Contribution from the International Council for the Exploration of the Sea (ICES) to the fifteenth round of Informal Consultations of States Parties to the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments 17 to 19 May 2022 (ICSP 15). Submission on implementation of an ecosystem approach to fisheries management.

The International Council for the Exploration of the Sea (ICES) is an intergovernmental science organization that coordinates and promotes marine research in the North Atlantic and adjacent seas. ICES mission is to advance and share scientific understanding of marine ecosystems and the services they provide and to use this knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals[1]. ICES unites a community of more than 2000 marine scientists from over 700 institutes in 20 member countries and beyond.

ICES is the sole scientific advisor to the North East Atlantic Fisheries Commission (NEAFC), and delivers scientific management advice to its Member Countries, the European Commission (EC), the North Atlantic Salmon Conservation Organization (NASCO), the Oslo Paris Commission (OSPAR), and the Helsinki Commission - Baltic Marine Environment Protection Commission (HELCOM).

ICES provides annual advice on fishing opportunities for approximately 260 fish and shellfish stocks (with a combined annual catch of over 8 million tonnes) of which many are straddling or highly migratory stocks. Its science and advice forms the evidence base to maintain and restore ecological and human well-being, and build mechanisms to achieve the timely implementation of the ecosystem approach to fisheries management (EAFM) in the North Atlantic. ICES works collaboratively with partners, such as FAO, PICES, NAFO, GFCM, and ICCAT to provide best available science for advice.

The organisation is committed to facilitating the incorporation of a wider range of scientific knowledge into the evidence base to inform decision makers and society. It has worked on constructing the evidence base for EAFM since at least 1992[2]. The implementation of EAFM in the Northeast Atlantic is incremental, which enables ICES to respond appropriately to the changing demands of a developing policy landscape and dynamic ecosystem. Through its outputs, ICES has contributed to the development of major initiatives, such as the European Union Marine Strategy Framework Directive (MSFD) which monitors progress towards good environmental status of European seas. ICES has also contributed to the implementation of an effective vulnerable marine ecosystem (VME) network in the NEAFC regulatory area, which was the first of its type in the world. In recent years, ICES has focused on trade-offs between management objectives, examples include the trade-offs between seabed integrity and value of catch for bottom trawling fleets[3], and between differing catch options in mixed fisheries with conflicting single stock management targets[4].

ICES uses ecoregions as the spatial units to synthesize the evidence for the ecosystem approach[5]. Once defined, the ecoregions adapt slowly and all advice is linked to an ecoregion, or a collection of ecoregions. A

[1] https://doi.org/10.17895/ices.pub.7460

[2] http://doi.org/10.17895/ices.pub.5466

[3] https://doi.org/10.17895/ices.advice.8191

[4] https://doi.org/10.17895/ices.advice.9185

[5] https://doi.org/10.17895/ices.advice.6014

set of 10 principles govern how advice is provided into the EAFM arena[6]. These principles include open documentation of processes and decisions, clear and transparent data policies and licensing, quality assurance of data flows, and the use of best available science. Two overlapping frameworks explain the routes taken to produce advice, one for fisheries[7] and the other for ecosystem services and effects[8].
A large network of integrated ecosystem assessment expert groups provides information in "ecosystem overviews" that describe the high priority anthropogenic pressure in each ecoregion, and provide the context for fishing in relation to other human activities[9].
ICES also evaluates fisheries management plans. Advice in some regions incorporates ranges for maximum sustainable yield (pretty good yield) and all catch advice must be precautionary with a risk of less than 5% of a stock being below its biomass limit reference point (precautionary approach).
50% of all stocks, and 73% of data rich stocks, have some component of ecosystem variability incorporated into the stock assessment[10]. The majority of management strategy evaluations carried out in the last eight years have a component of ecosystem variability incorporated. Methods to provide advice for data-limited stocks for MSY targets have been developed and implemented, and harvest control rules have also been tested and implemented for those data limited stock with only precautionary reference points.
Ecosystem observations and models are providing further insights. ICES first implementation of modelled ecosystem dynamics into the advice framework has taken place for demersal fisheries in the Irish Sea. Other regions are exploring this or similar approaches, e.g. the Baltic Sea pelagic fisheries, and Barents Sea demersal fisheries.
Discarding of fish is largely prohibited in the Northeast Atlantic, and ICES assesses the quantities of discards for most major fisheries. An annual advice is published on the estimated occurrence and rate of the bycatch of protected, endangered and threatened species (PETS) for various fleet segments[11]. A bycatch roadmap aids the development of methods to set management objectives and ultimately assess the impact of bycatch of PETS on their populations[12]. ICES has lists of marine mammals, seabirds, and fish of bycatch relevance for all ecoregions. Annual regional summaries, called "fisheries overviews", contain descriptions of the fisheries and their catch, dynamics of the stocks, and interactions between and effects of fisheries on the ecosystem [13].
The implementation of EAFM is a continuous and iterative process. The principles of EAFM are well documented and incorporated into most facets of ICES. ICES is clarifying its rationale, and evaluation of stakeholder engagement, and will soon publish a stakeholder engagement strategy. Its network is further defining a risk-based mechanism to strengthen the evidence base for EAFM. ICES is broadening its work to include more social and economic information, including coastal community vulnerability, assessment of culturally sensitive areas and aquaculture[14]. ICES is also working towards advancing cumulative effects assessments of human activities. Regular reviews of progress are made to ensure the momentum is maintained to improve the evidence base for implementation EAFM[15].
All references and products are available on the ICES website www.ices.dk.

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[6] https://doi.org/10.17895/ices.advice.7648

[7] https://doi.org/10.17895/ices.advice.7720

[8] https://doi.org/10.17895/ices.advice.7649

[9] https://www.ices.dk/advice/ESD/Pages/Ecosystem-overviews.aspx

[10] http://doi.org/10.17895/ices.pub.10037

[11] https://doi.org/10.17895/ices.advice.9335

[12] https://doi.org/10.17895/ices.advice.6022

[13] https://www.ices.dk/advice/Fisheries-overviews/Pages/fisheries-overviews.aspx

14 https://doi.org/10.17895/ices.advice.9585

[15] http://doi.org/10.17895/ices.pub.5468