Open session

Marine Science in 2017 and beyond

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This introductory session highlighted the drivers for, and impact of, ICES marine science and advice in 2017. It reviewed plans for the Theme Sessions and Open Sessions at this Annual Science Conference and sought to show how they addressed ongoing and emerging challenges for marine science, and the expected scope, scale and impact of outcomes. The introduction was assembled from material supplied by Science Committee and Advisory Committee and Members, staff in the ICES Secretariat and a number of scientists in our network, and inspired by the content of the Theme and Open Sessions at this ASC.

There are many policy drivers that both respond to and influence the direction of ICES science, and lead to calls for data streams and advice. These influence ICES ongoing scientific and/ or advisory roles and much of the funding to support them, and are well known to our community. But the session also highlighted some emerging influences, including the growing and changing profile of the seas and oceans in society and the engagement of many non-Governmental players in ocean use and conservation. Likely foremost among influential drivers for marine science in 2017, at least internationally, and for the marine science community as a whole, was the United Nations Conference to Support the Implementation of Sustainable Development Goal (SDG) 14: to Conserve and sustainably use the oceans, seas and marine resources for sustainable development. This Conference, as held in New York from 5-9 June, sought commitments on implementation, as well as ways to support this. For the ICES community, the explicit focus on life below water within the SDG is relevant, both in its own right and because it now highlights the interconnections and the interactions and trade-offs that exist between the state of life below water and the achievement of other goals like zero hunger, no poverty, affordable and clean energy, climate action and life on land.

Other ongoing influences with growing prominence were the Our Ocean conferences, as last held in Washington in 2016, and with another planned in Malta shortly after the ASC. These meetings are focused on stimulating commitments: to actions such as sustainable seafood sourcing, reversing overfishing, reduction of contamination and litter, improvements towards circular economy or funding of innovative projects. Participation and actions have clearly demonstrated the growing role of non-Governmental actors in affecting change in marine management and the marine environment. These events also continue a trend in recent years where connections with the sea, be they emotional, or linked to livelihoods and business, or concerns about the conservation of the environment, are receiving more and more attention outside the domain of conventional users, Ministries and managers. Thus deals between philanthropists, businesses and industry are affecting visible change in use and conservation of the sea either alongside, or sometimes in partnership with, Governments.

The review of marine science that led to this presentation suggested that it was sometimes challenging to define a clear role for a conventional scientific model in these processes. Some decisions can, and are, being taken primarily based on perspective or belief and are minimally informed by science. Further, the boundaries within which science is used, when it is used, can be strongly constrained by the scope of questions asked. Unsurprisingly perhaps, given ICES mission and our engagement in ICES, we argued that the role for science in providing and synthesising evidence and informing society, including policy makers and managers, should be greater than ever. In part, this is simply because science is always helping humanity to develop

understanding of our world with many implications, by providing a huge range of new data on chemical processes, seabed habitat and primary production, for example, and also by identifying opportunity and risk, for instance by selectively targeting fished species or spotting the harmful effects of new substances brought into the environment. We also argue that the role of science should be greater than ever given the broadening interest in the sea and the resulting increase in questions about (1) risks and opportunities and (2) the range of pressures, states and the links between them to consider when characterising the ecosystem and the effects of humans and the environment. This information is central to much state of the environment reporting in the ecosystem overviews or integrated ecosystem assessments generated by ICES scientists which are increasingly treated as sound regionally informed synopses. The role of science should be greater than ever because it supports the co-creation of knowledge founded on evidence, plays a central role in separating beliefs from evidence and in finding ways to address trade-offs between use and protection of the sea

ICES conducts science in many domains, be it discovery science, data science or the application of science in advice. In addition, ICES and the sessions at the ASC focus on many topics within these domains, from microbial ecology, to marine mammal or fisheries science, and, increasingly in ICES, the social and economic sciences. But the approach adopted to address these topics is founded on one philosophy, because the science is not driven by faith, tradition, hearsay or popular opinion, but by a pursuit of understanding based on evidence, by problems we are given to solve and, of course, by our own curiosity.

The presentation went on to review the challenges faced by marine science including the scale of the oceans, the lack of opportunities to replicate or repeat experiments (and, in many cases, the recognition that experiments are not possible at all given the scales of ecosystems and the dominance and intensity of pressures outside scientific control) and the existence of questions that apply on scales that span national borders and need to be addressed collaboratively. All these challenges have been drivers for marine science and the structures and collaborations that support it. Consequently, most of the great steps in marine science, and almost all the great data gathering exercises, are collective achievements based on international collaboration and collective innovation- as rightly predicted by the founders of ICES.

This ICES role in delivering salient, credible and legitimate advice is an important one and our advisory programme seeks to provide such advice in an efficient and timely way year in, and year out. The presentation summarised the scope of ICES advisory output in 2017. The recurrent advice on fishing opportunities for fish and shellfish stocks still accounts for the most of the advice provided by ICES. However, there is an increasing interest for advice of relevance for environmental management and about half the special requests (non-recurrent) for advice ICES receives are on non-fisheries issues. To be able to provide high quality responds to these requests, that are consistent and developed in a transparent process ICES is in the process of developing a framework for ecosystem advice similar to the existing framework for advice on fishing opportunities.

This advice is requested by clients. But we also recognise that the development of scientific knowledge linked to a request and advice will not be the only knowledge that is needed to ensure a long-term and viable relationship between society and the sea. So there is a stronger feedback here than sometimes recognised and our science can also drive the nature of future requests for advice- by showing what is possible and showcasing new data streams and analytical tools, by discovering the effects of emerging pressures and tracking environmental trends.

A core part of the ICES mission is to further understanding of marine ecosystems. Thus, through our science programme, our network seeks to bring forward and test ideas to shape

the future marine science agenda and provide the tools that may become the mainstay of marine science and management in coming decades. It is this necessary and enduring combination of discovery science, applied science, data and advice that is captured in the breadth of Theme and Open Sessions at our Conference: and these were reviewed in full during the presentation. The Theme and Open Sessions support the sharing and development of ideas and this is a critical part of ICES annual cycle of activity. The scope, scale and impact of our science also depend on great people and great data, now and in the future, and these are areas in which ICES continues to invest through the Training Programme and the Data Centre.

The presentation ended with some reflections on possible foci for ICES science, data and advice in coming decades. These included the importance of:

- Recognising new and emerging drivers and actors in 'marine' and engage with them
- Explaining and reiterating what science can offer; training, mentoring and engaging scientists; publicising and publishing research; demonstrating value of monitoring
- Emphasising and showing how regional experts working together develop science and advice which gives added kudos and legitimacy to national and global processes
- Accelerating application of scientific knowledge we have, always maintaining standards
- Developing new knowledge, to satisfy curiosity, identify opportunity and risk and to be ready for management challenges and advice requests in 2030 and beyond
- Strengthening links between science, data and advice; all based on reproducible and transparent processes.