SeaUseTip
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SeaUseTip@home: The spread of the Corona virus has also changed things for the SeaUseTip project team. We have turned our kitchen and living room tables into desks, equipped our laptops with all the data and programs necessary for working in our home offices. We postponed conference participations and workshops until next year and moved project meetings into virtual space. The weeks of the lockdown were also a tour de force for our stakeholders, so that the planned interviews with fishery representatives took a back seat for the time being.

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Nevertheless, team SeaUseTip has done a lot during the past months: We have discussed, organized, modelled, calculated, done research, written papers, and made decisions. In this newsletter, we have collected the most important milestones of the past months for you here. Enjoy reading!

Enjoy reading!

SeaUseTip in action

7 to 9 May 2019
Kickoff meeting with steering committee and scientific advisory board at the Thünen Institute of Sea Fisheries in Bremerhaven, Germany.

14 May 2019
The project is presented at the BioTip kickoff as part of th 15th BMBF forum for sustainability in Berlin.

September 2019 to September 2020
Regular meetings and workshops of the work packages take place in Hamburg, Bremerhaven and – in times of Corona – in virtual space.

Literature review on tipping points and regime shifts in the North Sea

The North Sea is one of the most heavily influenced seas in the world. Climate change and diverse human activities are affecting the complex ecosystem. Which tipping points and regime shift could scientists identify over the past decades and which communities of organisms have been affected? The scientists of the Institute of Marine Ecosystem and Fishery Science at the University of Hamburg (work package 1) wanted to find answers to these questions in a total of 72 relevant scientific publications dealing with this topic.

Most of them described regime shifts in the 1980s and 1990s. For the 2000s, however, no evidence of abrupt changes was found in the literature examined. The analyses focused either on the phyto- and zooplankton community or the whole ecosystem, but less on the fish community of the North Sea. Also, the consideration of the interaction of different influencing factors (climate, fishery, shipping, nutrient input etc.) was rather neglected so far.

The IMF scientists have come to the conclusion that the statistical analysis methods applied so far are not sufficient to uncover discontinuous dynamics in the North Sea ecosystem.

To solve this problem, they have studied time series of fish stocks between 1987 and 2015, using a model from catastrophe theory. In doing so, they not only considered individual actors in the food web, but the system as a whole. Their results show that the fish community has indeed undergone potentially irreversible changes in recent decades and is now in a new stable state.

However, this state is less resistant to disruptive factors. Thus, the scientists were able to trace a gradual transformation of the ecosystem with three major periods of change in the late 1980s, the 1990s and the early 2000s.

The results of their work, which will be published shortly, will now help to better understand the vulnerability not just of the North Sea but also of ecological systems in general to catastrophic changes under future stress scenarios.

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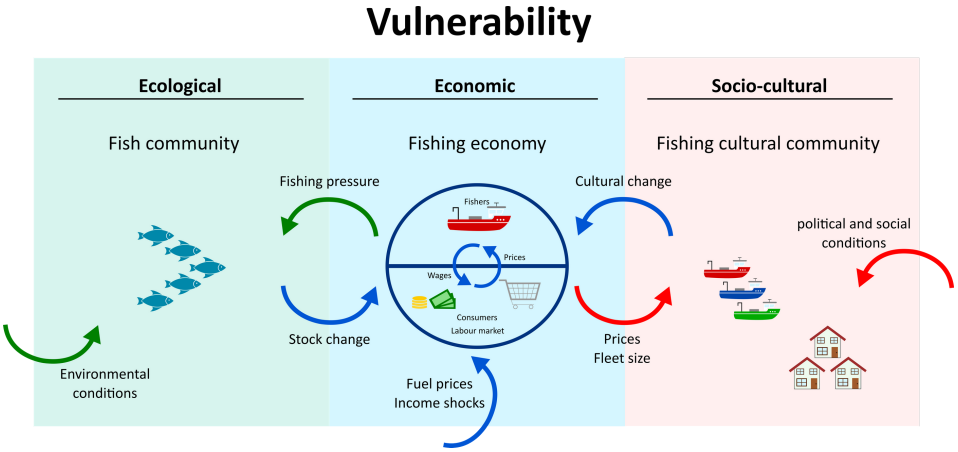
Bio-economic model takes shape

Numbers, formulas, diagrams in every conceivable way, a tangle of colourful boxes connected by countless arrows. If you are not a professional modeler, you can easily lose track of what the experts at the Research Unit Sustainability and Global Change at the University of Hamburg (work package 2) are dealing with. However, these experts are completely in their element when they allow complex ecological and economic and cultural interrelationships to interact with each other in the North Sea system. In recent months, a model has been developed to illustrate the vulnerability of the economic subsystem to tipping points. Based on these findings, meaningful management measures are then derived to strengthen the resilience of the economic system.

Starting from the fishery resources, a wide network of multi-layered information emerges. Catches are linked to both effort and yield. The market analysis includes both the market for fish and seafood, which is determined by supply and demand, and the availability of labour and the wage structure. In addition, several aspects relating to households with a certain income also play an important role, as well as preferences for purchasing food at sea, which are not necessarily a question of price.

After the scientists have given the model the appropriate structure, it is first fed with a variety of data and calibrated accordingly. The next step is validation in close cooperation with various stakeholders.



The different elements of the North Sea's socio-ecological system are closely interwoven and can be vulnerable in different ways. For example, changing environmental conditions and the intensity of fishing pressure influence the fish community. Changes in stocks have consequences for the economic structure of supply and demand, which is also subject to developments in costs, wages, revenues and selling prices. The economic changes are also reflected in the cultural change of the fishing communities. These communities in turn are under the influence of certain political and social dynamics.

3 to 5 June 2019

PhD candidate Jonas Letschert takes part in the HIFMB Symposium on Functional Marine Biodiversity in Oldenburg.

20 and 21 August 2019

PhD candidate Alexandra Blöcker attends the German Fishery's Day in Magdeburg.

11 to 13 September 2019

At the 21st BIOECON Conference in Wageningen (Netherlands) Benjamin Blanz reports on "Three types of interaction in multi-species fisheries and when they need to be considered".

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24 to 27 September 2019
Alexandra und Jonas present their work at the ICYMARE 2019 in Bremen.

1 to 5 October 2019
At the ISEM Conference in Salzburg (Austria) Jonas gives a talk about the socio-ecological dynamics of plaice and shrimp fisheries in the German Bight.

26 to 27 November 2019
PhD candidate Emily Quiroga-Gomez takes part in the EU Conference on Modelling for Policy Support in Brussels (Belgium).

Fisheries cultures are changing

What are the characteristics of sustainable and resilient fishing communities in times of profound ecological, climatic, social and political changes? How does the interplay of cultural knowledge and identity, environmental and economic conditions, and political and legal frameworks influence their resilience? This is what the researchers of the Helmholtz Zentrum Geesthacht (work package 3) want to find out.

In doing so, they are taking a closer look at German North Sea fishing, more precisely at coastal fishing and small-scale deep-sea fishing. And who better to provide information on this than the actors involved themselves? Discussions with various stakeholders, especially with fishers, are intended to produce an overall picture that traces the situation of the fisheries in as much detail as possible.

In order to question the interview partners as specifically as possible, the scientists designed a modular questionnaire during numerous meetings with the project partners, which can be adapted individually to the respective counterpart. In initial background discussions with fishery representatives and representatives of the Chamber of Agriculture of Lower Saxony, they were already able to gather important information, which will be deepened and supplemented by further interviews in the second half of the year.

It became clear that critical factors for the German fishing industry are not only changes in fishing resources, but also in market and business structures that intensify the competition with the fleets of neighbouring European countries, as well as difficult political and legal conditions.

New member in HZG team

SSince June 2020 Jürgen Schaper is part of the SeaUseTip project team. Together with Andreas Kannen, Kira Gee and Roland Cormier from the Helmholtz Zentrum Geesthacht (HZG), he will take a closer look at the fishing cultures of the North Sea and their vulnerability to tipping points as part of work package 3. In addition to biology, Jürgen Schaper studied communication management and earned his doctorate at the University of Hamburg on the topic of climate adaptation communication. Since then he has been researching interpersonal communication and transdisciplinary stakeholder participation for regional climate adaptation in the fields of coastal protection, storm surge risk management and agriculture. He has been and still is involved in various joint projects in East Frisia, Denmark and the Hamburg metropolitan region.
Jürgen Schaper will support the project work for SeaUseTip by, among other things, conducting and evaluating qualitative stakeholder interviews and workshops as well as risk assessments using bow tie analyses.

To gain a comprehensive understanding of the institutional development of European fisheries policy since the early 1980s, work package 3 is currently working on a historical-temporal analysis of European fisheries policy. This analysis is based on official documents and technical literature, but also on in-depth discussions with experts.

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14 February 2020
Work package 2 meets with representatives of DG Mare in Brussels.

February and March 2020
Camilla Sguotti is on research stay at the SCRIPPS Institution of Oceanography in San Diego and the University of Santa Barbara, California.

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From single fishers to the whole North Sea system

Data analyses and model development were also the focus of the scientists of the Thünen Institute of Sea Fisheries (work package 4). They collected information on effort and landings of German fisheries, environmental and economic parameters as well as marine spatial planning data in the German Bight. These form the basis for various models that help to present utilization scenarios in the North Sea, to evaluate conflict potentials of different utilization interests and to develop possible adaptation strategies.

How vulnerable is the socio-ecological system (SES) of the North Sea, which is at the same time a living, economic and cultural space, to tipping points? Where and to what extent can adaptation take place, which in turn strengthens the resilience of the system? To answer these questions, the researchers have developed a consolidated conceptual model of the SES and its functionality. As a first concrete case study, they consider plaice fisheries and their determining components from ecology, economy and sociology. Based on this first study, other specific fisheries will be considered in the course of the project.

If the focus is to be shifted from the German fleet as a whole to the fishers as individuals who make certain decisions and take certain actions, another model, the so-called agent-based model, promises to yield revealing results. Its advantage over a classic fleet model is the ability to depict the heterogeneous characteristics of the individual members of this fleet. For example, different vessels, catch compositions, social and economic backgrounds can be represented. In the next step, the scientists want to draw conclusions about larger-scale structures and developments by observing these processes on a small scale.

First case study: plaice fishery

- Where do fishers catch plaice in the German Bight?
- To what extend do they use their quota?
- Which prices do the fishers achieve for their landings?
- What is the actual relation between effort and revenue?
- In how far do natural and anthropogenic factors influence stock developments?
- Which changes will traditional fishing grounds be subject to?

In our first case study, we want to explore these and many other questions concerning one of the most important fishing target species in the German Bight.

Picture credits: Kay Panten, Nicole Stollberg, Jonas Letschert, Emily Quiroga-Gomez, Benjamin Blanz, Alexandra Blöcker, Camilla Sguotti, Pixabay