

Building Ocean Literacy - The ResponSEABle way

Connecting people to the ocean

Synthesis Workshop of Workpackages 1-3

5-6 April 2017, Jūrmala, Latvia

Report

Authors: Merle Kuris & Laura Rimmelgas, BEF Estonia

Tamer Fawzy & Heidrun Fammler, BEF Germany

Project coordinator:



Project beneficiaries:



Table of Contents

Introduction.....	3
Objectives of the workshop.....	5
Session 1. Introduction to the ResponSEABLE approach to Ocean Literacy	5
What is the advantage/added value of the ResponSEABLE approach?.....	8
Session 2. What is worth knowing about human-ocean relationship?	10
Session 3: Who needs to have the knowledge? Who is the actor?	14
Opportunities in the value chains where behavior change is most likely	18
Session 4. Building ocean literacy through communications	19
Session 5. Is there a specific Blue Growth dimension in literacy?	22
Who needs to be targeted by ocean literacy in a Blue Growth perspective?	24
Session 6. What are the preconditions for behaviour change?.....	25
Session 7. Conclusions and common lessons: moving from knowledge to behaviour change - ideas about effective ocean literacy.	26
Overall Conclusions: Synthesis of WP1-3 of ResponSEABLE	27
Annex 1: Agenda of the Jurmala Dialogue	30
Annex 2. List of presentations and speakers in the Jurmala Dialogue.....	33
Annex 3. List of participants	34

Introduction

To validate the first results of the ResponSEAbLe project among EU stakeholders (presenting our ResponSEAbLe approach and our first findings) an interactive workshop was held in Jurmala in April 2017 – called “Jurmala Dialogue on Ocean Literacy”.

The Jurmala Dialogue brought together people with different backgrounds who discussed the three basic questions of the ResponSEAbLe project:

1. Do people understand their connection to the ocean?
2. How much do they know, and do they have appropriate knowledge in order to act responsibly?
3. How can we encourage citizens to take an interest in the ocean, and to treat it with greater understanding and respect?

We were looking for contributions from those who:

- Work actively with those stakeholders that are depending on the sea and marine ecosystems for their living,
- Have an economic interest in maintaining healthy marine ecosystems through technology development, innovation, supply to industry, etc.,
- Implement policies, strategies and projects to protect marine ecosystems or promote sustainable practices to reduce pollution, protect marine species, halt the destruction of marine habitats, etc.,
- Develop education and other literacy activities to raise awareness about the importance of our oceans to society and promote sustainable practices to ensure healthy marine ecosystems,
- Broadcast about the ocean at any media channel or utilise and visualise knowledge on the ocean for communication and professional, even artistic expression.

At the workshop ca. 40 professionals, stakeholders and policy makers from the marine, socio-economic, literacy and communication communities shared their experience and views.

The workshop was divided into two days and seven sessions:

1. Introduction to the ResponSEAbLe approach to Ocean Literacy
2. What is worth knowing about human-ocean relationship?
3. Who needs to have the knowledge? Who is the actor?
4. Building ocean literacy through communications, awareness raising and other initiatives about the oceans for different audiences
5. Is there a specific Blue Growth dimension in literacy?
6. What are the preconditions for behavior change?
7. Conclusions and common lessons

ResponSEAbLe has been analysing the current state of knowledge around six themes or “key stories” that capture the complex interaction between people and the oceans:

1. Cosmetics and micro-plastics in European seas
2. Sustainable fisheries/sustainable seafood in the Atlantic Ocean
3. Ensuring that mass tourism is sustainable in coastal areas of the Mediterranean and the Black Sea
4. Addressing eutrophication in the Baltic and Black Sea

5. The problem of ballast water and invasive species in the Mediterranean, Baltic and Black Sea
6. Balancing marine ecosystem vulnerabilities and with the potential for Marine Renewable Energy in the Atlantic and North Sea

Using these key stories, the workshop examined

- the current state of our seas and identify activities putting pressure on, and/or benefiting from, marine ecosystems;
- the organization of “value chains” of consumer, retailer or industrial activities that put pressure on marine ecosystems – and the opportunities that might exist within them to do things differently;
- building ocean literacy through communications, awareness raising and other initiatives for different audiences; and
- Blue Growth: What does it mean and how can it be sustainably managed.

The current report describes in detail the topics discussed and the conclusions made at the workshop.

The agenda, the list of participants as well as the list of presentations and speakers can be found in the annexes of the report. The presentations are available on request. Please email Parvina.Samadova@bef-de.org

Objectives of the workshop

ResponSEable Jurmala Dialogue gathered about 40 participants from 13 EU countries and the European Commission. The organisations included environmental NGOs, consultant companies, scientific institutions, representatives of economic sectors, media, and education.

The objectives of the Jurmala Dialogue were introduced by H. Fammler (*Baltic Environmental Forum Germany – BEF DE*) in the opening of the event:

- To validate and get **feedback on the approach of ResponSEable** to knowledge, actors in the value chain and the communication of knowledge;
- To **share EU experiences** on ocean literacy; and
- To contribute to an ongoing EU discourse on how to increase ocean literacy in order to support a positive change in behaviour in favour of a sustainable production and consumption of goods, services and knowledge, while protecting the marine environment.

H. Fammler also introduced the concept and agenda of the event.

Session 1. Introduction to the ResponSEable approach to Ocean Literacy

The aim of Session 1 was to introduce the ResponSEable project and its approach to Ocean Literacy as well as to get feedback on it from the participants. The session was structured around three key notes from the ResponSEable project:

- “Connecting people to their ocean: why do we need a different approach? (*by Olga Mashkina, ACTeon*);
- “What does it take to be “ocean literate”? – The essential elements (introduction to the ResponSEable approach)” (*by Tamer Fawzy, BEF DE*), and
- Introduction of the ResponSEable key stories (*by Kari Synnøve Johansen, GRID-Arendal*).

Key Note 1: Connecting people to their ocean: why do we need a different approach?
Olga Mashkina, ACTeon, France

In her presentation, O. Mashkina explained why we need to have a different approach in awareness raising towards the oceans, what Ocean Literacy is, and how the ResponSEable project is dealing with the issue:

Many people have lost their connection to the sea due to a variety of reasons, such as the globalization of the economy. The different uses of the sea are no longer rooted in local contexts. Together with this loss, also a sense of responsibility decreased in many people. Ways to restore this connection are needed in order to protect the ocean and seize its opportunities responsibly.

The concept of ocean literacy originated in the USA where it aimed at integration of ocean related skills in the k-12 curriculum. It is currently being brought to Europe by two Horizon2020 projects, ResponSEable and Sea Change. Due to diversity of cultures, school systems, languages and seas, the concept cannot be taken over directly but has to be adapted to a European context. The approach ResponSEable has decided to follow, wants to extend the concept from awareness towards responsibility.

What do people need to know to care? Often communicated scientific knowledge focusses on pressing environmental problems. In order to understand the sources of these problems, people also need to know about human activities and the driving forces of these activities. In order to act responsible a general understanding of benefits and opportunities related to the ocean as well as potential solutions to existing problems is needed.

Who can become „ocean literate“? Traditionally children and youth have been targeted by awareness raising activities but this could and should be extended to other groups, e.g. sectors putting pressure on oceans, economic operators in the value chain, policy makers, and society as a

whole. Not just because the groups are in control of any immediate changes, they also shape the future by their influence over business-related and organizational cultures.

Who can contribute to ocean literacy and how? Traditionally scientists produce knowledge (i.e. scientific knowledge) but a wide range of professionals could be involved, e.g. social scientists, economists etc. New technologies, new ways of sharing besides scientific reports, more ways of interactive learning could be used to move to a more dynamic and systemic view of knowledge sharing. Communication specialists as multipliers for other target groups could be involved more frequently.

Key Note 2: What does it take to be “ocean literate”? – The essential elements (introduction to the ResponSEable approach).

Tamer Fawzy (BEF DE)

In his key note, T. Fawzy presented the essential elements of the ResponSEable approach by following the question „What does it take to be ocean literate?“:

In order to approach this question a definition of ocean literacy has to be identified. As ocean literacy is a skill carried by humans, one might as well ask what it means to be ocean literate. In the approach of ResponSEable to be ocean literate means:

1. To understand your influence on the ocean and the ocean’s influence on you.
2. To understand your influence on the ocean as an individual, professional and social being.
3. To be able to communicate responsibilities for the ocean to others

What does it take to be ocean literate? According to T. Fawzy three main factors:

Specific knowledge on the environment and human interactions. ResponSEable identified six challenging environmental pressures for the ocean. Existing knowledge on these key stories, including related economic activities and their context, affected ecosystem components, environmental and welfare impacts, and potential responses was gathered. Subsequently this knowledge was structured along the DAPSIWR¹ framework of the project.

Knowledge on specific actors and their interrelations. The actors related to pressure exerting activities are part of a bigger picture. They are depending on suppliant (upstream) and supplied (downstream) activities Therefore, the way activities are carried out is depending on a wide number of actors related to each other by governance, information or commercial relationships. The project identified the actors that have the biggest potential to reduce pressures through a behaviour change.

The ability to communicate within and between the actor groups. ResponSEable gathered existing communications and analyzed them in terms of senders and receivers, purposes, media types and content. By this pathways and content of communications could be visualized and compared between key stories, regions, countries and actors. Actors were subsequently interviewed to validate the obtained information.

¹ Driver-Activity-Pressure-State-Impact-Welfare-Response



Figure 1: The Knowledge Framework of ResponSEABLE.

Key Note 3: The ResponSEABLE key stories: eutrophication, microplastics, invasive species, marine renewable energy, sustainable fisheries/seafood and coastal development/tourism.

Kari Synnøve Johansen, GRID-Arendal, Norway

K. Synnøve presented the six key stories of ResponSEABLE and explained the process to identify them:

To narrow down the broad scope of ocean-human relationships, ResponSEABLE has decided to deal with the concept of Ocean Literacy through some thematic issues or key stories. 12 top ranking potential key stories were identified based on MSFD descriptors and 6 selection criteria: 1) potential for behaviour change, 2) new or old topic, 3) potential for innovation in media, arts and communications, 4) relevance for different project work areas – from an economic activity perspective, 5) a perception/understanding perspective, 6) relation to certain European regional seas. These 12 key stories were evaluated further against the regional seas programmes and the EU blue growth strategies. Finally, it was decided to include 6 key stories, three of which related to a pressure-based perspective and the other three to blue growth.

Geographic coverage of the key stories:

- The Baltic Sea: Eutrophication and agriculture, Invasive alien species and ballast water
- The Black Sea: Eutrophication and agriculture, Invasive alien species and ballast water
- The Mediterranean Sea: Invasive alien species and ballast water, Coastal tourism
- The North-East Atlantic Sea: Sustainable fisheries
- EU-wide: Marine renewable energy, Microplastic and cosmetics

The key stories are meant to identify gaps in knowledge that need to be filled to advance ocean literacy. They provide an overview of the current state of the oceans with regards to the issue, the connection to economic activities and our perception and understanding of this connection.

Feedback to the ResponSEAbLe approach to Ocean Literacy:

Maris Stulgis, European Commission, DG MARE Unit A1 (Maritime Innovation, Marine Knowledge and Investment)

Maris Stulgis agreed to the ResponSEAbLe approach but also gave a few comments and recommendations. He stated that there are direct bridges between ocean literacy, blue skills and blue growth and stressed that we have to be smarter than ever when it comes to managing oceans and seas because we are in a changing environment.

The basic approach of raising awareness is a right approach, also the goal to change behaviour of people. The creation of information is one of the key aspects, but also a project legacy is important as it ensures that these products will still be used when the project itself is over. Proper communication ways and channels are very important, e.g. how to communicate scientific data to kids. For example talk show format with actors (e.g. Monkey cage, by BBC Radio 4) has proven to be an attractive format for communicating science. Facebook and Twitter are great tools to reach huge amount of stakeholders at the same time. It is important to inspire people to care, consider also individual vs. collective intelligence and make things „differently“ – build up the best practices and use them.

Steve Fletcher, UNEP WCMC (World Conservation Monitoring Centre)

Steve Fletcher expressed his opinion that the marine branch of UNEP dealing with communication and behaviour change topics could definitely use outputs of ResponSEAbLe. He gave some comments on the framing and the purpose of the ResponSEAbLe project.

Framing: Sea-blindness – people do not see the connection to the sea. To overcome it, best sciences (environmental, behaviour sciences etc.) should be used, not only the usual soft approaches (education).

Purpose: Ocean literacy for what? Knowledge is not the same as behaviour change. To achieve behaviour change, we need to understand what motivates people etc.

Important questions for ResponSEAbLe: How to identify effective ocean literacy? Is it only raising people's knowledge or achieving behaviour change? What can this project do?

What is the advantage/added value of the ResponSEAbLe approach?

In a moderated feedback by the plenary participants the added value of the presented approach as well as aspects being challenging, causing doubts or opposition were discussed.

- There is an international agreement between EU and Canada on cooperation on ocean literacy with the aim to make people understand policies. It is important that the two Horizon2020 projects dealing with ocean literacy – Sea Change and ResponSEAbLe – cooperate closely with each other.
- ResponSEAbLe should think how to concretize the measure how to make stakeholders care. It is important to go out, speak with people, train the trainers. Understand different types of stakeholders.
- Knowledge is there and is communicated for ages, in ResponSEAbLe we analyse if we are communicating to right people, right media, how to measure the impact.
- US Ocean Literacy concept has 7 principles, which Sea Change project is working with, based on science. It is a very good framework. Ocean Literacy is a brand name (like Coca Cola) that should not be translated.

- There are many factors impacting behaviour of people. One factor is knowledge deficit: people are behaving badly because they do not know any better way. However, only information is not enough to initiate behaviour change, something needs to happen to make people care. Also mass media can help in this case. People believe only when they see algal blooms or other serious problems. Such cases provide an opportunity to explain what happened and make responsible persons start to think.
- ResponSEable could highlight 1 story and do it as pilot for communication, discuss 1 story more detailed. Pragmatic concept and creativity should be combined.
- It is important to look at the target groups, what info they need and how they could communicate with each other.
- The right knowledge should solve the problems and make people act. It is also important to acknowledge that people will act if they believe that acting makes a difference.
- Acting responsibly means what you do when you care. ResponSEable plans to make different types of products targeting different target groups in the next two years.
- It should be also taken into account that we do not operate in vacuum. Now fishermen need different info than 20 years ago, these differences need to be considered. For example, nowadays fishermen need to go for certification schemes if they want to be successful.
- Sometimes you need to go to your stakeholders and talk to them, for example fishermen might not answer questionnaires about algal blooms sent by e-mail but if you go to harbours and interview them, you can see that they in fact understand the problem.
- The stakeholders to communicate to and the ways for communication should be identified. A good option could be involving kids and parents at the same time – e.g. experiments, to inspire them.
- Framing and looking at far end is important. It is important to know to whom, how and also what to communicate.

Conclusion: ResponSEable Ocean Literacy is knowledge based in two ways: knowledge serves both to design our Ocean Literacy strategy as well as the content for our products. ResponSEable has to move on from the research stage and develop concrete ideas on communication approaches, to make „the computer work“.

Session 2. What is worth knowing about human-ocean relationship?

The aim of this session was to find out what is worth knowing about human-ocean relationship and it was structured around the following presentations:

- “What knowledge is communicated in education and science? (experiences/illustration from Sea Change project)” (by Fiona Crouch, MBA);
- “Illustration of “knowledge and gaps in knowledge” from the ResponSEable key story on microplastics & cosmetics” (by Tamer Fawzy, BEF DE);
- “Promoting citizen behaviour change to reduce marine litter: Insights from MARLISCO for ResponSEable” (by Steve Fletcher & Sabine Pahl, Plymouth University), and
- “Who needs to know what for making Ocean Literate policy?” (by Ivan Conesa Alcolea, European Commission).

What knowledge is communicated in education and science? (experiences/illustration from Sea Change project).

Fiona Crouch, Marine Biological Association MBA (H2020 SeaChange), UK

Fiona Crouch introduced the aims, activities and results of the Sea Change project, including a review of marine formal education, activities building capacity for a ‘Sea Change’, the identification of barriers to teach ocean literacy in schools and Sea Change activities addressing those barriers.

Sea Change (www.seachangeproject.eu) is a Horizon 2020 project aiming at advancing ocean literacy of European citizens through bringing marine issues into school curricula as currently there is not much about oceans in school curricula across Europe.

Sea Change has carried out a review of marine formal education. The recommendations from that include: overcoming barriers, building capacity, prioritising further research, using modern innovative technologies, advocating the right approach and inspiring future initiatives.

To build capacity for a ‘Sea Change’, the project has made direct connections to education policy at a European and national level, is developing guidance for policy makers and ocean literacy materials to be embedded in curricula, enhancing collaboration between different stakeholders and creating a knowledge based website.

The consultation of education stakeholders about barriers to teach ocean literacy in schools showed that the six top barriers were:

1. A lack of understanding of the concept or some of the elements of ocean literacy,
2. Policies and strategies affecting administration and budgets of schools,
3. Barriers relating to engaging students and speaking their language to increase interest and awareness of the ocean,
4. Barriers originating from the formal education sector and the nature of the ocean itself making it difficult to experience or understand
5. Collaboration between different marine education actors, and
6. Barriers related to connections between humans and the ocean, the blue economy.

Impactful and feasible options to overcome barriers include:

- spreading marine topic over curriculum,
- inclusion of ocean literacy subjects in teacher trainings,
- building a personal relationship with the ocean through interactive learning and connecting education with real projects.

Sea Change is addressing barriers through a Blue Schools initiative (that is strong in Portugal); Ocean Literacy Massive Open Online Course (MOOC); Ocean EDGE Resource Database; Marine

modules for FEE; innovative resources such as harmful algal blooms ibook; Citizen Science project CrabWatch and support through EMSEA (European Marine Science Education Association).

EMSEA conference will take place on 7-10 October 2017 in Malta
www.um.edu.mt/events/emsea2017

Discussion:

- Teaching is a lot about facts but new ways of teaching are needed that are not only about transferring facts.
- Why is the aim of the project to „Make a sea change“, and not to „Stop a sea change“?
- The aim is to change the sea for better.

Illustration of “knowledge and gaps in knowledge” from the ResponSEABLE key story on microplastics & cosmetics.

Tamer Fawzy, BEF DE

Tamer Fawzy explained the importance of knowledge and knowledge gaps for the ResponSEABLE approach based on the example of the key story on microplastics and cosmetics:

Microplastic in cosmetics creates only a small part of the problem of microplastics in the ocean but this topic was selected because of its relation to consumers. The problem here is that although we know that there is microplastics in the sea, we do not know how it reacts with the ecosystem. Details on the nature of the environmental pressure and its impacts are missing. However, information communicated to the public often highlights the problem for the ecosystem, thereby withholding actual gaps of knowledge. The general message on the issue can be written as a simple equation: Microplastics in the sea = Big Problem = Don't buy!

In this case, a potential approach towards an increased ocean literacy could be to communicate the need for current research activities (=Knowledge Gaps). As ocean literacy is a concept related to science literacy, there is no reason why the driving forces behind research activities cannot be part of the information. In the matter at hand, the overwhelming existence of microplastics in the sea, and missing knowledge on the actual impacts is a reason for research. At the same time this kind of information can also be used to inform consumers about the problem, even if impacts are unknown. This rationale is also close related to the precautionary principle.



Figure 2: A pointed illustration of the conventional approach to communicate the issue of microplastics in cosmetics to the consumer.

Discussion:

- Communicating the current knowledge is a good starting point to understand the consequences of our buying decisions.
- Banning microplastics in cosmetics is a quite effective measure.
- To change behaviour, people need to care first. In order to care, people need to know about the ocean.
 - That step is missing in communication. For example, there is a lot of communication on the issue in Germany but all is related to one information source. The main information tool is a single brochure for consumers, but to get to this brochure, you need to be interested in the first place to know what to search for.
- It is better to have a careful approach - first to complete the knowledge and then communicate. Depending on a target group there are also differences in communication. When banning microplastics, we should think also about effects of substitutes.
- It depends what sort of topics we apply to ocean literacy but change of law is probably not quite appropriate to address.
- We can inform people that 30-liter drinking water bottles contain toxic Bisphenol A (BPA) but there are no alternatives.
 - This shows how important it is to approach the right target audience.

Promoting citizen behaviour change to reduce marine litter: Insights from MARLISCO for ResponSEable.

Steve Fletcher & Sabine Pahl, Plymouth University, UK

Steve Fletcher introduced the FP7 project MARLISCO (www.marlisco.eu) dealing with awareness raising, evaluation and producing educational tools about marine litter, and gave an overview of the results of the survey of perceptions of stakeholders about different aspects related to marine litter.

The evaluation of what has worked and what has not, showed that psychology is an important tool for reaching target groups. We have to help people control the decisions they make.

MARLISCO carried out a European-wide online survey on perceptions about marine litter, its impacts, social norms and perceived responsibility, competence and motivation of other stakeholders. The results showed that people were recognising marine litter as a problem. People who responded also felt quite high personal responsibility. The perceived personal competence to deal with the problem was slightly lower. Motivation of government and industry, retailers and commercial users was perceived to be very low.

MARLISCO also organised a video contest for children on marine litter issues and evaluated its impact on behaviour of participants. The results show that a behaviour change has taken place. This shows the importance of learning process while making those videos – it was an intervention that changed children’s perceptions and reported behaviour.

MARLISCO has produced a guide „How to Communicate with Stakeholders about Marine Litter“ focussing on behaviour change. The guide is available at <http://www.marlisco.eu/how-to-communicate-with-stakeholders-guide.en.html>.

Discussion:

- Knowledge is supporting the development of ocean literacy. We need knowledge from wide variety of sources: psychology, social science, behavioural science, and we also need to know what knowledge is needed for initiating behaviour change.
- Marine litter should be called human waste in information campaigns to highlight the connection to the human society.
- The effect of any communication is bigger if it is communication in positive sense. The material discarded is too valuable to throw it away. We should include a message on what to do with it. We need to understand different mentalities.
- If there is an important but not enough motivated stakeholder we need to find the right knowledge to motivate him/her. We all have a different understanding what a holistic approach is. A consumer can have a feeling that he cannot capture all the many impacts that he has on the sea, and therefore he/she might not feel motivated to do anything. The advice could be to limit the personal footprint on the overall ecosystem, in which the sea is one component.

Who needs to know what for making Ocean Literate policy?

Ivan Conesa Alcolea, European Commission, DG RESEARCH

Ivan Conesa Alcolea gave an overview on the main EU Blue policies, the Blue Growth strategy, the Galway Statement on Atlantic Ocean Research Alliance (signed by Canada, the European Commission, and the United States in May 2013) and priority areas for cooperation, including ocean literacy. He also informed about Communication Innovation in the Blue Economy and support mechanisms for human resources, to address the gap of skills (Marie Skłodowska-Curie Actions (MSCA) in Horizon 2020, Knowledge Alliances, a new scheme under the Erasmus Programme).

He stressed that the greatest threat to the oceans is ignorance and misperception. There is knowledge but it is not used or taken into account, e.g. in case of fishing quota.

He also pointed out the importance of possibility to participate in local policy making in order to develop ownership of policies among citizens. Public pressure is important to affect behaviour of politicians.

It is also important to think how to reach people who are not interested (e.g. not following specific topics in social media). Using emotions, feelings, amazement about nature etc. might be a way to win the attention of busy people.

"In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we are taught." (Baba Dioum, 1968.)

Discussion:

- Legislation is based on science but sometimes politicians are not making decisions based on knowledge but to get votes.

Session 3: Who needs to have the knowledge? Who is the actor?

Pierre Strosser introduced the session by presenting the leading questions from ResponSEAbLe: Who to target within and around value chains? What are their opportunities for changing behaviour? Who are the Influencers? Which other actor play important roles and why? Is behaviour change reached individually or collectively?

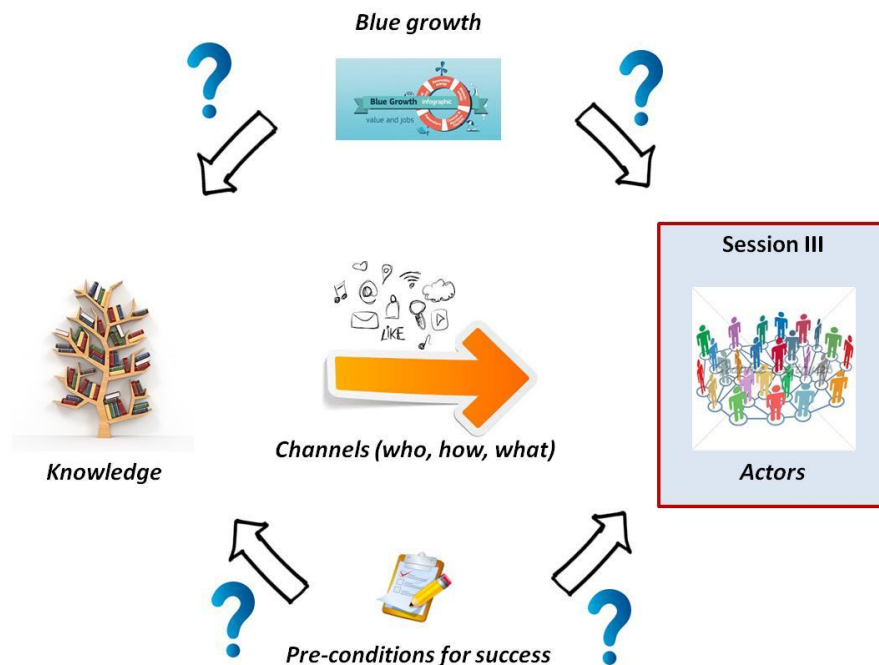


Figure 3: Bridging the gap between knowledge and actors through channels of communication. What Knowledge is needed for a sustainable Blue Growth and what are the pre-conditions for success?

The session was structured around the following presentations:

- “The organization of “value chains” of consumer, retailer and industrial activities that put pressure on marine ecosystems – ResponSEAbLe approach” (by Denis Baily & Joanna Cousinou, University of Western Brittany);
- “Fishermen and consumers – two actors in the value chain” (by Kari Stange, Marine Stewardship Council, Sweden);
- “Actors in the eutrophication and agriculture value chain” (by Laura Remmelgas, BEF Estonia), and
- “On the way to solutions for Marine Litter: learnings and activities of plastics producers” (by Ingo Sartorius, Association “Plastics Europe”).

The organization of “value chains” of consumer, retailer and industrial activities that put pressure on marine ecosystems – ResponSEAbLe approach.

Denis Baily & Joanna Cousinou, University of Western Brittany, France

The presentation introduced the value chain approach used in ResponSEAbLe, its purposes and methodology as well as an illustration of the value chain related to invasive alien species.

The value chain concept comes from the economic theory. The aim of business is to create value, so basically you should know where you create value and where you lose value (i.e. you pass it someone else).

Within the approach of ResponSEAbLe the purposes of value chains are:

1. To identify upstream, downstream and „sidestream“ activities leading to pressures on the environment;
2. To link economic activities and the marine environment: product and pressure perspective to analyse the value chain;
3. To analyse the range of stakeholders and influencers in the value chain and their relationships;
4. To ponder relative importance of different activities in terms of their economic position and influence on the pressure.

Schematic diagrams of actors and activities have been produced for all key stories in of ResponSEAbLe. The value chain analysis includes:

- Economic descriptions of activities influencing the pressures;
- Analytical illustrations of the legislative, technological and social context of the value chain;
- Understanding of actors' role and interrelationships;
- Assessments of the links between activities and environmental pressures to the marine environment;
- Assessments of potential areas of change in behaviour, opportunities and constraints.

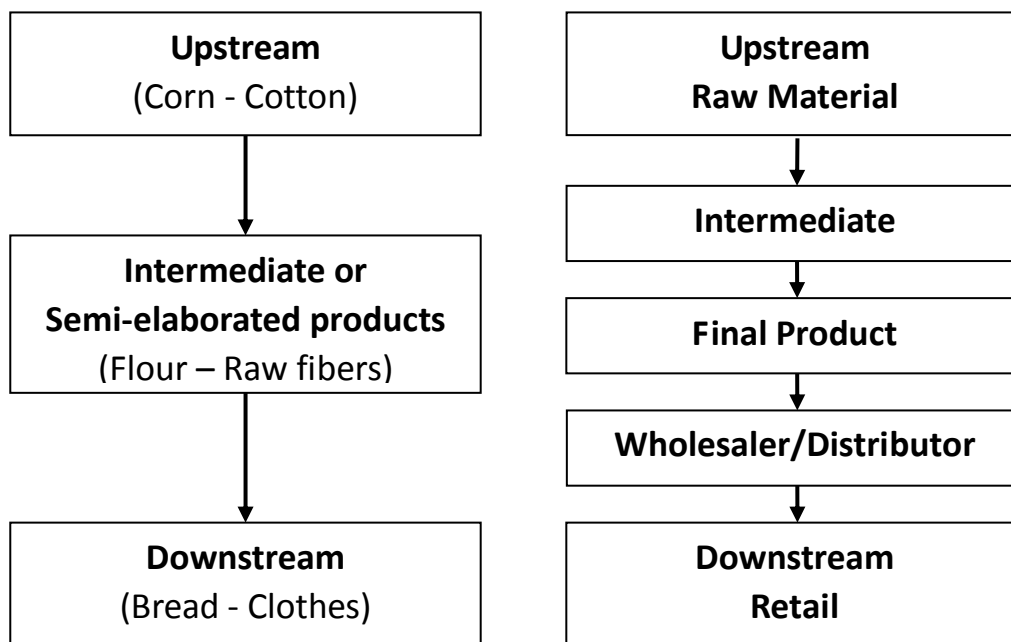


Figure 4: A basic schematic of a value chain.

Pressure is a negative output of human activities, as presented in the value chain related to invasive alien species. As the invasive alien species are transported with ballast water and biofouling, all related activities and actors were identified and their importance and influence on other actors were assessed. The key actors for a positive change appeared to be European/national legislators, ship owners and marine equipment suppliers & manufacturers.

When planning a campaign, these groups of people should be targeted and the relationships between different actors should be used for making the change.

Discussion:

- A bottom up approach was used in a H2020 Sea Change crab action. The decision makers can be emotionally influenced e.g. through involving children (e.g. kids going to the parliament).
- The interviews with ship owners showed that there is no possibility to influence their activities because it costs too much.
- We should be careful, not to have different messages in one campaign, which can be confusing for people. Children are probably not the right target group for a campaign on invasive species.

Actors in the eutrophication and agriculture value chain.

Laura Remmelgas, Baltic Environmental Forum Estonia

Laura Remmelgas presented an analysis carried out in the ResponSEAbLe project for the key story on eutrophication and agriculture.

At first she gave an overview on activities and actors related to agricultural production contributing directly or indirectly to a nutrient input in the Baltic Sea, and described the main actors, which in this case are farmers, decision makers, food producers, consumers, wholesalers and retail chains.

L. Remmelgas concluded that the structure of farms has changed – towards bigger and mono-functional holdings, which causes problems, e.g. surplus of manure in large animal farms. However, farmers do not exist in the vacuum and their farming decisions are often shaped by the external conditions (global market, other players, policy).

She highlighted a conclusion from the Baltic Compass project (2011): Farmers support environmental measures if they do not decrease their yields nor profits. Food producers could potentially stimulate pro-environmental solutions by setting requirements for the products they buy but they are highly influenced by large retail/wholesale chains, consumer choices and global market.

Consumer choices in turn are influenced by their awareness (which has already improved) but also on income levels. Wholesalers and retail chains are characterized by centralisation and emergence of large international brands and private labels. They have possibility to react on customers' demands but could take an educational role and more actively inform consumers.

Fishermen and consumers – two actors in the value chain.

Kari Stange, Marine Stewardship Council, Sweden

Kari Stange talked about two actors in the fisheries value chain – fishermen and consumers – and their roles in knowledge production and making the change towards more sustainable fisheries.

She informed about the GAP 2 project (FP7, 2011-2015), which aim was to bridge the gap between science, stakeholders (fishermen) and policy makers, and about sustainable fisheries certification scheme of the Marine Stewardship Council (MSC) aiming to contribute to the health of oceans.

Knowledge for EU fisheries management comes from science as well as from stakeholders (advisory councils). The knowledge of stakeholders does not always fit into the system of scientific knowledge and is therefore not included in the knowledge base. Stakeholders can take initiative and invite scientists to be part of their knowledge production to make it fit their system.

The speaker stressed the importance of knowledge exchange between different stakeholders – understanding each other enables to go further with solving the issues. For example, active participation of fishermen in the development of management plans creates a sense of ownership and thereby acceptance of the management measures by fishermen.

The aim of MSC fisheries standard is to make consumers aware and provide opportunity to make sustainable choices. Three parameters are used for assessing fisheries: (1) stock sustainability, (2) ecosystem impact and (3) effective management. The theory of change behind MSC is driven by

consumers: A change is not likely to come without the interest and/or demand as well as awareness of consumers.

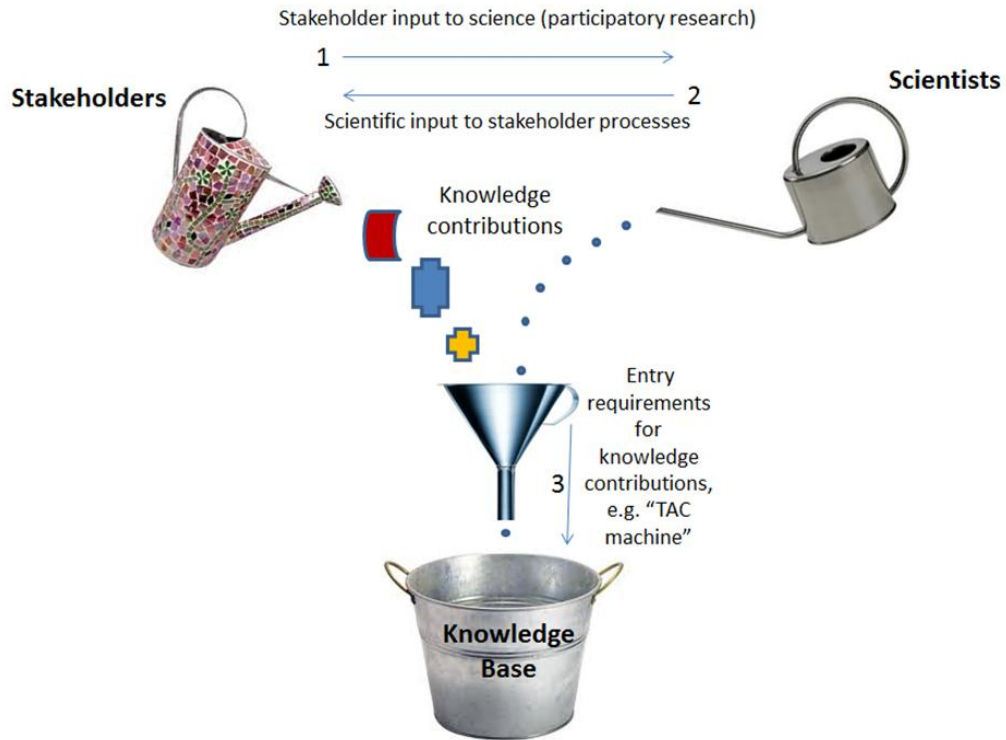


Figure 5: Challenges of knowledge co-production with stakeholder (Kari Stange, Knowledge production at boundaries, PhD thesis 2017).

On the way to solutions for Marine Litter: learnings and activities of plastics producers.
Ingo Sartorius, Association "Plastics Europe", Germany

Ingo Sartorius gave an overview on the plastics industry, demand for and benefits of plastics, stakeholders in the value chain, waste management and measures addressing the problem of marine litter, including gathering sound data, joint industry initiatives, communication and education activities.

PlasticsEurope is Pan-European association of plastics manufacturers. The production of plastics is closely related to the chemicals industry. Associations of the plastics industry includes the plastics machinery sector (Euromap), the conversion sector (EuPC) and the sector of production (PlasticsEurope).

The speaker stressed the importance of the demand for plastics. In the EU it reached 49 Mio t in 2015. Packaging (40%) and building & construction (20%) represent the largest end-use markets, followed by the automotive (9%) and electrical industry (6%) sectors.

There are many actors involved in the value chain from raw material production to waste management. Producer responsibility is implemented differently in different countries.

Post-industrial waste is mostly recycled but there is also post-consumer waste, which forms the major part of the total plastic waste. Plastic waste management is quite well organised in 9 EU countries but others should improve.

The plastics industry takes its part of producer responsibility through organisations established in many countries (although the plastics industry is not responsible for waste management).

There are quite many measures addressing marine litter. The plastics producers decided to concentrate on prevention, sound facts, information & education. The German plastics industry together with other related industries developed a joint position of the German chemical industry sectors on marine litter. The Fraunhofer Institute analysed entries of microplastics into German waters and found out that the biggest source was car tyres. Microplastics includes multiple materials, it has been found even in milk and honey. However, sometimes such information can come from e.g. contamination of samples in laboratory from air. It is important to ensure the reliability of analyses, to avoid distribution of false information.

The speaker concluded that the plastics industry is only one of many actors related to the issue: Responsibilities, contributions and a collaboration of all stakeholders are important for a change.

Opportunities in the value chains where behavior change is most likely

- The aim should be a decrease in demand to reduce the use of plastics. Who are the key actors to be targeted?
- Our personal consumption pattern, all industries together should be addressed. The problem is a reflection of our daily consumption.
- At the end, we ultimately need consumers to make the right choices. We should stimulate consumers to change behaviour. This cannot be managed within the project but we could make a start.
- We should be consistent along the chain and work with all actors. All actions could reinforce each other going the right way. Coherence between different chain components is needed.
- Consumers are targeted too often; they do not know how to make the right decisions. Therefore, we should assist them in choosing. We have to think about opportunities for reducing, not only producing.
- It is also a responsibility of the industry to help consumers to make the right choices. The EU market should be managed to go to the right direction.
- We should consider the scale, whether we are looking at the overall system or system details. Today we are consumers but tomorrow producers. The question is how to be producers and consumers at the same time?
- Human health is also an important aspect. People will care if there is a threat for human health.
- Who should be involved, depends on the (policy) objectives that we want to achieve through ocean literacy. We should assess how sensitive different approaches are in the value chain. From that point on, we could decide whom to engage.
- Health is important, but we must be careful not to be too much health impact oriented. We should think how to address all those intermediate actors that do not care about certification etc.
- Supermarkets sell MSC fish but they should know also the story behind the scheme to explain it to the consumers.
- The incentives and motivations are different for everyone. We have to understand the different motivations.
- The economic motivator is always coming first. How could people be motivated to buy more expensive certified fish?
- Maritime businesses are all about money, but include a short and long-term perspective. A long-term perspective and smarter benefit should be promoted.

Session 4. Building ocean literacy through communications

This session targeted the communication channels and ways to transfer knowledge in different awareness raising and other initiatives about the oceans for different audiences. It has been structured around the following presentations:

- “Communication channels to transfer knowledge with regard to fisheries – results from the ResponSEABLE analyses in Portugal” (by *Cristina Silva, Lusofona University*);
- “Perceptions of fishery related actors and consequences for Ocean Literacy education” (by *Erik Bogaard, ProSea Foundation*), and
- “Aquaculture and ocean literacy” (by *Martyn Futter, Swedish University of Agriculture*).

Communication channels to transfer knowledge with regard to fisheries – results from the ResponSEABLE analyses in Portugal.

Cristina Silva, Lusofona University, Portugal

Cristina Silva introduced the results of the media and effect analysis of fisheries-related information of ResponSEABLE in Portugal. Media analysis was done based on an internet search. The aim was to analyse who is communicating what, in which channels, and to whom. The effect analysis was based on interviews with several actors. Its aim was to find out which information is received by specific actors, which media channels to use to reach certain target group, who are key influencers and how messages about the ocean should be framed to achieve the behaviour change.

Communications regarding fisheries was mostly targeted at the general public (from a bigger diversity of groups), fishermen and retailers but consumers were addressed only by very few publishers. The main publishers/information providers were scientific knowledge producers, NGOs and national administrations followed by news producers and educators. The content of information for the public was very diverse, covering all elements of the DAPSIWR framework, which was not the case for other target groups.

The results of the interviews show that consumers are mainly interested in the quality of sea food, quality of beaches and documentaries on marine wildlife; fishermen are interested in quotas for commercial species, rules and health quality of their fishing areas; retailers are interested in volume, value and price of fishery products.

The main information sources were television for consumers; association meetings and other fishermen for fishermen; association meetings and specific websites for retailers.

The key influencers for consumers are scientific sources, less reliable is info from economic interest groups or without clear authorship. Fishermen do not trust any information. Retailers trust info from Docapesca Portos e Lotas S.A, AIPCE, IPMA.

Half of consumers believe that they can have influence by disseminating information or choosing a diet favouring sea products from sustainable sources. Fishermen think that the national fishery policy does not allow them develop positively. Retailers share the opinion that the most economically powerful countries dictate the rules of management, however they also think that countries with more enlightened consumers increasingly dictate the rules of fishing.

Discussion:

- What is the difference between general public and consumer?
 - Answer: The difference is of importance in terms of target groups. The general public includes everyone, e.g. producers, regulators and consumers. Information was classified as targeting the public, if it was not significantly targeting a more specific group. Consumers are addressed in their role as consuming something, e.g. eating fish. Information for consumers include messages how to consume, like shopping guides etc.

- If the media specifically points out consumption issue then it is targeting consumers, if not then general public.
- People like to listen to people in their own groups, therefore such channels are efficient, e.g. fishermen listen to other fishermen or fisheries associations first.
- Fishermen do not have time to look for information. Therefore, fishermen hire a representative to represent them, or also hire scientists if needed.
- Most people do not trust social media but almost everybody is using it. People are thinking that they are not getting affected by it. We do not know how much they filter such info.
- Fishermen think that information on fishing is not realistic, they do not trust other groups.
 - Objection: They trust information from scientific sources.
- We should provide a filtering mechanism for people to help them in reading information. There can be also wrong scientific information. A capacity to filter information is important.
 - Addition: A capacity for information regarding the ocean is basically the meaning of ocean literacy.
- Criticism is a strength in society. There is a lot of not relevant/incorrect information available. Are we able to create a channel that people would like to visit, that they would not ignore?
- There must be a filter because there are different worlds - fishermen is one world, others are outside. Ocean literacy can be a bridge between these two worlds.
- This is called cognitive dissonance - fishermen doubt in information that tells them to fish less as it means less income. Cognitive dissonance is characteristic for all people, not only for fishermen.

Perceptions of fishery related actors and consequences for Ocean Literacy education.

Erik Bogaard, ProSea Foundation, The Netherlands

Erik Bogaard from ProSea Foundation, dealing with education of marine professionals, explained in his presentation how fishermen are thinking and how this target group should be approached.

He stressed the importance of knowing the target group. The study of perceptions on change of North Sea fish stocks has shown that fishermen are thinking differently. For example, fishermen talk about the area that they fish, not fish stocks like scientists. NGOs often talk about a global perspective, the world seas and long term developments. There are differences in levels and time. Politicians set quota for the next year, scientists look wider but fishermen do not. Fishermen know their fishing areas and changes there but often on a short term.

In addition, the understanding of discarding is different:

- CFP aims at eliminating discarding. The discard ban should force fishermen to change their fishing practices, to fish more selectively, which would be good for everybody.
- Fishermen think differently: many discarded fish survive and dead discard is a part of the ecosystem. A discard ban will not decrease bycatch, but the fishermen will get less profit. Scientists say that there are low survival rates among discarded flatfish. Fishermen say that if we take them to land then 0% survives.
- Educating fishermen is important. All courses start with ecology. E.g., Fishermen are surprised that plankton is needed to get fish. It shows, basic knowledge is needed to have a discussion.

Another topic is the fishing economy: to go through how the money is earned and what factors are impacting it. Fishermen are convinced that the best fisherman catches the most fish. A course on the fish supply chain brought together fishermen and retailers. Together, they found solutions on what fishermen have to do to get fish into the store.

As fishermen tend to trust other fishermen, a biologist who was a fisherman at the same time was a good messenger – fishermen listened to him.

In conclusion, Fishermen look at things differently, educators have to take their perspective into account. They have a lot of knowledge. We have to respect their knowledge and their opinions, if we want them to respect our knowledge. It is important to provide accurate, relevant, up to date info, create an open minded atmosphere and encourage sharing with others, choose an info channel acceptable for fishermen, challenge participants (we want them to improve), instead of accusing them.

Discussion:

- Fishermen are quite a special category of stakeholders. We need to understand how they think, what is behind their thinking. Fishermen have been regulated by rules, quotas etc. for ages. It is a challenge to get them motivated and inspired to improve. How do you get them motivated?
 - Answer: It takes a long time. ProSea started with schools, education system, courses paid by the fishing board. Slowly fishermen started to be interested. We do not force them, they come voluntarily but they do not pay themselves for the courses (the board pays).
- Stock assessment is based on data from fishermen log books but still the fishermen do not trust this info. A discard ban is a good idea in theory, but it relies on fishermen and is uncontrollable in practice.
 - Answer: ProSea has written about fish stock assessment in an article for fishermen. Fishermen often do not know that their data are used in fish stock assessment.
- An actor to actor knowledge creation principle is important. Fishermen are a difficult stakeholder group but also very similar to some others, e.g. farmers. But fishermen are also heavily regulated, they want to decide themselves.
- Fishermen need to take a few steps for better sustainability, education of fishermen is important for the policy.

Aquaculture and ocean literacy.

Martyn Futter, Swedish University of Agriculture

Martyn Futter explained the problems related to environmental impact of open cage fish aquaculture and proposed some solutions.

Fisheries and aquaculture have similar relation as hunting and farming. We have to balance environmental issues for providing cheap protein (open-cage salmon aquaculture) as wild catch fisheries are not able to satisfy the demand. The European Commission is promoting aquaculture, but there are difficulties in getting permits to open aquaculture farms. A solution can be circulating systems (closed systems with nutrient recapture). Aquaculture should be done on land as farming.

The inputs should be minimised and outputs maximised/recycled. The possible solutions include: fish food with less Phosphorus, capture of some of the waste, closed cage systems, less emission to environment, effective /optimised feeding, reusing nutrients in downstream systems, e.g. growing mussels, recycling losses to close the nutrient loop.

We have to keep in mind that aquaculture is actually agriculture and there are possibilities to decrease environmental impacts.

“Literacy skills are fundamental to informed decision making, personal empowerment and active and passive participation in the local and global social communities.” Stromquist (2005)

Discussion:

- Aquaculture is a quickly developing sector. There is a lot of research about it going on, but closed systems are not yet widespread. There is room for the development of literacy.
- Ocean literacy is a lot about understanding and taking the decision.
- It is a new angle to look at it as agriculture, different messages are needed.

Session 5. Is there a specific Blue Growth dimension in literacy?

Introduction: What is Blue Growth to you?

Pierre Strosser/Gloria de Paoli, ACTeon started the session with interactive question to the audience: "What is Blue Growth to you?"

Discussion: *What is Blue Growth to you?*

- Blue Growth means activities in the sea, especially new activities but also old ones like shipping.
- Blue Growth means economic activities that are related to oceans and that one assumes to be sustainable.
- Blue Growth means economic activities but also healthy seas and oceans. Blue Growth relies on Innovation.
- People need to be ocean literate for blue growth
- SeaChange is organising a workshop on ocean literacy and Blue Growth during EU maritime day.
- Blue Growth is similar to green economy.

The discussion was followed by the presentations from *Maris Stulgis, European Commission, DG MARE* about EU initiatives related to Blue Growth and Ocean Literacy, and from *Pierre Strosser/Gloria de Paoli, ACTeon* about "Challenges for Blue Growth in 3 key sectors - aquaculture, marine renewable energies and coastal tourism".

How Blue Growth is framed in the EU policy discourse.

Maris Stulgis, European Commission, DG MARE

Maris Stulgis gave an overview on EU initiatives related to Blue Growth.

Blue Growth (BG) means growth in the blue economy. The blue economy includes many sectors but focuses on areas with the biggest BG potential (renewable energy, coastal and maritime tourism, aquaculture, mineral resources and biotechnology). Also, other sectors, such as ship building and repair, transport, fisheries, offshore oil and gas, are important for value and jobs.

In 2012 a brochure on BG communication was published by the European Commission.

In 2017 a BG Staff Working Document on main achievements is compiled. The EU maritime sector includes 5 million jobs, EUR 500 billion/year, and there is a potential to create many more jobs. There is an explosive growth in installation of offshore wind farms and the potential of maritime tourism is growing.

BG is supported by a policy for innovation, including relocking tidal and wave energy potential, tackling regulatory barriers to aquaculture, development of marine biotechnology research, technologies to monitor environmental impact of deep-sea mining, innovation in marine equipment, shipbuilding, ocean observation, dredging, coastal protection and marine construction. There is also a big support from the EU research and investment programmes.

There is quite big focus on mobilising market forces and removing market failures that are barriers for development. In addition, actions on maritime skills and development of cross-border maritime spatial planning are contributing to it.

In 2017 BG communication includes a research agenda for BG and some progress on investment in the blue economy. The aim is to have healthy seas for a sustainable Blue Growth.

Challenges for Blue Growth in 3 key sectors - aquaculture, marine renewable energies and coastal tourism.

Pierre Strosser/Gloria de Paoli, ACTeon

Pierre Strosser and Gloria de Paoli introduced the challenges for Blue Growth in three key sectors – aquaculture, marine renewable energies and coastal tourism.

Aquaculture: Aquaculture in the EU covers 10% of fish consumption. However, the production level is the same as in 2000. There is a high quality and high environmental requirements but also high costs, which means competitive disadvantage for EU countries. This is addressed by policy support EMMF, CFP and Aquaculture Advisory Council as well as by technological improvements. Another challenge is finding place for expanding aquaculture (due to occupation of coastal areas by other activities and also environmental impact of aquaculture) that could be solved by including aquaculture in the MSP to reduce conflicts and may be integrate aquaculture with other activities such as marine renewable energy production.

Marine renewable energy (MRE): There is a large production potential as well as potential for contribution to EU emission reduction targets and economic growth and job creation. The main challenges are immaturity of technical solutions and need to develop grid connection, a lack of supporting activities and difficulties to assess and compensate the environmental impact. Solutions include EU support for technological developments, voluntary payment mechanisms to secure financing as well as inclusion of MRE in MSP.

Coastal tourism: It is contributing to the economic and social development of local communities and a driving force for other sectors. However, the current mass tourism model – the 3s model (sun, sand and sea) has strong environmental impact leading to loss of attractiveness of these areas. The challenges include also sectoral fragmentation and lack of an overall planning framework for the sector. The current decline of mass tourism is also an opportunity to develop a more sustainable system including innovative business models, comprehensive strategy and overall governance system.

Blue Growth and Ocean Literacy - current EU initiatives, e.g. Blue Skills.

Maris Stulgis, European Commission, DG MARE

Maris Stulgis introduced EU initiatives on developing blue skills and blue careers and pointed out the relation to ocean literacy.

The COMM "Innovation in the Blue economy..." 13.5.2014 identified a skills gap - a gap between education offer and labour market needs. As a response, an education and training part was started in IMP. The causes of shortage of maritime staff include non-replacement of retired staff by new generation, a poor image of the marine sector, a lack of knowledge about career opportunities, a lack of cooperation between industry and education. So, there is a need to make the blue economy sectors more attractive for young people. Ocean Literacy can also be a tool for that.

DG MARE initiatives on Blue careers: There are 6 Blue careers projects (EMFF, 2017-19) financed, an expert group on skills and career development established (consisting of representatives of different sectors) and the COM Communication „A New Skills Agenda for Europe“ published in June 2016.

A new skills agenda for Europe includes a blueprint on sectorial skills cooperation for the Maritime Technology sector - to develop a comprehensive strategy at EU level with action plan - to implement at national/regional level through EU structural funds. It includes 3 phases: 1) Collect evidence of skills gaps; 2) Set up a sectorial skills platform at EU level by end 2017; 3) Rolling out at national and regional level.

Erasmus+ will allocate €4 million for 4 years. The platform will need also to work on ocean literacy.

Who needs to be targeted by ocean literacy in a Blue Growth perspective?

In this brainstorming session the following issues have been discussed:

- One challenge is sustainable Blue Growth, there is also a demand for ocean literacy in relation to that.
- Is BG a kind of „greenwashing“ an unlimited growth of the maritime industry?
 - It should be rather be called „blue-washing“. Green becomes blue in the ocean, because there is a significant environmental dimension in the BG policy.
 - IMP released a stronger pillar for an environmentally friendly policy, there is a need to protect the resources, to maintain BG capacity.
 - However, there are still concerns that environmental and social sustainability is not integrated strong enough in the BG strategy.
- There have been courses, debates on green economy and green-washing. We should take the lessons from that to avoid problems.
- The Erasmus activities are included in EU new skills agenda
- A problem related to tourism is that it is giving job for people only for 6 months per year. We need to develop other models keeping people busy for 12 months.
- One dimension not mentioned so much is the need for social licence to operate for BG. Ocean literacy in terms of dissemination in local communities and their acceptance towards new BG activities could contribute here.
- We can take some learning from other systems. We need better communication certain certification/labelling schemes, e.g. product carbon footprint.
- The aim of ResponSEABLE is to provide knowledge that helps people make informed decisions. If we do not eat protein from aquaculture then we eat protein from somewhere else that might have an even worse environmental impact.
- An opinion was expressed that the aim of ocean literacy should not be attracting young people to maritime field.
 - Not BG itself, but individual opportunities to protect the ocean is the objective of ocean literacy.
 - Many people do not have a clue about the ocean and how we depend on it. The aim is to make people aware and consequently more interested about the ocean.
- There is a connection between ocean literacy, blue skills and BG. Ocean literacy is more about informing kids and young people about environmental aspects. When they become more ocean literate, it might create an interest for the blue economy and BG. Environmental protection is integrative part of BG already.
 - Ocean literacy is not only for young people. It also includes information that you need in order to establish a responsible blue start-up, for example.
 - Ocean literacy is more than teaching kids and youth. It also includes more than just environmental aspects.
- The EC decided to promote BG. We need to know how we build firewalls for environmental and social sustainability. Aquaculture is not like agriculture. For example, Sweden does not need any salmon to feed people but salmon is needed to substitute anchovies. The rest is global business.

Session 6. What are the preconditions for behaviour change?

This session examined the preconditions for behaviour change and was structured around the presentation “Behaviour change – is knowledge sufficient or if not what else is needed?” (by Prof. Susanne Stoll-Kleemann, Greifswald University).

Behaviour change – is knowledge sufficient or if not what else is needed?

Prof. Susanne Stoll-Kleemann, Greifswald University, Germany

Susanne Stoll-Kleemann introduced examples of models explaining behaviour and behaviour change and the role of knowledge in it. She also presented a review on barriers and opportunities for changing behaviour and some conclusions.

There are different models explaining behaviour. The “ISM-tool” starts from an individual, its attitudes, costs and benefits, emotions, skills, habits etc. and then looks at the social environment. According to the model of responsible environmental behaviour, the behaviour is determined by personality factors (attitudes, locus of control (do I really believe in my personal ability to change anything?), personal responsibility) and knowledge.

Prof. Stoll-Kleemann highlighted the Model of Pro-environmental Behaviour as her favourite model for explaining environmental behaviour where knowledge is framed as “problem awareness”. It includes internal (personality, knowledge, feelings, values etc.) and external factors (social and material factors). Black boxes on the scheme are barriers, white enabling factors.

Knowledge is important but there are also other impacting factors like feelings, fear, emotional involvement etc.: Maybe you have knowledge, but it is just not important for you.

The study Stoll-Kleemann S., Schmidt U.J. (2016) “Reducing meat consumption in developed and transition countries to counter climate change and biodiversity: a review of influence factors” investigated the barriers to reduce meat consumption and opportunities arising from them. It analysed 155 studies and found that values and attitudes, habits and taste are most investigated, other factors less. The result was a model of impact factors on meat consumption, which shows that emotions play an essential role in perceiving environmental information. Male humans eat more than double of the amount of meat compared to women. Younger people eat less meat, there are more vegetarians among younger people - they are more educated.

Access to substitute, cooking skills etc. are also important factors. Individuals as agents of change are important. Habits are important - it is difficult to change habits if you really love the taste of meat.

Knowledge can change actions, but it can also be prohibited by **cognitive dissonance** - a contradiction of thoughts by an inner conflict.

Inner strategies to overcome cognitive dissonance:

- Justification and neutralization: A defence mechanism to justify and neutralise my behaviour (e.g. “I do not want animals to suffer but it is very natural to eat meat, we need protein.”)
- Denial: “I protect the environment otherwise” or “You have no right to challenge me” or “I’m not the main cause of this problem”, ignorance, powerlessness, fabricated constraints, comfort (“It is too difficult for me to change my behaviour”)

Solution strategies:

- Behavioural prevention: Education, information; transparency to impede the cognitive dissonance; supporting skills/empowerment/motivation. Role models can help to convince people.
- Structural prevention: Enhancing the surrounding factors, changing the whole context.
- Psychology based solutions: Make sustainable behaviour the social default, emphasize personal relevance, make hidden info visible, foster mindfulness, create opportunities for competence, skills and knowledge, make change a by-product of other events, balance urgency with realistic hope.

Conclusions:

- Knowledge is a precondition but not sufficient for behaviour change.
- Barriers: internal (lack of knowledge, cognitive dissonance, habits, lifestyle, identify issues), external (infrastructure, subsidies, externalisation, market concentration)
- Chances: Behaviour (new social norms, social marketing, critical mass, education/information); Context (enhancing infrastructure/supply, political and economic claims)

Main points from the discussion:

- We can translate it to our key stories.
- The tone of messages is impacting the reaction. Often environmentalists tend to send out absolute messages (you do that or nothing). Such messages do not do any good.
 - This is the worst thing to do. Just asking for behaviour change is wrong.
- The question is who produces knowledge. If fishermen and environmentalists cooperate in producing knowledge it has better chances for behaviour change. The process of knowledge creation is important.
 - The role models and practical (good or bad) examples help to convince people.
- There are internal barriers for behaviour change. What do we need to know about the target audiences to generate interventions?
 - You need to know about barriers and role models. Many people have problems with scientists, you need time for building confidence, finding people who could make the first step, need detailed analysis of your target group, to find ways to avoid cognitive dissonance.
- We need a role model that works, a mechanism for effective role models. It could be simple message: "I do the same as he does".
 - It is not so painful to change behaviour. People want to be respected and accepted. People want to be sure that they are not punished for different behaviour. Role models show that it is good, not so painful and that you will not be punished.
- For more technical audiences also more technical role models could be used.
- There is interesting dilemma between emotions, facts and behaviour. What is the motor for behaviour when you need to consider the costs?

Session 7. Conclusions and common lessons: moving from knowledge to behaviour change - ideas about effective ocean literacy.

In the last session of the workshop the common lessons were discussed. John Crump, GRID-Arendal, and Olga Mashkina, ACTeon presented their concluding remarks and lessons to take home:

- Knowledge is the foundation of our society. But also cognitive dissonance is a fact - people know but still do not do.
- The seminar has provided a lot of information and discussions on actors and audiences. Concrete examples were very useful, e.g. on fishermen and their knowledge.
- We need to look at the filters we are using. We had some definitions for ocean literacy during the meeting. The language used in communication to stakeholders and partners is very important.

- Emotional connections, stories connecting these issues are important for people. They do not make choices based on knowledge and information alone, there are also emotional factors.
- We should not downplay the idea of wonder - Living labs, children making movies etc. In the presented example children created a powerful emotional connection to the issue and took action. Kids can influence their parents and through that create a change.
- What is the legacy of this project, how can we keep it alive in the long term? You have to keep in mind what you can get individual actors to do.

Discussion:

- Often we do not have enough knowledge to teach somebody and therefore wrong information is provided, e.g. that Baltic salmon is heavily polluted (but fishermen did not believe that luckily).
- The change of behaviour is a long process. It would be good to find an ambassador from each of groups. Ambassadors are important for spreading the message in proper way.
- The message that the ResponSEAble team takes on board: it is a challenge for us how to translate all this info into development of ocean literacy tools. Different actors have different levels of knowledge, this has to be taken into account. There is a need to look for somebody with whom we could work together. These people are different for each key story. We have to think, who are these people and what do we tell them.

Overall Conclusions: Synthesis of WP1-3 of ResponSEAble

Reflecting the workshop discussions and the work implemented within WP1-3 so far we would like to draw up a few conclusions which also shall function as a “handing-over” to WP4 and WP5:

The ResponSEAble approach to OL

The ResponSEAble approach of sorting knowledge into the DAPSIWR Framework (see above), working in six key stories related to hotspot issues for the marine environment and combining the perspectives of knowledge, value chains and communication channels (WP1,2 and 3) has been attested innovative. Now it is crucial for the project that this innovative character will be reflected in the OL tools we develop.

Ocean literacy and Knowledge

We would like to state that many disputes within the project team and with externals are tackling the issue of “Ocean literacy – for what?” – while the ResponSEAble team took the approach of investigating existing knowledge and the communication about it at a first step (WP1-3), the discussions often move (too) quickly to an immediate AIM of OL: behavior change – of policy makers, economic stakeholders and the society at large.

Talking about “Ocean literacy products” and their “effectiveness” we again drifted to the question how effective these products were in terms of initiative behavior change, influencing perception of people or reaching a large amount of target group. It seems not so easy to discuss the “literacy” aspect as single feature.

The ResponSEAbLe Ocean Literacy is knowledge based in two ways: knowledge serves both to design our Ocean Literacy approach as well as the content for our products. ResponSEAbLe has to move on from the research stage and develop concrete ideas on communication approaches, to make „the computer work“.

We can conclude from the international workshop, the interviews carried out by now as well as the first regional workshops (WP4) that ResponSEAbLe started successfully to build up a European network of ocean experts, policy makers, ocean-economy stakeholders (Blue Growth economy and traditional economic sectors), environmental NGOs (campaigners) and media/PR people which can function as a reference group to discuss further – and, the further discussion and communication about the project findings, OL as such and beyond, is crucial to establish an Ocean Literacy debate in Europe.

Knowledge, Information, behavior change

Knowledge is not the same as behaviour change. To achieve behaviour change (at society, at stakeholders) we need to understand what motivates people and we need to learn from behavioural models about the potential OL of our target audiences:

- It is important to inspire people to change the way they think and also act in relation to ocean matters.
- However, knowing does not always lead to doing – cognitive dissonance is a significant challenge in overcoming this inertia.
- Before embarking on a lengthy and costly OL initiative, it is important to develop a Theory of Change for this situation. By this we mean a comprehensive description of how and why the change desired by the OL initiative will actually come about. Effectively a set of desired outcomes and a causal understanding of how these will be achieved through the activities we will undertake.
- It is important to distinguish between the different target audiences: Not all target audiences are equally “sea-blind” (levels of literacy will vary), so it is dangerous to apply the same theory of change to disparate groups.

Moving towards effective Ocean Literacy products

1. As our knowledge of the combination of WP1-3 deepens, we learn more about why actors act the way they do and how information travels. We also learn more about which communication channels specific actors listen to and trust most.
2. Knowledge is more than facts: the form is important (eye catching), we assume traditional forms are “outdated”. Number of recipients – the dimension has changed with internet and social media, we seek for (new) tools and messengers to drastically increase number of recipients.
3. When giving information (knowledge) to someone the purpose of how it shall be perceived already drives the message.
4. Gaps in knowledge: often the uncertainties in knowledge (e.g. impacts from microplastics) are not well communicated; assumptions are posed without information on the drivers behind or the impacts; this is an important factor to take into consideration for producing OL materials.
5. We make choices for emotional reasons at least as much if not more than, reasons based on facts or knowledge. Therefore we must make emotional connections between our audiences and the stories we use as vehicles for our OL tools.
6. Groups can influence each other, very often based on emotional connections to stories, and thereby create change.

7. A pre-requisite to developing OL products is the understanding of networks and connections between actors in the value chains and beyond, between actors and ecosystems. People tend to listen to people in their own groups, therefore such networks are efficient.
8. The language of communication varies enormously, and we must strive to understand the language of our target audiences. Equally, we must strive to understand the filters which we / they use both in transmitting and receiving information and knowledge. These filters potentially bias and even block out information which is unwelcome or difficult to accept.
9. Ambassadors should be useful in spreading messages with target groups.

Annex 1: Agenda of the Jūrmala Dialogue

The event will take place at Jūrmala SPA Hotel, address: Jomas iela 47/49, Jūrmala

11:00	Light Lunch & Registration
12:00 – 12:30	Opening and Introduction Round Heidrun Fammler, Baltic Environmental Forum
Session 1: Introduction to the ResponSEable approach to Ocean Literacy	
12:30-13:15	<p>Key Note 1 Connecting people to their oceans: why we need a different - ResponSEable way Olga Mashkina, ACTeon</p> <p>Key Note 2 What does it take to be “ocean literate”? – the essential elements (introduction to the ResponSEable approach) Tamer Fawzy, BEF DE</p> <p>Key Note 3 The ResponSEable key stories: eutrophication, microplastics, invasive species, marine renewable energy, sustainable fisheries/seafood and coastal development/tourism Kari Synnøve Johansen, GRID –Arendal</p>
13:15-14:00	<p>Feedback to the ResponSEable approach to Ocean Literacy</p> <ul style="list-style-type: none"> • Maris Stulgis, European Commission, DG MARE Unit A1 (Maritime Innovation, Marine Knowledge and Investment) • Steve Fletcher, UNEP WCMC (World Conservation Monitoring Centre) <p>Moderated feedback by the plenary:</p> <ul style="list-style-type: none"> • <i>What is the advantage/added value of the ResponSEable approach?</i> • <i>Which aspects are challenging, cause doubts or opposition?</i>
14:00 – 14:30	Coffee break
Session 2: What is worth knowing about human-ocean relationship?	
14:30 – 16:00	<p>What knowledge is communicated in education and science (experiences/illustration from Sea Change project) Fiona Crouch, Marine Biological Association MBA (H2020 SeaChange)</p> <p>Illustration of “knowledge and gaps in knowledge” from the ResponSEable key story on microplastics & cosmetics Tamer Fawzy, BEF DE</p> <p>Microplastics in personal care products: knowledge and perceptions of environmentalists, beauticians and students Steve Fletcher & Sabine Pahl, Plymouth University</p> <p>Making ocean-literate policy: who needs to know what? Ivan Conesa Alcolea, European Commission, DG RESEARCH</p> <p>Moderated Discussion: <i>What is worth knowing about human ocean relationship</i></p>
16:00 – 16:30	Coffee break
Session 3: Who needs to have the knowledge? Who is the actor?	
16:30 – 18:00	The organization of “value chains” of consumer, retailer or industrial

	<p>activities that put pressure on marine ecosystems – ResponSEAbLe approach Denis Bailly & Joanna Cousinou, University of Brest</p> <p>Illustrations from of who are the actors in the “value chains” in two ResponSEAbLe key stories</p> <p>-Invasive Alien Species Maggi Kossida, Seven Solutions, Greece</p> <p>-Eutrophication Laura Remmelgas, BEF Estonia</p> <p>Fishermen and consumers – two actors in the value chain Kari Stange, Marine Stewardship Council, Sweden</p> <p>Actors of the plastic industries in the value chain Ingo Sartorius, Association “Plastics Europe”</p> <p>Group Discussion: <i>Opportunities that might exist within the value chains to do things differently – who are the actors where behaviour change is most likely, and are they actually addressed?</i></p>
19:00	Dinner in Hotel Jurmala

Thursday, April 6

9:00	Start of the day (Heidrun Fammler, Baltic Environmental Forum)
Session 4: Building ocean literacy through communications, awareness raising and other initiatives about the oceans for different audiences	
9:10 -10:30	<p>Communication channels to transfer knowledge with regard to fisheries – results from the ResponSEAbLe analyses Cristina Silva, Lusofona University Portugal</p> <p>Perception of fishery related actors and consequences of perceptions for education, for Ocean Literacy Erik Bogaard, Pro Seas</p> <p>Aquaculture and literacy – a lot can go wrong Martyn Futter, Swedish University of Agriculture</p> <p>Facilitated discussion: <i>Who gets what message today? What are the communications channels? Whom is it targeted at? Is it right?</i></p>
10.30 – 11:00	Coffee break
Session 5: Is there a specific Blue Growth dimension in literacy?	
11:00 – 12:00	<p>Introduction: What is Blue Growth to you? Pierre Strosser/Gloria de Paoli, ACTeon</p> <p>How Blue Growth is framed in the EU policy discourse Maris Stulgis, European Commission, DG MARE</p> <p>Challenges for Blue Growth in 3 key sectors - aquaculture, marine renewable energies and coastal tourism Pierre Strosser/Gloria de Paoli, ACTeon</p> <p>Blue Growth and Ocean Literacy - current EU initiatives, e.g. Blue Skills Maris Stulgis, European Commission, DG MARE</p> <p>Brainstorming session: <i>Who needs to be targeted by Ocean Literacy in a blue</i></p>

	<i>growth perspective? What needs to be shared as an information?</i>
Session 6: What are the preconditions for behavior change?	
12:00 – 12:30	Behavior change – is knowledge sufficient? If not, what else is needed? Prof. Susanne Stoll Kleemann, Greifswald University, Germany
Session 7: Conclusions	
12:30 – 13:30	Common lessons: moving from knowledge to behavior change - ideas about effective ocean literacy John Crump, GRID-Arendal, Pierre Strosser and Olga Mashkina, ACTeon Ending & Farewell Heidrun Fammler, BEF
13:30	Lunch and departure

Annex 2. List of presentations and speakers in the Jurmala Dialogue

1. Opening. *Heidrun Fammler, Baltic Environmental Forum Germany (BEF DE)*
2. Key Note 1: Connecting people to their ocean: why do we need a different approach? *Olga Mashkina, ACTeon, France*
3. Key Note 2: What does it take to be “ocean literate”? – the essential elements (introduction to the ResponSEABLE approach). *Maria C. Uyarra (AZTI Tecnalia, Spain), Denis Bailly (University of Western Brittany (UBO), France), Tamer Fawzy (BEF DE)*
4. Key Note 3: The ResponSEABLE key stories: eutrophication, microplastics, invasive species, marine renewable energy, sustainable fisheries/seafood and coastal development/tourism. *Kari Synnøve Johansen, GRID –Arendal, Norway*
5. What knowledge is communicated in education and science? (experiences/illustration from Sea Change project). *Fiona Crouch, Marine Biological Association MBA (H2020 SeaChange), UK*
6. Illustration of “knowledge and gaps in knowledge” from the ResponSEABLE key story on microplastics & cosmetics. *Tamer Fawzy, BEF DE*
7. Promoting citizen behaviour change to reduce marine litter: Insights from MARLISCO for ResponSEABLE. *Steve Fletcher & Sabine Pahl, Plymouth University, UK*
8. Who needs to know what for making Ocean Literate policy? *Ivan Conesa Alcolea, European Commission, DG RESEARCH*
9. The organization of “value chains” of consumer, retailer and industrial activities that put pressure on marine ecosystems – ResponSEABLE approach. *Denis Bailly & Joanna Cousinou, University of Western Brittany (UBO), France*
10. Actors in the eutrophication and agriculture value chain. *Laura Remmelgas, Baltic Environmental Forum Estonia*
11. Fishermen and consumers – two actors in the value chain. *Kari Stange, Marine Stewardship Council, Sweden*
12. On the way to solutions for Marine Litter: learnings and activities of plastics producers. *Ingo Sartorius, Association “Plastics Europe”, Germany*
13. Communication channels to transfer knowledge with regard to fisheries – results from the ResponSEABLE analyses in Portugal. *Cristina Silva, Lusofona University, Portugal*
14. Perceptions of fishery related actors and consequences for Ocean Literacy education. *Erik Bogaard, ProSea Foundation, The Netherlands*
15. Aquaculture and ocean literacy. *Martyn Futter, Swedish University of Agriculture*
16. Introduction: What is Blue Growth to you? *Pierre Strosser/Gloria de Paoli, ACTeon, France*
17. How Blue Growth is framed in the EU policy discourse. Blue Growth and Ocean Literacy - current EU initiatives, e.g. Blue Skills. *Maris Stulgis, European Commission, DG MARE*
18. Challenges for Blue Growth in 3 key sectors - aquaculture, marine renewable energies and coastal tourism. *Pierre Strosser/Gloria de Paoli, ACTeon, France*
19. Behaviour change – is knowledge sufficient or if not what else is needed? *Dr. Susanne Stoll-Kleemann, Greifswald University, Germany*

Annex 3. List of participants

Laura Remmelgas	Baltic Environmental Forum Estonia
Merle Kuris	Baltic Environmental Forum Estonia
Kristina Tiivel	Estonian Marine Institute
Olga Mashkina	ACTeon
Pierre Strosser	ACTeon
Joanna Cousinou	Université de Bretagne Occidentale
Denis Bailly	Université de Bretagne Occidentale
Heidrun Fammler	Baltic Environmental Forum Germany
Tamer Fawzy	Baltic Environmental Forum Germany
Dr. Susanne Stoll-Kleemann	University of Greifswald
Ingo Sartorius	PlasticsEurope Deutschland e.V.
Owen Mollow	National University of Ireland, Galway
Eleonora Pantò	CSP
Gloria De Paoli	ACTeon
Dace Strigune	Baltic Environmental Forum Latvia
Ingrīda Puriņa	Latvian Institute of Aquatic Ecology
Ieva Putna-Nīmane	Latvian Institute of Aquatic Ecology
Ieva Bārda	Latvian Institute of Aquatic Ecology
Kristīne Sēnele	Baltic Environmental Forum Latvia
Maija Balode	Latvian Institute of Aquatic Ecology
Solvita Strāķe	Latvian Institute of Aquatic Ecology
Uldis Cekuls	VFS FILMS
Kari Synnøve Johansen	GRID – Arendal
John Crump	GRID – Arendal
Dag Hjermann	Norwegian Institute of Water Research
Anna Birgitta ledang	Norwegian Institute of Water Research
Cristina Silva	Universidade Lusófona
Iulian Nichersu	Danube Delta National Institute
Maria C. Uyarra	AZTI Tecnalia
Kari Stange	Marine Stewardship Council
Martyn Futter	Swedish University of Agricultural Sciences
Erik Bogaard	ProSea Foundation
Fiona Crouch	Marine Biological Association
Louisa Harris	The Marine Foundation
Steve Fletcher	Plymouth University and UNEP-WCMC
Nick Rance	Tve
Māris Stulģis	European Commission
Ivan Conesa Alcolea	European Commission