addition, consumers, as responsible for goods´ demands and therefore, for the increasing maritime transportation in the Mediterranean, were directed through the development of “fact video” and a “cartoon” video.

With regards to **coastal tourism**, OL initiatives are required at different levels. At the local level, there are still significant gaps between local development plans for supporting tourism development and the vulnerability of marine ecosystems. Thus, specific OL initiatives targeting local authorities and economic interests are required to support greener development of the tourism sector. At the more global level, Ol is needed for tourism operators and citizens to support a change in “consumption”, the development of alternative offers that do not negatively impact on marine ecosystems, and the search for leisure activities that reduce pressures on marine ecosystems.

Actors:

In addition to the Mediterranean states, either through ministries or national environmental agencies, the Barcelona Convention (UNEP-MAP), is the main key player unifying the whole basin, including European member states, candidates to become members and non-EU member states. These actors should be coordinated with different EU DGs, such as REGIO, ENV, MARE, RTD, in order to provide a solid message. This message should be articulated around the different European strategies and policies, such as that on Biodiversity, Marine (MSFD), Blue Growth, Fishing (Common Fisheries Policy), etc. At the same time, it is important that the formal Barcelona Convention process mobilises all stakeholders of the Mediterranean Sea in translating general policy principles into reality.

Strengthening OL and communication

Some regional initiatives in communication were proposed for the Mediterranean sea basin:

- Several media channels were listed as adequate means to convey messages in the Mediterranean Sea: face to face communication, exhibitions, leaflets, specialized webs, newspapers, Facebook, TV spots, documentaries, radio podcasts, videos in Youtube, etc. Cartoons dedicated to the issue of invasive species and coastal tourism have been developed in ResponSEAble, which, although not focusing specifically in the Mediterranean, are conveying messages relevant to this regional sea.
- TV is a good media to introduce through e.g. advertising or weather forecast short messages with environmental content. During the last one and half year of ResponSEAble, much has been done in this way, developing TV documentaries with interviews about each of the key stories including maritime transport and coastal tourism.
- Whereas participants listed marine waste, sustainable seafood, or awareness about invasive species as the messages that they receive, massive coastal tourism-related problems are rarely addressed explicitly, or are not reaching actors and the wider public.

A clear change in OL strategy is required (in terms of the messages, ambassadors of these messages, alternative solutions that can be proposed to deliver similar benefits to people…) to support a change of model that would account for the vulnerabilities of marine ecosystems.

- Ocean literacy initiatives were reported as generally delivering impacts, including some changes in behaviour (although these might remain limited as compared to the magnitude of the problem).
- The most frequently reported "new behaviour" was: (i) To be more aware and careful in daily life (in using water, taking shower, boating…); (ii) To stop buying products that are seen as problematic (e.g. sun cream with microplastics), (iii) Reporting environmental issues and problems (to NGOs, to websites, etc.) so as to steer action and solutions.
- Many barriers to behavioural change have been identified: (i) For invasive species, the lack of knowledge, the absence of adequate infrastructures and the costs of adapting new practices are barriers that can prevent implementations of better practices for managing ballast waters; (ii) For mass Coastal tourism, main barriers include lifestyle/ habits and lack of adequate infrastructures.

Recommendations and visions for regional policy makers in the Mediterranean Sea

For ballast water and invasive species, a combination of actions was suggested as means to facilitate the implementation and/or the acceptance of invasive species-related legislation. Such actions include: education and awareness raising on the impacts of invasive species, dissemination of good practices, tax incentives and subsidies including tax for transport/ship owners. In terms of actors, ship owners were considered important with consumers and policy makers being identified as additional key actors that should be targeted by OL initiatives.

For coastal tourism, the following key actors were identified: banks and funding sources, spatial and city planners, travel agents, etc. Incentives that would support blue tourism are needed to reverse coastal tourism behavior and coastal development trends.

The approach used in ResponSEAble, where a combination of frameworks and analysis D(A)PSI(W)R, value chain and media analysis, interviews / workshops / webinar, provide good basis to identify key environmental challenges, actors, and tools to have effective communication that can lead to behavioural change (ocean literacy).

Although several media channels were listed as adequate means to convey invasive species and coastal tourism related messages (e.g. face to face communication, exhibitions, leaflets, specialized webs, newspapers, Facebook, TV spots, documentaries, radio podcasts, videos in Youtube, etc.), fit-for-purpose tools are required for effective ocean literacy. This is particularly important for the Mediterranean Sea Basin with a wide diversity of cultures and languages.

ResponSEAble highlighted the importance of addressing environmental issues from a multidisciplinary perspective, where the environment is considered at equal footing as economic development needs and the culture/social aspects. Addressing issues from a multidisciplinary perspective requires multidisciplinary teams, such that created in ResponSEAble, were a broad array of professionals were represented, allowing for a good understanding of the topic and innovative solutions to address problems.

Policy makers require "fit-for-purpose" solutions, which require full scientific understanding of key challenges to develop specific communication tools, policy makers as well as the society at large do require ocean literacy.

Recommendations the Black Sea

The Black Sea is unique, with life only till 200 m depth and a big stock of sulphurate hydrogen in its depth (max 2,121m) and by isolation, being linked to the Mediterranean Sea only by the Bosphorus Strait.The Black Sea is vulnerable to pressure from land-based pollution from its catchment area that causes the degradation of the sea's aquatic ecosystem through eutrophication. Similar processes are taking place in the Azov Sea (included in the Black Sea basin), as well as in the rivers flowing into both seas: Danube, Dnister, Dnipro and Don.

Damage to the marine environment has become evident throughout the world, and Black Sea waters are no exception. Threats are often transboundary and are mainly caused by overfishing, destructive fishing techniques, discarding of pollutants and coastal pollutants, ship-borne pollution through ballast water, maritime transport infrastructure, submarine acoustic activity but also from invasive species, impacts of climate change, oil extraction, or urbanization in coastal areas. The protection of the marine environment has been among the preoccupations of international cooperation through a series of conventions, strategies and action plans, such Convention on the Protection of the Black Sea Against Pollution, adopted at Bucharest on 21 April 1992, EU Strategy for Danube Region (EUSDR), Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea, a**dopted in Sofia, Bulgaria, 17 April 2009.**

Almost one third of Europe's land areas are linked to the Black Sea. It is an area that includes major parts of 17 countries, 13 large cities and about 160 million people. Designated today as a specially protected area, it is the largest continental basin in the world with salty and tidal waters, with a 4.358 km coastline length, a volume of 529,955 km3 and an area of 412,490 km2. Here are the great European rivers: the Danube, the Dnieper and the Don, the only link to the oceans of the world, via the Mediterranean, being the Straits of Bosphorus, Dardanelles and Gibraltar, and the Azov Sea in the North by the Kerch Strait, while the Black Sea depth exceeds 2 km. Due to these environmental conditions, the Black Sea waters are "dead" below 180 m, making it the largest anoxic pool in the world. The whole ecosystem is in an advanced process of degradation. The accidental introduction of fauna, the destruction of coastal aesthetic resources, overexploitation of resources are obvious facts.

The provisions of the BS SAP 1996 clearly stated for the ICZM issues in the Black Sea area, that in order to ensure proper management of the coastal zone, coordinated integrated coastal zone management strategies shall be developed for the Black Sea region. In order to attain this, the following actions were foreseen to be taken:

a) A Regional Black Sea Strategy for integrated coastal zone management should be developed. It was advised that the Istanbul Commission develop such a strategy by 2005, upon the recommendations of its Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management. The regional strategy should elaborate basic principles and methodologies for land- and water-use planning as well as for designing zoning systems. The methodologies and principles recommended in the regional strategy shall be taken into account when developing or reviewing national strategies and planning instruments for integrated coastal zone management.

b) Each Black Sea coastal state should endeavour to adopt and implement, in accordance with its own legal system, by 1999, the legal and other instruments required to facilitate integrated coastal zone management.

c) Inter-sectorial committees for integrated coastal zone management should be established at the national, regional and local levels of public administration, where appropriate, by the end of 1997. These committees should design and implement national plans for integrated coastal zone management through participatory approaches.

d) Erosion and land degradation have important environmental and social impacts. Coastal erosion, due to the changed hydraulic conditions in many of the region's rivers, is a problem which has transboundary implications. Deforestation is another major factor contributing to land degradation. A survey of coastal erosion problems in the region was to be conducted by 2005. It was recommended that the Istanbul Commission, through its Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management coordinate the work on this survey. The survey should have addressed the magnitude of the problem, including its economic implications; propose remedial actions, and included suggestions for pilot studies and demonstration projects.

e) Aquaculture and tourism are two areas of the Blue Growth considered to have scope for economic development in the Black Sea and to benefit the region in general. In order to avoid environmental damage resulting from these activities, and particularly damage with transboundary implications, their development should be managed along common environmental norms to be established by 2006, supported after by the European Marine Spatial Planning Directive (2014) It was advised that the Istanbul Commission, with the support of its Advisory Groups, adopt these common norms and liaise, where appropriate, with the Fisheries Commission, once this body has been established, to adopt an industry code of practice.

f) Eco-tourism should be stimulated in the region, amongst other things, through the implementation of concrete pilot projects in Black Sea coastal states. In close cooperation with the tourist industry and the national tourism authorities, environmental codes of conduct and training courses in sustainable tourism were to be developed. The tourism industry, both for the benefit of the industry and for the benefit of the environment, needs to be more adequately planned with a view to incorporating concerns such as those related to water supply, sewage treatment bathing water quality, the use of natural resources and resort development into newly developed projects from the beginning. Moreover, it shall be required that tourist development projects be subjected to environmental impact assessments.

Pollution and irresponsible fishing have led to a reduction in resources biological diversity, species diversity and the natural environment of the Black Sea ecosystem, but also other causes such as: accidental catching during legal or illegal fishing (poaching) with the use of abusive methods and tools (such as fixed gear such as gillnets calcane), sea water pollution with petroleum products and urban waste water and agriculture.

The need to solve problems related to the marine environment at regional level is recognized by all sectoral programs and Community initiatives on marine protection. There are currently numerous regional processes under the Marine Strategy and MSP EU Directives adopted by the Commission in 2005. In line with the Union's Marine Strategy European Union Member States must cooperate in all the regional countries where the EU is bordering with all the countries in the region.

Recommendations and visions for regional policy makers in the Black Sea

The efforts for effective OL should be consolidated and strengthened by policies, programs and actions that will follow specific agenda.

- Ocean Literacy can build on the emerging ocean knowledge base that is being developed in the Black Sea. Further support to the development and strengthening of ocean literacy activities should be made, building in particular on the growing importance of civil society organisations in in the Black Sea.
- More efforts should be made at the scale of the Black Sea basin to support the broad exchange of information, publications and documents – not limited to technical and scientific data but also including training, awareness, education and communication initiatives and efforts.
- Peer-to-peer initiatives, associating OL experts and projects from different countries, could be further supported. The exchange of information, expert missions, seminars and webinars for the sound management of the various areas of OL could help bringing OL forward in the Black Sea.
- Much attention is given to Blue Growth in the Black Sea basin. because of the highly vulnerable ecosystems of the Black Sea, it is important that Blue Growth is accompanied by sufficient OL efforts supporting informed decisions. Particular attention should be given to OL for local authorities, professionals and funding agencies that are supporting different economic sector development.

Ocean literacy work would be more effectively oriented towards introducing new technologies in environment protection. To enhance the role of the ocean literacy in the future in the black Sea, the following can be highlighted:

- Adoption of OL ”standards” in the Black Sea region countries, in particular setting OL conditionality in financial instruments targeting EU and non- EU countries;
- Continue the development of environmental monitoring, strengthening the monitoring of socio-economic activities and of value chains to strengthen knowledge required for supporting ocean Literacy initiatives;
- Involvement and assistance of international communities to strengthen OL in the Black Sea region is crucial in identifying problems and solutions, and applying best practices and lessons learned in other sea basins;
- Inter- basin cooperation between regional seas can play an important role to promote and raise awareness and level of ocean literacy, targeting all key actors including policy makers.

3. Conclusions

Originally seen as addressing only Regional sea basin issues, challenges and solutions, WP4 was further adapted and expanded to address also the opportunities EU-wide (marine) policies could offer for OL.

There are many recommendations derived from ResponSEAble research that are presented in this report – this being explained by the wide approach to OL chosen by the project (in particular with regards to the different thematic marine challenges and target groups that can be the focus of OL initiatives). Some of these have already been "internalised" in some sea basin (e.g. Helcom) or national initiatives (see for example the call on Ocean Literacy for ALL that is launched by DG MARE and that makes reference to ResponSEAble).

In addition to the recommendations developed here, the activities carried out under WP4, regional workshops, webinars, EMD workshop and the very successful Ocean Dialogues, have helped widening the community of OL followers in the different sea basins and at the EU scale – a key element of successful OL in Europe and beyond.

ANNEXES

The Baltic sea

The Baltic Sea Region (BSR) is home to 85 million inhabitants in 14 different countries. With its very strong agricultural sector, the BSR is the bread- and meat basket of Europe. While the coastline is a tremendous treasure for the inhabitants and the economy, the strong population and human activities are not for the Baltic Sea. In fact, the Baltic Sea is one of the most polluted aquatic ecosystems in the world, with negative effects on humans well-being and identity.

The current Baltic Sea Action Plan (BSAP), adopted by all the coastal states and the EU in 2007, aims to reach a good environmental status for the Baltic Sea by 2020. The resent environmental status assessment indicates that the countries will fail reaching the target. The implementation of the BSAP is coordinated by the HELCOM Secretariat (www.helcom.fi)

“The situation of the Baltic Sea is not good because of us. Therefore, continued efforts to reduce the environmental impacts of agriculture, industries, maritime transports or fishing and also aquaculture are needed.”, stated Estonia´s Prime Minister Jüri Ratas at the 9th Annual Forum of EUSBSR (the EU Strategy for the Baltic Sea Region) in June 2018.

As embedded in the Baltic Sea Action Plan, to obtain a well-functioning and healthy Baltic Sea environment, following four goals must be met as soon as possible:

1. **Baltic Sea unaffected by eutrophication:** clear water, natural level of algal blooms, natural distribution and occurrence of plants and animals, natural oxygen levels
2. **Fabulous status of the Baltic Sea biodiversity:** natural marine and coastal landscapes, thriving and balanced communities of plants and animals, viable populations of species
3. **Baltic Sea undisturbed by hazardous substances:** concentrations of hazardous substances close to natural levels, all fish are safe to eat, healthy wildlife, radioactivity at the pre-Chernobyl-level
4. **Environmentally friendly maritime activities:** enforcement of international regulations (no illegal discharges; safe maritime traffic without accidental pollution, efficient emergency and response capabilities, minimum sewage pollution from ships, minimum air pollution from ships, zero discharges from offshore platforms, minimum threats from offshore installations)

Especially the topic **Eutrophication & Agriculture** has been discussed in public and among policy makers for many decades. Regulations, technical and pro-environmental measures have been implemented to limit or reduce point and diffuse pollution loads, but with not much success. Currently, over 95% of the Baltic Sea suffers from eutrophication.

Nutrient Reduction Scheme adopted in 2007 is a one of the major initiatives at the regional level of the Baltic Sea to sharing ambitions in nutrient reductions to achieve the goal of a Baltic Sea unaffected by eutrophication agreed by the Baltic Sea countries. The countries have agreed to reduce the input of N and P nutrient loads at the sub-basin scale of the Baltic Sea. The assessment of progress towards the countries’ input ceilings in 2014 indicates different situations between the countries. All countries still shall make all efforts to fulfil the commitments.

Who are the key players who are involved in OL?

Numerous stakeholders and actors are connected or involved in activities to reduce eutrophication in the Baltic Sea. Economic actors are represented by the organisations, which by the legal status are also considered as non-profit, non-governmental organisations, and acting for lobbying for own sector interests, thus belonging to the social framework.

The groups of key players on eutrophication issue in the Baltic Sea level were identified as follows:

1. **Policy developers at EU level**

Agricultural policy at EU level (Common Agricultural Policy = CAP) has been changing over the years. However, the overall goal of CAP is to provide a stable, sustainably produced supply of safe food at affordable prices for Europeans, while also ensuring a decent standard of living for farmers and agricultural workers.

The current CAP 2014-2020 has multiple goals: At first, it aims to support farmers to produce affordable, safe and good quality products. By introducing so-called “greening measures”, the CAP finally supports farmers for adopting certain farming methods (e.g. share of grasslands in arable land; maintaining an ecological focus area).

However, the European Court of Auditors in 2017 concluded that greening is unlikely to provide significant benefits for the environment and climate, estimating that greening led to changes in farming practices on only around 5 % of all EU farmland, although 30% of the EU budget for direct payments to farmers have been allocated for this goal.

The current CAP also continues to financially support agri-environmental measures implemented voluntarily by farmers. Agri-envionmental schemes form a part of Member State’s Rural Development Programme. The schemes include various measures that support achieving environmental objectives, including water protection and nutrient reduction measures.

2. **Regulators and decision makers at the Baltic Sea level**

HELCOM and its Secretariat is the major player on OL at the regional se level. It is has established the wide and long-term regional knowledge base, carries out assessments on the state of the environment, develops and adopts decisions in form of recommendations for all Baltic Sea countries.

HELCOM has its rules of procedure, structure and working practice. Various working groups are set-up to support the implementation the Convention.

To support the cooperation on agri-environmental policy measures and instruments and facilitate joint discussion on the Baltic agriculture in the context of the protection of the marine environment, in order to address nutrient inputs and emissions from agriculture, a HELCOM Agri-Group was established in 2014. This is a platform of representatives from agriculture and environment authorities of the Baltic Sea countries, as well as EU, and HELCOM Observers aiming at promotion of Sustainable Agricultural Practices. The Agri-Group has identified the priorities for cooperation, mainly focusing on reduction of pressure from agriculture practices.

HELCOM Secretariat is actively participating in the transnational and cross-border cooperation programmes where involvement of the stakeholders, capacity building of public authorities and dissemination and communication on project results is implemented.

EU Strategy for the Baltic Sea Region (EUSBSR) is another mechanism that is involved in supporting the OL activities in the Baltic Sea region. One of the objectives of the strategy – "Save the Sea" includes a Policy Area aiming at reducing nutrient inputs to the sea to acceptable levels (PA-Nutri). PA Nutri is coordinated by Finland and Poland. The concrete, grass root implementation of the EUSBSR takes place in joint transnational projects and processes. The implementation of actions involves wide range of the stakeholders. The PA-Nutri Actions are targeted to managing nutrients more efficiently; facilitating cross-sectoral policy-oriented dialogue; improving nutrient load data and etc.

EUBSR annually organises a forum that brings together all relevant stakeholders to discuss and present achievements as well as to discuss about identified challenges.

3. Regulators and decision makers at national level

The Governmental bodies in particular ministries of environment, agriculture and economies are the ones which transposes EU policies and legislation as well as HELCOM recommendations on national legislations and organises enforcement.

The national legislators and policy makers also drive and financially support monitoring and creating of knowledge base that is essential for establishing OL.

4. International and national NGOs

There few civil society organisations – environmental NGOs active at the Baltic Sea level. WWF and Coalition for Clean Baltic (CCB) are also observers for the HELCOM. WWF, CCB and BEF are implementing environmental projects at transnational level that includes a strong awareness rising component, campaigning and educational activities related to key issues of the Baltic Sea.

Many environmental NGOs are established at national, regional or local level. They implement grassroot activities, organising campaigns, supporting local inhabitants in defending their rights for clean environment, etc.

Economic actors are also represented by the organisations, which by the legal status are also considered as non-profit, non-governmental organisations, and acting for lobbying for own sector interests, thus belonging to the social framework. In the Baltic Sea region, farmer organisations are very active at national, regional as well as EU level. They are also active in communication and dissemination of relevant information materials and organization of seminars. Many organisations are taking part in transboundary projects related to farming practices including reduction of nutrient pollution load from agriculture.

5. Scientific community

Scientific knowledge providers are the main knowledge producers. In the Baltic Sea region, BONUS programme (https://www.bonusportal.org/) has been supporting strategically scientific research relevant for whole Baltic Sea. The BONUS programme supports the projects on ecological as well on social-economic and governance issues.

The research institutes that generate knowledge base for eutrophication or other environmental issues are well known in the Baltic Sea region. The recent approach is to share and disseminate

generated knowledge beyond the scientific community; however, this group often lacks capabilities to communicate the results to a wider audience.

Knowledge generation and communication

Although the D(A)PSI(W)R[16] framework assessing the causal-effect relationships is well known by environmental authorities, the approach is not often applied to the review of communications efforts or with the intent towards increasing ocean literacy.

Applying the DAPSIWR framework to past communication efforts about eutrophication, the project ResponSEAble reviewed 766 sources[17] in an attempt to answer two questions: (1) What information is transferred? and (2) Who transfers information to whom?

Knowledge content: Based on this review, the project determined that the knowledge transfer does not cover the entire D(A)PSI(W)R framework (Figure 1). Instead, the knowledge dissemination focussed most strongly on the *pressures* (nutrients' runoff from land into water), *state* (e.g., concentrations of nutrients, transparency of waters), *impacts* (algal blooms, oxygen-depleted zones) and *responses* (reduction of pressure) related to agricultural activity (practices and techniques) that causes the pressure.

The largest drawback in current communication efforts is the exclusion of the *drivers,* which are key factors for determining agricultural activities such as the food industry and related trades and markets.

Actors in communication: The media assessment determined that the main target groups receiving information were citizens, consumers and farmers. These groups were mainly approached by NGOs, knowledge associations and scientific institutions. Farmers were additionally approached by manufacturers (e.g. fertilizer producers). However, retailers, wholesalers and policy makers were seldomly targeted.

The main findings were:

- Most communications did only tell parts of the story about eutrophication. Most of them centred around describing **A**ctivity-**P**ressure-**S**tate, most did not cover the aspects of **D**rivers and **W**elfare. Consequently, most proposed **R**esponses were tackling **A**ctivities and **P**ressures, but not the **D**rivers.
- The two main target groups receiving information about eutrophication were (1) the individual actors and (2) the crop and animal producers. Information providers targeting individual actors were mostly representatives from the knowledge sector such as scientific knowledge providers and educators, and the institutionalized sector such as NGOs. Crop and animal producers were mainly informed by NGOs, the secondary sector representing manufacturers (mainly fertilizer companies) and regulators.

[16] Drivers - (Activity) – Pressure – State – Impact - (Welfare) - Response

[17] Sources very retrieved from Google, YouTube and Facebook in seven countries of the BSR (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland).

The Mediterranean sea

Regional identity

At ResponSEAble we organized a regional workshop in the Mediterranean, in 2017, with the aim of: (i) reviewing Ocean Literacy initiatives currently in place around marine challenges in this regional sea; (ii) identifying possible ways forward to enhance the effectiveness of Ocean Literacy activities; and (iii) issuing recommendations on how to implement cost-effective Ocean Literacy strategies.

From the total six Key Stories selected by ResponSEAble, the partners of the project selected as of primary interest for the Mediterranean those on microplastics, the introduction of alien species by ballast waters and the implications of coastal tourism in the degradation of habitats and biodiversity, as well as ecosystem services, in this basin. During the discussions of the workshop, some challenges were identified, linked with those key stories, but also with others.

The Blue Growth in the Mediterranean Sea goes hand in hand with some human activities.

From them, only commercial fisheries and wastewater and Persistent Organic Pollutants are expected to decline over the coming years. All others are expected to continue increasing.

From the six key stories identified in ResponSEAble, the workshop participants recognized that the three selected by the partners are a matter for concern for the Mediterranean Sea, as well as fisheries and renewables. Only eutrophication was considered of secondary importance.

Participants of the workshop highlighted the regulation of sustainable fisheries and education/awareness, together with coastal development matters, as the most relevant challenges for the Mediterranean Sea.

Some perceptions about the key stories in the Mediterranean were:

The approach followed by ResponSEAble was considered as a sensible manner to organize knowledge and processes.

For the ballast water key story, a combination of actions was suggested as means to facilitate the implementation and/or the acceptance of invasive species-related legislation. Such actions include: education and awareness raising on impacts of invasive species, dissemination of good practices, tax incentives and subsidies, and tax for transport/ship owners.

In terms of actors, ship owners were considered important but as actors that comply with legislation. Consumers and policy makers are identified as additional key actors.

For the coastal tourism key story, the following additional actors were identified: banks and funding sources, spatial and city planners, travel agents, etc.

Incentives that boost blue tourism are needed to reverse coastal tourism behavior and coastal development trends.

Key players who are involved in OL?

In addition to the Mediterranean states, either through ministries or national environmental agencies, the Barcelona Convention (UNEP-MAP), is the main key player unifying the whole basin, including European member states, candidates to become members and non-EU member states. These actors should be coordinated with different EU DGs, such as REGIO, ENV, MARE, RTD, in order to provide a solid message. This message should be articulated around the different

European strategies and policies, such as that on Biodiversity, Marine (MSFD), Blue Growth, Fishing (Common Fisheries Policy), etc,

What approaches exist in communication

Some regional initiatives in communication were proposed for the Mediterranean:

Several media channels were listed as adequate means to convey messages: face to face communication, exhibitions, leaflets, specialized webs, newspapers, Facebook, TV spots, documentaries, radio podcasts, videos in Youtube, etc. During the last one and half year of ResponSEAble much has been done in this way, such as the cartoons, which, although not focusing specifically in the Mediterranean, have conveyed a message applicable also to this regional sea.

TV is a good media to introduce through e.g. advertising or weather forecast short messages with environmental content. During the last one and half year of ResponSEAble much has been done in this way, including the TV documentaries with interviews about each of the key stories.

Whereas participants listed marine waste, sustainable seafood, or awareness about invasive species as the messages that they receive, massive coastal tourism-related problems seem not to be as present in the media or simply, not reaching the society.

Ocean literacy initiatives were reported as generally impacting the participants, and in about 50% of the cases leading to behavioural changes.

The most frequently reported “new behaviour” was: (i) To be more aware and careful, (ii) To stop buying certain products, (iii) Reporting environmental issues (to NGOs, websites, etc.).

Many barriers seem to hindrance behavioural change: (i) For invasive species it can be seen that lack of knowledge, lack of adequate infrastructures and price are the main barriers that might prevent their implementation; (ii) For massive Coastal tourism, contributions show that the main barriers are related to lifestyle/ habits and lack of adequate infrastructures.

The Black Sea

Regional identity and main marine challenges

Eutrophication of the Black sea and the rivers has harmful environmental, socio-economic and human health impacts, sometimes causing the death of animals and fish, degrading waters used for both drinking and irrigation, impacting recreation, among others. Annual economic losses for the Black Sea from environmental problems were estimated to be approximately 500 million USD in only the fishery and tourism industries.(refs).The immediate cause of eutrophication is an overabundance of nutrients originating primarily from agriculture and municipal sewage systems problems: estimated at approximately 80% from agriculture, 15% from urban water and 5% from other sources.(refs)

The inflow of nutrients to the coastal sea increased since the communism time, producing almost 6-7 algal blooming during summer with critical impact on environment quality and organisms (biodiversity and density); in recent decades because of economic and population changes, and megatrends the consequences started to be a combination of a cumulative cause.

Driven by the intensive agricultural production of centralized economies and receiving 70% of its nutrient load from the River Danube, the northwestern shelf of the Black Sea was experiencing primary symptoms of eutrophication by the 1970s (Bodeanu 2002, Mee et al. 2005). By the 1980s, secondary symptoms including hypoxia and mass mortality of benthic flora and fauna were occurring (Cociasu et al. 1996). The collapse of the centralized governments and the resulting intensification of agriculture, the main driver of eutrophication, were followed by signs of recovery (Mee et al. 2005, Mee 2006). (EEA, 2015)

The main cause of the increasing eutrophication in the sea is nutrient inputs from the rivers. The catchment area of the Black Sea is over 2 million km2, five times the size of the sea itself. The drainage basin entirely or partially covers 22 countries in Europe and Asia Minor. The largest volume of river flow entering the sea comes from the north-western part of the basin. Depending on meteorological, hydrothermal and hydrobiological conditions during summer and autumn, oxygen deficiency (hypoxia or anoxia) and mass mortality caused by eutrophication have become an annual event in the north-western shelf area where anoxic zones expanded from covering 3 500 km2 in 1973 to 40 000 km2 in 1990 (EEA, 2000).

Estimating overall trends in socio-economic development is already a challenge in a single country, as such developments are dependent on many factors that cannot be influenced by states (such as global commodity prices, exceptional events etc.). These challenges are aggravated in a region that consists of a multitude of different countries using different methodologies and approaches in their statistics and national forecasts and must be estimated in the future because of its difficulty. Nevertheless, some general trends can clearly be recognized. (DRMP,2015)

Sustainable coastal tourism;

The main tourist attraction of the whole region is the Black Sea coast itself, with all the facilities and health resources it offers. The Black Sea climate is blander than the Baltic Sea and less warm than the Adriatic and Mediterranean. The average annual temperature is 11.2 ° C and in July it rises to 21.8 ° C.

Besides the Black Sea as the main tourist attraction, the coastal and shallow water areas offer a natural potential that includes:

- nature reserves (e.g. the Danube Delta, Vama Veche in Romania) and unique natural landscapes,
- health and treatment resources, including sources of natural mineral waters or curative shores, etc.
- cultural attractions, e.g. historical and architectural places, film and music festivals,
- winter sports and hiking, especially in the Black Sea coastal region of Turkey and Bulgaria with high mountain regions, yachting represents a future tourism potential for all Black Sea countries.

The impact of tourism activity is manifested by:

- a lack of information and environmental education related tourism;

- a difficult out-of-season access;

-a low level of accommodation and infrastructure, including quality of them;

- the difficulty of tourists to make responsible travel in the reserves;

- the car/bus and the train access is very difficult;

- building constructing buildings without paying attention to the landscape, leads to the emergence of new landscapes without any harmony with nature;

- the building of lighting poles on beaches, sometimes too big;

- the modification of the shoreline deviations or changes followed by the erosion phenomenon intensification;

- the significant demographic growth in the summer season causes additional requirements for services: the distribution of drinking water and additional equipment for domestic water treatment and use, as well as increased space for solid waste disposal and treatment;

- additional costs for the treatment of solid and liquid wastes, which is has been a problem for the local authorities budget, limiting the amount spent for other local community requirements and emergencies;

- the existence of occupied areas with buildings that are used only 3-4 months per year.

In general for Black Sea there are big differences concerning demographic, social, economic and political aspects, different nations, cultures, languages.

The tourism activity is a profitable sector for the neighborhood countries economy, as well as for local population incomes. For example, Dobruja Region (Dobrogea, Romanian name) has a high touristic potential compared to other Black Sea countries, but this sector have to be valorized at the real capacity, more attractive, well known and popularized, needing large investments in two directions:

1. an improvement of tourism services and facilities, the expansion of tourism facilities, systematic sanitation of beaches,
2. the development of new tourist and recreational complexes in the coastal area, as well as in the Danube Delta Biosphere Reserve.

Despite the economic potential that tourism can offer, we must take care to preserve the aesthetic and health environment because the environment is specifical, unique and the support that it can develop.

The low quality of the environment threatens the development / growth of tourism already affected by an unstable economic situation that characterizes several countries in the area. This does not

allow the necessary investments in tourism to improve the facilities that are indispensable to its development.

However, environmental health surveillance in relation to tourism is relatively underdeveloped along the Black Sea coast. Tourists, and especially foreign tourists, are increasingly asking for information on health / environmental cleanliness and information materials on which to select their holiday destination. In spite of new legislation harmonized at European requirements and obligations of its implementation in tourism there are still difficult. Tourism is overburdened by its seasonal demands. During the short tourist season (May-September, but only July-August more intensively), an estimated additional volume of 14,623,000 m3 of fresh water and additional domestic waters of 9 million m3 are being discharged. Issues are oversized by the concentration of tourism activities in a short period of time and in specific, often small areas, which are usually subject to environmental pressures from other economic activities such as agriculture, industry development and the resident population.

Tourism thus acts as an important seasonal factor affecting the pace of domestic discharges. The total volume of domestic sewage discharges from the coastal communities of the Black Sea is estimated at 55 m^3/year. Considering an average tour of the 15 days / year tourist, it is possible to add an estimated amount of domestic waste of 9 mil m3 / tourist to the amount generated by the local population.

It could be added to all of these the climate instability of the area (variability of temperatures, salinity, density of marine waters, drought or flooding periods, strong winds and waves) causing some natural processes related micro- or macro algal blooming, anoxia followed by aquatic organisms death and organic decomposition, necessity to collect macroalgae stranded on the beach are phenomenon confronting tourism, and of course the euthrophication.**Addressing the issue of invasive species.**

In the last hundred years, exotic plants and animals have invaded the Danube Delta and the Black Sea, having a negative influence on the unique ecosystem in Europe and on the health of the population. On the territory of the Romanian coast and Danube Delta there are exotic, invasive plants, many of which can cause health problems and economic losses. Researchers at the Danube Delta Research and Development Institute in Tulcea, say that 187 foreign species were inventoried on the territory of the reserve, of which 35 are invasive, that is, they can cause health problems, material and economic losses.

The concept of microplastics

In the last years, surface water samples were collected in the Danube Delta Biosphere Reserve – Black Sea Coastal area, for qualitative and quantitative assessment of microplastics. The sampling, separation, sorting, measuring, weighing operations have highlighted the presence of these new classes of pollutants, whose impact on the trophic chain in delta ecosystems is not yet well known. In addition, these microplastics, by ingestion, can become a means of transporting the various adsorbed contaminants. The recording of the vibration spectra allowed the identification of the micro-plastic organic groups.

The qualitative assessment of organ group identification as well as the quantitative analysis of each separate microplastic specimen will be part of future studies as it requires high-performance equipment and a long period of assessment, expertise and validation.

Given the importance of knowing the ecological status of aquatic ecosystems in the Danube Delta Biosphere Reserve, due to the complexity of phenomena occurring in the biotic and abiotic environment, it is necessary to continue the studies on the quality status in all ecosystem’s

compartments, the quantitative evaluation of all the parameters described in the Directive water framework.

In addition, surface microplastics studies, qualitative and quantitative assessment should be continued by extending the sampling, sorting and identification phases at all sampling stations in the Aquatic Complexes of the Danube Delta Biosphere Reserve. In-depth study of these studies is possible through the acquisition of ultra-performing equipment, FTIR and a specialized dairy for the determination of microplastics. Given the state of health of the population of the Danube Delta Biosphere Reserve and adjacent areas, future studies will also need to focus on carcinogenic substances and pharmaceutical residues present in surface waters.

Also, genetic diversity and ecology of the population is an important descriptive component for assessing the conservation status of an aquatic ecosystem, and therefore it is necessary to continue and deepen the genetic activities developed within this project. Furthermore, the approaches to the genotoxicity of microplastics and various substances with estrogenic-mimetic activity are imperative to know their impact and, implicitly, the conservation status of aquatic ecosystems with higher net resolution.

Regional initiatives

Important moment in the Black Sea region management started following the signing of the Convention on the Protection of the Balck Sea Against Pollution (Bucharest Convention, 1992). Acting on the mandate of the Black Sea countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine) which on the 21-04-1992, signed and shortly thereafter ratified the Convention on the Protection of the Black Sea Against Pollution, the Commission on the Protection of the Black Sea Against Pollution (the Black Sea Commission) implements the provisions of the Convention and the Black Sea Strategic Action Plan.(http://www.blacksea-commission.org/_mission.asp)

ICZM activities were launched within the Black Sea Environmental Program (BSEP) funded by GEF and jointly managed by UNDP, UNEP, World Bank, and European Union's PHARE and TACIS programs in the period 1993 - 2008. The Black Sea countries have reached a consensus on the necessity of reconstruction of existing management systems in compliance with ICZM principles in the Odessa Declaration (1993), Strategic Action Plan (1996), and in the new Strategic Action Plan for the Protection and Rehabilitation of the Black Sea, which was adopted in April 2009 (Antonidze, 2010).

The Strategic Action Plan (1996) for the Rehabilitation and Protection of the Black Sea (BS SAP) has been one of the fundamental elements of the regional cooperation in the Black Sea which was first settled in 1992 by the Convention on the Protection of the Black Sea Against Pollution. The Plan was based on the findings of the first Transboundary Diagnostic Analysis (TDA) of the Black Sea (1996) and developed with certain principles to include specific policy actions to combat with the identified threats and problems.

The provisions of the BS SAP 1996 clearly stated for the ICZM issues in the Black Sea area, that in order to ensure proper management of the coastal zone, coordinated integrated coastal zone management strategies shall be developed for the Black Sea region. In order to attain this, the following actions were foreseen to be taken:

> a) A Regional Black Sea Strategy for integrated coastal zone management should be developed. It was advised that the Istanbul Commission develop such a strategy by 2005, upon the recommendations of its Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management. The regional strategy should

elaborate basic principles and methodologies for land- and water-use planning as well as for designing zoning systems. The methodologies and principles recommended in the regional strategy shall be taken into account when developing or reviewing national strategies and planning instruments for integrated coastal zone management.

b) Each Black Sea coastal state should endeavour to adopt and implement, in accordance with its own legal system, by 1999, the legal and other instruments required to facilitate integrated coastal zone management.

c) Inter-sectorial committees for integrated coastal zone management should be established at the national, regional and local levels of public administration, where appropriate, by the end of 1997. These committees should design and implement national plans for integrated coastal zone management through participatory approaches.

d) Erosion and land degradation have important environmental and social impacts. Coastal erosion, due to the changed hydraulic conditions in many of the region's rivers, is a problem which has transboundary implications. Deforestation is another major factor contributing to land degradation. A survey of coastal erosion problems in the region was to be conducted by 2005. It was recommended that the Istanbul Commission, through its Advisory Group on the Development of Common Methodologies for Integrated Coastal Zone Management coordinate the work on this survey. The survey should have addressed the magnitude of the problem, including its economic implications; propose remedial actions, and included suggestions for pilot studies and demonstration projects.

e) Aquaculture and tourism are two areas of the Blue Growth considered to have scope for economic development in the Black Sea and to benefit the region in general. In order to avoid environmental damage resulting from these activities, and particularly damage with transboundary implications, their development should be managed along common environmental norms to be established by 2006, supported after by the European Marine Spatial Planning Directive (2014) It was advised that the Istanbul Commission, with the support of its Advisory Groups, adopt these common norms and liaise, where appropriate, with the Fisheries Commission, once this body has been established, to adopt an industry code of practice.

f) Eco-tourism should be stimulated in the region, amongst other things, through the implementation of concrete pilot projects in Black Sea coastal states. In close cooperation with the tourist industry and the national tourism authorities, environmental codes of conduct and training courses in sustainable tourism were to be developed. The tourism industry, both for the benefit of the industry and for the benefit of the environment, needs to be more adequately planned with a view to incorporating concerns such as those related to water supply, sewage treatment bathing water quality, the use of natural resources and resort development into newly developed projects from the beginning. Moreover, it shall be required that tourist development projects be subjected to environmental impact assessments.

The Atlantic Ocean and the North Sea

Regional identity/Key issues in each region

The North Sea is a shallow, north-eastern arm of the Atlantic Ocean on the European continental shelf located between the United Kingdom (particularly England and Scotland), Denmark, Norway, Sweden, Germany, the Netherlands, Belgium and France (Figure 1). It connects to the Atlantic ocean through the English Channel in the south and to the Norwegian Sea in the north and to the Baltic Sea in the east. It is more than 970 kilometers long and 580 kilometers wide, with an area of around 570,000 square kilometers. The North Sea is a very productive sea with copepods and other zooplankton which are crucial elements of the food chain supporting plenty of fish. Calanus Finnmarchicus and its smaller close relative C. Helgolandicus make up to 80 percentage of the total biomass of zooplankton in the North Sea in the spring season[18]. Over 230 species of fish live in the North Sea. Cod, haddock, whiting, saithe, plaice, sole, mackerel, herring, pouting, sprat, and sandeel are very common and fished commercially[19,20]. In addition are the Crustaceans (Norway lobster), deep-water prawns, and brown shrimp also commonly found throughout the sea and commercially fished.

The production of fish in The North Sea is worth 2 billion annually (ICES 2017[21]) and fish counts for almost 20% of the animal food consumption in the world. The demand for seafood products is still growing due to the combination of several factors such as demographic growth, urbanization, increase of richness and international trade providing wider choices. Demersal fishing in the North Sea represents over 70% of the sector in this area, involving several thousand vessels from at least the seven bordering member states (i.e. Belgium, Denmark, France, Germany, the Netherlands, Sweden and United Kingdom). World per capita apparent fish consumption increased from 9.9 kg in the 60's to 14.4 kg in the 90's and 19.7 kg in 2013 (Food and Agriculture Organization, FAO).

The catches from the global large-scale fisheries (industrial) are declining (top and middle, **Erreur ! Source du renvoi introuvable.**)[5]. In the North Sea, 75% of the 35 fish stocks in the North Sea are in satisfied or in good condition[1]. Still, there are growing concerns in fish stock management (Institute of Marine Research (IMR), Directorate of Fisheries in Norway and ICES) on the declining trend of cod stock in the North Sea (bottom, *Figure 2*). During summer 2018 the Directorate of Fisheries in Norway suggested protection of the spawning areas in the Skagerrak and no fishing of cod from the area Telemark to Swedish borders. The current stock size is among the lowest observed[22].

[18] https://www.hi.no/filarkiv/2015/05/overvakningsrapporten_1b_2015.pdf/nb-no

[19] *"MarBEF Educational Pullout: The North Sea" (PDF). Ecoserve. MarBEF Educational Pullout Issue 4. Retrieved 12 January 2009.*

[20] *"Quality Status Report for the Greater North Sea". Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). 2010. Retrieved 23 June 2013.*

[21] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Greater_North_Sea_Ecoregion_Fisheries_Overview.pdf

[22] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/cod.27.21.pdf

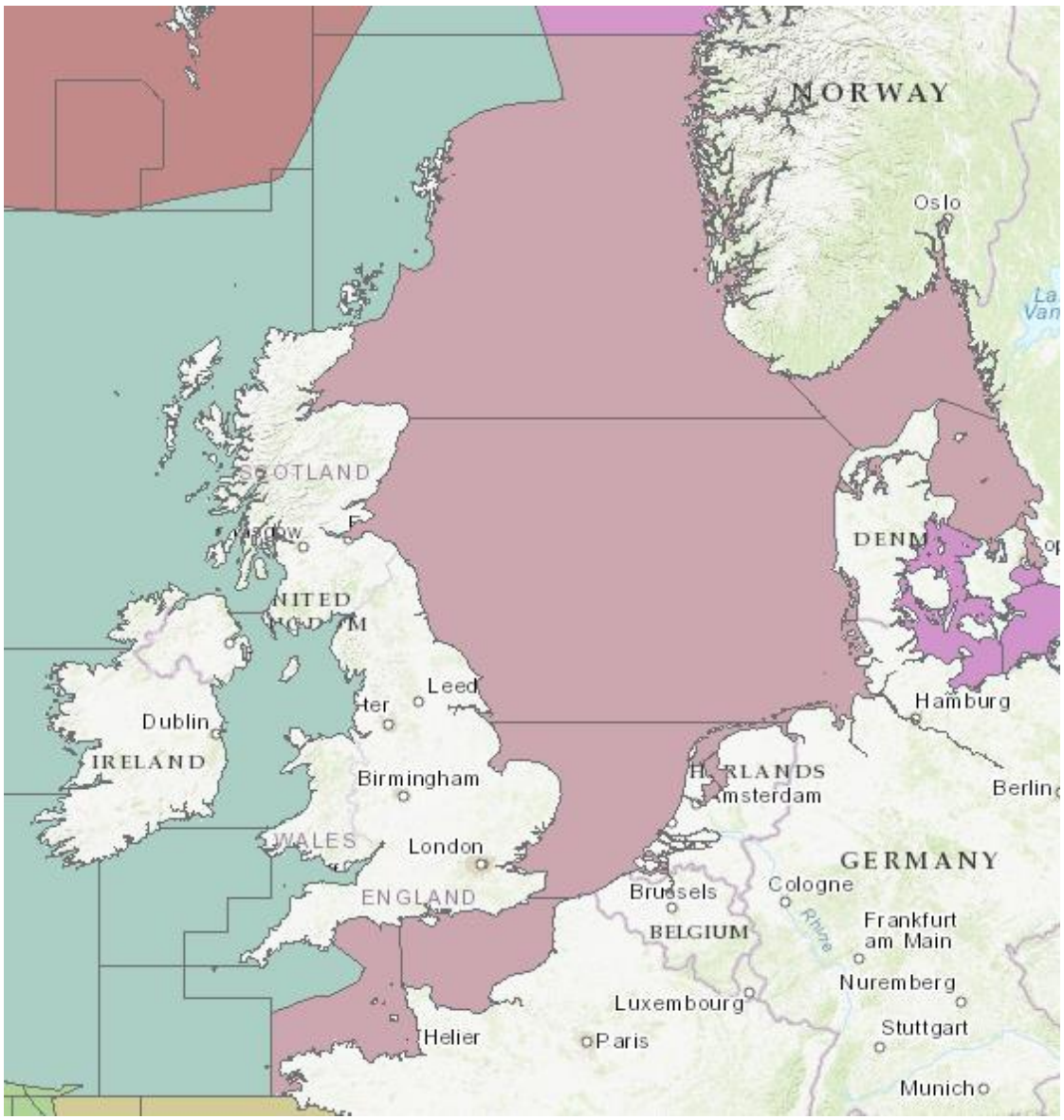

Figure 1. Sub-areas and Divisions of FAO fishing areas 27 and 37 in the North Sea.

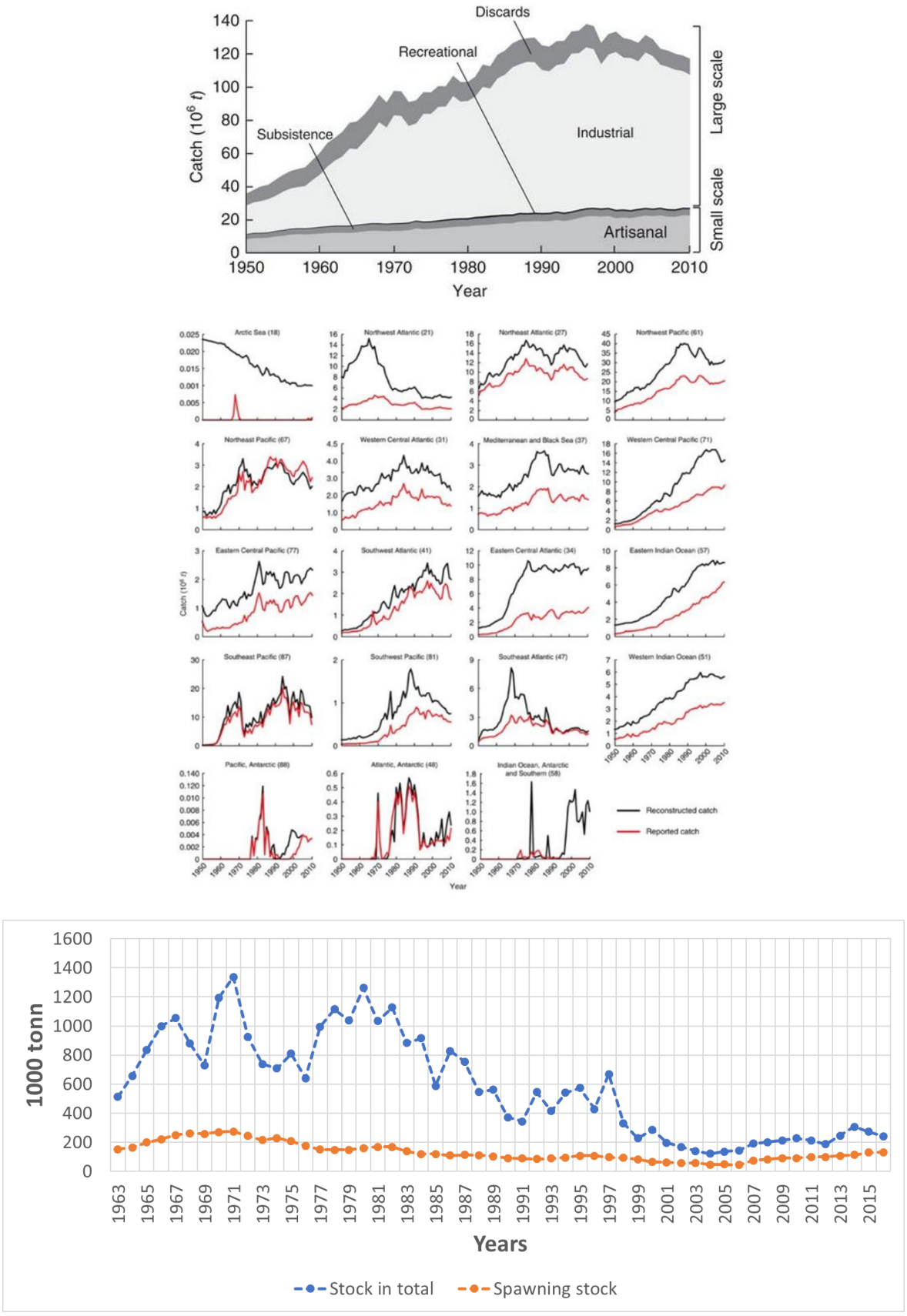

Figure 2. Top : Reconstructed catches for all countries in the world by large-scale (industrial) and small-scale sectors (artisanal, subsistence, recreational)[23]. Middle: *Reconstructed and reported catches by the 19 maritime areas FAO use to spatialize the world catch.*[5] Bottom: Development of the cod stock from 1963 until 2016. Data source: https://www.miljostatus.no/torsk-i-Nordsjoen.

Input from ResponSEAble regional Workshop on sustainable fisheries in the North Sea held in Oslo September 2017 claimed that the Dutch fisheries has changed the last 10 to 15 years (Tim Hasnoot, ProSea) due to changed markets and consumer demands, environmental challenges and higher regulatory pressure which requires different knowledge and skills. To be able to reach consumers (**Erreur ! Source du renvoi introuvable.**), informing people about fisheries and to be visible is important. To make sure of a sustainable way forward the policy should be about the three P's; people, profit and the planet. New challenges will arrive with the Brexit, and with marine renewable energy the spatial planning of fishing areas will be very important due to less fishing areas. In general, fishers want to and are capable to operate sustainable. There is a large variety of vessel types and sizes, and very often the fishermen involve also their family and have a passionate relation to their job and way of life. Traditional beam trawl which penetrates the sea bottom are replaced with innovative beam trawl with pulse gear with less penetration of the floor.

> **Sustainable Fisheries:** The key story is highly covered in terms of different target groups and the variety of messages. The coverage of content varies between different countries and target groups. Focusing on consumption related messages is not recommended as these are mostly covered by existing resources and campaigns. Retailers and especially retailers that are willing to support sustainable fisheries might be targeted to deepen their understanding of ecological relationships and economic challenges.

Who are the key players who are involved in OL?

In the North Sea there are several key players. From policy developers at EU-level, national and international NGO's and scientific communities giving advices to the national policy developers to the media and press. More detailed description are given below.

1. **Policy developers at EU level**

Under the Directorate-General for Maritime Affairs and Fisheries[24], they manage two policy areas, integrated maritime policy and common fisheries policy (CFP). The integrated maritime policy work with policies like Blue Growth which is the long-term strategy to support sustainable growth in the marine and maritime sectors. For the CFP the principal aim is to ensure high long-term fishing yields for all stocks by 2015 where possible, and at the latest by 2020 through fishing management.

Data and science advice drive the fisheries management with control measures to ensure that rules are applied fairly to and complied with by all fishermen. The EU has adopted laws to protect our environment and biodiversity – whether on land and at sea because we all depend on healthy ecosystems for food, energy, raw materials, air and water. Fish stocks generally have a high, but

[23] Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. Daniel Pauly and Dirk Zeller. *Nature Communications* volume 7, Article number: 10244 (2016).

[24] https://ec.europa.eu/fisheries/about_us_en

not unlimited, reproductive capacity. With no control on fishing, stocks may collapse, or fishing may cease to be economically viable. It is therefore in everyone's interest to have a fisheries management system in place to safeguard stock reproduction for high long-term yield, lay the foundations for a profitable industry, share out fishing opportunities fairly, and conserve marine resources.

The CFP also includes rules on aquaculture and stakeholder involvement, with their own group on North Sea Advisory Council (NSAC) as one of eleven Advisory Councils within Europe.

2. Regulators and decision makers at the North Sea level

ICES

The International Council for the Exploration of the Sea (ICES) is an intergovernmental marine science organization, meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans. The goal of ICES is to advance and share scientific understanding of marine ecosystems and the services they provide. ICES use this knowledge to generate state-of-the-art advice to reach conservation, management, and sustainability goals. ICES cover a network of more than 5,000 scientists from over 700 marine institutes in 20-member countries and beyond and 1,500 scientists participate in their activities annually.

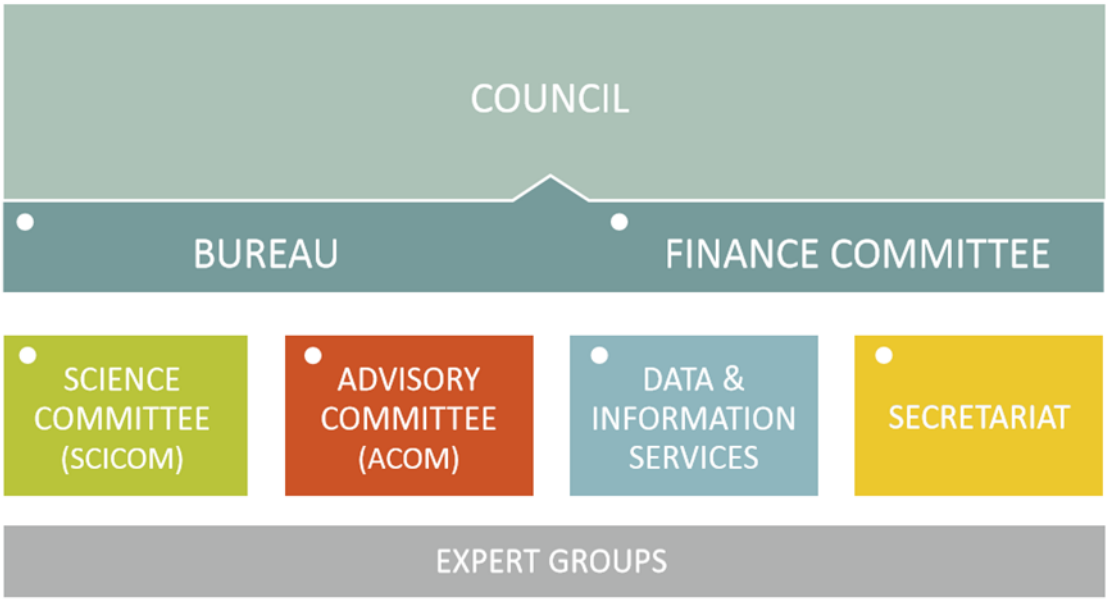

Figure 3. The organization of ICES.

Ospar

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) from 1992 combines the Oslo convention from 1972 on dumping in sea and the Paris convention from 1974 on marine pollution from land-based sources. It was adopted together with a Final Declaration and an Action Plan. All the Contracting Parties has signed and ratified the conventions (Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland) along with Luxembourg and Switzerland. The OSPAR Convention work to identify threats to the marine environment and has organised, across its

maritime area, programmes and measures to ensure effective national action to work against these. By setting internationally agreed goals and by agreeing commitments by participating Governments to deliver what is needed, methods for monitoring and assessing the environmental status of the sea have been developed. OSPAR Commission is an important mechanism to help Governments cooperate in the region and a key partner in further efforts to improve the protection of the North-East Atlantic. The often limited or incomplete scientific knowledge in marine management requires the application of the precautionary principle, which is central to the ecosystem approach. The ecosystem approach is defined for the OSPAR Convention, as "*the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity*".

Directorate of fisheries in Norway

With the vision "Life in the ocean- our common responsibility" the directorate of fisheries in Norway should promote profitable and value-added industry through sustainable and user-oriented management of marine resources and marine environment. They want to reach that by gathering, using and convey knowledge and data, develop policy and management tools, implement regulations and guidance on rights and duties, treat cases and perform supervision and control, participate and give guidance and advice in processes and debates and follow the development of the society and see new challenges.

Norwegian Food Safety Authority

The Norwegian Food Safety Authority (NFSA) is a governmental body. Their aim is to ensure that food and drinking water are as safe and healthy as possible for consumers and to promote plant, fish and animal health. In addition is the **mission of the NFSA to promote**
Ethical keeping of fish and animals, Environmentally friendly production, Good quality, honest production and fair trade and Innovation in the food sector. The NSFA advise the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affairs and the Ministry of Health and Care Services.

3. International and national NGOs

WWF

World Wide Fund (WWF) is a global environmental organization working for that no animals and species should be eradicated because of human behavior. WWF works on stopping illegal fishing, overfishing and discards. Fish and other seafood are the main food source for coastal society globally and three billion people have this as a very important food source. And for the future this demand will grow with the increasing population.90% of the fish stocks are overexploited or fully exploited. Aquaculture is an important piece making food available for everybody, but it has also very significant environmental affects to be aware of. WWF are working on making this industry sustainable. This includes issues such as the survivor of the wild salmon, salmon lice which is the biggest problem with aquaculture in Norway today and discharges from feeding the fish which sinks to the bottom. In addition to this is the plastic pollution from small plastic particles blown out to sea through the feeding hoses and when old cages are cut into smaller pieces.

MSC

The Marine Stewardship Council joined the ResponSEAble Regional workshop on Sustainable fisheries in the North Sea held in Oslo September 2017. The Marine Stewardship Council was established in Norway (Mari Nordstrøm, MSC) recently, while it has been present in Sweden for about 10 years. The eco labels from MSC have been defined through work of fishing standards and scientists. All parts of the supply chain need to be MSC labelled, not only the fishing procedure, to get the ecolabel. To be certified the stock sustainability, the ecosystem impact and effective management need to be fulfilled. Globally, 30 % percent of all seafood is mislabeled, and DNA testing of seafood are also performed. 67 % of the volume of Norwegian fish and 79 % of the value of Norwegian fish is MSC certified.

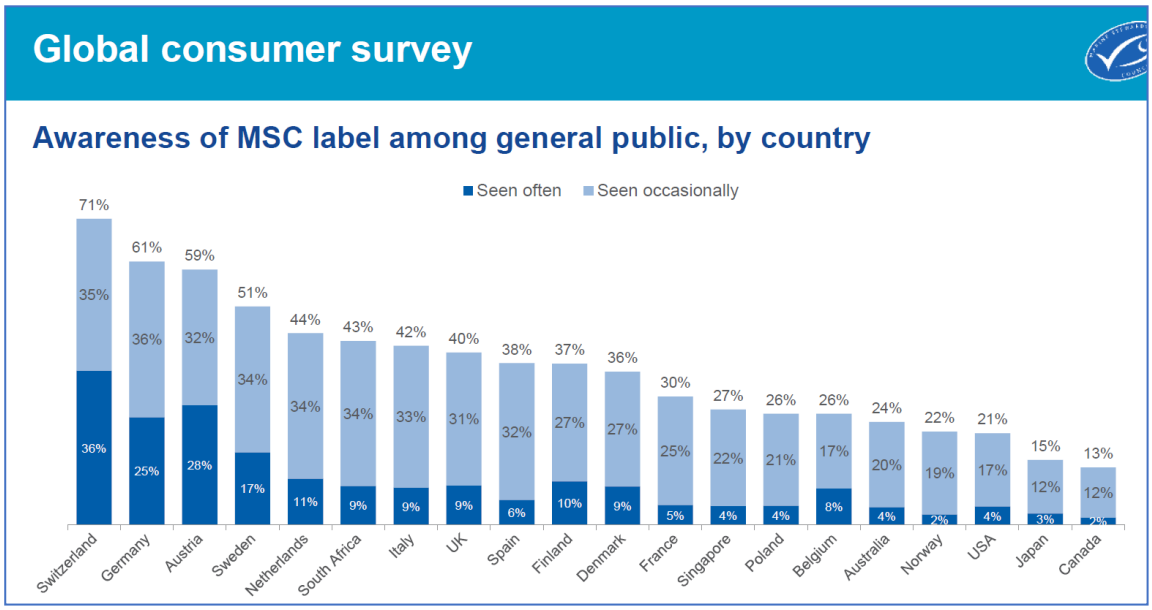

Figure 4.

4. Federations and other interest organisations

One example of a federation working on seafood is The Norwegian Seafood Federation which represent the interests of approximately 600 member-companies where the seafood industry represents one of Norway's largest export industries after oil and gas. Norway exports farmed and wild fish to more than 150 countries. The Norwegian Seafood Federation is affiliated with the Confederation of Norwegian Enterprise (NHO) which is the main representative body for Norwegian employers. The current membership are over 20.000 companies ranging from small family-owned businesses to multinational companies.

Another example is The Global Salmon Initiative (GSI). This is a leadership initiative established by leading farmed salmon CEOs from around the world. They share a vision of providing a healthy and sustainable source of protein to feed a growing population, while minimizing their environmental footprint, and continuing to improve their social contribution. The GSI was launched in August 2013 and have 15 members. Their operations cover 8 countries – Australia, Canada, Chile, Faroe Islands, Ireland, New Zealand, Norway, and the United Kingdom. The group together represents approximately 50% of the global farmed salmon sector. The GSI members have committed to achieving the Aquaculture Stewardship Council (ASC) certification across 100% of the global farmed sector.

5. Scientific community

There are several Norwegian scientific institutes working on research on the fields of fisheries, fish stock management and aquaculture. Examples on such institutes are Institute of Marine Research (IMR) and the National Institute of Nutrition and Seafood Research, NIVA, IRIS, the Norwegian Veterinary Institute and Nofima a.o..

6. Media (press, broadcasting, etc.)

In Norway, media often have thematic article series where they focus on a specific theme. In the recent years, a lot of the focus has been on plastic. Just recently, focus has been placed on the declining stock of cod in the Skagerrak region. There has also been focus on the sea lice problematics of the aquaculture industry and in general on the climate change.

What approaches exit in communication

A fund driven by the **EU's maritime and fisheries policies** along with national funding is used to co-finance projects. This is not directly communication, but still this is a way to help fishermen in the transition to sustainable fishing, including sustainable aquaculture developments. Each country is allocated a share of the total fund budget based on the size of its fishing industry. An operational program is drawn up saying how this should be spent. When the program is approved by the Commission, national authorities decides who should receive funding and both national authorities and the Commission are jointly responsible for the implementation of the program.

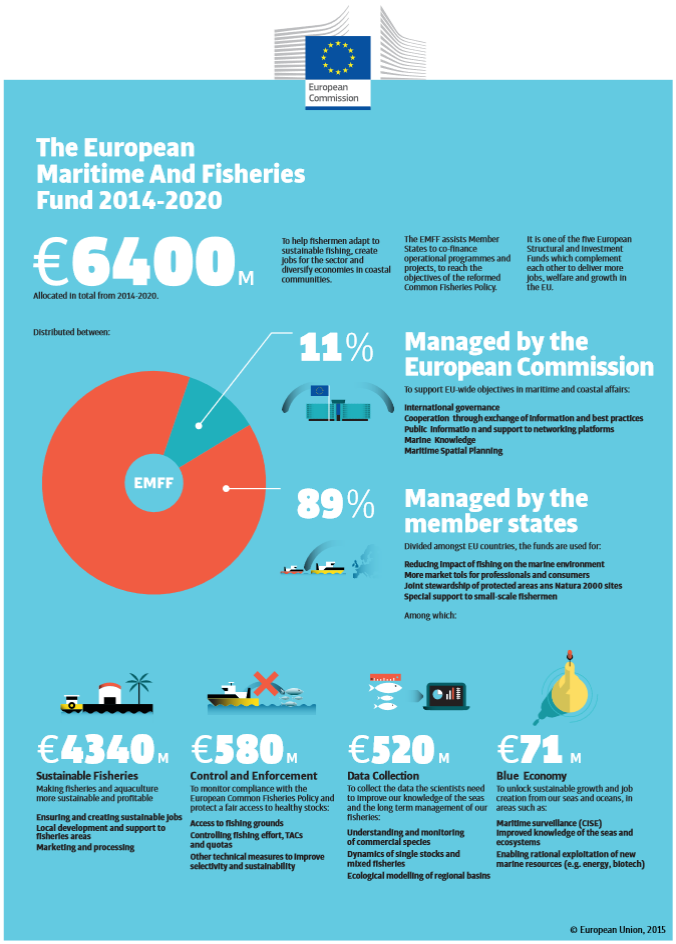

Figure 5.

The **WWF** have developed a seafood guide[25] which guides you into what kind of seafood you can eat and what you should not eat. They encourage you as a consumer to use your consumer power to ask where the fish and seafood are from and to choose green alternatives. Included in this is the encouragement to choose fish products and aquaculture fish products which have the **Marine Stewardship Council (MSC)** and the **Aquaculture Stewardship Council (ASC)** label. In addition to these encouragements, they are in the media talking about current environmental issues.

As part of the **BarentsWatch**[26] program, a webpage is dedicated to present facts about the environmental, economic and societal sustainability of Norwegian aquaculture. How does the aquaculture industry affect the environment, what are the production and economy of the aquaculture industry like and how does the aquaculture industry impact community development and social conditions? However, it does not provide an assessment of the sustainability of the aquaculture industry.

The awareness of the **MSC** label in the various country globally is very spread, but they have various campaigns to reach out to the consumer. For instance, in Sweden the retailers are very active on promoting the MSC label, and the outreach is done through campaigns with partners.

[25] https://www.wwf.no/engasjer-deg/sjomatguiden/beste-sjømatvalg-dette-kan-du-trygt-spise

[26] https://www.barentswatch.no/en/havbruk/

Each country often has their own approach, for instance in Norway the language needs to be in Norwegian compared with Denmark were the campaigns are in English. Each country does their own consumer survey to make sure they will reach the correct target group with biggest potential of behavioral change.

The various scientific communities do outreach to the public. Articles are published on places like www.forskning.no, which is a Norwegian online newspaper for norwegian and international research news. Each year Research days are arranged in Norway and in 2019 the Environment will be a parent theme on how the environment affects us and we effect the environment. These are just few examples on public outreach.

There are other organizations working on spreading knowledge about the ocean and strengthen their relationship with the ocean. For instance, **Passion for ocean**[27] are arranging an ocean festival in 2019 talking about how consumers can get enough knowledge to join keeping the ocean clean and healthy. Another example is the **Nordic Ocean Watch**[28] which is an environmental collective dedicated to taking care of the ocean with various project.

ICES have a document called "Implementing the ICES strategic plan"[29]. In this, ICES have several topics relating ICES to different communication. The most relevant points from this document is given as bullet points below.

- ICES will achieve the Science goals through four supporting activities with **Goal 2:**
  « Providing tools and methods for assessing relationships between marine ecosystems, their biological resources, and the provision of services to society, including socio-economic aspects». (Page 8)
- «Using the ecosystem approach, ICES strengthen the link between science, policy developments, and advisory needs to inform society regarding the ecological, economic, and social trade-offs among different policy options». (Page 10)
- Where the ecosystem approach is outlined in "the Strategic Plan" with a framework that fosters interlinking between different sectors. Communications is under the Secretariat. The Secretariat should be «fostering cooperation and communication with member countries, partner organizations, stakeholders and society ». (Page 60)
- "In cooperation with SCICOM (Science Communication), ACOM (Advice Communication), and Data and Information Services, the Secretariat will identify areas where new tools should be developed and implemented to enhance the work, efficiency and inter-linkage of the organization". (Page 43)
- PUBCOm (Publication and communication groups) are additional working groups of ICES
- "The Secretariat will strive to ensure that ICES is an open and transparent organization that welcomes stakeholder participation and contributions. Using the ICES website, social media, and other communication tools, the Secretariat will provide easy access to the latest ICES science and advisory information. The Secretariat will work assiduously to promote and enhance the visibility of ICES by demonstrating the relevance of ICES activities and

[27] https://www.passionforocean.no/

[28] http://nordicoceanwatch.no/en/projects/

[29] « Implementing the ICES strategic plan 2014-2018 Linking science, advice, data and information, and sectretariat. August 2014. ICES"

accomplishments for society. In addition to the publication activities coordinated by SCICOM (which are primarily focused on the scientific community), the Secretariat will promote **ocean literacy** in the wider society by raising awareness about the work of ICES work in relation to human concerns and needs. This will be accomplished using **a variety of external communication tools.** The Secretariat will also develop internal operational procedures to ensure that all communications are efficiently produced and convey consistent information." (Page 63)

In addition to this, ICES mention for outreach and ocean literacy MarBef[30], Euro Marine[31] and JPI Joint Programming Initiatives[32]. The structure of The Secretariat is given in Figure 6.

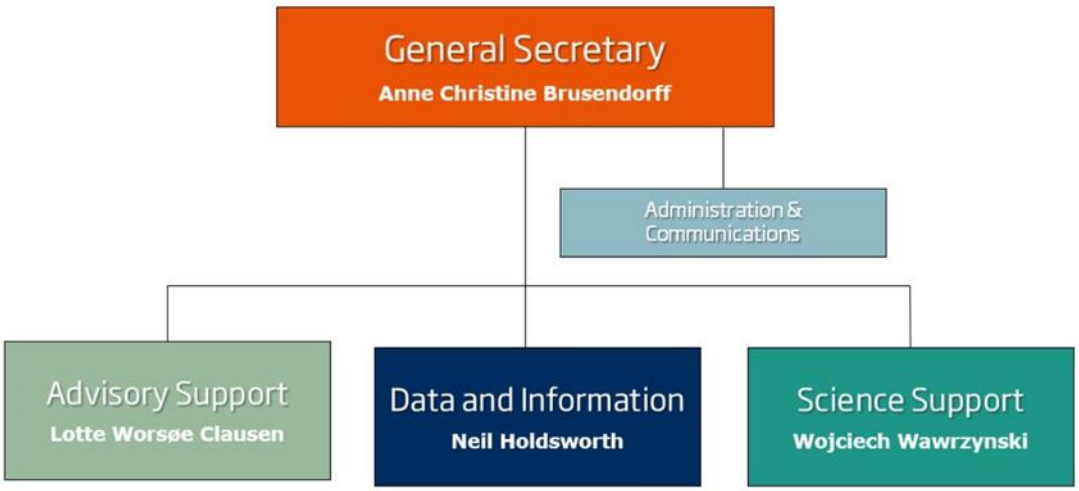

Figure 6. The structure of the ICES Secretariat.

[30] http://www.marbef.org/outreach/index.php

[31] http://www.marinetraining.eu

[32] http://ec.europa.eu/research/era/joint-programming-initiatives_en.html