

WORKSHOP ON KATTEGAT ECOSYSTEM MODELLING SCENARIOS WITH STAKEHOLDER PARTICIPATION (WKKEMSSP)

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i Executive summary

The first Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholders Participation (WKKEMSSP) met on the 22 May at the Swedish Agency for Marine and Water Management (SwAM) in Gothenburg, Sweden, chaired by Andrea Belgrano (Sweden), Andrew Kenny (UK), and Erik Olsen (Norway).

The main goal was to scope for key ecosystem interactions and future modelling scenarios for human use that are most relevant to stakeholders and managers in the Kattegat. Specifically, WKKEMSSP contributes to developing strata specific decision support tools (WGINOSE ToR d) by developing and exploring scenarios for future conditions and human use of the Kattegat sea area using the Mentalmodeller tool, a scoping tool that allows transparent stakeholder participation in identifying key links between the natural ecosystem, pressures, human activities and management objectives.

The group was composed of a variety of experts and stakeholders, including recreational fishers, NGOs, managers, and scientists. The Kattegat mental model was developed through the following stepwise process:

1. Identification of key management objectives for the region
2. Identification of key human activities and linking these to the objectives
3. Identification of pressures stemming from the human activities and linking these to the activities
4. Identification of management actions relevant to the objectives and human activities and linking these to the activities
5. Identification of the ecosystem components (biological and physical) and linking these to the pressures and objectives

Five future scenarios were developed at the very end of the meeting and briefly discussed:

1. Increase MPAs
2. Increase demersal fishery
3. Decrease pelagic fishery
4. Increase recreational fishery
5. Increase habitat restoration

The mental model developed for Kattegat will be used to scope main issues and interactions between ecosystem components, and to define scenarios for future use that will be quantitatively explored using ecosystem models (e.g. EwE, EcoSpace).

ii Expert group information

| | |
|----------------------------|---|
| Expert group name | The first Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholders Participation (WKKEMSSP) |
| Expert group cycle | Annual |
| Year cycle started | 2019 |
| Reporting year in cycle | 1/1 |
| Chair(s) | Andrea Belgrano, Sweden Andrew Kenny, United Kingdom Erik Olsen, Norway |
| Meeting venue(s) and dates | 22 May, Gothenburg, Sweden (17 participants) |

1 Opening of the meeting

The meeting was hosted by the Swedish Agency for Marine and Water Management (SWAM) in Gothenburg, Sweden. Andrea Belgrano and Ulrika Gunnartz welcomed the participants on behalf of WGINOSE and SWAM, respectively.

During the round of introductions, the participants (Annex 1) were asked to add a coloured sticker to their name-tag in accordance to what category of stakeholders they were (see Table 1 below)

Table 1 Numbers of stakeholders at the WKKEMSSP according to the categories they identified with.

| Stakeholder Category | Colour Badge | Number |
|------------------------------|--------------|--------|
| Scientist | Green | 9 |
| NGO | Orange | 2 |
| Fishing Industry | Blue | 0 |
| Managers (Government/Agency) | Red | 4 |
| Recreational Fishing | Grey | 1 |
| Other | White | |

The largest group attending were scientists (9) followed by managers (4). Unfortunately all representatives of the commercial fishers or fishing industry that initially had agreed to attend had to cancel their participation.

2 Adoption of the agenda

The agenda in Annex 2 was adopted

3 Development of the Kattegat qualitative model

Following presentations of the work and ambitions of WGINOSE the qualitative modelling approach using the Mental Modeller software (www.mentalmodeler.org) was presented.

The Kattegat mental model was developed through the following stepwise process:

1. Identify key management objectives for the region
2. Identify key human activities and linking these to the objectives
3. Identify pressures stemming from the human activities and linking these to the activities
4. Identify management actions relevant to the objectives and human activities and linking these to the activities
5. Identify the ecosystem components (biological and physical) and linking these to the pressures and objectives

All links were specified as either positive or negative, set at ± 0.25 for “weak” links and ± 0.5 for “strong” links. The final model developed is shown in Figure 1 below.

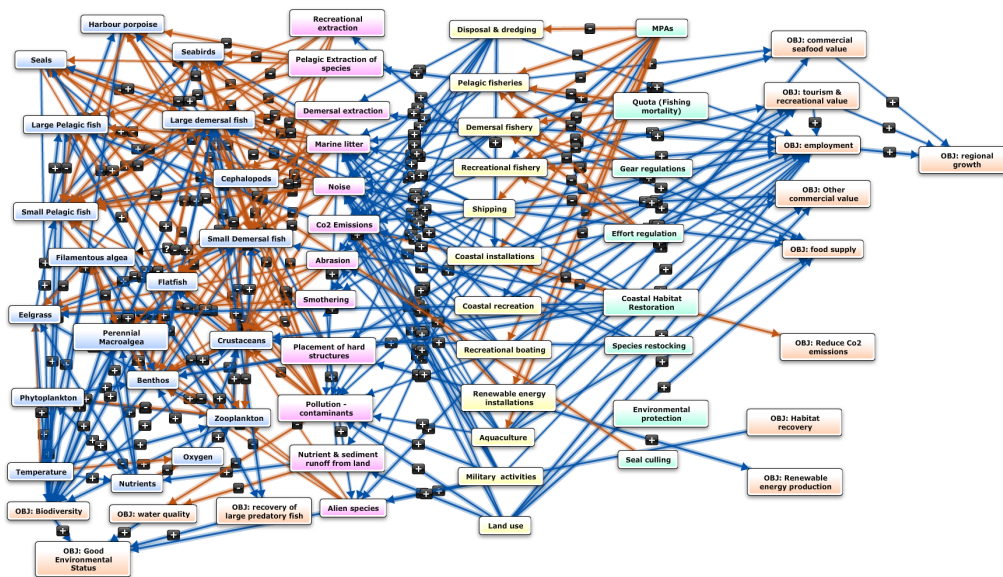


Figure 1 Qualitative model of the Kattegat region developed using the Mental Modeller software (www.mentalmodeler.org). Arrows show interactions between components, red: negative effects, blue: positive effects. Width of line identify a strong or weak link. Shading of boxes: Blue: ecosystem components, Pink: Pressures, Yellow: Human activities, Turquoise: Management actions, Brown: Management objectives.

Scaling of the interactions became a discussion point during model development as it was pointed out that some interactions were either very strong or very weak, e.g. pelagic fisheries has a low positive impact on CO₂ emissions because pelagic fishery is very energy efficient compared to other fisheries and shipping, and so does the recreational fishery, although the scale of the recreational fishery is much smaller than the pelagic. So in a more refined model, it should be considered to have six categories for strengths of interactions to be able to highlight the very weak or very strong ones. However, the sensitivity to this can be explored using QPress analysis of the current model setup.

3.1 Scenarios

Five future scenarios were developed at the very end of the meeting and briefly discussed:

1. Increase MPAs
2. Increase demersal fishery
3. Decrease pelagic fishery
4. Increase recreational fishery
5. Increase habitat restoration

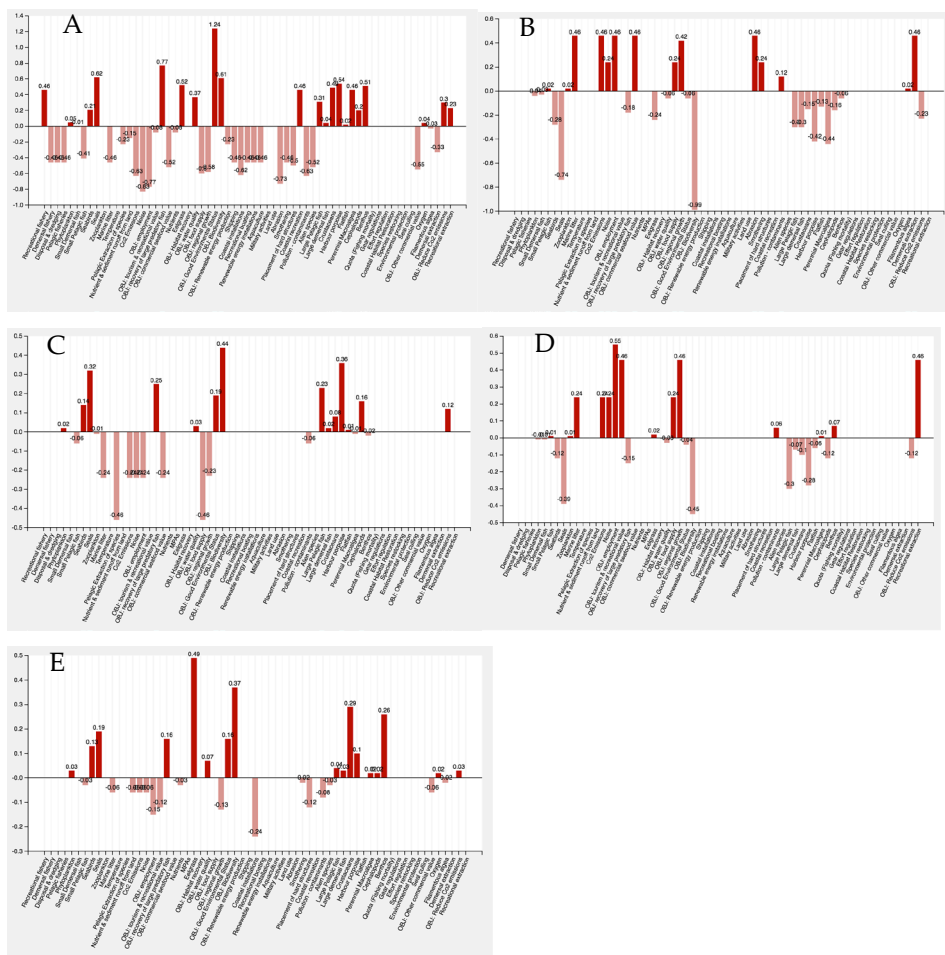


Figure 2 Scenarios for A) Increased MPAs, B) Increased demersal fishery, C) Decreased pelagic fishery, D) Increase recreational fishery, E) Increase habitat restoration developed for the Kattegat mental model.

The development and discussions of the scenarios was very brief due to the workshop running short on time.

For future WK it should be considered increasing the time to 1,5 days to allow for sufficient time to develop and discuss the scenarios.

Roadmap with future intentions

The mental model developed for Kattegat will be used to scope main issues and interactions between ecosystem components, and to define scenarios for future use that will be quantitatively explored using ecosystem models (e.g. EwE, EcoSpace).

- The scenarios developed by WKKEMSSP will be explored using the Ecopath EwE model for Kattegat
- The preliminary results will be presented at WGSAM 2019
- The complete evaluation combining qualitative/quantitative modelling approaches will be presented during WGINOSE 2020
- At WGINOSE 2020 will be discussed how to contribute with a product output to the North Sea Ecosystem Overview.

Annex 1: List of participants

| Name | Institute | Country (of institute) | Email |
|------------------------|--|------------------------|---|
| Andrew Kenny | CEFAS, UK | UK | andrew.kenny@cefas.co.uk |
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Annex 2: Agenda



WKKEMSSP
Draft Agenda
Revised on 22 May 2019

Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation (WKKEMSSP)

Chairs: Andrea Belgrano, Sweden, Andrew Kenny, UK, and Erik Olsen, Norway, SwAM, Gothenburg, Sweden, 22 May 2019

Wednesday 22 May

- 10:00 Welcome and roundtable presentations (Andrea Belgrano, Ulrika Gunnartz)
- 10:15 Introduction to WGINOSE work (Andrew Kenny)
- 10:45 Introduction to the Mental Modeller tool and examples (Erik Olsen)
- 11:30 Introduction to the Kattegat MentalModel template (Erik Olsen)
- 12:00 *Lunch*
- 13:00 Making the Kattegat MentalModel and simulate scenarios (All)
- 15:00 *Coffee & Tea break*
- 15:15 Discussion on simulated scenarios and next steps (priorities and roadmap)
- 16:30 Wrap up and closing

Annex 3: Resolutions

WKKEMSSP - The Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation

2018/2/IEASG08 The **Workshop on Kattegat Ecosystem Modelling Scenarios with Stakeholder Participation (WKKEMSSP)** within the ICES Working Group on Integrated Assessments of the North Sea (WGINOSE), chaired by Andrea Belgrano, Sweden, Andrew Kenny, UK, and Erik Olsen, Norway will be established and will meet in Gothenburg, Sweden, 22 May 2019 to scope for key ecosystem interactions and future modelling scenarios for human use that are most relevant to stakeholders and managers in the Kattegat. Specifically, WKKEMSSP will:

- a) Contribute to developing strata specific decision support tools (WGINOSE ToR d) by developing and exploring scenarios for future conditions and human use of the Kattegat sea area using the Mentalmodeller tool, a scoping tool that allows transparent stakeholder participation in identifying key links between the natural ecosystem, pressures, human activities and management objectives.

WKKEMSSP will report by June 2019 for the attention of the IEASG Committee.

Supporting information

| | |
|--|---|
| Priority | WKKEMSSP is essential to WGINOSE to be able to deliver on its ToRs and subregional analysis of the North Sea ecosystem |
| Scientific justification | Term of Reference a) This workshop is a part of the regionalization of Integrated Ecosystem Assessment carried out by the WGINOSE group. Kattegat is one of 14 subregions of the North Sea for which WGINOSE is developing separate models and analyses to evaluate trends, ecosystem state and pressures. |
| Resource requirements | The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible. |
| Participants | 10 – 20 participants will be expected. |
| Secretariat facilities | None. |
| Financial | No financial implications. |
| Linkages to advisory committees | There are no obvious direct linkages with the advisory committees. |
| Linkages to other committees or groups | WGINOSE, WGIBAR, WGINOR, WGIAB |
| Linkages to other organizations | NOAA IEAs |