

Report to the Marine Alliance for Science and Technology (MASTS)

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Event title: Meeting of the ICES WG on Marine Benthic and Renewable Energy Developments: Understanding the ecosystem consequences of offshore renewables.

Location: SAMS, Oban, Argyll.

Dates: 21 -24 April 2015.

Attendees: 19 (see Appendix 1).

Nationalities represented: UK (England, Scotland), Estonia, Germany, France, Netherlands, Belgium.

1. Agenda report.

Day 1: the workshop opened with a Welcoming address by Axel Miller (Acting Director, SAMS) who gave an overview of SAMS as a partner institute within **MASTS**. This introduction was expanded upon by Raeanne Miller who gave an introduction to the renewables-related work being undertaken within **MASTS** partner institutes. Introductions to progress within different countries was given by other members of the WG and progress on inter-sessional work was discussed

Day 2: the workshop was split into two groups discussing a) how renewables might interact with the benthic environment and b). how monitoring around renewables could be improved (led by Tom Wilding). This discussion involved Finlay Bennet (MSS, Chair of the ICES WG on Marine Renewable Energy) whose input, from the regulatory perspective, was invaluable.

Day 3: The Group re-appointed existing chairs (Andrew Gill and Jennifer Dannheim), summarised the ICES Report, were shown around SAMS and experienced the Gulf of the Corryvreckan, a highly energetic site which forms one assessment site for technologies being developed to monitor offshore renewables (tidal).

Day 4: Finalise inter-sessional work (review papers). Assess funding opportunities, agree next venue and new Terms of Reference.

2. Main outputs

The main work programme was centred around the completion of two reviews. The titles of these are:

Wilding et al: Turning off the DRIP ('Data-rich, information-poor') – defining logical, threshold-based, spatio-temporally bounded questions in relation to offshore renewable energy developments.

Target: Journal of Applied Ecology.

Synopsis: To date, monitoring around offshore renewable developments has been ad-hoc and neither based around a threshold or spatially/temporally delimited. Such monitoring serves little purpose (data-rich, information-poor) and, consequently, progress in understanding ecosystem-scale changes that might be attributable to the development, are hampered. The review highlights conceptual issues in relation to data gathering, confidence and risk and the problems (with some suggested solutions) to defining relevant spatial and temporal scales around any monitoring programme. We conclude that there should be more focus on understanding the ecosystem-scale consequences of the developing renewables sector.

Dannheim, Wilding et al: Benthic effects of offshore renewables: prioritising the known unknowns.

Target: WIREs Climate Change.

We assess the activities associated with marine renewable energy developments (MREDs) and the pressure on the benthos. Cause-effect relationships have been identified, based on existing knowledge from other industries and MREDs already installed and/or in operation. The likely abiotic and subsequent biotic effects that are likely at different stages of MRED development have been identified. These benthic effects have been grouped into three major areas of interest: changes in food

resources, the benthos as a biogeochemical reactor and changes in biodiversity. Through these three pillars, cause-effect relationships and the potential cascading effects into higher trophic levels have been identified. Empirical evidence supporting these relationships is identified and knowledge gaps highlighted in view of focusing targeted monitoring on the areas where evidence and knowledge is lacking.

3. Proposed inter-sessional work (2015 – 2018)

The WG will address the following during the next 3 years:

ToR 1. Critically assess relevant temporal and spatial scales in relation to the effects of offshore renewable energy devices on the benthic ecosystem and evaluate its consequences in relation to environmental policy and decision making.

ToR 2. Review progress of filling knowledge gaps relating to benthic ecosystems including differentiation among MRE technologies e.g. reports of national activities

ToR 3. Analysis of networks and interactions amongst WGMBRED and other relevant groups including regulators, stakeholders, policy makers and scientists in order to evaluate 'routes to policy' and scientific impact.

ToR 4. Identify and operationalise relevant indicators in relation to assessing ecosystem functioning and change in relation to MBRED as scales identified in ToR A. Determination of appropriate techniques and approaches to measure change at different scales

4. Enhancing MASTS /ICES collaboration, understanding networks and film-making

The MASTS Marine Renewables Forum and WGMBRED share a similar vision in terms of promoting the assessment of the impacts of the offshore renewables industry at the ecosystem-scale. Communication between ICES WGs (including the ICES Marine Renewable Energy WG) and MASTS Marine Renewables, Oil and Gas and Marine Spatial Planning Forums will help promote the concept that man's interventions in the coastal zone should be jointly assessed, within a common framework, rather than on a sector-by-sector basis. There are numerous similarities between the problems posed by assessing the impacts of oil and gas structures, and their decommissioning, and that in relation to assessing the impacts of renewables (e.g. fundamental questions about what it is we are trying to achieve, relevant scales for any assessment) and this is already being fed into MASTS Science (e.g. via ICES WG members' participation in MASTS Forums).

The ToR 3 (above) will be led at SAMS (Tom Wilding (MASTS Oil and Gas Forum), Raeanne Miller (MASTS Renewable Energy Forum) and Lucy Greenhill (MAST Marine Spatial Planning Forum)) and will address how scientific researchers and their host institutions are linked to policy makers. This will help all MASTS institutions align themselves in the policy-influencing process, both at a national and international level, further highlight the importance of MASTS institutions in the renewable energy sector and assist in the development of cross-disciplinary, cross-institutional research proposals.

SAMS (Tom Wilding) is working with the ICES secretariat and other members of the ICES Working group /MASTS institutions (e.g. MSS) to produce a short documentary film (with a professional film maker) highlighting how marine ecosystem services could be affected by interventions (such as offshore renewables) and how these should be assessed. The film will showcase the research done at SAMS/MASTS/ICES and thus promote these organisations within the global scientific community.

5. Appendix 1: Members of the ICES WGBRED present at Oban

The ICES WGBRED consists of 35 members, from 16 nations. Of these 15 (+ guests) were present at the Oban meeting (Figure 1 and Table 1).



Figure 1 – participants at the ICES WG meeting

Table 1 - members of the ICES WGBRED present at the Oban meeting.

Name (standing, left to right)	Nationality	Institution
Emma Sheehan	UK	Plymouth University
Liis Rostin	Estonia	Estonian Marine Institute, University of Tartu
Finlay Bennet	UK	Marine Scotland Science/ MASTS
Angus Jackson	UK	Cornwall College
Jozefien Derweduwen	Belgium	Institute for Agricultural and Fisheries Research
Ilse De Mesel	Belgium	Royal Belgian Institute of Natural Sciences
Zoe Hutchison	UK	SAMS/MASTS
Tom Wilding	UK	SAMS/MASTS
Joop Coolen	Netherlands	IMARES Wageningen UR
Andrew Gill	UK	Cranfield University
Jennifer Dannheim	Germany	Alfred Wegener Institute
Jean-Philippe Pezy	France	University of Caen
Jean-Claude Dauvin	France	University of Caen
(kneeling, left to right)		
Steven Degraer	Belgium	Royal Belgian Institute of Natural Sciences
Arjen Boon	Netherlands	Deltares
Aurore Raoux	France	University of Caen
Not in photograph but present during the meeting		
Adrian Macleod	UK	SAMS Research Services Limited.
Sally Rouse	UK	SAMS/ MASTS
Raeanne Miller	UK	SAMS /NERC KE fellow/ MASTS Renewable Energy Forum member.