

Implementing EA in the Icelandic LME

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Fisheries are an important part of the Icelandic economy and in recent years fisheries products have constituted about 30-40% of the value of exported goods. A sustainable fishery is therefore vital for the Icelandic economy both in light of economic importance and also with respect to accepted notions on ecosystem approach to management.

The fisheries research, advice and management in Iceland has first and foremost considered status and production of individual stocks but with a reference to the ecosystem approach. Large part of the marine research in Iceland is, however, related to the ecosystem approach, e.g. monitoring of environment, 1⁰ and 2⁰ production and habitat mapping. Central to the management policy is the emphasis on sustainability with a TAC regulated fishery and additional management measures such as area closures to protect small fish, spawning areas and coral fields. The management is based on scientific advice often as part of HCR's that aim at achieving MSY through integration of EA and PA.

The development of HCR are an important prerequisite towards ecosystem based management particularly in ecosystems where fisheries have large impact on stock development. In recent years MFRI has in accordance with government management plans worked towards development of HCR for some of the main exploited fish stocks (i.e. cod, haddock, saithe, golden redfish and capelin). The HCRs have then been evaluated against international agreements on sustainability by ICES and subsequently been adopted by Icelandic authorities. The HCR for capelin takes account of uncertainty in the acoustic assessment, growth, natural mortality and also the predation of capelin by cod, haddock and saithe. HCRs for other stocks for which data and assessments are available are now being considered. These stocks are: Ling, tusk, plaice, Atlantic wolffish and summer spawning herring. For some of these species HCR should be completed by 2017. After having adopted a HCR the authorities have followed TAC advice which in addition to sustainability importance also secures socio-economic benefits, such as job security, a stable environment for the industry and steady supply of fish products to consumer markets.

At the instigation of ICES and in co-operation with OSPAR Commission (Convention for the Protection of the Marine Environment of the North-East Atlantic) and ODEMM (an EU supported project entitled Options for Delivering Ecosystem Based Marine Management) MFRI scientists have been working on a detailed ecosystem overview of the Icelandic ecoregion. The overview gives a description of the Icelandic marine ecosystem and points out the main human induced pressures and how they impact on the ecosystem.

Along with the fisheries advice based on achieving MSY through integration of ecosystem and precautionary approaches bottom and habitat mapping are an important steps towards ecosystem approach to management. IMFR has recently secured funding for an extensive (2.5 million US \$ annually) multibeam mapping program with the aim of completing the mapping of the Icelandic EEZ (754 thousand km²) by 2030. Further, in 2015 a 3 year pilot project started that aims to make evaluation of macro benthic invertebrate by-catch an integral part of the Icelandic Autumn Groundfish Survey. Implementing the ecosystem approach into the management of the ocean can only be done step wise and with continual development.