COASTAL & MARINE

Coastal Management –

Training & Supporting Tools

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Editorial

Dear reader,

This edition of Coastal and Marine shines a spotlight on coastal management from the perspective of capacity building with lessons from the BONUS BaltCoast project. What is particularly striking about the project is the critical focus on the need for impact amongst the scientists involved. This manifests itself into a range of training and supporting tools for coastal managers, which are comprehensively outlined in this edition. The Baltic coast is a microcosm of coastal systems across the northern hemisphere, with a diversity of habitats, environmental conditions and provisioning services. Therefore, lessons learned from this region are transferable to other parts of Europe and the world. What perhaps sets the Baltic coast apart, is the intensity of effort around ICZM that prevails. In fact, ICZM is more relevant now than in the last circa 40 years of evolution of the concept. In practice, good coastal management is not easy.
If it were, we would be seeing much more of it. Capacity building in ICZM is very much needed. We require training and tools that are fit for purpose, targeted towards a multitude of potential end users. This includes tools for natural and social scientists such as the Systems Approach Framework (SAF), adapted by BONUS BaltCoast; training for young scientists and coastal professionals via summer schools, student courses and workshops; and tools for coastal practitioners and policy makers. This volume of Coastal and Marine provides a rich source of reference material, and gives a glance at teaching activities of the BONUS BaltCoast project and others.

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Coastal & Marine Union (EUCC)

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EUCC advocates best practice by developing coastal and marine policies, mobilising experts and stakeholders, providing advice and information, and implementing demonstration projects.

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Content

Colophon

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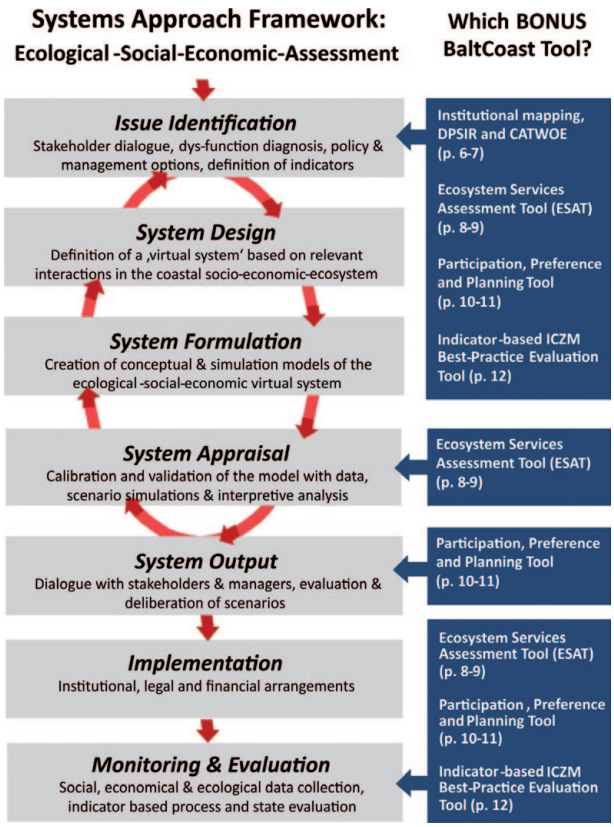
What makes a good scientific ICZM tool?

Some of the authorities with roles and responsibility for coastal planning and management in Europe have limited resources and competence, especially at the local level. At the same time the demands and expectations for coastal management to be science-based are increasing.

To overcome this challenge, different science-based "tools" have been developed. Some are to check and support that local developments are in line with national policies or EU directives. Some are to support local decision making in its own right, with information about the local situation.



The Systems Approach Framework (SAF), developed in the project SPICOSA and further adapted by BONUS BaltCoast, is a tool to address and solve problems of coastal management in a stepwise guided process, as shown in the figure. The tools developed within BONUS BaltCoast introduced in this issue, can support the accomplishment of one or more SAF steps.

The BONUS BaltCoast project is currently refining and applying such tools to the Baltic coastal areas. They can be useful in different steps of the Systems Approach Framework (SAF), which is a holistic and systematic approach to coastal management issues, as displayed in the figure. They help to assess the sustainability of the current situation, to map preferences, and to support stakeholder participation. Therefore, the tools can be used to provide information and knowledge, but also to help achieve good processes.

Tool-makers must consider if their tool shall be operated primarily by local authorities or stakeholders, or if scientists or consultants shall use it for example for a mapping and then provide information to local authorities and stakeholders. If it is a matter of fulfilling clear-cut national directives through local policy, the latter might be ok. But usually objectives can be achieved in different ways, and many trade-offs are possible, so the local authorities and stakeholders need to fully understand the information, what lies behind it and its implications. Operating the tools themselves then seems clearly preferable, or at least being deeply involved in the operation.

For proper science-based coastal zone planning and management it seems necessary that: 1) tools are made so easy to use that local authorities even in the smallest of municipalities/regions can operate them; 2) the results or outcomes of the tools are fully understandable to all local authorities and relevant stakeholders; and 3) local authorities can develop or permanently employ the competence required for science-based coastal zone planning and management.

The use and application of science-based tools can also be a good way for local authorities to develop such competence. For this, tools should both be based on what the users already know well but might need help to investigate or implement, and introducing and familiarising users with new methods, concepts and perspectives.

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Weaknesses and shortcomings in ICZM – is it possible to overcome them?

Most of the weaknesses and shortcomings in the ICZM process are due to a lack of information and education about a very complex subject, not well understood by all directly or indirectly involved.
Historically, the coastal zone has been a major focus for the development of human society. Use of the sea for transport and trade and availability of abundant food from highly productive coastal waters encouraged settlement.

The dynamics of natural coastal processes influence the ability to sustain human activities in these areas. This is manifested by increased hazards and increasing costs of sustaining infrastructure and human populations as sea level rises, as a consequence of climate change. Human actions have in some areas exacerbated these problems through the inappropriate location of infrastructure developments and overexploitation of living and nonliving resources. Such human pressures pose the risk of destroying habitats and the resource base of the coastal zones. Increasing population is leading to conflicts between competing uses in the coastal zone, of both the land and the sea. Low impact uses are frequently being replaced by intensive uses that are profitable in the short-term, but which undermine the long-term potential of the coast, by reducing its resilience.

Most of the common problems and conflicts observed in the coastal zone can be traced to procedural, planning, policy and institutional weaknesses, many of which can be related to a lack of awareness about the strategic economic and social importance of sustainable coastal zone management. Also historically, legislation and policy has been uncoordinated, and isolated sectoral planning decisions have often worked against the long-term interests of sustainable management of the coastal zones, rigid bureaucratic systems had limited local adaptability, local initiatives in sustainable coastal management has lacked adequate resources and support from higher administrative levels, management of the coast has lacked vision and has been based on a very limited understanding of coastal processes and scientific research and data collection isolated from end-users. All successful initiatives should follow certain known general principles.
Taking all this into account some weaknesses and shortcomings in the ICZM process can be identified despite the existence of strategies that could be fulfilled through training education in Europe or worldwide. From this process a clear progress in ICZM could be achieved. The Systems Approach Framework (SAF) developed within BONUS BaltCoast and its benefits as a holistic approach to coastal management issues is a good way through.

It is apparent that something needs to be done to address the underlying educational weaknesses that have caused or exacerbated the problems in the coastal zones, and to find a formula for moving towards sustainable development in these strategically important areas. The complexity also makes it difficult to indicate which approach to ICZM might work best in a given area. However, initiatives can learn from the experiences of others by considering the most critical driving forces in the target area, and identifying other similar initiatives.

Support for the development of educational tools and methodologies for ICZM, includes human resource development and information collection. Finally, certain community policies could better support the objectives of ICZM to integrate management of the land and the sea by clarifying and resolving debates concerning their application to the sea. Incorporating activities to raise awareness about the beneficial effects of the adoption of ICZM, dissemination of structured information and education on good practice in ICZM ensure that the limited expertise in ICZM is not lost, to finally promote targeted information and knowledge diffusion.

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Distance-learning on environmental protection and coastal management – facing an increasing demand

As one of the earliest founded universities in northern Europe, the Alma Mater of Rostock is looking back at a 600 years long academic tradition. Today, as its motto "traditio and innovatio" suggests, tradition in academic teaching goes hand in hand with scientific and technological innovation. Today the university offers over 100 degree courses on a diverse range of disciplines.

Located near the Baltic Sea coast, it is natural that the University of Rostock has set a particular emphasis on subjects such as marine ecology, aquaculture and protection of marine ecosystems, to train young scientists interdisciplinary in managing issues of coastal management and the marine environment. The master degree course »Environmental Protection«, for example, enables students to gain a high-level overview about the field of environmental protection through the acquisition of well-founded theoretical knowledge; enables students to develop a critical understanding of sustainability in order to shape our society in a long-term and promising way as well as provides students with personal skills, competences and a professional perspective that allows them to apply their knowledge and understanding in the field of environmental protection, to detect problems and analyze them individually as well as to find and formulate approaches to solution.

"Environmental Protection" is designed as a distance learning course. The flexibility of distance learning makes it a popular, appealing option - students are given the option of gaining a master's degree without being physically present. This makes the studies open to a wide range of students who can put the gained knowledge into context with the issues of their surroundings, which goes beyond the borders of Rostock. Using a combination of remote instruction and one-on-one face time, students can work on their own with new concepts. The rising importance of online teaching material in times of e-learning distance studies lies on the hand. In addition to comprehensive study materials, in class lectures and an excursion, students use the online material further developed within the BONUS BaltCoast project. Especially the learning module on Integrated Coastal Zone Management as well as the role play on establishing a mussel farm in coastal waters are intensively used within a presence weekend in the coastal resort Zingst. Within the four hours of role-play, students get an insight into coastal management in practice and about regional geography. However, even more important is that it promotes intensive communication and interaction between students and helps to establish and strengthen links between the participants.


© Iris Bockholt

Students improving their management skills in the simulation game "fishbanks"

The success and the growing demand in distance learning courses at Rostock University reflect the general tendency that many jobs require a life-long learning and increasing qualifications levels.

The special demand in coastal and marine issues has several reasons. Today the Baltic Sea is surrounded by EU countries. It developed into a fast growing economic region with a joint identity. Further, coastal and marine issues became focus of EU policy, like the Marine Strategy Framework Directive, the Directive on Marine Spatial Planning or the Blue Growth Strategy. As a consequence, coastal and marine uses, planning and management move into the focus and require experts that have the education to deal with these new challenges. As consequence, it is likely that educational offers and especially easily accessible, free online learning material will face an increasing demand. BONUS BaltCoast serves this demand.

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What's in the toolbox for ICZM?

The Systems Approach Framework (SAF) structures the iterative process for sustainable Integrated Coastal Zone Management (ICZM). The SAF, adapted for BONUS BaltCoast project comprises five major steps: Issue Identification, System Design, Formulation, System Appraisal, System Output. Further to these steps are Implementation and Monitoring of success. The first step, Issue Identification, is especially crucial to the success of an ICZM process because it lays the foundation for appropriate and timely communication between and among managers, scientists and other stakeholders. Among the tools available to support Issue Identification we will here focus on institutional and stakeholder mapping and DPSIR and CATWOE.

How do issues arise?

Issues can result from conflicts between human activities or between human activities and nature protection. Issues can extend over different scales geographically and politically. Single issues may be easy to deal with, but often multiple issues are involved that affect the ecological, social and economic aspects at different levels and scales. Also, issues can be transboundary. Policy decisions can be made at international level but need to be implemented at a national and local level.

An issue is perceived as a problem that needs a solution that is sustainable and would satisfy society. The recognition of an issue initiates the SAF process, often with a request from government to one or more persons. An issue can also be generated "bottom-up" by stakeholders seeking documentation on effects of human activities or by scientists concerned about an environmental, societal or economic problem. With the problem at hand, the priority is to identify all the bodies involved in decision making and implementing, who are causing or being affected, and who can assist in finding appropriate solutions. The Issue Identification step is initiated by institutional and stakeholder mapping, followed by DPSIR and CATWOE mapping.

Institutional and stakeholder mapping

Institutional mapping (Fig. 1) is important to understand how governance relates to human activities and stakeholders. Together with the stakeholder mapping an overview is gained on the structure of "power", "influence" and "interest" relevant to the issue and locality. Similar issues may be dealt with totally differently depending on the social and cultural structure they occur in.

Mapping is a basic tool required to understand which institutions and stakeholders are involved and how they interact and to assess their potential role in the SAF process. Figure 1 shows an example of institutional mapping in the form of a diagram, but intuitional mapping may also be a description.

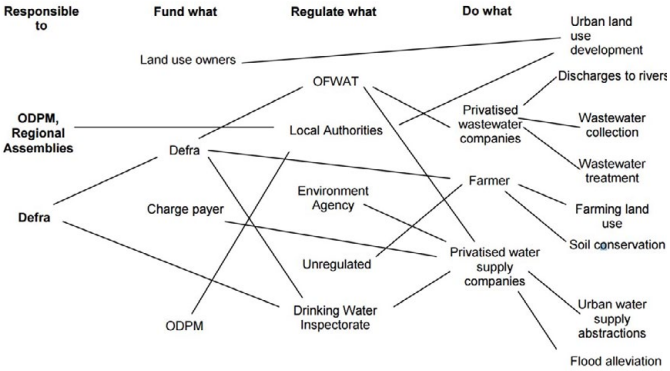

Fig. 1: An example of an institutional mapping. From http://www.coastal-saf.eu/design-step/support/introducing_institutional_mapping.pdf

The Systems Approach takes into consideration that natural systems are constantly being affected by human society and cannot be managed without including the human dimension. Therefore, in SAF, managers, scientists and the general public who have an interest or stake in the issue are all considered stakeholders.

An important aspect of the Issue Identification step is the early engagement of the stakeholders whereby the issue defined in further detail and their participation in the development of the DPSIR and CATWOE is ensured. Stakeholder participation at the early stage in the process encourages policy ownership, which may result in high compliance to new regulations.

DPSIR

The causal framework, DPSIR (Driver, Pressure, State, Impact, Response), (Fig. 2) was adopted by the European Environmental Agency (EEA) for reporting on environmental issues and interactions with society. This conceptual tool is popular but has been criticized for being too simplistic and has its limitations when dealing with multiple issues or issues that extend over multiple scales. In the SAF we use this tool to aid in the identification of the issue and causal relationships and reveal the iterative nature of the process. One example of an environmentally oriented DPSIR is also provided in Figure 2.

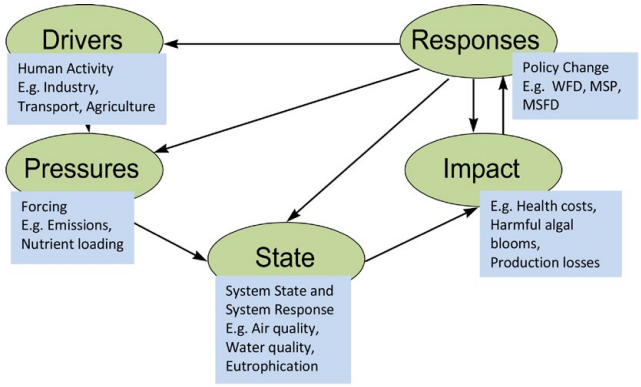

Fig. 2: Diagram of the DPSIR adapted with a general descriptor and an example concerning WFD, eutrophication and mussel production.

CATWOE

The links between the natural system and human society can be mapped using the conceptual tool, CATWOE (Customers, Actors, Transformation, Worldview, Owners, and Environmental constraints). In CATWOE, this is done by describing the relationship between stakeholders and individual human activities. For each human activity, Customers are those who benefit or suffer from the activity, Actors are those conducting the activity, Worldview is the bigger picture as perceived by the general public, and Owners are those who can start or stop the activity.

Transformation is the conversion of inputs to outputs and can be ecological, social, economic values, and Environmental constraints are the limitations caused by physical, financial, legal or cultural constraints.

What comes next?

The Issue Identification prepares the way for the next step, System Design, in which all core stakeholders are engaged and a good communication is established within the SAF team. During the System Design, a conceptual model of the simplified virtual system is developed.

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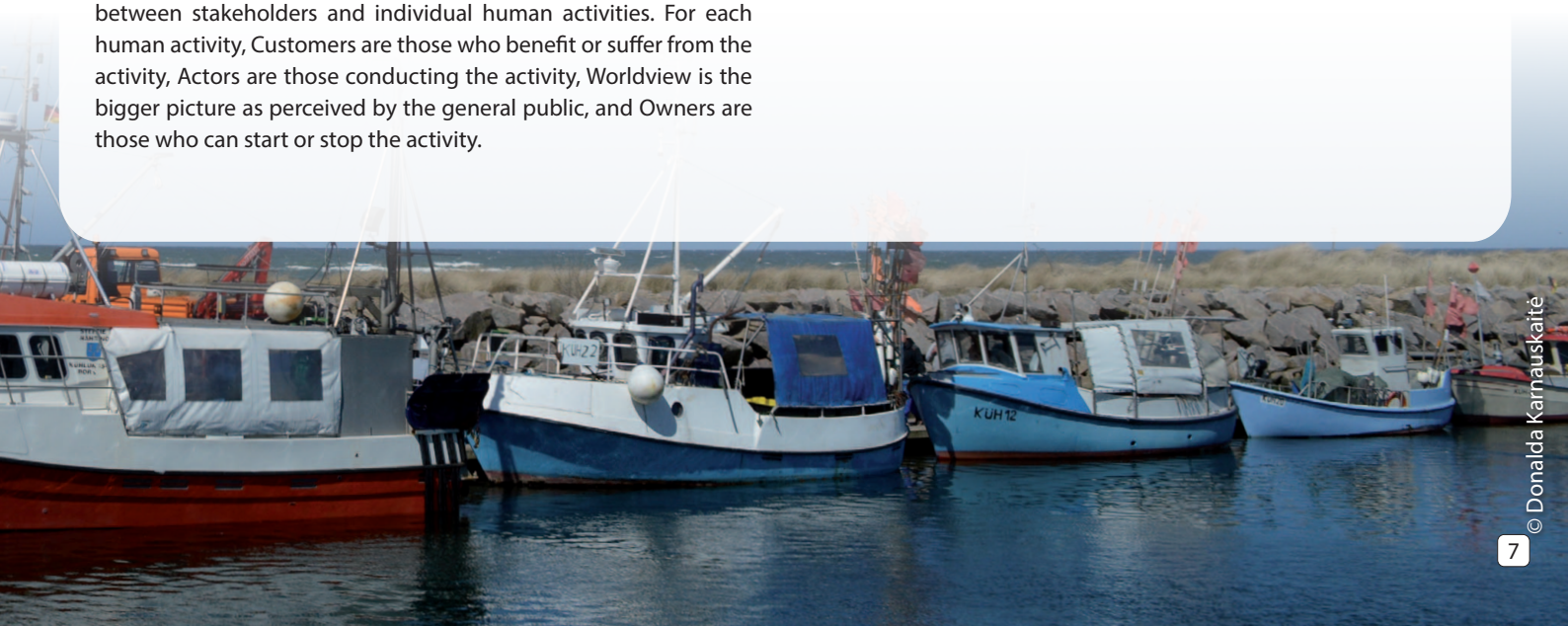
Stakeholder meeting and discussion at the Szczecin lagoon

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The Ecosystem Services Assessment Tool (ESAT) – Assessing ecosystem services and tracking their changes over time

Integrated Coastal Zone Management is an important and valuable approach to deal and manage the increasing pressure, impacts and risk that ravage the coastal ecosystems. The increasing pressure binds to the fact that humans depend very much on what the environment provides and what we can use as benefits for our wellbeing. What we use from the environment can be divided into goods and services. Ecosystem goods are tangible outputs that are directly taken from the ecosystem, and ecosystem services are the processes that regulate the delivery of the goods which we use.

There are many ways to define the concept of ecosystem services, but the most widely used and simplest definition refers to benefits that we use from the environment that contribute to human wellbeing. Regarded as a multidisciplinary approach as a tool for management efforts it brings together economic, social and environmental disciplines with the aim to provide a holistic view of the system. Let's take fisheries as an example to understand the concept: if we extract fish from the sea, harvest mussels or farm fish in the sea, then we are using what the ecosystem provides to us, this is what is meant by ecosystem services.

They are divided into different categories: Provisioning, Regulating & Maintenance or Cultural Services. Provisioning services can be defined as tangible elements related to biota that can be used as nutrition, materials or energy. Examples are fisheries, aquaculture, production of biogas from algae or building material from macrophytes. Regulating & Maintenance services control and shape the environment, they are not used directly as services but instead they regulate the performance and the provision of the other categories. Examples are the maintenance of nursery areas, filtration and sequestration of nutrients, flood protection, climate regulation, and the maintenance of physical and chemical conditions of the waters. Cultural Services are connected with an anthropogenic perspective of nature, it includes all non-material ecosystem outputs and interactions that have a symbolic, cultural or intellectual significance for humans. Activities related to biota such as whale and bird watching, bathing, cultural sites, protected areas, are examples of this category.

With an increasing number of scientific publications, ecosystem services have become a popular research topic. There are already many international initiatives that push forward the knowledge about the concept. Europe is on the frontline in terms of developing the concept with many research projects, partnerships and platforms. Under the research umbrella of the BONUS BaltCoast project a methodology and tool to assess ecosystem services were developed, named Ecosystem Services Assessment Tool (ESAT).

This tool will be then further applied and tested during the German Research Project SECOS – Syntheses (http://secos.deutsche-kuestenforschung.de/projekt-secos-synthese.html) where one of the work packages aims to assess and map ecosystem services of the German coastal waters.

The approach and tool were developed to overpass the lack of marine ecosystem services assessments. The tool adds an innovative aspect to the concept by not only analysing the provision of the present times ecosystem services, but also looking at the past. In this way it is possible to track changes in ecosystem services provision and to display how these changes are connected with environmental or socio-economic conditions and changes from past to present times. The objective is that the results obtained from the tool are policy relevant and can be used by governors, managers and stakeholders that are responsible for the development and management strategies of an area.
The tool is built on a Microsoft® Office Excel® spreadsheet format aiming to be user friendly by not requiring technical expertise. The tool comes with a guideline document to facilitate the users in the process. Beside this, all calculations of the tool and results (graphs and figures) are automatically generated. Outputs can then be used to communicate the results of the assessment to a wide range of audience (from general public to stakeholders and decision makers).

Up to date, the tool includes 31 services classified from a modified version of the "Common International Classification on Ecosystem Services (CICES)" (www.cices.eu). Since not all services can be directly measured and assessed, the use of indicators to represent the services is a common practice. We followed this concept and the 31 services are represented by 54 indicators. Some of the indicators used are proposed by the European Union (EU) Project "Mapping and Assessment of Ecosystems and their Services (MAES)" (www.biodiversity.europa.eu/maes), developed to help Member States to fulfil Target 2 (Maintain and restore ecosystems and their services) of Biodiversity 2020 Strategy. Since not all indicators proposed were suitable, we also developed an own set of indicators through discussions between young and senior scientists, whereby our criteria were the availability of data and the capacity to represent the service.

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The approach consists of 4 steps:

- The first step is the definition of the study area. This is done based on the coastal waters classification of the Water Framework Directive. For this European Directive the Member States had to define and classify their coastal waters into different water body types according to different physical and chemical parameters (salinity, temperature, water depth). This water body typology is available for each country and is used in the tool.

- The second step is the definition and assessment of services and indicators for the initial status. The initial status is defined also according to the Water Framework Directive, which defines reference ecological conditions (conditions of the water body in a time when human impacts did not play a role) for the water bodies. Increasing the nutrient loads from the reference conditions by 50% we will in general achieve a good ecological status of study area. This point in time after the 50% increase is the time we use for the initial status (the point in time varies between countries; in Germany where the tool was tested, the initial status refers to the early 1960s)

- The third step is the definition and assessment of services and indicators for the present status. The present status should reflect the actual ecological conditions of the environment.

- The fourth and last step is the visualization of results. There is a comparison between the assessment of initial and present statuses, this difference is then inserted into a scale divided into classes of change. The scale (Fig.1) has a positive side representing an increase in the service provision and negative side of scale representing a decrease. If nothing changes then the service provision is maintained through time.

The approach was tested in the Szczecin Lagoon and the results showed differences in the services provision over time (Fig.2). The tool is also to be applied in Pomeranian Bight (Germany), Curonian Lagoon (Lithuania), Schlei (Germany) and Darß-Zingst (Germany).

The novelty of this approach is the comparison of the provision of services between two different ecological statuses. With this methodology it is also possible to define theoretical future scenarios with different management options to improve the ecological status of coastal waters, allowing knowing which services provision will increase, decrease or stay the same for the future. The tool and methodology will continue to be improved with the aim to achieve always a reliable management tool to support the decision-makers when planning and dealing with problems in coastal zones.

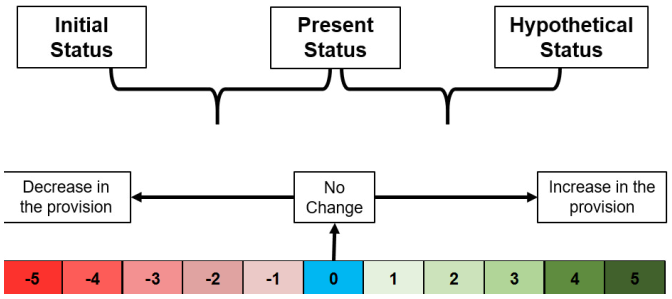

Fig.1: Scale used in the tool for the classes of change in the provision of services (classification from -5 to 5: an increased number means an increase in services provision and vice versa; "0" means that by comparing the two statuses there is no change in the provision of services). Within the assessment an initial and present status can be compared to a hypothetical scenario.

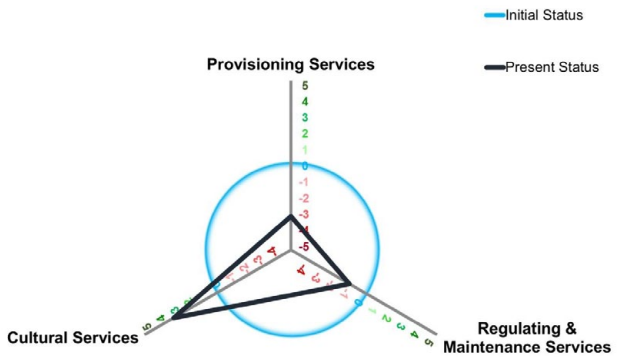

Fig. 2: Simplified version of the aggregated results showing the change in ecosystem service provision comparing the initial and present status of the Szczecin Lagoon. The blue colour (middle ring) represents the initial status. The green colours represent the classes 1 to 5 from inner to outer circle and therefore an increase in ES provision. The red colours represent the classes -1 to -5 from outer to inner circle, and therefore a decrease in ES provision.

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A participation, preference and planning tool for a systematic involvement of stakeholders

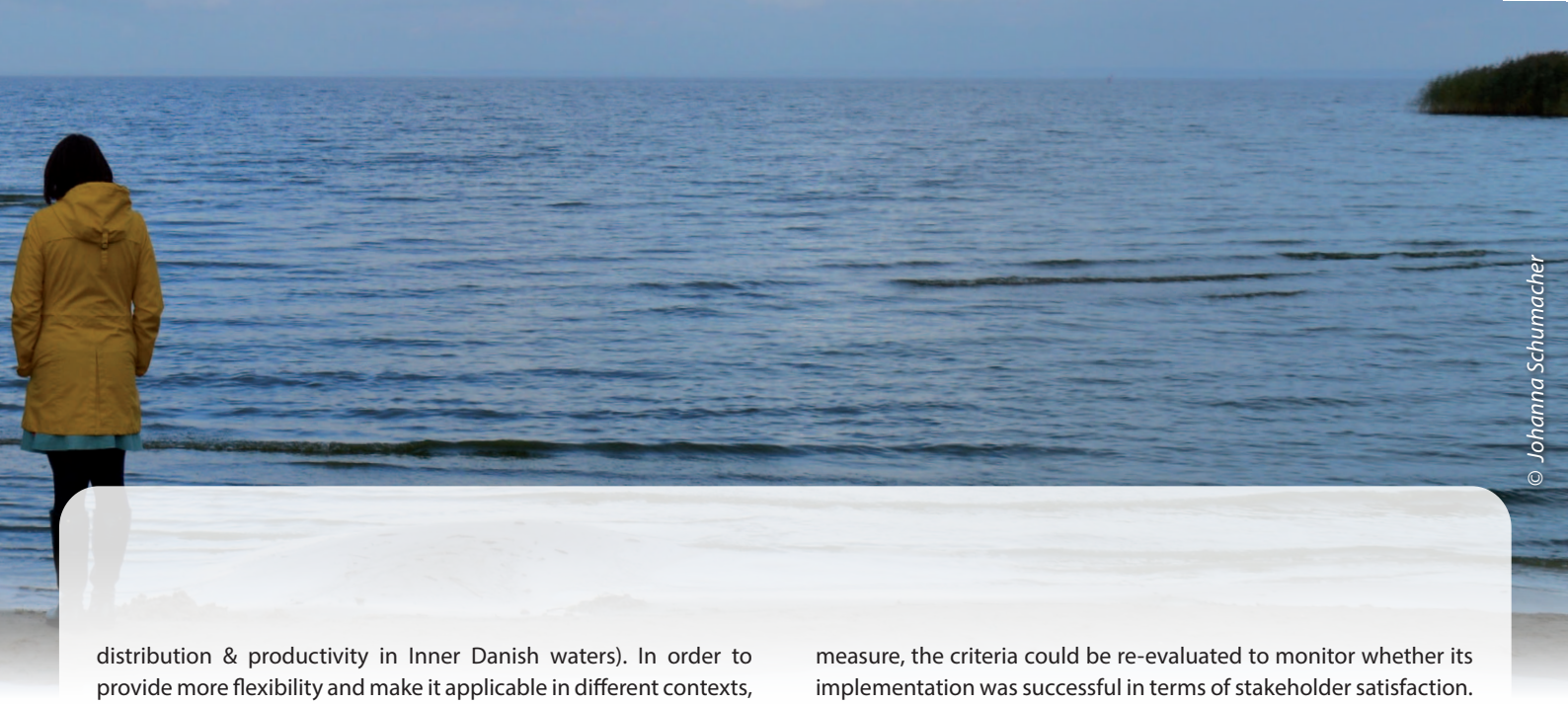
Coastal and marine management problems are usually complex and affect various actors. Hence, transparent decision-making processes, including stakeholder participation are often required. Involving stakeholders early in the process can have several benefits. On the one hand, an early involvement can reduce later conflicts and increase the acceptance of the decisions. On the other hand, stakeholders can provide local knowledge, professional experiences and know the political realities.
Hence, also within the Systems Approach Framework (SAF), active involvement of stakeholders plays a crucial role and reoccurs within the different SAF steps. In order to involve stakeholders systematically, easily applicable tools are needed, which support the process. Thus, within BONUS BaltCoast we are further developing a participation, preference and planning tool that is aimed at raising awareness about sustainability issues and developing a common vision for future development and shall thereby support decision-making processes.

The tool is built upon the DeCyDe-for-Sustainability approach, which was developed within the project SUSTAIN by ISOTECH Ltd Environmental Research and Consultancy. It is a two-step approach and consists of an indicator application and a weighting exercise to assess stakeholder preferences. Hereby, the pillars of sustainability (Environmental Quality, Economics, Social Well-Being and Governance) or supporting issues (such as Pollution or Changes at the Coast) are organized in a spreadsheet matrix. In a moderated discussion, stakeholders are asked to compare two pillars or issues at a time and give a score based on their relative importance. After all scores have been determined, a weight coefficient for each sustainability pillar, or issue respectively, is automatically calculated. The weight coefficient can then be used in combination with the indicator application to provide flexibility and adjust scores to local specificities, by giving smaller weights to issues that are of less relevance for a municipality or region.

Within our German BONUS BaltCoast case study site (the German part of the Szczecin lagoon and surrounding regions), we applied the weighting methodology in an adjusted questionnaire format during the first stakeholder meeting in Ueckermünde. In preparation for the workshop, we asked the participants to determine the relative importance of the sustainability pillars for the current state as well as for the future state, to which they would like their region to develop. For this, each participant received background information with a short description and a table with the underlying issues as well as the indicators that are included in each issue. The summarized results were presented in the workshop and used as a starting point for a discussion on the needs for the region's future development. Participants identified issues from the provided list that are most relevant for their region, and listed and discussed additional aspects that are of importance. Thereby, the aim was to enable a discussion among the diverse stakeholder group about the future development vision and the role of the Szczecin Lagoon in this context. This formed the basis for our later discussion on the need for water quality improvements in the lagoon.
The DeCyDe-for-Sustainability approach provides a systematic way to generate a discussion among stakeholders about the importance of a sustainable coastal development. However, the tool mostly focuses on the municipal and regional level. Therefore, it was not suitable for all issues addressed within our BONUS BaltCoast case study sites (e.g. the issue dealing with fish

Discussion of questionnaire results with stakeholders

Listing of region-specific criteria by stakeholders



distribution & productivity in Inner Danish waters). In order to provide more flexibility and make it applicable in different contexts, the tool was adjusted within BONUS BaltCoast. The modified tool allows to choose and enter criteria freely into the matrix, which then enlarges automatically. Thereby, local issues can easily be included and discussed with stakeholders, and thus support the issue identification step.

Test application of the modified tool by Lithuanian students using success vcriteria for the for re-opening of a bathing beach in the Curonian lagoon

Furthermore, the tool can be adjusted to other circumstances. For instance, perceived conflicts between various activities or stakeholder groups, such as fisheries, nature protection and tourism, can be assessed and discussed using the matrix. Conducting the exercise at the beginning as well as the end of the SAF application allows to see how stakeholders' perceptions change over time.

Within the frame of our BONUS BaltCoast teaching activities, we also tested the tool's ability to assess the success of specific measures, such as the reopening of a bathing beach in the Curonian lagoon (Lithuanian case study). Hereby, the students represented stakeholders and listed criteria that should be considered and fulfilled at the end of a measure's implementation. First, criteria mentioned by the stakeholders (e.g. reduction of tourism seasonality and ensuring beach safety) were grouped and inserted into the weighting matrix. Afterwards, they were discussed and compared against each other to assess their relative importance. This helped to gain a common understanding of the measure itself and generate a discussion on the stakeholders' preferences for the future local development. The defined criteria could then be used to identify additional indicators, which are required to evaluate the success of the measure. After the implementation of a measure, the criteria could be re-evaluated to monitor whether its implementation was successful in terms of stakeholder satisfaction.

CRITERIA (insert below)	Eutrophication	Hypoxia	Chemical Input	Lack of fish	Habitat degradation
Eutrophication	1	Input	Input	Input	Input
Hypoxia		1	Input	Input	Input
Chemical Input			1	Input	Input
Lack of fish				1	Input
Habitat degradation					1

Legend for the Weighting System of the Criteria

Criteria Y			COMPARED TO			Criteria X	IS
less important ←				→ more important			
much	more	slightly	equal	slightly	more	much	
1/7	1/5	1/3	1	3	5	7	

Excerpt of the modified participation and preferences tool

The modified weighting tool is adjustable to various circumstances and can be easily applied to support stakeholder participation by using the tool to enable a discussion, but also to map stakeholder preferences and thereby supporting decision-making processes. Thus, it is a useful tool to support the Issue Identification step within the Systems Approach Framework. However, it can also be re-applied at the Systems Output step to assess stakeholders' preferences for various scenarios or be used as a monitoring tool. Thereby, it is a valuable tool within the SAF toolbox, which is easy to use and applicable by authorities. Yet, an experienced moderation is recommended and adjustments (such as pre-assessments via questionnaires) due to large group sizes and time limitations might be necessary.

Johanna Schumacher
Leibniz Institute for Baltic Sea Research Warnemünde, Germany

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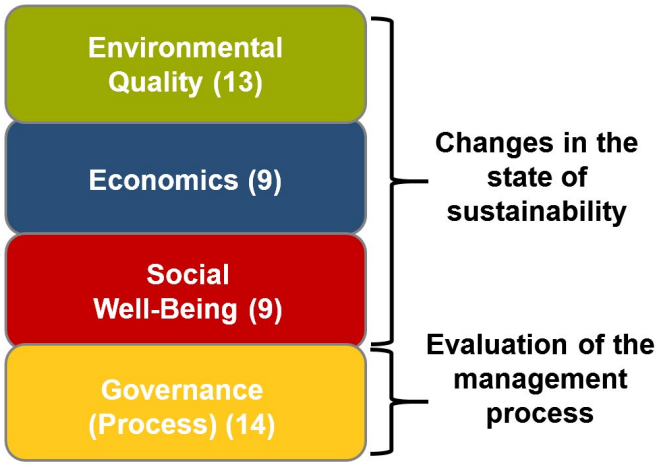
An evaluation tool for the success of ICZM best-practices

Through the project OURCOAST, the European Commission aims to share the coastal management experiences around European coastlines to make them accessible to those who are seeking sustainable solutions to their coastal management practices. Over 350 Integrated Coastal Zone Management (ICZM) best practices are collected in the OURCOAST database with the aim to share lessons learned from coastal planning and management experiences. It is commonly observed that the success and implementation process of ICZM so called 'best practice' are not evaluated. So, are these really best practice examples?

As part of the BONUS BaltCoast project, a new indicator-based tool has been designed specifically to measure the current state of sustainability in coastal areas and to evaluate the success of different ICZM best practice examples applied throughout Europe. The Microsoft® Office Excel® spreadsheet tool includes a set of 45 well-established indicators that are grouped into 4 categories: environmental quality, economics, social well-being and governance/process indicator.



The indicator set categories of the indicator-based ICZM best-practice evaluation tool, evaluation purpose & number of indicators per category

The environmental quality indicators cover issues of coastal zones like air, water and soil pollution, coastal erosion, flooding, climate change, biodiversity and land use. The economic indicators show the accomplishment of sustainable coastal economy. Issues of social well-being have been selected from the areas of quality of life, educational opportunities, conservation of cultural heritage, crime prevention and safety.

The governance indicators have been selected to show impacts from management efforts and the degree to which the objectives of the integrated management initiative have been practically achieved. Furthermore, the process indicators can help to show possibilities to improve integrated coastal management projects and programmes. Two different scoring ranges using the Likert scale were developed in order to give a quantitative score for each indicator. The scale of the sustainability indicators ranges from -3 to +3. The value of -3 indicates strong negative effects, -2 considerable negative effects, - 1 weak negative effects, 0 indicates that no change is observed, 1 indicates weak positive effect, 2 considerable positive effects and 3 strong positive effects. The scale for governance indicators ranges from 0 to 4, where 0 indicates that the objectives of the respective indicators have not been implemented, followed by 1 (yes, slightly), 2 (yes, moderately), 3 (yes) and 4 (yes, fully). Based on the score of each indicator, an average will be calculated in the respective categories. For an easy usage in entering and calculating the results, the indicator set is put into Excel spreadsheets.

ICZM measures that are considered best practices have been selected from the EU OURCOAST database to demonstrate the fit with sustainability and a degree of ICZM implementation. The development of the indicators showed that they can be tailored to the needs of the strategic goals of ICZM initiatives. Application results showed that some best-practices have more social impact, some have a greater contribution to environment, yet others show greater investment in economics. This methodology can be a tool for the improvement of different ICZM projects or initiatives because it helps to identify strengths and weaknesses of ICZM initiatives and their contribution to sustainable development. Moreover, the methodology based on qualitative results seems to be useful to support strategic planning and System Approach Framework evaluations. This will help decision makers, coastal communities or regions to include sustainability into their development and prospective planning.

To have a look at the indicator spreadsheet tool please visit
http://www.baltcoast.net/indicators.html

Donalda Karnauskaitė
Leibniz Institute for Baltic Sea Research Warnemünde, Germany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How does BONUS BaltCoast affect local learning processes?

Interview with Eglė Baltranaitė, BONUS BaltCoast representative of the Lithuanian case study site and co-director of the Nida Culture and Tourism Information Centre

Hello Eglė! You are a representative of the Lithuanian case study site. Could you give a short introduction to it?
In the Lithuanian Curonian Spit case study, an issue of Curonian lagoon water in terms of bathing quality is addressed. This issue is directly connected to the local tourism industry: After beaches had to close due to the low water quality, we are now tackling the idea of opening a beach on the Curonian lagoon site in the Neringa municipality again, since the water quality is improving.

How does this issue concern you?
On first hand it concerns me as a scientist. I've been involved in this matter since I was a master student. But I do not only have a scientific view on the Curonian lagoon. I am originally from Neringa, I grew up bathing in the Curonian lagoon and now I work at the Nida Culture and Tourism Information Centre. So I also have a stakeholder's perspective on the project and I am actively participating in the stakeholder involvement process.

That gives an interesting all-round perspective on the issue. How are stakeholders being involved in the project? What would you say is important when it comes to stakeholder involvement?
During the first year we addressed the stakeholders of the territory, which was rather easy since Neringa has a small and close community - people were very supportive. From the start, we agreed to update the stakeholder group on our results and to not make public statements before the results were presented to the community. This agreement was a very important step. It allowed building a relationship of trust between scientists and stakeholders/end users, and the stakeholders offered their participation in return. This is the foundation for long-term local learning processes.

The term "social learning" implicates a change in the understanding that goes beyond an individual and becomes situated in a community within a process through social interactions. Can you observe such a learning process at the example of the Lithuanian case study site?
Learning processes can take place on several levels. On the one hand, we have a strong network of scientists involved in the Lithuanian BONUS BaltCoast case study with different backgrounds, who exchange expertise and widen each other's knowledge.

At the same time, addressing the community representatives about their concerns is providing a kind of "expert knowledge" one could hardly obtain on one's own! For example, some of them helped to develop the indicator-based evaluation tool that is introduced in this issue. So the process definitely works both directions. Last but not least, the dialogue with stakeholders is especially important for young scientists, because it sharpens their social skills – they develop a kind of "social knowledge".
Of course we aim for a long-term learning process here. I can witness a deeper understanding in the community of what a sustainable development means, and stakeholders are realizing that the knowledge accumulated by the scientists is relevant for their daily processes and is helpful for managing their territory.

Would you say the SAF applied within BONUS BaltCoast is specifically helpful for this process?
From my scientific perspective I see the SAF as a kind of communication tool. It "translates" the scientific process and therefore supports a clear communication to the stakeholders. Applying the SAF step by step ensures that there is always a dialogue between the involved parties and that everyone stays included. The SAF gives the communication process more structure which enhances a deeper learning and understanding.

Thank you for the interview!

Interviewer: Svenja Höft


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Eglė Baltranaitė in the field


© Anna-Lucia Buer

Training in ICZM - new modules and student courses

Capacity building, education and training are an important activity in BONUS BaltCoast. Young academics and students shall be trained in the Systems Approach Framework and its application, to support a new generation of coastal managers and practitioners as well as a new generation of scientists who are better able to deal with complex, interdisciplinary coastal issues and problems. BONUS BaltCoast partners have agreed on a concept for training and education lectures dedicated to students from different programs. The modules prepared were and will be further tested during the summer schools organised in 2016 (Klaipėda, Lithuania) and 2017 (Riga, Latvia).

The course about SAF will include major and complementary modules and it will be available online and free of charge.
The major course will provide basics on:

- Integrated Coastal Zone Management issues
- The introduction to SAF
- The SAF application for 6 different study cases within the BONUS BaltCoast project.

Complementary modules will consist of lectures with background information and practical exercise guidelines.
They will cover the following topics:

- Learning ICZM & SAF
- Understanding the system - ecosystem service assessment
- Issue Identification Step: Stakeholder mapping, CATWOE, DPSIR
- Stakeholder involvement and participation
- Design Step: System Definition, Conceptual model, Data and methods, Problem scaling
- Formulation & Appraisal Step: modelling
- Output Step: Role play on scenarios
- Evaluating success: Indicator set application
- Critical evaluation: based on case study evaluations.

Meanwhile, in April 2015 and 2016, Lithuanian students with background in Ecology and Environment, Marine Environmental Engineering, Ichthyology and Aquaculture and Geo-informatics received a 2 weeks training on coastal management in Germany at the Leibniz Institute for Baltic Sea Research Warnemünde. In September 2015 and 2016 it followed a 10 days intensive teaching course on coastal management for students at Klaipėda University, with strong involvement of BONUS BaltCoast scientists.

Main concern of the courses is the application of a Systems Approach Framework (SAF) by addressing a variety of topics concerning coastal management, such as bathing water quality, coastal tourism, coastal protection management, ecosystem services, coastal and marine spatial planning, fisheries and aquaculture, hydrological modelling and climate change adaptions in the Baltic Sea region.

Topics are orientated on local case study examples and during several excursions, field and laboratory work, student presentations and group discussions, the students' practical knowledge and skills are strengthened. In 2017, the student courses in Germany and Lithuania will be continued.

Marija Kataržytė
Klaipėda University, Lithuania


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Students during field work with water samples


© Svenja Höft

Social activities do not come too short during student courses, like e.g. the swing dance course in April 2016 in Germany

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A new ICZM training website

Now, more than ever before, people spend hundreds of hours online doing everything, from shopping to entertainment, from socializing to studying. The importance and effectiveness of online learning platforms is therefore rising, since it represents a highly popular, quickly available medium. First attempt to introduce the SAF approach for coastal zone management via an online platform was in the frame of the SPICOSA project. The tool is an open source manual on how to apply a SAF for an integrated assessment of coastal areas. Currently it is presented as a description and explanation driven handbook with some examples and tasks, dedicated mainly for policy makers and those who have a specific interest in the SAF. We want to go further and introduce a SAF training basis for a more diverse audience.

Our desire to share our knowledge, which we accumulated about SAF over the years, in a more simplistic and user friendly manner, led us to the decision of creating an own training website. The course will focus on the Systems Approach Framework application for Coastal Research and Management and will cover 40 academic hours of different subjects following the five SAF steps: 1) Issue identification, 2) System design, 3) System Formulation, 4) System Appraisal, 5) System output, followed by additional modules about monitoring and evaluating the success of the application. This course will be a direct descendant of the SAF Handbook, introduced during the SPICOSA project, but will provide a more user friendly learning experience.

For the implementation the main UX (User Experience) principles are used: accessibility, clarity, visual appeal, visual and contextual hierarchy, reusability. How many times did you open an online course and closed it after several minutes, not because the material or subject was not appealing, but because it "felt" wrong? This is because the creator of the course did not think about the user, when designing the course material: the presented material was difficult to access and then to follow, it had complicated terms, too much theory and not much or no practical exercises, text driven explanations, no visual aids and so on. These mistakes need to be avoided to finally introduce an immersive learning experience with visual (video and image) aids, understandable texts for a variety of people from different backgrounds, theory and practice exercises, and for analysing learned skills – an online test segment.

Important issues kept in mind while designing the website were the project life-cycle and its added value and survivability after the official project end. Students, teachers, or policy makers alike are welcome to benefit from the open source material that shall be useful to the future generations of scientists also after BONUS BaltCoast as a project is finished.
While the project is ongoing, the usability of the course will constantly be monitored and evaluated to make corrections based on user feedback. After the project ends, the user will have all the contacts for a personal inquiry for a specified subject provided. Feel encouraged to visit the training webpage, which will launch at the end of 2016 and will be available directly from the main BONUS BaltCoast website. Meanwhile, the material from our recent Summer School is available online and will be partly incorporated in the training website.

To find out more about BONUS BaltCoast student courses and to check out the training material, please visit www.baltcoast.net

Natalja Čerkasova
Klaipėda University, Lithuania

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Role-plays to support coastal management training

Integrated Coastal Zone Management (ICZM) is a dynamic, continuous and iterative process designed to promote sustainable management and development of coastal zones. ICZM addresses problems in a circular process that covers the steps: initiation, planning, implementation as well as monitoring and evaluation. In a Systems Approach Framework (SAF), the planning step is even further sub-divided into systems design, formulation, appraisal and output. The involvement of stakeholders is imperative throughout the entire ICZM process.
ICZM teaching courses face the problems that they have to familiarize students with this complex approach and to provide training that later allow students an application in practice. Especially the involvement of stakeholders and public participation are major challenges that largely determine whether a coastal measure or initiative is successful or not. Role plays turned out to be a successful vehicle to train ICZM cycles and to transport major ideas.

The BONUS BaltCoast project has the objective to carry out intensive training and education for students and professionals in order to increase the capacity to deal with complex coastal issues in a systematic way. For this purpose, a role play has been developed. It is located at the Greifswald Bay and assumes that an investor wants to establish blue mussel farms in alternative locations. Mussel farming in Baltic coastal waters is a controversial issue. Climate change improves the conditions for and enables mussel cultivation in the Baltic. Blue mussels are a high-quality protein source for human nutrition and as animal feed and mussel farms can serve as an environmental measure within the Water Framework Directive to remove nutrients, increase water transparency and to reduce eutrophication. On the other hand, mussel farms have diverse impacts on the ecosystem, especially on sediments, birds and fish species.

The situation to be played is a first meeting between investor and major local stakeholders representing environmental and health agency, tourism association, nature protection NGO, fisheries association and local municipality. After the mussel farming project presentation by the investors, a moderator runs the meeting with the aim to explore possibilities and limits for establishing farms. The meeting closes with joint recommendations. The students represent all roles and run the meeting independently. The role-play is introduced in a lecture about the regional setting, followed by preparation time and a two-hour meeting. The entire role play covers about five academic hours and finishes with a general lecture about pro and cons of mussel-farming in marginal coastal regions.

The role play and the lectures are publicly available under http://www.baltcoast.net/training.html and is built upon the German case study within the BONUS BaltCoast project.

Gerald Schernewski
Leibniz Institute for Baltic Sea Research Warnemünde, Germany

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The role-play on mussel farming in Greifswald Bay is applied for coastal management training within student courses at Klaipeda University, Lithuania, and Rostock University, Germany. So far, the feedback by students is very positive, because the role-play supports an active and practice relevant learning process.
One aim of the role-play is to expose students to a situation they might face later in their job. Another aim is to improve skills in communication, discussion moderation and presentation.

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BONUS BaltCoast summer school 2016: "A System Approach Framework for Coastal Research and Management: From theory to practice"

While the BONUS BaltCoast teaching activities in form of the annually running master student courses have already successfully taken place in 2015 and 2016, the project also went into its first round in holding a summer school from 22th-28th August in Klaipeda. The summer school gave opportunity to share the knowledge about the SAF approach, applied in the BONUS BaltCoast case studies, with interested bachelor and master students, young post-graduates up to young PhD students.

During one week of intense training, a group of 25 participants from Germany, Latvia, Spain, Poland, Italy, Lithuania and Morocco gained insight into the stepwise SAF application on coastal management issues. During the course all five SAF steps were addressed both theoretically and during exercises or group work, especially on the example of the Lithuanian BONUS BaltCoast case study site with the coastal management issue of bathing water quality & tourism at the Curonian lagoon and coast. The beforehand introduced tools which are being developed and applied within BONUS BaltCoast were applied by the participants as a test, which on one hand was supposed to help the students understand the system from different approaches, but also played an important role in further improving the tools. The summer school was supported by expert lecturers on the particular SAF application steps, which allowed a lively dialogue and intense discussions between the participants and lecturers.

Warmly welcomed by the Lithuanian project team, the group of students and lectures could enjoy Klaipeda city and culture, connect with each other and exchange about their background of expertise. The summer school was an important first step to not only pass on knowledge from the inside of the project to others, but also to receive valuable feedback from international scientists. A big thank you to everyone involved and hopefully we will welcome as many participants in 2017 at the second BONUS BaltCoast summer school from 20-26th August in Latvia, Riga!

To get more information and to check out the teaching material used during the lectures, please visit the summer school 2016 on www.baltcoast.net

Svenja Höft
Leibniz Institute for Baltic Sea Research Warnemünde, Germany

Sabina Khan, Masters of Science candidate in Global Change Ecology at University of Bayreuth (Germany)
"The most important learning experience for me was developing skills on how to be a moderator and how to take stakeholders through the SAF process. The process can unfold in various ways, and the modelling step makes it easier to mediate between stakeholders and to diffuse conflicts. I see The SAF as a helpful approach to clarify the validity of stakeholder perceptions and positions. Also I received insight into how a new coastal management tool can be developed, who needs to be involved and how this tool can be tested, e.g. with stakeholders or via a summer school."

Michal Piotr Morawski, PhD student at the Institute of Hydro-Engineering of Polish Academy of Sciences in Gdańsk (Poland)
"At the summer school I learnt how to deal with complex models and how to set them up taking into account the concerns of different stakeholders. I also saw it as a great opportunity to meet people with different backgrounds and cultures and to exchange myself with them."

Katrina Abhold, Ecologic Institute Berlin (Germany)
"The SAF approach is similar to and integrates well with my own research and project work. It incorporates elements of environmental and socio-economic analysis with modelling, which is something I was interested in learning overall. I had a great time and learned aspects of the SAF approach that I can apply going forward."

© Michael Gilek

BONUS BaltCoast partner projects' summer schools

BONUS BALTSPACE summer school 2016

The BONUS BALTSPACE summer school took place from 29th August to 2nd September 2016 in Klaipeda, Lithuania with additional financial support from VASAB (Vision and Strategies around the Baltic Sea). BONUS BALTSPACE researchers, invited MSP experts as well as 15 PhD students and early-career professionals gathered for jointly exploring the topic of transboundary Maritime Spatial Planning (MSP) in the Baltic Sea.
The researchers and invited MSP experts gave a state-of-the-art update on the academic discourse and provided empirical insights on transboundary MSP. In addition, science-based tools and approaches and their potential application to address transboundary integration in MSP were presented and reflected upon.

The students, coming from diverse academic and professional backgrounds as well as from different countries of the Baltic Sea Region (BSR) and beyond, presented their own experience in transboundary MSP or related fields of interest. Furthermore, they were tasked to reflect upon transboundary challenges in the BSR in teams and defend their findings in front of the whole group.

After the five days the students took home not only new insights on transboundary MSP, but also an expanded international network of professionals and academics engaged in MSP research and practice. The BONUS BALTSPACE researchers benefited from the interesting perspectives and reflections provided by the students, which will serve as inspiration for their further work on the project's case studies and tools.

Antje Roß
s.Pro – sustainable projects GmbH, Germany

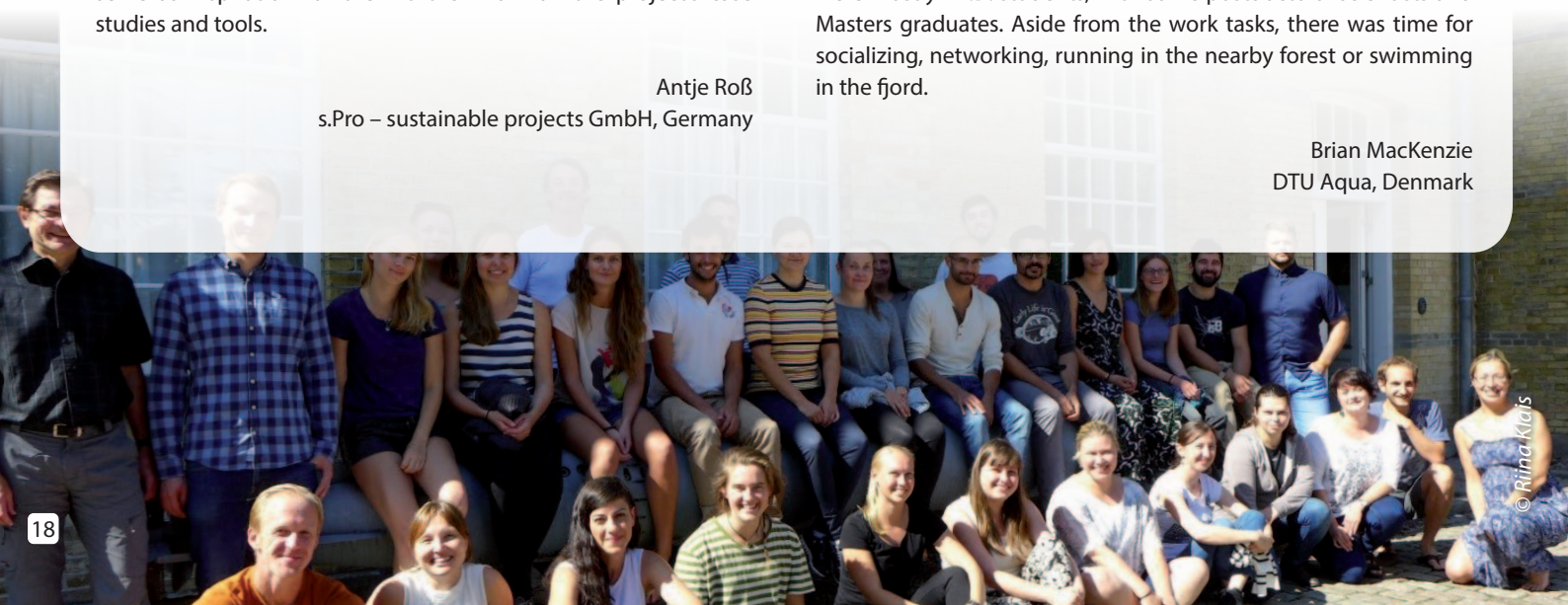
BONUS BIO-C3/INSPIRE/COCOA/BAMBI 2016 summer School – "Modelling Biodiversity for Sustainable Use of Baltic Sea Living Resources"

From 22nd-26th August 2016, 23 students and 10 lecturers came together for the jointly organized summer school of the four BONUS projects BIO-C3, INSPIRE, COCOA and BAMBI at Søminestation, near Holbæk, Denmark. Main purpose was to educate and train a new generation of young scientists on the challenges and opportunities that face biodiversity in the Baltic Sea and provide them with new knowledge and quantitative tools on how to model its variations and their consequences.

The course consisted of a mix of lectures, hands-on statistical analyses/ modelling exercises and discussions addressing both functional and taxonomic aspects of marine biodiversity, with emphasis on estuarine systems, using the Baltic Sea as a case study. Topics covered in the course included time-space variation of biodiversity, including both functional and taxonomic perspectives at different levels of biological organization (populations, species, communities). The course also reviewed and identified how different drivers (e.g., fishing, eutrophication, climate change, invasive species) affect biodiversity and how biodiversity levels and variations feed back to the drivers and ecosystem management policy developments. Students learned new modelling approaches and software skills which they could take home and apply to their own research projects.

The students came from both Baltic and non-Baltic countries, were mostly Ph.D. students, with some postdoctoral scientists and Masters graduates. Aside from the work tasks, there was time for socializing, networking, running in the nearby forest or swimming in the fjord.

Brian MacKenzie
DTU Aqua, Denmark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Realising potential of young scientists – the leaders of tomorrow

As part of its programme delivery, key communications tools and means are put in practice in BONUS, the joint Baltic Sea research and development programme. The ultimate aim is to seek and seize opportunities to enhance scientific knowledge and its use across different policy and socio-economic stakeholders. A particular emphasis is invested on young scientists' skills and their development. By realising young scientists' potential, for instance in creating strong online and social media presence with direct links to wider societal dialogue, can create a new generation of scientists who are not only comfortable talking about their research but who are also easily understood by a 'layperson' – be it your local member of the parliament or grandmother!

Incepted first in 2010, the BONUS Young Scientist Club's offers to date have been met with enthusiastic and inspiring participation of hundreds of PhD students and early career Postdocs. Trainings have included hugely popular transferable skills' sessions e.g. the world-renowned researcher trainer Hugh Kearns revealing 'Seven secrets of extremely successful researchers' and an interactive public engagement workshop 'Engaging researcher' by a researcher trainer Paul Toombs, and many more.

In late 2014, BONUS launched also a new website www.bonusprojects.org, with management tasks handed over from the very start to the individual BONUS projects. During its first calendar year of existence (2015), over half of the 28 000 visits (close to 20K unique page views) to the site were made to the young scientists' blog section which discusses their experiences and different observations while working in BONUS projects. The threshold for producing content by enthusiastic project members was kept as low as possible while still maintaining a good quality base-level on content. Gradually this is being built on as skills – and projects – mature and results start accumulating.

In fact, also in late 2014 BONUS was chosen as a pilot of the PE2020 Public Engagement Innovations for Horizon 2020 project https://pe2020.eu which after shortlisting potential case-studies within BONUS, chose the young scientists' blogging activity as its real-time case study. Consequently, a BONUS young scientist training opportunity was funded by PE2020 in March 2016 when a science communication company KasKas Media led an online social media and blogging clinic. Most recently BONUS joined forces with ICES at its Annual Science Conference 2016 held in Riga in September 2016 and organised a workshop attended by some 70 young scientists on the topic of 'getting published'.

Blogging and the recent blog training have not only brought BONUS a bunch of new bloggers and visitors, as although seeing growing numbers is always satisfying, even more so is reading more and more inspiring, well-written, thoughtful and funny blog posts that reach out far beyond the BONUS community. A specific autumn 2016 blog challenge for young scientists contributed to the BONUS-HELCOM-VASAB-Baltic Earth session at the EUSBSR Annual Forum 2016 (9th November 2016) titled 'Hot Seat: Which way is up? Young scientists take on key regional actors about desired future options for the Baltic Sea'. Questions considered by young scientists today include such as 'what stands in the way of bringing citizens, scientists and management together in the Baltic Sea area', or 'why there is a tendency of unnecessarily negative images that come with a great risk when stakeholders and public need convincing to invest into the Baltic Sea environment', or 'how some species and parts of the environment can indeed benefit from the ongoing change in the societal production structure' (see www.bonusprojects.org/futures). This type of ample science communications promises good things for our future aspirations!

Now in horizon is the 11th Baltic Sea Science Congress (2017), and when the Baltic Sea community gathers to Rostock for a week next June, so will the next BONUS Young Scientist Club event too!

www.bonusportal.org/ys | facebook and twitter: BONUSBaltic

Maija Sirola
Communications Manager, BONUS


© Viktorija Vaitkevičienė

Groupwork session during the young scientists public engagement workshop, Klaipeda, August 2013

BONUS BaltCoast Summer School 2017

"A System Approach Framework for Coastal Research and Management: From theory to practice"

20th-26th August 2017; Riga, Latvia

Registration Deadline: 30th April

For more information, please visit

http://www.baltcoast.net/summer-schools.html

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