from 2017-2018 have been solved in the meantime. An explicit outcome of Eurofleets+ is to enable the creation of complete CSRs based on the cruise and full event details any PI enters into EARS. This removes the burden of manually creating the CSR by the cruise Chief Scientist, and finding out the sampling details of other PIs partaking in the cruise. This, and other improvements, will be released in EARS v3 by the end 2020. CSR creation for instance relies on using international standards from the start and providing a summarising view on the events. The R/V Belgica will function as a test environment for the Eurofleets+ software developments. A newer version of the EARS v2 software will be installed on the ship in December 2019. The goal of our contribution to BICEpS 2019 is to encourage attendants to use the software (both EARS v2 and especially EARS v3 later on) on the R/V Belgica. A training is foreseen in the first quarter of 2020.

Work related to ICES via DIG – the Data and Information Group.

(15) Towards a coherent and coordinated monitoring of marine mammals?

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For marine mammal populations, it is generally agreed that ideally a coherent and coordinated monitoring is in place across their area of distribution. Such an approach is especially required in the frame of our reporting obligations under the European Commission (EC) Marine Strategy Framework Directive (and consequently also under OSPAR: IA 2017, QSR 2023), possibly leading to conservation and management action. Especially countries such as Belgium, with small marine areas and small marine mammal populations, can hardly provide stand-alone assessments.

Member States of the European Union and Parties to OSPAR only recently initiated efforts to streamline indicators, targets and monitoring methods. Data on marine mammals collected within the North Sea, and jointly assessed, include those on population abundance, distribution and bycatch. Apart from (inherent) methodological and reporting difficulties, an additional complication to the data collection and assessment is the fact that many similar initiatives are being taken, or obligations exist, in several fora, including those of EC Environment, EC Mare, ASCOBANS, OSPAR and ICES Working groups (WG MME and WG BYC). This not only means a dilution of effort (eg. replicate data calls), but also the possibility of deviating conclusions being made and a lack of responsibility.

We will present, specifically for Belgium, an overview of the data requirements on marine mammals and of the fora that use such data for assessments.

Work related to ICES via WGMME (Working Group on Marine Mammal Ecology) and WG BYC (Working Group on Bycatch of Protected Species).

(16) Genetic tools for Ecosystem health Assessment in the North Sea Region (GEANS)

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To conserve and manage seafloor ecosystem health, proper management measures need to be taken, which depend on fast and accurate monitoring. Appropriate measures should be based on joint, standardized monitoring, using cost-effective, early-warning and accurate methods. Traditional benthic assessments are often time-consuming, labor-intensive and expensive: seafloor samples are taken, sediment washed out, animals fixed in formalin and then sorted, identified and counted using microscopes, requiring trained experts and taking up to a couple of days per sample. Quality assurance is often not guaranteed due to different analyst expertise, surely when comparing results from different institutes or countries. The use of DNA-based tools can circumvent many of these shortcomings. DNA-based monitoring promises faster and cheaper methods to assess environmental health, as animals are not processed individually and allow simultaneous analysis of tens to hundreds of samples. In addition, DNA-based methods can be standardized across institutes and countries through standard operating procedures (SOPs), being less subject to expert judgement.
Currently, several institutions experiment with genetic approaches, but a concerted, harmonized, routine implementation in biological monitoring and management is lacking. Within the GEANS (Interreg-North Sea region) project, 7 countries from around the North Sea collaborate for the moment, with an overall aim:
1. To develop joint time- and cost-reducing genetic monitoring tools that feed into existing indicators to assess ecosystem health

2. To implement standardised genetic tools and SOPs in routine biological assessments
3. To develop a framework to apply and implement DNA-based tools in policy and transnational management of the NSR.

To this end, field pilots have been set-up to clearly demonstrate the benefits and/or added value of DNAbased methods and to validate the SOPs. The final output integrating all outputs will be a decision support framework for application of genetic tools in routine biological monitoring, and implementation of the outputs in ecosystem health assessment in support of policy and transnational management. ICES has endorsed this project at the start as they see a clear advancement into the current benthic monitoring for seafloor ecosystems. Furthermore, the ICES network can be used to further spread the developed methods by for instance publishing the SOPs in the ICES TIMES series in which state-of the-art description of methods and procedures relating to chemical and biological measurements in the marine environment are presented.

Work related to ICES via:
- WGEXT (Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem);
- BEWG (Benthos Ecology Working Group);
- WGIMT (Working Group on Integrated Morphological and Molecular Taxonomy).

(17) Seascape-mediated patterns and processes of population differentiation in European seabass

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Identifying biologically relevant levels of population structure and demographically independent populations is imperative for sustainable fisheries management but challenging because of high levels of gene flow and large population sizes leading to weak genetic structure. However, increasingly good access to genome-wide variation and architecture have facilitated accurate determination of fine scale genetic population structure. Here, we studied the population structure of European seabass (Dicentrarchus labrax L.), a commercially exploited and farmed fish with high dispersal capacity. In addition, we examined the influence of geographic distance and abiotic environmental variables on the observed genetic structure with a seascape genomics approach. Seabass showed a largely panmictic pattern within the Atlantic Ocean, whereas several genetic clusters were distinguished within the Mediterranean Sea based on 2,549 SNP markers genotyped using ddRAD (Restriction site Associated DNA markers) sequencing. Introgression of Atlantic alleles was detected throughout the western Mediterranean Sea, but introgression of Mediterranean alleles was only found in a restricted area in the Atlantic Ocean off the Strait of Gibraltar. Seascape analysis suggested that genetic population structure is mediated by both dispersal limitation and environmental gradients, indicating local adaptation. As such the study provides key information for fisheries and conservation management of European seabass.

Work related to ICES via WKBASS (the benchmark Workshop on Seabass).

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