Regional aspects of the European Ocean Literacy

Deliverable 4.1

Description of an approach and processes for the regional workshops

WP4

June 2017

Regional aspects of the European Ocean Literacy

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Content

Introduction

This deliverable provides an insight in to the work flow of Workpackage 4 and its approach to understanding regional strategies of Ocean literacy and developing cost - effective regional strategies, in particular in the organization of the regional workshops, where these are discussed by regional stakeholders.

Due to the challenges faced in the project, in particular caused by the delays in WP2 and consequently WP3, the work of WP4 has been also delayed.

Thus, this draft presents the vision and framework of what ResponSEAble Ocean Literacy regional strategy should include. It provides an approach to the regional workshops, agenda, questions to be raised, stakeholders, etc.. The regional workshops are scheduled to be held between March and June 2017. The annexes include summaries of the regional workshops.

Regional strategies of the ocean literacy in ResponSEAble project

In the course of the ResponSEAble project regional strategies/priorities were taken into consideration from the very beginning of the project, when the key challenges (key stories) were selected as a part of work of WP1. Regional leaders were asked to rank the challenges according to the regional priorities. There were sic Key stories that were finally selected for the project. Each Key Story has a particular regional focus, while some key challenges are global (such as marine litter- microplastics in cosmetics).

Table below reminds the reader the regional focus of ResponSEAble Key Stories.

Table 1. Regional focus of ResponSEAble key stories

The Black Sea –eutrophication and invasive alien species/ ballast water	
The Mediterranean – coastal tourism, invasive alien species/ ballast water	
The Baltic Sea – eutrophication and invasive alien species	
The North East Atlantic Sea – sustainable fisheries	
EU wide – microplastic and cosmetics, marine renewable energy	

Key findings of WP1, 2, and 3 provide us with the information on what knowledge we have using DAPSI(W)R framework (recorded in the Knowledge base), who are the main value chains (actors) involved and what is being communicated about these issues at the moment.

Key findings of the WP1/2/3 in the key stories are coming together as a « processing box » transforming them into the operational recommendations. See below the work process and link of regional strategies for cost effective ocean literacy initiatives.

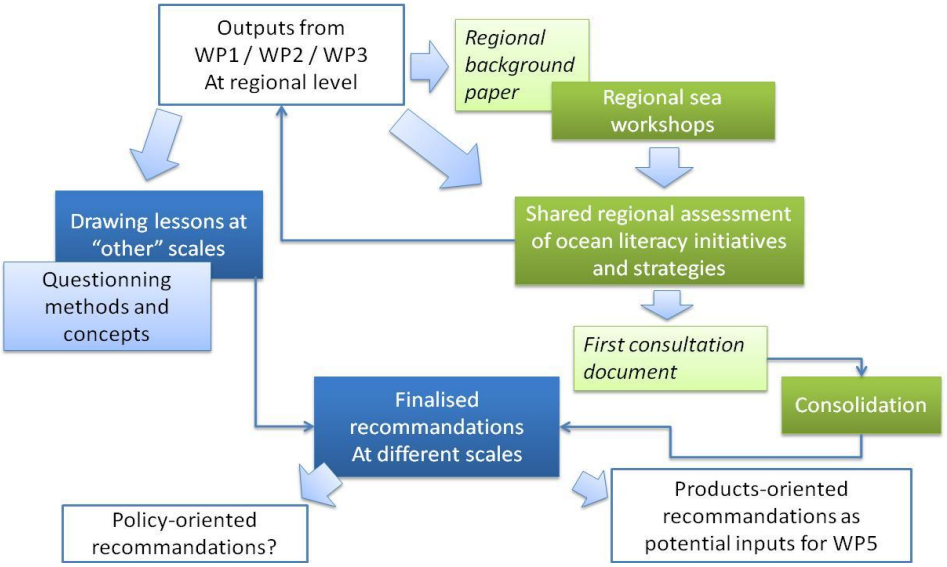


Figure 1. Work flow of WP4 and interlink with other WPs

When discussing EU and regional strategies of Ocean Literacy, we would first like to know what is currently on the agenda of the ocean literacy in the regional seas, more general on the EU agenda and what issues are on the transatlantic scale?

In order to find this out we pose the following questions:

- **Which topics of the ocean literacy are predominant on the agenda of the regional seas? What are similarities and differences?**
- **To whom Ocean Literacy is targeting? similarities and differences**
- **How Ocean Literacy is being implemented – what tools are in place and what is lacking?**

As a synthesis we will arrive at what has been implemented in the regional seas and whether we can *say if we are ocean literate*? (Or most likely not – as not much has changed in the situation (which is specific for each region).

Effectiveness of literacy: what do we want to measure and how?

The analytical approach for analysis and deriving recommendations about which ocean literacy initiatives are cost effective was designed based on the following questions and joint ResponSEAble –SEAChange workshops on assessing effectiveness during partners meeting in Plymouth and Athens:

- **What is my objective?** (ocean literacy is better understanding – of what? And by whom? Change of behavior - which one, by whom, reduced pressure on the sea, healthier sea…)
- **Which indicator(s) helps me to assess if I reach – or not – my objective?**
- **Which method can I apply to estimate the effectiveness** of my Ocean Literacy initiative or a change in my indicator? (before/after, with/without)
- **How to "do well" Ocean Literacy so I have the highest effectiveness?** (knowledge shared, the process to develop/participation, the level of "interactiveness" proposed, etc.)

As we would like to analyse different types of ocean literacy initiatives/strategies (including ocean literacy which is targeted toward different groups), we can use a basic indicator - how many people are recipients of the knowledge via different types of tools, and also assess in qualitative terms whether the costs associated with production of these ocean literacy tools were high /moderate /low.

However, when we talk about ocean literacy which is not only informing, but we also talk about empowering people to make responsible decisions (which means possible change in behaviors) - thus objective of the assessment is slightly different.

Literature review suggests that there are numerous factors which affect the behavioral change (see graph below).

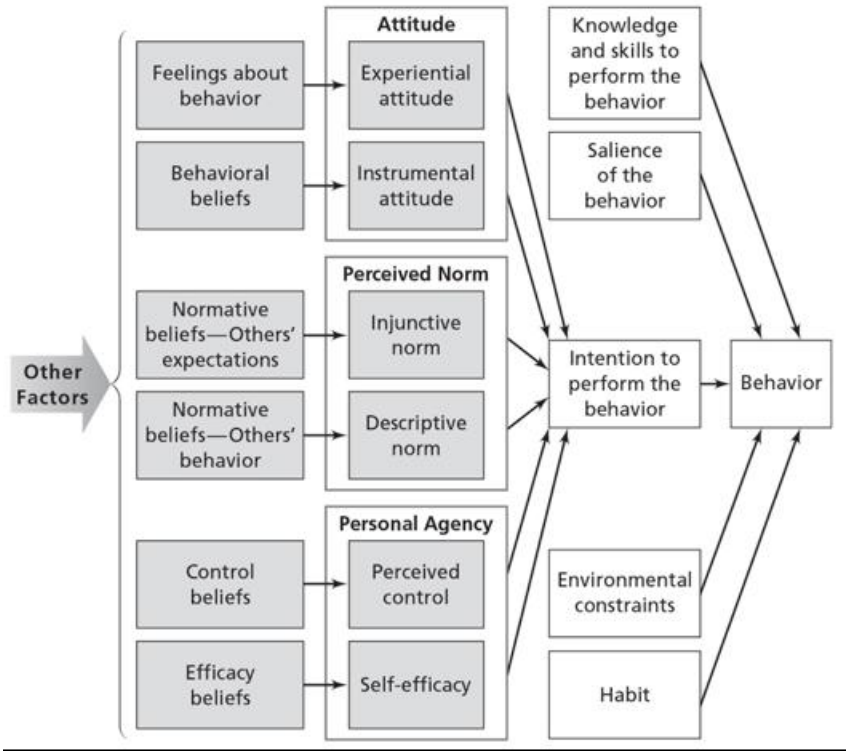


Figure 2. Factors which affect the behavioral change
Source: Schuldt 2016

For example, when looking at consumers' individual behavior, first conclusions from the literature review about information impact on consumers' behavior can be made (Cremel, 2016):

- **The effectiveness of environmental campaigns that relied solely on providing information is very low**: very well-crafted international interventions have produced very small change (10-20%) in certain targeted consumer behavior such as littering or electricity consumption reduction.
- **What makes information effective is not its accuracy and completeness but more the extent to which it captures the attention of the audience**, gains their involvement and overcomes possible skepticism about its credibility and usefulness for the recipient situation.
- **Financial cost or inconvenience represent the main barriers** to action, leading to little or no effect on consumer behaviors.

Recent studies of public perceptions about ocean issues report high concern but limited knowledge, prompting calls for information campaigns to mobilize public support for ocean restoration policy.

Drawing on the literature from communication, psychology and related social science disciplines, we consider a set of social-cognitive challenges that researchers and advocates are likely to encounter when communicating with the public about ocean health and emerging marine diseases—namely, the **psychological distance at which ocean issues are construed, the unfamiliarity of aquatic systems** to many members of the public and the **potential for marine health issues** to be interpreted through politicized schemas that encourage motivated reasoning over the dispassionate consideration of scientific evidence. (Schuldt et al (2016) offers theory-based strategies to help public outreach efforts address these challenges and present data from a recent experiment exploring the role of message framing (emphasizing the public health or environmental consequences of marine disease) in shaping public support for environmental policy.

Schuldt et al.(2016) proposes the following to address these challenges:

- Highlight the **centrality of ocean health and services to the society**
- **Use immersive technology** such as virtual reality to make ocean spaces more vivid and close
- Design **interactive tools that aggregate and simplify data** for the public such as the Ocean Health Index (www.oceanhealthindex.org)
- Metaphors that ground marine systems **in terrestrial concepts** (e.g. describe coral reefs as forests)
- Emphasize the **certainty of marine disease** occurrence over the uncertainty
- Framing **ocean health issues in terms of public health issues**, which impact directly consumers as opposed to environmental consequences that remains external

Thus, the barriers and solutions that can help to overcome these barriers, by including different actors or providing incentives for behavior change can make campaigns more effective.

Understanding the psychological aspects of behavioral change, such as theory of change or theory of cognitive dissonance contribute to designing more effective ocean literacy products.

It is important to put these findings from the cognitive science and economics into the context of **existing EU marine policy**, where a lot efforts have been done towards improving the environmental status of the oceans, and developing opportunities of the Blue Growth.

These include **on-going programs and initiatives of the regional sea conventions** and other policy making initiatives on regional levels. (HELCOM, OSPAR, Plan BLEU….Black Sea Convention), which have particular regional programs for monitoring and supporting raising awareness.

In order to be cost effective, **the strategies of ocean literacy have to be also implementable and in line (coherent) and supported by the policy goals and ongoing initiatives** and go beyond and propose the strategies for the areas (target groups) which are not yet reflected in these policies.

Measurement of the effectiveness of ocean literacy tool depends on an actor (target audience) and the objective of a particular ocean literacy campaign. Whether the awareness was raised and resulted in a direct behavior change.

Regional workshops of ResponSEAble

In order for ocean literacy products that will be developed in the ResponSEAble project to be cost effective, all of the issues described above need to be taken into the consideration when designing agendas for the regional workshops, which structured the discussions among stakeholders.

There are 2 series of regional workshops that are planned in the project:

The first series of the Regional workshops were planned during March - June 2017. The regional workshops allowed to present and validate ResponSEAble approach on the regional level and discuss the issues that are priorities for the regional sea, present the first findings of the project on

the key stories which were chosen by the project for each region and discuss with the stakeholders existing ocean literacy initiatives and their effectiveness, as well as to discuss what are the barriers and constraints that keep the current initiatives from being effective. Getting busy stakeholders to come to the workshop is very challenging task, especially when the attendance is not renumerated. Thus, some workshops had to be rescheduled; to ensure the attendance by the larger number of stakeholders.

To the moment of this deliverable the following workshops took place:

- Black Sea - March 27, Constanta Romania
- Mediteranean Sea – May 11-12, Villefranche, France
- Baltic Sea – June 14-15, Berlin, Germany
- Atlantic Arc – June 21-22, Brest, France

The second series of the regional workshops will take place in 2018, when the first ocean literacy products will be developed and presented to the stakeholders to be tested, to provide feedback and dissemination.

The following section describes in more detail objectives of the regional workshop, agenda issues, and type of stakeholders for the first series of the regional workshop. Each regional workshop followed these in the organization of their work and drawing conclusions.

Objectives, agenda, participants

The objectives of the first series of regional workshops:

1. To review collectively existing ocean knowledge and ocean literacy initiatives *at the regional sea level*;

2. To investigate (national, thematic, target group focused) awareness raising initiatives that are currently proposed (including activities proposed under the first cycle of the MSFD) in the Region;

3. To identify and prioritize the main challenges and constraints faced by ocean literacy initiatives in the regional Sea.

Agenda of the workshops

Regional workshops are proposed to be in a format of 1,5 day workshop, starting or finishing noon, and comprising of the 4 following sessions (to be slightly adapted to each regional workshop):

Session 1. Ocean Literacy and ResponSEAble vision of Ocean Literacy (a keynotes from OLTT, ResponSEAble), (short glance at the regional issues – from ResponSEAble project).

Session 2. Sharing experiences. Short presentations of the most effective experiences in communication that the participants have encountered.

Session 3. "Cost-efficiency" in communication, how is it defined and monitored. Presentations from researchers, presenting our approach. Open discussion. ResponSEAble key stories of the region, as examples

Session 4. Parallel sessions on each regional sea?

Session 5. Wrap-up session. Lessons to take home for cost-effective Ocean Literacy

Each workshop organizer tailored agenda to particular regional specificity and available speakers.

Organization

Venue provided by co-organizer, coffee/dinner (or lunch) is paid by organizers. Expenses for workshop can be shared accordingly to ensure participation of key people from the regions involved.

Participants

Expected about 20-25 experts from the regional sea areas in the following fields:

- Policy makers (In DG MARE changes in the way regional seas are represented
- Researchers (especially communicating science projects)
- NGO
- All people who have tried to communicate sustainability issues
- ResponSEAble partners
- OLTT members who have expressed interest
- KS leads who are working on specific relevant stories
- Additionally, other influential actors in the region (politically, economically, social figures)

Expected Outcomes of the workshops

- Provide experiences what worked and what didn't work and capture differences (Are we ocean literate? Or maybe not – as not much has changed?)
- Show the need to upgrade ocean literacy to Ocean Literacy 2.0 and in addition to educators to include value chains, consumers and others…
- Show what means to be cost- efficient (based on how to evaluate efficiency, for example how to reach more people or specific groups of people who are yet not targeted (link with multipliers), etc…
- Understand what would be the top agenda to communicate on regional level
- Get to know the regional key experts with who to continue working on the ocean literacy products/tools and communication in the future

Annexes of this report provide the summaries of the regional workshops. Deliverable 4.2 provides the analysis of the outputs of the workshops and recommendations.

Annex 1. Regional workshop report from the Baltic Sea

"How literate are we on well-known issues such as eutrophication of the Baltic Sea?"

The workshop took place at the « Federal Ministry of Environment », Berlin, Germany, on June 14th and 15th, 2017.

The workshop was designed as a combination of short presentations with active discussion and elaborating proposals for follow-up work of the project. The inputs were provided by the ResponSEAble project team as well as by different stakeholders of the Baltic Sea region. Prior to the workshop the speakers were coordinated and communicated with each other to build a logical chain of the presentations. The workshop was moderated by Heidrun Fammler, BEF Germany.

The objective of the workshop was to discuss along the ResponSEAble approach of sorting available knowledge and ocean literacy examples of a defined key story – eutrophication in this case - into the framework of drivers-activities-pressures-state-impact-welfare-responses. When doing that the ResponSEAble team came to define a motto or challenge for the Berlin event that was the guiding principle for the discussion:

In the Baltic Sea region we are advanced in research, in policy shaping, in communication with stakeholders – but we still find eutrophication as the biggest issue for the Baltic Sea. How comes? The knowledge is out there (do we know enough, do we look behind the scenes at the drivers?). It has been communicated since decades - Did we talk all those years to the right stakeholders? Did we communicate the right messages? Who are the actors in the value chain - Is there an opportunity for a change at some of them? At whom?

Agenda

Wednesday, June 14

14:30	**Coffee & Registration**
15:00 – 16:00	**Introduction to the Event** *Heidrun Fammler, Baltic Environmental Forum Germany (BEF DE)* **Introduction Round** *Participants* **From Policy to Action: The New York Ocean Conference and its relation to Ocean literacy** *Monika Luxem - Fritsch, Ministry of the Environment, Germany* **The H2020 ResponSEAble Project** *Gloria de Paoli, project partner, ACTeon, France*
Session 1: Introduction to the ResponSEAble approach to Ocean Literacy	
16:00 – 16:30	**Key Note: What does it take to be "ocean literate"? – the essential elements (introduction to the ResponSEAble approach)** *Tamer Fawzy, BEF DE, ResponSEAble partner*
16:30 – 17:00	**Feedback to the ResponSEAble approach to Ocean Literacy by participants** What is the advantage/added value of the ResponSEAble approach? Which aspects are challenging, cause doubts or opposition?
17:00 – 17:20	**Coffee break**
Session 2: Ocean Literacy, Science and Governance – How literate are we in general?	
17:20– 18:30	**Awareness of policy makers, use of scientific knowledge and readiness to act of stakeholders - 40 years contributing to Baltic Sea literacy by HELCOM** *Marianne Wenning, Chairperson of HELCOM for the European Commission* **13 years of fascination in maritime research – the German Youth Competition „Research at Sea"** Frank Schweikert, German Marine Foundation **Uncertainty communication in science for policy/science for governance** *Dorothy Dankel, University of Bergen* *Discussion*
20:00	**Reception in Berlin**

Thursday, June 15

9:00	**Baltic Sea group - Eutrophication** Moderator Heidrun Fammler, BEF
Session 3: How literate are we on eutrophication? We are advanced in research, in policy shaping, in communication with stakeholders – but we still find eutrophication as the biggest issue for the Baltic Sea. How comes? Did we talk all those years to the right stakeholders? Did we communicate the right messages? Is there an opportunity for a change?	
9:15 -10:45	**The Eutrophication key story in the ResponSEAble approach: a thorough analysis: Knowledge** **Value Chain and actors** **Communication channels and effect analysis** *Laura Remmelgas, BEF Estonia & Tamer Fawzy, BEF Germany* **Guest presentations** **Behavior change of the society with regard to meat eating – a solution for mitigating eutrophication? Is knowledge enough?** *Prof. Susanne Stoll-Kleemann, University of Greifswald* **The CONSUME project: guidance for less meat eating by WWF as answer on the eutrophication issue** *Stella Höynälänmaa, WWF Finland*

	Direct payments from the CAP and their impact on eutrophication of the Baltic Sea *Elina Kollate, Pasaules Dabas Fonds Latvia/Alex Lotman Estonian Fund for Nature* **The EU Strategy for the Baltic Sea Region addressing eutrophication – PA NUTRI fostering policy implementation – a wrap-up of successes and gaps, ideas for future work** *Sanni Turunen, EUSBSR PA NUTRI coordinator, Ministry of Environment, Finland*
10.45–11:15	**Coffee break**
11:15 – 13:00	**Discussion:** in the Baltic Sea agricultural practice is the core issue for eutrophication – farmers the key stakeholders addressed by all means of communication. But: looking at the value chain we see whole-sellers, the agro-food industry as dominant players, the Baltic agricultural products feed other regions – are we talking to the wrong people all the time? How to reach the driving forces behind agricultural mass production? Is the consumer of the Baltic Sea region addressed properly? Drivers: what are the most important drivers and market forces behind the economic activities – exports? The CAP? Activities: Which alternatives are there besides the existing value chains? Responses: which are the relevant policy levelsl? Activities: which change we opt for that is not harming agriculture as source of income? Which actors we need to reach for it? What do they have to know?
Session 4: Conclusions	
13:00 – 13:45	**Who are the "right" target groups we should reach? Which messages? How we could we work within EUSBSR PA Nutri, HELCOM and in a policy-science-NGO coalition to reach these right target groups** Agreement about follow-up activities, a next workshop, and further action *Ending & Farewell, Heidrun Fammler, BEF*
14:00	**Coffee/light lunch and departure**

List of participants

Name	Institution
Heidrun Fammler	Baltic Environmental Forum Germany
Matthias Grätz	Baltic Environmental Forum Germany
Parvina Samadova	Baltic Environmental Forum Germany
Tamer Fawzy	Baltic Environmental Forum Germany
Frank Schweikert	Deutsche Meeresstiftung
Wera Leujak	German Environment Agency
Susanne Stoll-Kleemann	University of Greifswald
Laura Remmelgas	Baltic Environmental Forum Estonia
Sanni Turunen	Ministry of the Environment of Finland, EUSBSR PA Nutri
Stella Höynälänmaa	WWF Finland
Denis Bailly	Université de Bretagne Occidentale
Connor McCrossan	NUIG
Owen Molloy	NUIG
Gloria De Paoli	ACTeon
Kristina Veidemane	Baltic Environmental Forum Latvia
Elina Kolate	Pasaules Dabas Fonds
Ugis Rotbergs	Pasaules Dabas Fonds; Institute of Environmental Solutions
Kari Synnøve Johansen	GRID-Arendal
Dag Hjermann	NIVA
Dorothy Dankel	University of Bergen
Martyn Futter	Swedish University of Agricultural Sciences
Dennis Collentine	Swedish University of Agricultural Sciences

Marianne Wenning	EU Chair HELCOM
Monika Luxem-Fritsch	BMUB

Main highlights of the workshop

Introduction Round

A total of 24 stakeholders attended the meeting. In the round of short self-presentations the external participants and the members of the ResponSEAble Consortium briefly presented their organisations, their specific work and their interest in ocean literacy.

From Policy to Action: The German Experience with Ocean Literacy

Monika Luxem-Fritsch, Ministry of the Environment, Germany

M. Luxem–Fritsch brought fresh information from the recent Ocean Conference held in New York the week before. It focused on implementation of the UN Sustainability Goal No.14 – "conserve and sustainable use the oceans, seas and marine resources for sustainable development". The conference brought together about 4000 participants, organized about 170 side events - it was a high political priority of Germany. Main outcomes of the conference were as follows:

- "Call for Action" - A concise, focused, inter-governmentally agreed declaration by consensus.
- Seven partnership dialogues on the key issues, such as addressing pollution, sustainable fishery, minimising acidification, etc.
- More than 1300 voluntary commitments for the implementation of the Goal 14 were announced as initiatives of different stakeholders at various levels.

The conference also addressed "Ocean literacy" at many sessions and side events: especially the need to have a better view and knowledge about the impacts and their cumulative effects, the complexity of the marine issues and the need for the right means to transport these messages to people.

The conference highlighted the necessity for a regional ocean governance system. The Baltic Sea region and HELCOM, which have been prominently represented in NY, are serving as an example of good cooperation between neighboring countries. For example, the Baltic Sea Action Plan on Marine Litter is being proposed as a model also for other seas and for global cooperation.

Moreover, the conference pointed out the need for cooperation and coordination across sector policies and issues; interlinkages between local, national, regional and global scale shall be demonstrated broadly; the up-stream and down-stream connection as well as connectivity of freshwater and marine systems must be highlighted better.

The H2020 ResponSEAble Project

Gloria de Paoli, project partner, ACTeon, France

G. de Paoli briefly described the project concept on ocean literacy targeting people in a way that they become responsible through establishing conditions that enable individuals or organized groups to develop their knowledge and potential so, that they can take their role and responsibility in society. G. de Paoli stressed that even many efforts have been taken at policy level, the messages have not always reached the people who have to change their behaviour and take the actions. It has been observed that people are aware of the issue but it is still unsolved on how to make people responsible on the issue of concern.

The ResponSEAble project works to answer a series of literacy questions. Traditionally, in communications a focus is put on the pressures or actions, but there is not enough focus on what people could do better and what effects would be observed if people would change their behaviour. The project has identified major target groups to be addressed: economic operators and professionals, policy makers and society at large.

When knowledge has been gathered the attention shall be put on the ways and means of the communication. The ResponSEAble consortium will apply new technologies for setting conditions to become more *ocean literate*. The approach is implemented through key issues (stories) and at regional seas basins. Based on descriptors of the Marine Strategy Framework Directive (MSFD) 6 stories have been identified; eutrophication is one of them.

Session 1: Introduction to the ResponSEAble approach to Ocean Literacy

Key Note: What does it take to be "ocean literate"? – the essential elements of the ResponSEAble approach

Tamer Fawzy, BEF DE, Germany

Before answering on the question "What does it take to be ocean literate", one shall answer another question - "What does it mean to be "ocean literate"? The idea of the project is based on the American understanding of ocean literacy, which originally has been defined as "educational programme", mainly in schools. The ResponSEAble consortium has developed its own definition of an "ocean literate person" like the following:

1) A person understands its own influence on the ocean and the ocean's influence on him/her.
2) A person can have different roles and shall understand its own influence as an individual, professional and social being.
3) A person shall be able to communicate on the responsibilities in a social group as well as across the groups.

The project has already identified steps to be taken in order to become "ocean literate". These are the following ones:

1) To obtain specific knowledge on the environment and human interactions – one shall understand some components of own actions & activities to the environment; the knowledge can be structured in a way linking human activities with the ocean to point out responsibilities of actors. For structuring knowledge, ResponSEAble has proposed a modified conceptual framework on causal relationships: Driving force – Activities – Pressures – State – Impact – Welfare – Response (further: DAPSIWR). Furthermore, the project demonstrates how this framework can be applied for the selected key stories. For this purpose a Knowledge Base has been created to sort the available knowledge and information.
2) To obtain knowledge on the specific actors and their interrelationships - The identification of the activities and actors of the ocean economy connected to particular environmental challenges has been implemented by using a "value chain approach". The approach allows to identify and assess different direct and indirect relations between activities, actors and pressures and to assess interdependencies. The project looks at the key actors which have the biggest potential for behaviour change. They will be targeted later in the project.
3) The ability to communicate within and between actor groups. People are receiving and sending different messages. They focus of the different aspects of the story. The project team gathered communication messages and saw who sent to whom these messages and by which communication tools. A picture of communication pathways was created (see presentation). Furthermore, the content of the collected communications was analysed regarding the focus of message in relation to the key stories. The project team also conducted interviews to analyse how different key actors perceive information.

In conclusion T. Fawzy stressed that the project is not only communicating existing knowledge, but using the knowledge to create products in terms of content, target group and design.

Feedback to the ResponSEAble approach to Ocean Literacy by participants

Existing knowledge for finding effective solutions to the problem

- A problem in communication is occurring if knowledge is not sufficient to be certain what and how to communicate on the problem and to come up with the solutions. It has been observed

that it is easier to communicate on the problem than on solutions, in particularly, when "something bad" has happened (e.g. a spill), then an effective way of communication is seen.

- It is recognised that many environmental problems are complex and knowledge might not be sufficient; however, it is not sufficient to talk only on the problem for a long time, (especially if the person is a politician…). The society does not want only to talk on problems but expects proposals for solutions and action. With regard eutrophication, the problem is known - also the pressures and activities causing the problem are known, thus a demand to reduce pollution is relevant. It does not mean that the problem is fully solved in short-time, but it will take time - and this needs to be clearly communicated. People shall understand that some measures needs to be over-long time to see an environmental effect. So, the people should not give up.
- We need to show and explain to actors and citizens benefits - what the oceans (Baltic Sea) do for us. It is important to search for and use not only traditional, well-known knowledge, but to find new aspects – especially on socio-economic interactions (eco system services). When understanding the benefits people can get motivated in taking actions. It is also to show not only environmental benefits but also economic and social benefits. It is very important when talking to farmers or other economic actors.
- Knowledge does not mean necessarily a better decision-making. We need to analyse other factors influencing human behaviour. The focus shall be on the values of people that influence decisions.
- Many groups try to influence sustainability goals. That leads to the need to establish partnerships to influence investments going into the same direction. It has become more evident that scientists need to work together with NGOs and policy makers.
- It is also important to recognise that knowledge on the issue has changed and the dynamic feature of knowledge needs to be respected and clearly communicated. This is also relevant for knowledge on eutrophication.
- The participants shared their experience from work with consumers. The necessity to provide advice and solutions is more relevant compared to talks on problems.

Ocean literacy of people

- There are limitations that people can get "ocean literate", as many other fields of environment, like atmosphere, soil, climate, as well as social life requires literacy. So, scientists need to be careful with their expectations towards people's capacities.
- As different literacies are expected from the citizens, it is a good approach to focus. Additionally, it would be important to find out where different literacies overlap.
- People are more responsive to the visible problems, like plastics, although it is not a major problem.
- Even people have built up their literacy, they might have different preferences on what to choose and how to act. Being ocean literate does not automatically lead to a change in behaviour and better decision making. Therefore, it is important to identify and work on common values and then mobilise for action. People are ready to take an action even not having sufficient knowledge and being "ocean literate" if their values are touched.
- Literacy is nice but it is first step. Values do not lead to behaviour, there are much more that leads to behaviour, like emotions, collective responsibilities, social norms.
- Cognitive dissonance when people deny knowledge because it is too painful to accept is another aspect shall be also considered in the context of ocean literacy. It is important to address such type of people by developing different communication strategies. Such people are also among the politicians who make the decisions impacting the environment.
- Another challenge is how to address a group of people who would react as follows: *"nice knowledge, I believe you, but I am more comfortable, and I am lazy to change behaviour*". Probably this issue needs to be another by another project.

- Critical reading ability also becomes actual factor impacting people's view and knowledge in the times when wide range of information is available and spread over different media and social networks.

Identification of actors & value chains

- The value chain approach is recognised as suitable to address the issues of concern. It is very important to elaborate on how exactly to identify which actor is the right one in the value chain to target and what message needs to be given. There are a lot of actors and value chains and overlaps within value chains. The ResponSEAble team has interviewed key actors about the key stories, about the available information and thus needs for information have been identified.
- It is suggested to investigate alternative value chains, making them simpler by activating shorter and direct links. For example, direct consumer purchases from fisherman; fisherman-market links. This simpler approach might help to reinforce "connections' between actors which seems to be missing.
- The value chain approach provides more systematic view to demonstrate that solutions can be provided by others than those who create direct pressure on environment. Therefore, it is important to identify the full spectrum of the actors.
- Consumers as one of the key actors who could contribute to reducing pressure by influencing the retail and whole trade. The project has identified them as main target group and aims to work out the right information that consumers can make environmental friendly choices. It is important to equip a consumer with right questions to be asked or answered before he/she makes a purchase.

Session 2: Ocean Literacy, Science and Governance – How literate are we in general?

Awareness of policy makers, use of scientific knowledge and readiness to act of stakeholders - 40 years contributing to Baltic Sea literacy by HELCOM

Marianne Wenning, EU Chairperson of HELCOM

As the EU chair of HELCOM, Ms. Wenning pointed out that her view on marine issues is broader than the current role is to coordinate and keep dialogue among all contracting parties of HELCOM on behalf of the EU. The observations from the process show that there is awareness among politicians in the respective domain - environment. We have a number of policy documents, including Baltic Sea action plan to be implemented by 2021 and ministerial declarations.

In the frame of HELCOM, ministerial meetings are taking place once in four year, next one to be held in 2018. In February, 2017 a meeting to discuss the actual issues to be brought for ministers for their attention was discussed by high level officials from the contracting parties. They discussed actual issues to be included in the agenda of ministers. It shows that in addition to the action plan a few new issues emerged: marine litter, invasive species, noise, etc. HELCOM also looks at SDG and the potential of establishing closer links and synergies between global processes and the Baltic Sea Action Plan. Policy makers are aware of HELCOM being able to provide significant input to the global processes of SDG. The current preparatory process of the ministerial meeting indicates that commitment to strengthen the implementation of the Baltic Sea Action Plan will be achieved. Eutrophication is really one of the issues that HELCOM considers still important to be tackled. Other sectors, domains and their different policy makers are not sufficiently strong towards environmental policy! This needs to be strengthened because environmental issues can be solved only if all sectors cooperate together. For example, Maritime Spatial Planning is a process which provides a new opportunity to coordinate different development interest and sectors in the Baltic Sea.

Ms. Wenning informed on the use of scientific knowledge in the frame of HELCOM. The 1st holistic assessment (HOLAS) was prepared in 2010 to show the status of the Baltic Sea based on scientific knowledge and available monitoring data and information. Now the 2nd edition is shortly to be published, addressing the period 2010-2015 (and, if possible, 2016). This Report **serves as an input**

to raise awareness of policy makers by informing and supporting debates on what policy action shall follow. The Report will contain some issues on cost benefit analysis. The work on HOLAS has been a complex process and it can be stated that the main areas of the BSAP have been assessed based on best available data in the scientific community. There are still data gaps and uncertainties and we see that most probably the full understanding of the problem will not be achieved, but we can understand the status of the Baltic Sea over the times. So, we can compare different periods and trends. The Baltic Sea has achieved much more than other Seas and regions. Ms. Wenning stressed that the scientific knowledge in many areas is sufficient to take policy actions.

The readiness to act of stakeholders depends on levels where we want people to act. Policy makers are ready to act if they have very hard figures. The need not only environmental and health data, but also cost benefit analyses to be able (and willing) to take decisions.

HELCOM works with industrial stakeholders, too, - fishermen, farmers – and currently intensifies the communication, involving them in different projects and technical discussions to understand the issues, facts and impacts of the sectors. However, the cooperation very much relies on the willingness of the sector. If the sector sees that environmental issue also impacts their economic interests, then they are more prepared to come with solutions.

Finally, Ms. Wenning highlighted the importance of the local level: there is a need also for bottom-up interest in addressing the issues. Implementation always depends on people on the ground where measures are taken. The understanding of issues is very important to successfully achieve our common objectives.

HELCOM tries to adjust its Communication Strategy to bring scientific knowledge out that it can be used by different organisations and also journalists. Journalists needs to be a part of the daily life. It needs to come as a routine to work with journalists.

Discussion

- HELCOM is the convention on the protection of the environment. The parties work to promote best available technologies; promoting ecosystem approach in different sectors. However, HELCOM does not have power to directly impact sectors of economy. The key issue is the right communication that leads sectors to act better to have less impact on water.
- The HELCOM hot spot programme has been a successful approach. In the frame of that, Poland has agreed that they need to clean up their hot spots with waste water treatment. HELCOM has discussed on how agriculture could be more sustainable, to reduce the impacts on the Baltic Sea. The new approach is that benefits shall be demonstrated by side costs of the implementation.
- The Baltic sea is located down-stream while economic activities are upstream – this means that eutrophication of the Baltic Sea does not directly affect economic operators up-stream. The economic effects due to lower environmental status will not be on farmers as eutrophication of the Sea will not impact them up-stream. There needs to be clearer communication about the costs-benefits of the reduction of eutrophication.

13 years of fascination in maritime research – the German Youth Competition „Research at Sea“
Frank Schweikert, German Marine Foundation
Mr. Schweikert shared his and his organisation's experience in communicating on ocean issues, including broadcasting live on eutrophication effects. The educational, research and communication work is performed from a sailing boat ("ALDEBARAN") since 1992. The boat is accommodating scientists and journalists that can see the research work, get closer to environment and can have more in-depth reporting and communication with society on the issues of concern.

The main milestones of the work, the Marine Research & Broadcast programme was presented as well as some major project.
Since 2005 Youth competition „Research at Sea“is implemented. Young people can study environmental issues including practical exercises for several days using boat as research station.
Mr. Schweikert emphasized that electronic media is very effective to communicate nowadays. Own specific story lines are also produced and delivered to TV channels, however, this is very expensive.
He also introduced the German Ocean Foundation that was established in 2015. A conclusion from the previous work was that a regular dialogue between scientific community and society needs to be maintained. There are also many ministries and stakeholders are related to maritime issues to be discussed for better decision making. To ensure that the Foundation was established.
Finally, Mr. Schweikert emphasized that the main target is to tell to the society that we live in democracy to ask politicians what they will do exactly for oceans; which decisions they will take on financial markets and others to save the oceans.

Discussion

- Due to rapid change in technologies, gadgets and new tools for communication different approaches and ways of communication are needed.
- The young generation today puts attention to different issues than earlier generations: e.g. plastic in oceans, climate change.
- There is a need to have access to TV and for that (a lot of) money is needed to ensure broadcasting to a wider audience. It would be good to set the requirement to have certain slots for environmental education on TV channels.
- A lot happens on internet which is a far cheaper communication media. However, to communicate about marine environment one needs impressive images from marine environment which is more expensive to produce compared to typical documentary about a person.

H. Fammler informed that a film context will be organised within ResponSEAble project, thus it will give opportunity to create new products. Additionally, next Düsseldorf international boat fair could be used to present ResponSEAble project and it’s materials.

Uncertainty communication in science for policy/science for governance
Dorothy Dankel, University of Bergen
The presentation was plaid via an internet platform as Ms. Dankel could not attend the event. She talked about the relation of science to ocean literacy – giving facts and information or to inspire by giving more emotional information. Therefore, it is important to discuss how science has been contributing to the communication on eutrophication; where are the actual trigger points to enact the action on eutrophication.
Discussion

- Eutrophication is difficult to communicate emotionally compared to other environmental issues such as plastic waste. Additionally, the eutrophication problem has reduced although the good status is not achieved for the marine ecosystem. The problems in the sea are getting more remote and thus not so much visible and not to the mind of people. As result, a part of society did not experience large algae blooms in recent years – which makes it much more difficult to communicate the problem.
- Another perspective is that through years people have adjusted to live with algae blooms; the blooming phenomena is already excepted by the society as they have got used to that and do not know how it is without eutrophication effects. This is also reflected by media who talks not about the human activities and pressure that caused the algae blooms, but rather about warm weather fostering the process.
- The interviews carried out by the project team show that the term “eutrophication” is not known, but people have heard that the status of the Baltic Sea is impacted by

eutrophication. The word has been given by scientists who wanted to describe the process in one word. But the word is rather sophisticated for layman.

- The shift of the perception is an issue of the particular region. Currently we manage on scientific approach, we manage to look back to the past, and setting the politically, socially accepted reduction targets.

Session 3: How literate are we on eutrophication?

The Eutrophication key story in the ResponSEAble approach: a thorough analysis

Laura Remmelgas, BEF Estonia & Tamer Fawzy, BEF Germany

L. Remmelgas gave a brief overview on current status of the agricultural sector in the Baltic Sea region which is characterised by trends of enlarging farm size; almost equal shares between crop and animal production; however the sector is influenced by global market as animal feed is imported while other products e.g.(dairy) is exported.

In order to characterise key actors, main activities related to agro-food sector were identified at first. All potential actors were listed. Based on literature the actors where characterised by the following features: Influence on activities linked to pressure (causing a direct or indirect pressure on the Baltic Sea); impact on other key actors; independence; feasibility of behaviour change. The literature findings are validated by carrying out interviews.

As result four key actors across the value chain were identified to be addressed with ocean literacy communications by the project:

1) Farmers cause direct pressure but are highly influenced by the value chain. They are mainly influenced by wholesale and retail. Famers recognise that consumer choices cannot really influence the wholesale and retail. Farmers are a sensitive target group as they have a lot on stake economically and are exposed to fluctuations on global markets.
2) Wholesale is a very important link across the value chain. The actors are centralised, having a strong bargaining power, stepping into food production by creating own labels and demands for the food producers. The sector is making the most money of the whole value chain; its driven by profit and not by public interests or protection of environment.
3) Consumers – the analysis shows a change towards higher awareness, higher share of organic products are purchased, local dimension is getting more important for supporting local community. Organic food consumption is higher in those countries where people spend less on food.
4) Decision makers – they are operating at multilevel governance. There is a position among national stakeholders that they cannot influence as most of the decisions are taken on EU level.

Discussion

- There is an observation from other studies in the region where farmers have been interviewed that they state being powerless to solve the problem or influence decision making. Although they are aware on the environmental issues and would be willing to contribute to improvement. Farmers in the Baltic States are strongly linked to the existing markets (global ones) and do not seem to be so flexible to change their trade habits. Therefore direct marketing from farmers might not be so feasible.
- The research indicates that there are very few wholesale and retail players in the Nordic and Baltic countries influencing the flexibility of the food producers and farmers. Moreover, whole sale and retail are getting very integrated now. Retails are studding closely consumer consumption patterns and thus adjust to consumer demands.
- When presenting the scheme on activities and pressure, it is important to include also a link from human consumption to nutrients to the Baltic Sea. Otherwise, people see that the issue concerns farmers and not them as consumers.

T. Fawzy continued by presenting results from his analysis on the information flow on eutrophication in the Baltic Sea region. Information flows creates some clusters, like NGOs; authorities and scientists & educators are sending information to general public. Farmers are receivers of information also from them. It has been found out that there has not been much information produced and sent to address retailers or wholesalers. In information analysis, consumers are defined as a target group when a publication contains information on what to buy, where, etc. It was recognised that much more sophisticated information is available in English then into national languages.
The content analysis shows that there are no information and publications related to the driving forces and eutrophication, main focus has been on activities and pressures as well as on specific components of ecosystem. Information is also very little on impacts on the environment and welfare. These aspects are only mentioned but no specific information. T. Fawzy presented also results of analysis of HELCOM that indicates that they target authorities and scientists.

Discussion and clarifications

- Knowledge related to the key story on eutrophication is described from natural science perspectives. It is very often observed that scientists are looking in rather narrow angle and this might not be so easily up-taken by society. On the other hand eutrophication is a complex issue which is difficult to explain and sell to people.
- Organisations have put mainly their efforts in broadcasting or publishing information while direct communication with stakeholders is much less practiced as it requires more time and also different skills.
- It would be good to differentiate between publishing information which is based on facts and telling a story which involves emotions. We are lacking good stories to tell people in a way that it touches their hearts. The problem needs to be presented very clearly and bold. It can be that the facts are the same while different stories are created for each target group to give specific information for their attention.
- It would be also important to include pictures in colours and these pictures can tell a story. However, the picture can be perceived very differently based on the own background. Cartoons can be also a good mean to create attention.
- Health and nutrition problems do not really seem to be evident in relation to eutrophication. It would be more important to address that eutrophication can impact recreation which is an important part of our life. Having clear water for recreation is valued very high in Nordic countries, where they spent a lot of time at lakes or sea shore, while in other countries it might not be the case as due to Soviet times people were disconnected in particularly from the Baltic Sea which was external border area of Soviet Union.
- The general public shall be a target group of communication and information in particularly when politicians are not implementing the right policies or insufficiently acting. Enforcement is lacking towards reducing eutrophication. There is a need for an emotional story, also facts underlining it, and to propose solution or action which can be implemented by an individual.
- There is a need for stronger cooperation between NGOs, activities and scientists. A Platform for communication on global level is set-up, but perhaps this approach would be also valuable at local or regional levels. NGOs need facts to justify the story what they are telling.

Behaviour change of the society with regard to meat eating – a solution for mitigating eutrophication? Is knowledge enough?

Prof. Susanne Stoll-Kleemann, University of Greifswald

S. Stoll-Kleemann presented her research results in particularly characterising barriers and opportunities for changing (meat eating) behaviour. Different factors (internal and external) and

their influence have been examined. Knowledge skills, values and attitudes play an important role in consumption patterns. Additionally, cognitive dissonance when people deny the knowledge and base their behaviour on emotions also is very essential factor. External factors like infrastructure, subsidies, market concentration also are important. Even if a person would be willing and ready to change meat consumption, it might be that this is not feasible due to the external influences.
In the research work barriers and opportunities were identified with regard to each factor. Ms. Stoll-Kleemann pointed out that is important to create and promote new social norms to create critical mass in the consumption so that the markets are reacting and changing.

Discussion

- Meat consumption is also heavily debated in Estonian mass media and different opinions are presented to society. Contradicting statements are given by doctors: e.g. that it is not recommended to exclude meat from diet in Northern countries.
- There is a need to show stronger link between eutrophication and eating/not eating meat products. Perhaps the link is not so strong to be the right argument for changing consumption habits. For layman, health arguments are very often more stronger that environmental protection needs.

The CONSUME project: guidance for less meat eating by WWF as answer on the eutrophication issue

Stella Höynälänmaa, WWF Finland

S. Höynälänmaa introduced the work of WWF Finland to create a Meat Guide that aims at influencing daily choices. At first WWF created a sea food guide which is already used by 25% of Finnish inhabitants (survey). When developing the Meat Guide, WWF experts discussed with meat producers and retailers to come up with feasible proposals and recommendations. The motto "*less and better*" is used to promote a change of the consumption patterns. It is intended that such guide will be produced for other countries around the Baltic Sea, Sweden and Germany are participating in the project, too.
The success of the guide is evaluated in interviews and surveys among Finnish people. Additionally, media hits, statistics are collected. When working on the guide the team of the WWF cooperates also with other NGOs, particularly with very active animal right protection groups. In cooperation with farmers, WWF tries to convince farmers to practice livestock on natural pastures and organic farming.

Direct payments from the CAP and their impact on eutrophication of the Baltic Sea

Elina Kollate, Pasaules Dabas Fonds Latvia/Alex Lotman, Estonian Fund for Nature

E. Kolate presented results from a research on the direct payments from the EU Common Agricultural Policy (CAP) and its influence on the nitrogen amounts emitted to the sea. The study shows that CAP direct payments appear to contribute to N surplus in Estonia and Latvia and therefore more serious intervention is needed. Otherwise it leads to the situation that subsidises increases eutrophication.

Discussion:

- The impact of the direct payments and the graphs showed raised resistence of the experts – especially D. Collentine, an economist from Swedish Agriculture University opposed the findings of the Estonian/Latvian study. This issue will have to be disputed after the seminar.
- HELCOM Agri-group is bringing some good examples; to share experiences; to show solutions how to organise fertilisers use to avoid any surplus. This information and guidance needs further dissemination.

The EU Strategy for the Baltic Sea Region addressing eutrophication – PA NUTRI fostering policy implementation – a wrap-up of successes and gaps, ideas for future work

Sanni Turunen, EUSBSR PA NUTRI coordinator, Ministry of Environment, Finland
S. Turunen introduced herself as a person coordinating Baltic Sea regional activities for the policy area NUTRI (PA NUTRI), hosted by the Finnish Ministry of the Environment. She briefly explained the EU Baltic Sea strategy established by European Commission in 2009. The Strategy is a planning document for EU countries; countries also cooperate with Russia, Belarus and Norway. The overall goal is to find solutions for common challenges of the region.

The PA NUTRI is related to the policy objective "save the sea". The main aim is to reduce nutrient levels to acceptable levels. The target is based on best available scientific knowledge, but the target is made by political decision. The countries have committed to achieve the proposed target. The ultimate goal is the good status of marine environment (also accepted with the Marine Strategy framework Directive and Water Framework Directive). All countries in the Baltic Sea area are committed on political level to reduce nutrient input levels in the sea. The PA NUTRI acts as a tool to support countries to work across countries, across sector borders, at multi-level form. The results from the actions and projects shall be brought back to the policy level. PA NUTRI works very closely with HELCOM.

The PA NUTRI has set some actions for the EU Strategy for the Baltic Sea, Action Plan. The actions are implemented via flagships – projects or process. There are many actors working in the region working to save the sea but the goals have not yet been reached. Nevertheless, the loads are reduced and the status is improving. Due to climate change we might not see the result so soon, therefore, actors need to be involved even more.

S. Turunen brought up **some ideas for future work with agriculture and consumers**. The key issue still is on how do we reach the right target groups on policy and implementation level; how to promote the implementation of solutions and actions by different sectors. It would be also useful to receive recommendations on how PA NUTRI could work better to strengthen the implementation of the Action Plan.

Annex 2. Regional workshop report from the Black Sea

The workshop was organized in the Romanian Marine Research Institute, Constanta headquarter on 27/03/2017.

The workshop is co-organised and hosted with the help of Danube Delta National Institute for Research and Development, Tulcea, Romania and Romanian Marine Research Institute, Constanta, Romania.

The workshop was attended by 20-25 experts, stakeholders and decision-makers of different Black Sea countries and networks, such as: marine experts; sector experts & professionals; policy makers, knowledge brokers; literacy and education professionals.

The main objectives of the workshop were:

1. To review collectively existing ocean knowledge and ocean literacy initiatives *at the regional sea level*;
2. To investigate (national, thematic, target group focused) awareness raising initiatives that are currently proposed (including activities proposed under the first cycle of the MSFD) in the Region;
3. To identify and prioritize the main challenges and constraints faced by ocean literacy initiatives in the regional Sea.

Starting from the broad perspective of sustainable management of the Black Sea, the workshop focused in particular on the next **key stories identified by ResponSEAble for the Black Sea region**:

- Sustainable coastal tourism **;**
- Eutrophication
- Addressing the issue of invasive species.
- The concept of microplastics

The outputs of the workshop helped identifying possible ways forward for enhancing the effectiveness of ocean literacy. It will guide the development of recommendations for useful and

effective ocean literacy strategy for the Black Sea Region, to be discussed during a second regional workshop.

The key questions addressed

The workshop more specifically addressed the following key questions:

1. Introduction: what are the main challenges for a sustainable management of the Mediterranean Sea? And what are the options for solving these challenges?
2. What are initiatives for educating, informing and raising awareness raising awareness on human and ocean relationship? And what are the main challenges they face?
3. What are the main issues and constraints faced today for effective and useful ocean literacy in the regional sea?

It will combine presentations in plenary of existing (knowledge, knowledge transfer, literacy) initiatives and working sessions in smaller groups.

Agenda

Programme		Speakers
08:30-09:00	Registration & coffee	
09:00-09:15	Why this workshop?	**Iulian NICHERSU**
09:15-09:30	Tour de table	
09:30-09:45	**Effective Communication about the state of the Ocean - how do we change things? Key note on Ocean literacy?**	**Iulian NICHERSU/ Olga Mashkina**
09:45-10:00	What is **ResponSEAble approach?**	**Iulian NICHERSU/ Olga Mashkina**
10:00-11:00	**Our Black Sea:** what are the main problems/issues and how these are communicated? (What is being communicated to whom and what and what is missing?) Experiences from different organizations	**Mamuka Gvilava Martha Papathanassiou Dykyi Evgen**
11:00-11:30	Coffee break	
11:30-13:30	**Parallel groups**: (1)sustainable tourism and coastal development + microplastics (2)Eutrophication and invasive species	**Open Discussions**
13:30-14:30	Lunch	
14:30-15:00	Reporting from 2 parallel groups	
15:00-16:00	Other experiences from media projects, NGO, interest groups - followed by discussion how to assess effectiveness?	
16:00-16:30	Coffee break	
16:30-17:00	Moderated discussion on how to assess effectiveness? What do we need to know in the context of the Black Sea?	
17:00-17:30	Share outcomes and impressions of the workshop	
17:30-18:00	Wrap up of the workshop and closure	

List of participants

Mihaela Mirea	Mare Nostrum NGO	Romania
Martha Papathanassiou	HCMR	Greece
Mariia Pavloska	SCES	Ukraine
Mariana Golumbeanu	NIMRD Grigore Antipa	Romania
Alma Elena Alexandrov	Alma Tour Operator, Constanta	Romania
Angelica Paiu	Mare Nostrum NGO	Romania
Mamuka GVILAVA	ICZM National Focal Point	Georgia
Marian MIERLA	DDNI Tulcea	Romania
Eugenia MARIN	DDNI Tulcea	Romania
Cristian TRIFANOV	DDNI Tulcea	Romania
Carmen BUCOVALĂ	"Ovidius" Highschool	Romania
Eugen DYKYI	SCES	Ukraine
Magda NENCIU	NIMRD Grigore Antipa	Romania
Elena BIȘINICU	NIMRD Grigore Antipa	Romania
Marian Paiu	Mare Nostrum NGO	Romania
Angelica Curlisca	Natural Sciences Museum, Constanta	Romania
Răzvan POPESCU MIRCENI	S.E.O.P.M.M. OCEANIC-CLUB Constanța	Romania
Florentina SELA	DDNI Tulcea	Romania
Iulian NICHERSU	DDNI Tulcea	Romania
George TIGANOV	DDNI Tulcea	Romania

Main highlights of the workshop

For review existing OL to enable and enhance best practices from Black Sea Region 5 Presentations were made which respond to:

- → **What should we share as "knowledge" (components, causal relationships,...)?**
  Maritime and Coastal Issues
- → **What should we prioritize?**
  Acting on maritime and coastal issues in the Black Sea region:

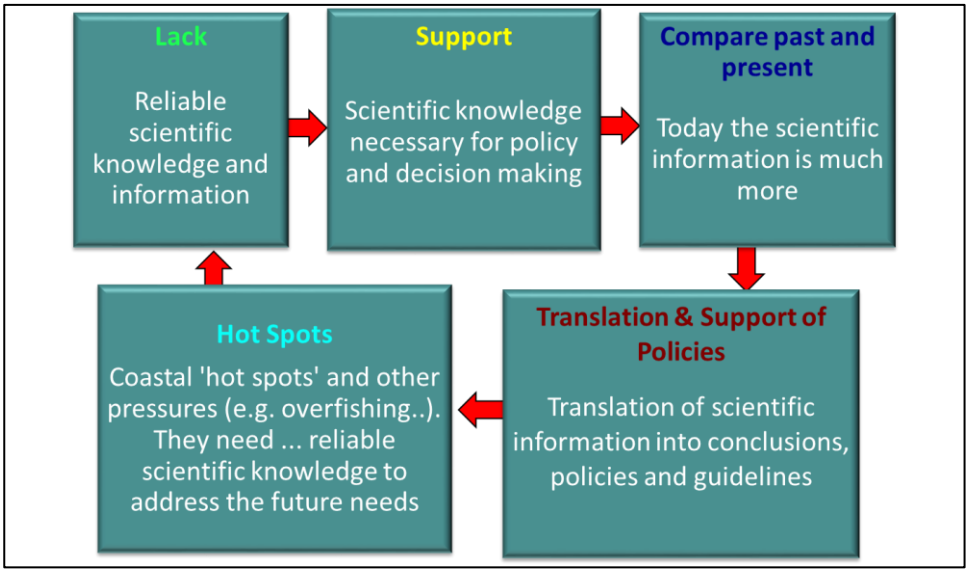
- Eutrophication
- Loss of Coastal and seabed habitats
- Pollution and marine/beach litter
- Coastal sensitivities to oil spills

- Operational/illegal spills along ,aritime routes
- Overfishing and decline in living marine resources
- Need for coastal and marine conservation

→ **Which gaps do exist in knowledge?**

- How can we be more ResponSEAble to the Black Sea Pressures on the marine environment....
- What do we do?
- Harmonization of marine monitoring procedures in Black Sea Region with the requirements of MFSD and WFD
- To develop the set of monitoring recommendations and schemes as done in MISIS project
- Comprehensive research program of Black Sea environmental status

Martha Papathanassiou (HCMR/SeaChange project) presented the Main pressures:



EMBLAS project (http://emblasproject.org/archives/1702)

- Major aim: harmonization of marine monitoring procedures in Ukraine, Georgia and Russia with the requirements of MFSD and WFD
- To develop the set of monitoring recommendations and schemes as done in MISIS project
- Comprehensive research program of Black Sea environmental status

INTELLIGENT OCEANOGRAPHICALLY-BASED SHORT-TERM FISHERY FORECASTING APPLICATIONS

Dr. Murat DAĞTEKİN, Central Fisheries Research Institute

NORTH/SOUTH CONTRAST

- The Black Sea region is experiencing increasing pressures mainly due to population increase, urbanization and growth in agriculture, fisheries, and industry.
- As it is essential for the national economy, competition for its resources is growing, threatening to destruct the functional integrity of the coastal resource system. The coast is already subject to erosion, water pollution, decline of renewable resources, loss of biological diversity, wetlands losses and destruction of landscape. The need to deal in the future with the impacts of climate change in combination with finding adaptive responses is also an essential issue.

Think Tank Debates. The Synetics method with 2 groups organized on 4 Key Stories was used.

WORK GROUP 1– Sustainable tourism and coastal development, microplastics

Questions to respond: *What are the mains constraints and challenges faced by ocean literacy initiatives in the Black Sea region related to sustainable tourism and coastal development, microplastics?*

List of main constraints and measures identified for **coastal development and sustainable tourism, microplastics**:

Constraint	**WASTE MANAGEMENT**
Topic	**Sustainable tourism, Coastal development**
Description	This constraint was mentioned related especially to the tourism development, waste being generated by the objects of tourism infrastructure and facilities (sewage, waste water plants, etc.).
Proposed measures	Integrated waste management; selective waste collection; reduce the amount of waste.
Constraint	**UNEQUAL TOURISM DEVELOPMENT**
Topic	**Coastal development, Sustainable tourism**
Description	There are differences in touristic development areas, some of them are highly developed meanwhile others with the same potential are less developed. Also, was mentioned the vertical density development and tall touristic buildings which lead to changes in coastal landscape.
Proposed measures	Improvement of legislation framework or adequate mechanisms in order to enforce policies which are not compulsory, but more as recommendations.
Constraint	**MARINE LITTER**
Topic	**Coastal development**
Description	All participants agreed that marine litter is one of the main threats of marine environment, harming the health of ecosystems.
Proposed measures	Need of new policies for reducing marine litter and changing attitudes and practices among consumers. Increase public awareness and introduce environmental education curricula. Waste prevention and better waste management on land.
Constraint	**PARTICIPATION WITH STAKEHOLDERS**
Topic	**Coastal development, Sustainable tourism**
Description	For the Black Sea region was stated that there is a lack of an effective participation of citizens with stakeholders, especially in local governments.
Proposed measures	Taking actions and getting more involved in public debates, especially at local level.
Constraint	**LACK OF EDUCATION AND AWARNESS**
Topic	**Coastal development, Sustainable tourism**
Description	All participants agreed that there is an obvious lack of education in the effort of environmental low and of getting involved in decision making process.
Proposed measures	Improve and strength the efforts of education and raise awareness in changing attitudes and practices related to environment. One solution would be to create friendly user websites because some people do not have the necessary environmental knowledge.
Constraint	**LACK OF ENFORCEMENT OF POLICIES**
Topic	**Coastal development, Tourism development**
Description	Lack of marine spatial planning enhances the pressure exerted by tourism on natural resources and environment. There was mentioned an ineffective governance and inadequate reinforcement mechanisms.
Proposed measures	Improvement of legislation framework or adequate mechanisms in order to enforce policies which are not compulsory, but more as recommendations.
Constraint	**INDUSTRY**

Topic	**Coastal development, Sustainable tourism**
Description	The participants stated that there are different types of industry which interfere and affect the tourism development.
Proposed measures	There is a need of choosing between sectors of activity (types of industry).
Constraint	**TRANSPORTATION IN TOURISM**
Topic	**Sustainable tourism**
Description	Uncontrolled transportation may threat biodiversity of the area where there is tourism activity, and puts pressure on habitats and different species and can lead to impact such as natural habitat loss, pressure on endangered species, pollution and discharges into to sea, land solid waste.
Proposed measures	Improve the control of tourism transportation in order to reduce the environmental impact.
Constraint	**LACK OF AN INTEGRATED WASTE MANAGEMENT**
Topic	**Microplastics**
Description	Were identified the sources of this important threat for Black Sea region, such as household waste, transport, shipping, fisheries and industries (chemical, cosmetics, /detergents, textiles etc.)., which products by disintegration fragment in smaller particles which are more difficult to monitor.
Proposed measures	Prevent and improve waste management plastics, changing the chemical composition of products with less harmful ones or finding alternatives, develop awareness among stakeholders and consumers, enhance voluntary commitment, find best practices, improve legislation framework.
Constraint	**LACK OF MONITORING AND CLEANING – UP OPERATIONS**
Topic	**Microplastics**
Description	In order to capture a better image of the microplastics' status in the Black Sea region there is an evident necessity of monitoring and cleaning-up activities of microplastics. Was mentioned that there is not a proper control of sea activities, such as: transport or fishing which are the main sources when it comes to microplastics.
Proposed measures	This constraint might be tackled by the measures of best practice: use the other countries' examples for monitoring and cleaning-up activities, based on their lessons learned and also, to develop mechanism and methods for such activities.
Constraint	**LACK OF EDUCATION AND AWARNESS**
Topic	**Microplastics**
Description	The issue of microplastics is not very well known by citizens or even by authorities, hence there is the necessity of receiving more information.
Proposed measures	Getting involved the NGO's, volunteers and other different stakeholders (authorities) in order to increase knowledge about microplastics, how can be prevented and what measures must be taken in order to help reducing in the marine environment, through public awareness campaigns.
Constraint	**LACK OF COMMUNICATION BETWEEN DIFFERENT STAKEHOLDERS**
Topic	**Microplastics**
Description	There is an obvious gap between research and development (as scientific basis for future polices) and political stakeholders, and also the generators of microplastics; gap between citizens and authorities from local, regional, national and international level that could improve or even set up new regulations related to microplastics.
Proposed measures	Financing measures and mechanism to run scientific and regulations' projects to reduce the gap between different stakeholders, from local, regional, national and international level. Organise, on a time chosen basis, public meetings regarding the topic of microplastics for producing new policies for a better control of this issue.

WORK GROUP 2 – Eutrophication and invasive species

Questions to respond: *How alien species (invasive species) and eutrophication affect Black Sea environment?*

Main invasive species identified for Black Sea region:

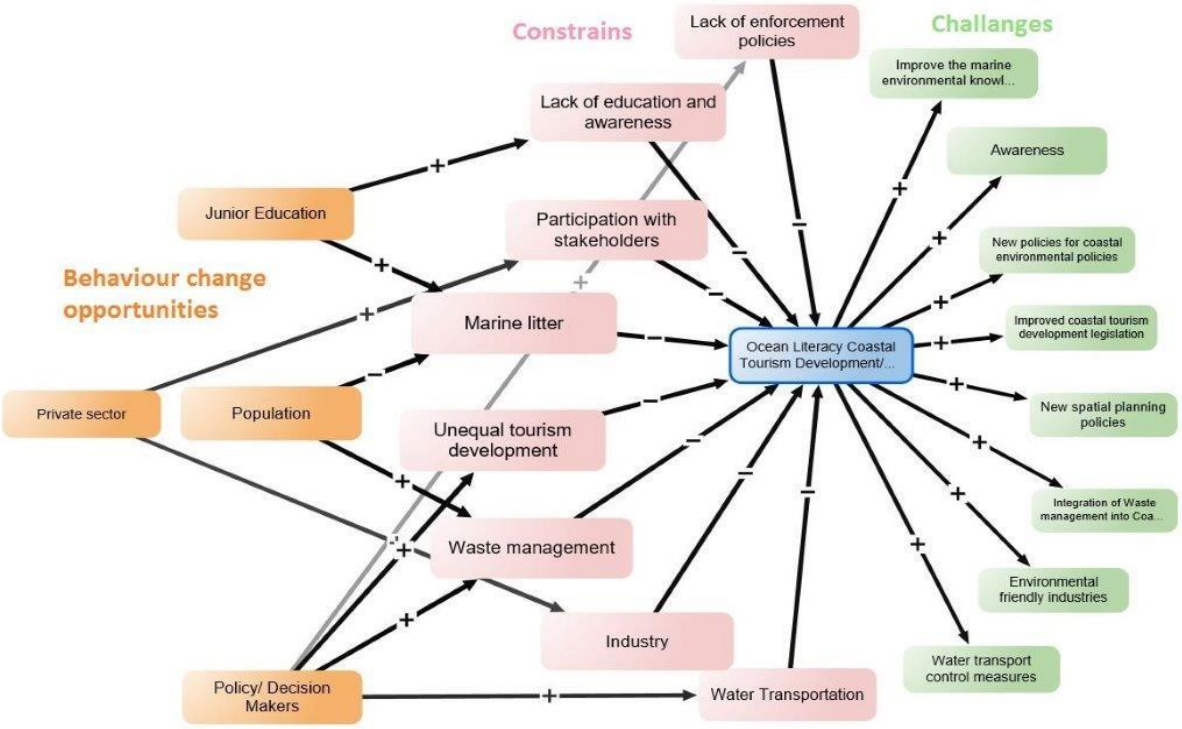
Invasive species	Description
Rapana venosa	The participants stated that this specie is one of the most unwelcomed invaders worldwide and influence other organisms, with a very big impact in habitat. *R. venosa* is an active predator of epifaunal bivalves. Has an important economic and commercial value and became one of the most important exploitable resources in Romanian Black Sea fishery.
Mnemiopsis leidyi	It has a big impact in destroying first development stage of a fish population (larvae and juvenile). Jellyfish influences the hole ecosystem.
Mya arenaria and other crustaceans	These species are consuming fish larvae and have trophic spectrum which is not so diverse, also they don't have high reproductive capacity, don't develop immediately huge population which could balance the system. They don't have negative impact in the environment because they don't have natural enemies.

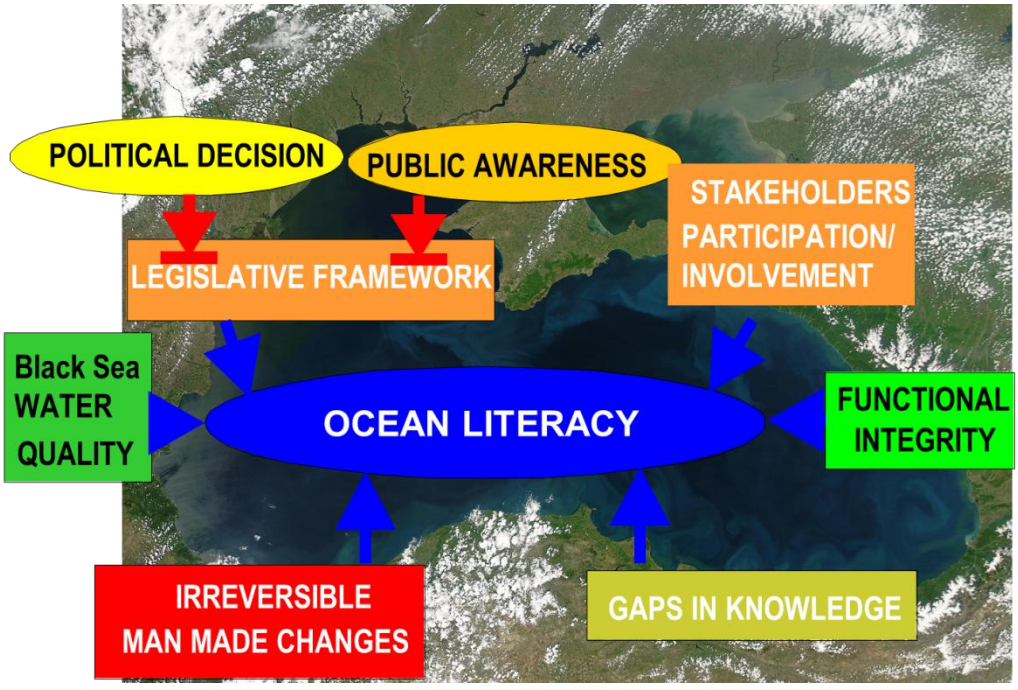
Outputs:

List of main **constraints and measures identified for alien species and eutrophication** in Black Sea region:

Constraint	**LACK OF LEGISLATION**
Topic	**Alien species, eutrophication**
Description	Romania did not attend the International Convention for the Control and Management of Ships Ballast Water & Sediments in 2004. In Romania, there is no legislation regarding invasive species and eutrophication.
Proposed measures	Improving the existing marine environmental regulation and lows.
Constraint	**LACK OF EDUCATION**
Topic	**Alien species, eutrophication**
Description	In Romania, only the sailors have training courses regarding environment and marine water, ballast water. In general, the education among the population is missing.
Proposed measures	Environmental education is a process of an essential dimension in recognition environmental values and defining concepts on aimed at improving the quality of life. This type of education aims at inducing, especially educational institutions, social dynamics on education (knowledge, skills, motivation, values) that stimulate personal development, collaborative and critical approach, and taking responsibilities of the decisions taken maintaining the quality of the marine environment. In the blended learning strong environmental education is a process consisting of individual concepts based on five elements: *awareness* (that people understand what they can make choices as consumers, but assuming that these elections can have multiple environmental implications); *knowledge* (helps to understand the interrelationships the living world, so that people understand how interact with the environment, what problems can arise and how they can be resolved); *involvement* (encourages people to apply knowledge acquired to actively participate in decision to take up their own opinion). All these concepts, environmental education lies the environmental policy, whereby interaction human-environment should aim primarily strengthening the relationship between economic activities and effective management of environmental resources in general and marine ecosystem in particular.
Constraint	**CLIMATE CHANGE**
Topic	**Alien species (invasive species), eutrophication**
Description	Many invasive species came in Black Sea from ocean and Mediterranean Sea. While

	ballast water is essential for safe and efficient modern shipping operations, it may pose serious ecological, economic and health problems due to the multitude of marine species carried in ships' ballast water. The transferred invasive species may survive to establish a reproductive population in the host environment, becoming invasive, out-competing native species and multiplying into pest proportions. Increasing the number of nutrients (eutrophication), nitrogen and phosphorus reaching the sea water due to extensive use of fertilizers in agriculture and discharges wastewater untreated, leads to an increased explosive alga (flowering algae) at certain times of the year. The problem of invasive species in ships' ballast water is largely due to the expanded trade and traffic volume over the last few decades and, since the volumes of seaborne trade continue to increase, the problem may not yet have reached its peak yet. These species are causing enormous damage to biodiversity and the valuable natural riches of the earth upon which we depend. Direct and indirect health effects are becoming increasingly serious and the damage to the environment is often irreversible. Increased explosive algae resulting in massive consumption of oxygen in the water (in some areas result in suffocation and death of the mass of living organisms on the seabed (*Mya arenaria, Mytilus galloprovincialis*, etc.); changes in the populations of marine animals (decrease in the number of plankton species, almost total disappearance of at least the Romanian shore of fish).
Proposed measures	- Introduction of predator species; - To identify and introduce another fish species; - Developing plans and projects meant to protect unique and extended types of natural marine habitats; - Evaluation of legislation to reduce exposure to climate change risk.
Constraint	**LACK OF MONITORING PROGRAMME AND RESEARCH PROJECTS**
Topic	**Alien species, eutrophication**
Description	From biodiversity point of view, all alien species are in danger because these species have completion with local natural fishers. From the fisheries point of view, the local fish species are changed by alien species. There are no projects in order to identify the pollutants, sources of eutrophication; to classify all vector pollutants along the Danube and other rivers. There are no projects to solve the problems caused by agricultural activities along the entire Danube, due to bad land waste management and sewage.
Proposed measures	All countries must monitor their rivers and assess the sources of eutrophication, because eutrophication is an important factor for invasive species. Because there is not a permanent monitoring programme in the Black Sea region, the participants agreed that for the Black Sea there is not, for the moment, a completed list of invasive species and for this reason it must be found the research programme which finance the monitoring network between the Black Sea countries. Cooperation between the research institutions in order to develop a research project for monitoring the invasive species and eutrophication (sources of eutrophication), in order to identify the pollutants etc. Vessels can pay taxes for monitoring the alien species.


Constrains
Challanges
Lack of enforcement policies
Improve the marine environmental knowl...
Lack of education and awareness
Awareness
Junior Education
Participation with stakeholders
New policies for coastal environmental policies
Behaviour change opportunities
Marine litter
Improved coastal tourism development legislation
Ocean Literacy Coastal Tourism Development/...
Private sector
Population
New spatial planning policies
Unequal tourism development
Integration of Waste management into Coa...
Waste management
Environmental friendly industries
Industry
Water transport control measures
Policy/ Decision Makers
Water Transportation


POLITICAL DECISION
PUBLIC AWARENESS
STAKEHOLDERS PARTICIPATION/ INVOLVEMENT
LEGISLATIVE FRAMEWORK
Black Sea WATER QUALITY
OCEAN LITERACY
FUNCTIONAL INTEGRITY
IRREVERSIBLE MAN MADE CHANGES
GAPS IN KNOWLEDGE

Annex 3. Regional workshop report from the Mediterranean Sea

The Mediteranean regional workshop was organized in Cillefranche sur mer on 11-12 of May 2017. The O*bservatoire Océanologique de Villefranche sur mer* (France) kindly offered to host this workshop. ResponSEAble would like to thank the *Observatoire* and specially Carolyn Scheurle (Communication and Outreach Officer) for her helpful assistance in organizing this event.

A total of 42 stakeholders, affiliated to Universities, NGOs, research institutions, business clusters, administrations, companies, museums and local schools were invited to join the workshop. Finally, eight external and five ResponSEAble participants attended the event.

For the Mediterranean Sea, two main challenges that were key to implement Ocean Literacy actions in this regional sea are:

1) The invasive species introduced through ballast waters and fouling incrustations in vessels, and
2) The massive coastal tourism

Therefore, a **workshop focusing on these two issues was proposed with the following objectives:**

- Review OL initiatives currently in place around the invasive species and coastal tourism issues
- Identify possible ways forward to enhance the effectiveness of OL activities
- Issuing recommendations on how to implement cost-effective OL strategies which will help identify priorities for the Work Package 5 (« Developing interactive and mutual learning OL tools »)

Agenda

An agenda was developed to cover these objectives:

13:00-13:30 Registration & coffee
13:30-14:00 Introduction
Welcome to the venue (Director of the Observatoire, CNRS).
Objectives and agenda of the workshop (Angel Borja, AZTI).
Introduction of the project: why do we need a different approach to ocean literacy? (Olga Mashkina, ACTeon).
14:00-15:00 You and ocean literacy
Each attendee will give a 5-7 minutes presentation, presenting the work they do, the work in the organization, interest and work in Ocean Literacy actions (especially those related to alien species and coastal tourism).
15:00-15:15 Session I. Setting the scene
Our Mediterranean Sea: Blue Growth in the Mediterranean Sea and challenges of Good Environmental Status (Ángel Borja, AZTI)
15:15-16:00 *Discussion on:*
a) main challenges for a sustainable management of the Mediterranean
b) options for solving these challenges (What is there? What is missing? What can be done? What are the main constraints?)
16:00-16:30 Coffee break
16:30-16:50 Session II. Introduction on ResponSEAble´s framework
(a) marine issues - building DAPSIWRM (Angel Borja, AZTI),
(b) value chain - searching for the right actors (Maggie Kossida, SEVEN), and
(c) WP3 assessment - identifying the right message and media (Ángel Borja, AZTI)
16:50-18:15 Session III. Discussion
Two sessions for discussion of the framework as in relation to two ResponSEAble Key Stories:
(1) maritime transport and invasive species (Maggie Kossida, SEVEN) and
(2) coastal tourism (Olga Mashkina, ACTeon)
-Who has something at stake? Actors in the problem and Actors in the solutions
-What is already done?
-Who were the targeted actors of the chain?
-Did it have impacts?
-Which are the pre-conditions for success?
18:15-18:20 Wrap up Day 1 and planning for next day

List of participants

Organization	Name
Pôle Mediterranée	Hugo Blanchet
Villefranche sur Mer University	Carolyn Scheurle
SME/freelance Fish Consultant	Johanna Herfaut
Station Biologique de Roscoff (CNRS)	Fabrice Not
UPMC/CNRS	Jean-Olivier Irisson
Centre de Découverte du Monde Marin	Marine Clozza
National Institute for Marine Research and Development "Grigore Antipa"	Laura Boicenco
Aldebaran	Frank Schweikert
ResponSEAble partners	
SEVEN	Maggie Kossida
AZTI	Angel Borja
AZTI	Carolina Alonso
ACTeon	Olga Mashkina
CSP	Eleonora Panto

Main highlights of the workshop

The workshop was designed as a combination of short presentations, individual exercises, participatory dynamics and shared conversations, to make a participative and dynamic debate.

Introduction

The Director Anne Corval of the hosting institution, the Observatoire Océanologique de Villefranche, welcomed the participants to the workshop remarking the relevance of the issues to be discussed in the next days.
This was followed by:

1) a presentation of the objectives of the workshop by Angel Borja (AZTI) and
2) a presentation of ResponSEAble project by Olga Mashkina (Acteon), coordinator of the project.

You and Ocean Literacy

A total of 13 people attended the meeting. A round of short self-presentations followed the introduction, where both stakeholders and members of ResponSEAble Consortium briefly presented their organisations, their specific work and their interest in OL.

The following table summarizes the represented institutions and skills at the workshop:

Organization	Organization type	Skills	OL Projects
Fish Consultant (former Ifremer)	Consultancy	Fisheries Marine Protected Areas Well being	IMPAC conference
CDMM – Centre de Decouvert du Monde Marine	NGO	Education Exhibits Marine sports Campaigns	BIBLIOMER Eco ATTITUDE ECOGESTES Fete de la Science

			Mediterranean Day
Pole Mediterranee		Microplastics Awareness raising	Baseman Simplex InfoPArcs ARTREEFS
CNRS – Centre National de la Recherche Scientifique	Research organization	Education Blue biotechnology Marine Ecology	Planktomania
Observatoire Océanologique de Villefranche	Research organization	Dissemination	Culture-ocean.com Commocean Mon Ocean et Moi Peacetime project Adopt a Float Medites Meditererranee diffusion des techniques et des sciences
NIMRD – National Institute for Marine Research and Development "Grigore Antipa"	Research organization	Operational Oceanography, Marine Environment Protection Area, Marine Living Resources	

After this introduction, the next sessions followed a similar scheme:

1) they were introduced by one or two short talks by ResponSEAble partners to put the topic into context, and
2) then participants would be asked to individually answer some questions related to the topic,
3) which were later shared aloud and discussed among all attendants.

Session I: Setting the scene

Angel Borja (AZTI) presented "Our Mediterranean sea: Blue Growth and challenges for Good Environmental Status", with some key ideas about how to reconcile the Marine Strategy Framework Directive (the environmental directive, with the aim of achieving Good Environmental Status, and the Maritime Spatial Planning Directive (the Blue Growth directive, with the aim to achieve sustainable use of marine resources).The presentation offered a general view of the problem and then focused in the Mediterranean Sea problems, based upon the report: "Piante, C., D. Ody, 2015. Blue Growth in the Mediterranean Sea: the Challenge of Good Environmental Status. MedTrends Project. WWF-France,192 pp.".

After this presentation, an exercise was carried out with the idea of setting people into context and explore if participants identify similar challenges faced by the Mediterranean than those identified and targeted by ResponSEAble. Hence, the discussion focused on:

1) main challenges for a sustainable management of the Mediterranean
2) options for solving these challenges (What can be done? What are the main constraints?)

For this exercise, the main challenges for a sustainable management in the Mediterranean (i.e. oil and gas exploration and exploitation, maritime transport and ports, professional fishing, recreational fishing, marine aquaculture, tourism, renewable energies, seabed mining, coastal

development, land-based pollution sources) (Piante & Ody 2015) were printed out and hung on a wall. After some time for reflection, participants identified in post-its the main issues associated with those challenges and attached to them.

Figure 1: Post-its with similar contents are grouped

Post-its sharing similar contents were clustered together as one idea (Figure 1). Those ideas were then listed on a white board and each participant prioritized them by assigning 1, 2 or 3 gomets according their relevance and discussed why. Finally, the issues were ranked from the highest number of gomets to the lowest (Figure 2).

Figure 2. Issues are voted according to their importance

The main challenges identified as in relation to developing the Blue Growth strategy and reaching the Good Environmental Status in the Mediterranean Sea are presented in the following table:

Table 1: Ranking of the challenges.

CHALLENGE IDENTIFIED	Nº OF GOMETS
Regulation for sustainable fisheries	11
Education/awareness	9
Poor urban planning/infrastructures	8
Marine litter and pollution	6
Effective coastal zone management to avoid destruction of coastal line	6
Declining biodiversity/ habitat destruction	4
Sustainable tourism	4
Changes in local identity	3
Balance economy and protection	3
Ballast water/invasive species	3
Efficient ships	3
Users conflicts	2
Concentration of resources in artificial reefs	2
Visual impact of renewable energies	1
Creating ecological corridors	1
Clean ports	1
Environmental impact	1
Identify right species to grow in aquaculture	1
More research	1

Contributions were a mix of challenges and solutions to challenges. It is worth noting that out of the six key stories covered by ResponSEAble (i.e. sustainable fisheries, microplastics in cosmetics, eutrophication and agriculture, coastal tourism, invasive species from ballast water, renewable energies), five were mentioned more or less directly (all but eutrophication). Since the Mediterranean Sea is in general an oligotrophic sea, the problem of eutrophication is not perceived as important, since only few local areas have these problems (e.g. the Adriatic).

It is remarkable that one of the key stories identified by ResponSEAble for the Mediterranean Sea ranked very low (Invasive species through ballast water, with 3 gomets) while the other one (Coastal tourism) which is related to the challenges “poor urban planning/infrastructures”, “Effective coastal zone management to avoid destruction of coastal line”, and “sustainable tourism” (as identified by participants) accumulated 18 gomets. This might indicate that participants perceive massive tourism as a much more relevant issue for the Mediterranean Sea than invasive species, which in a way may not be surprising, since invasive species are not always directly visible to the human eye. The challenge “Declining biodiversity/habitat destruction” can be related to both key stories.

- Regarding the other ResponSEAble key stories, the: Sustainable Fisheries ranked very high
- Renewable energies ranked very low
- Eutrophication was not mentioned

Session II. Introduction on ResponSEAble’s framework

Ángel Borja (AZTI) and Maggie Kossida (SEVEN) gave three short presentations to explain the "ResponSEAble Framework: What does it take to be ocean literate?", including:

1) how ResponSEAble had selected the key stories with which is working,
2) how the right actors had been targeted in the value chain (using the DAPSI(W)R(M) approach: D: Drivers, A: Activities, P: Pressures, S: changes in the state, I: impacts, W: human wellbeing, R: Response, M: Management) and
3) how Work package 3 had analysed the messages found in the media.

Additionally, the Invasive species and Costal tourism key stories were presented by Maggie Kossida (SEVEN) and Olga Mashkina (ACTeon), respectively, covering the above-mentioned points.
After these presentations, participants were asked to think of initiatives, according to their knowledge and experience, that while not being specifically OL initiatives, they had led them to behavioural change. There were two separate debates in this session: one for the invasive species and another one for coastal tourism (Figure 3).

Many of the contributions received for this exercise were not based on actual initiatives that participants knew of but rather on ideas they thought they could be successful. The main ideas are highlighted in Table 2 below.

Table 2: List of successful or potentially successful initiatives leading to behavioural change, as in relation to the to key stories of interest.

Key story	Initiatives
Invasive species	○ The regulation about ballast water treatment will be implemented so ship owners have no other choice, but other actors such as consumers might be targeted. ○ Tax incentives and subsidies can help implementing new practices ○ Actions that push for legislation ○ An educational tax ○ Introducing a tax for transport or to ship owners in general in order to compensate the loss of ecosystem services their activity represents ○ Disseminate good practices to deal with fouling in a right way ○ Education about the impact of invasive species in the marine ecosystem
Coastal tourism	○ Some missing actors should be considered in the picture: Banks and other funding drivers should be targeted ○ Fishermen have a big impact on how harbors and other things are organized so they should be included in any initiative ○ Initiatives addressed towards spatial planners and city planners ○ Travel agents (Airbnb, booking, tour operators) could sell blue packages: offer discounts/free diving trip if certain behavior is met. ○ Use weather forecast presenters to deliver short messages with environmental content

Session III. Changing behaviour. Which media for which audience

Carolina Alonso (AZTI) presented the communication model followed by ResponSEAble (Who Says What in Which Channel to Whom and with What Effect), with examples applied to the key stories that are being dealt with within the ResponSEAble project.
Then each participant was asked to think of OL initiatives they knew, around the Invasive species and Coastal tourism, and fill in a template giving details of whether these OL actions had had any impact on them, whether they had led to a behaviour change, who the messenger had been and which channel had been used.
Each participant shared aloud their ideas on OL initiatives and a general conversation followed.

The OL initiatives that participants mentioned were more frequently related to:

- Dealing with waste: plastic and other kind of litter, cigarette butts, cleaning the beaches and the underwater bottoms, etc.

- Awareness about invasive species: lionfish, *Caulerpa taxifolia*, trumpetfish, non-indigenous species in general

- Observation (reporting) and awareness about environmental issues

- Need of information about sustainable seafood

In most cases, participants reported that the OL initiatives had actually had an impact on them and, in approximately half of the examples given, the OL initiatives had led to a change in behaviour. The most frequently reported "new behaviour" was:

- To be more aware and careful,
- To stop buying certain products,
- Reporting environmental issues (to NGOs, websites, etc).

The channels to convey the message were:

- Informal conversations with fishermen, friends and instructors from diving centres,
- Fish retailers,

- Exhibitions,
- Leaflets,
- Specialized webs,
- Newspapers,
- Conferences and environmental courses,
- Panels and posters,
- Facebook,
- TV spots,
- Documentaries,
- Radio podcast,
- Videos in Youtube

Session IV. Challenges for behaviour change: cognitive dissonance.

Carolina Alonso (AZTI) presented some key ideas on how the tension between our perceptions, emotions and knowledge (cognitive dissonance) can hinder OL actions and some strategies to overcome this were put forward.

Participants were given a list of behaviour changes that would be desirable to improve the challenge posed by of Invasive species and massive Coastal tourism. They were asked to fill in a template where they identified barriers to implement those behaviour changes and ways to overcome those barriers.

The individual contributions were shared aloud and commented in a general discussion.

Tables 3 and 4 show the type of barriers that each behaviour change might meet according to the participants' opinion. They could vote for more than one barrier for each behaviour so the figures indicate the number of persons that voted positive for each barrier.

Table 3: Barriers to achieve behaviour change with regards to Invasive species. When the any specific barrier was identified by 0-2, 3-4, and 5-7 participants, cells are highlighted in green, yellow and red, respectively, being the red ones those of higher concern.

Invasive species	**Internal barriers**				**External barriers**		
	Cognitive dissonance	**Habit**	**Lack of Knowledge**	**Lifestyle**	**Infrastructure**	**Market concentration**	**Price**
Installation of ballast water treatment systems in all vessels			3		2	1	6
Use of ballast water treatment facilities at port		1	2		5		2
Implementation of "best practices" for fouling cleaning	1	2	2	2	1		2
Use of on shore facilities for fouling cleaning		1	1		5		2
Reduce consumption patterns (reduce transport)	2	3	1	4		2	
Use of MedMIS app (early detection)			5	2			

Implementation of IAS genetic analysis at ports			5		3		4

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.

Table 4: Barriers to achieve behaviour change in with regards to Coastal tourism. When the any specific barrier was identified by 0-2, 3-4, and 5-7 participants, cells are highlighted in green, yellow and red, respectively, being the red ones those of higher concern.

Coastal tourism	**Internal barriers**				**External barriers**		
	Cognitive dissonance	**Habit**	**Lack of Knowledge**	**Lifestyle**	**Infrastructure**	**Market concentration**	**Price**
Setting larger minimal distance for development	1			5	7		2
Reduce water consumption	2	7	2	5		2	1
Consume sustainable seafood	2		4	1		3	6
Reduce waste production	2	5		7	3	1	2
Reduce marine litter	1	3		1	7	1	
Banning/control smoking at beaches	2	6	5	5			1
Oil & foams controls in marinas		1	2		3	1	2
Fouling cleaning control at marinas	1	2	3		4		2
Use sea friendly sun-creams	1	3	4		1	4	3

For massive Coastal tourism, contributions show that the main barriers are related to **lifestyle/ habits and lack of adequate infrastructures.**