Theme Session B Report 2024

Towards integrated operational marine science and advice

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Session synopsis

Large quantities of scientific information are routinely produced annually by governmental and non-governmental organizations that are intended to guide fisheries policy- and decision-making. Yet outputs using these data are often specific to one aspect, for example, an assessment of an individual fish population, the selectivity parameters of a specific fishing gear, or the level of bycatch of a sensitive species. In contrast, fisheries managers are tasked with the overarching management of fishing to meet broadly defined environmental, social, and economic objectives. This requires interpreting and acting on a wide range of scientific advice to operationally manage fisheries and protect the marine environment, at a time when the environment is undergoing significant change and being impacted beyond previous experience.

This theme session explored the demand for more integration of marine and fisheries science advice across disciplines to provide managers with operational advice to meet broader objectives. We asked whether managers should be requesting more holistic advice, and invited examples of integrated operational fisheries science advice provided in response to broad management questions. Contributions were invited from the following areas:

1. Integrated monitoring and data collection
2. Combining existing data sources to generate integrated operational science advice
3. Systems approaches to practical marine and fisheries management
4. Methods of evidence integration and evaluation

Of the abstracts submitted, 20 oral presentations were selected for the session and 9 posters were displayed. The session was delivered in five clusters of presentations each followed by time for Q&A. In the first series of presentations, we explored a high-level view of science advice, challenging some of our general approaches. For example, the false precision presented in catch advice which does not adequately address the numerous uncertainties inherent in scientific advice. It was proposed that using alternative ways of understanding and communicating uncertainty, along with adopting inclusive procedures in advice formulation, could offer a more robust solution.

Linked to this was the observed current narrow perception of sustainability, with a focus on numerical biological models and near absence of social and economic elements in routine science advice – this period was described as a time when the science community have been “drunk on numerical models”. The shared consensus view was that, while we are successfully delivering various element of science and advice as intended, it is not translating into successful management of the marine environment, either from an ecosystem, social or economic perspective. Therefore, we must critically review the activities of our science community and make changes.

The next session began to zoom in on some of the existing science advice mechanisms and progress towards better integration of science and scientific advice. At the broadest level, the ICES framework for ecosystem-informed science and advice (FEISA) aims to operationalize and incrementally expand and improve best available ecosystem science into ICES advice. FEISA advocates for a social-ecological systems approach, the incorporation of all forms of knowledge, and combines a system of qualitative, semi-quantitative, and quantitative indicators to advance and coordinate knowledge and data and

translate them into advice. Moreover, it was recognised (by a manager) that managers should also critically review their activities to evaluate if they are using all the appropriate scientific evidence to deliver sustainable fisheries, resilient fishing communities and healthy ecosystems. Exploring this together would have an impact on shared knowledge, understanding, and motivation to evolve activities and improve outcomes.

The latest iteration of the ICES Fisheries Overviews provided an illustration of a positive collaboration with the diverse group of advice requestors to improve the presentation of science outputs generated routinely by ICES. The next step in this process will be to convert this evidence into holistic operational advice that requestors can use for decision making. Moving to the next level of resolution, management strategy evaluation (MSE) in mixed fisheries science, applies single-stock management to deliver mixed fisheries objectives, accounting for stock and fleet dynamics. The potential for MSE to develop and test management options to resolve conflicting single-stock advice was demonstrated using the case study of Celtic Sea gadoids. However, it was observed that, while a range of tools to advise on mixed fisheries challenges are available, these are not consistently applied by managers. We should understand the root cause of why the tools are not consistently applied so that we can advise and support managers to fully utilise all available evidence.

The second half of the theme session focussed on a wide range of specific case studies of integrating evidence and data collection. These case studies showed how knowledge and evidence from a range of disciplines can be collected and used in collaborations to enhance the management of fisheries. For example, Newcastle University, Natural England and the Northumberland Inshore Fisheries and Conservation Authority (NIFCA), worked together to directly inform the management of the inshore shellfish pot fishery, including input controls such as a pot number limitations, vessel size limit, and assessments of fishing within marine protected areas (MPAs).

There were many other discrete examples of successful integration of data from different disciplines and applying evidence from new data sources to address fisheries management challenges. These varied from integrating social data, industry generated empirical data, and new scientific data from genetics, telemetry and novel monitoring and survey methods.

Conclusion

The ICES community are active in developing and providing more integrated science advice at all scales, drawing on new and multidisciplinary information sources. While there are successful case studies where these activities have enabled positive operational changes to the management of fisheries, so far these are limited to local, less complex fishery systems. In general, broad ecosystem and social and economic management objectives for the marine environment have not been met, and progress towards achieving them is slow. Better integration of scientific advice that reflects the broader aims of managers is seen as a critical contribution from the science community. Of equal importance is the requirement for managers to break the habit of focusing on isolated and short-term science outputs and take a longer-term view that utilises relevant integrated evidence and knowledge.

Recommendations

Accelerate the development of integrated operational science advice that can be applied by decision makers. This should include input from advice requesters and make explicit the links between broad management objectives and routinely generated integrated advice. It should make use of successful case studies to demonstrate the process and benefits and identify test cases at an increasingly larger scale where integrated advice can be applied operationally. Specifically, we recommend that a workshop is proposed that would bring together principal science advisors and advice requestors to

develop and agree the sequence of tasks and outputs that will generate more integrated operational advice, which would become the basis for decision making.