



NEWSLETTER no. 4, 2018

ARctic Marine Resources under Climate Change:
Environmental, Socio-Economic Perspectives and Governance

In the Arctic, higher temperatures and retreating sea ice will redefine boundaries of biological life, ecological structure, and commercial and social opportunities. Complex interactions exist, from the physical impacts in terms of temperature, ocean currents, and sea ice, via biological and ecological adaptations in terms of changing habitats, growth, and species interactions, via social and business enterprises in terms of new fishing areas and trade routes, to governance implications in terms of pressure on existing agreements, surveillance, and commercial activity. ARC-Change will study some of these interlinkages while bringing together expertise from an array of disciplines and institutions.

Newsletter no. 4, headlines:

- *New publication*
- *Ocean sustainability under global change*
- *The 10th anniversary of the Ilulissat Declaration*
- *Workshops & meetings*

New publication

Recently, ARC-Change-affiliated Alf Håkon Hoel has published the following article:

Northern Fisheries, by A.H. Hoel (in *The Routledge Handbook of the Polar Regions*, edited by M. Nutall, T.R. Christensen, M. Siegert, 2018).

Ocean sustainability under global change

The Institute for Marine Research recently released the report *Ocean sustainability under global change: Top priorities for Norwegian research and prospects for collaboration*. In the report, results from the IMBER – Future Earth Norway workshop of September 2016 are discussed. The workshop was attended by ARC-Change researchers Sturla Kvamsdal and Leif Sandal and further attracted participants from a broad range of organizations, sectors, and disciplines. Participants discussed how to improve collaborations to make rapid progress on ocean and marine resource management goals in the coming decade.

A recurrent topic in the discussions was the importance of building high-quality collaborations, in particular potential opportunities and current barriers. Recommendations from the workshop participants regarding future research include improvements to integrated ecosystem assessments, assessment and guidance on institutional development, understanding of ecological, economic, and social trade-offs, and improving how uncertainty is dealt with in research and governance. Suggestions for the marine research community include more focus on solutions-oriented science, integrated research across sectors and disciplines, to seek a common language that improves

communication and eases collaboration, and highlight policy and management relevance of new research.

A more comprehensive summary and a link to the report itself can be found on the Future Earth webpage: <http://www.futureearth.org/news/secure-rich-and-clean-oceans-people-are-our-greatest-resource>.

The 10th anniversary of the Ilulissat Declaration

The following is based on an editorial by Alf Håkon Hoel, published by the Fram Center. The full editorial is available here: <https://framsenteret.no/2018/05/10-ars-jubileum-for-kyststatsinitiativ-for-polhavet/> (in Norwegian).

In 2008, the Arctic Ocean coastal states – US, Canada, Denmark/Greenland, Norway, and Russia – signed the Ilulissat Declaration. The declaration acknowledged the Law of the Sea as basis for exploration and governance, and the signatories committed themselves to peaceful cooperation and dialogue regarding development in the Arctic Ocean. In the ten years hence, developments that motivated the declaration – climate change, development, and interest in the Arctic region – have only continued to intensify.

Regarding international cooperation, three major agreements have been established; regarding search and rescue operations (2011), response to marine oil spills (2013), and facilitating research collaboration (2017). All these agreements have been negotiated within the Arctic Council.

In 2015, the coastal states released a declaration concerning prevention of unregulated fishing in the central Arctic Ocean. A binding agreement that included China, South Korea, Japan, EU, and Iceland was put into force in 2017.

The Arctic Ocean may be ice free during summers in 20-30 years, and one has come to realize that changes and developments in the Arctic has far-reaching consequences, affecting not only the coastal states. The Arctic also holds natural resources that may be important for future resource needs. Against this backdrop, the Ilulissat Declaration demonstrates ability and willingness among the Arctic coastal states to meet new challenges.

Hoel has written further editorials recently, on the new fisheries agreement in the Arctic and on the FAO report on the state of the world's fisheries among them. See the ARC-Change webpage (goo.gl/rxMhHP) for a full overview of popular writings and further output from the project.

Workshops & meetings

Samfunnsøkonomenes Forskermøte 2018 The annual meeting of the Norwegian Association of Economists was held in Bergen on January 3-4. Sturla Kvamsdal (ARC-Change) presented on-going research under the title 'Ecosystem Wealth in the Barents Sea,' which is joint work with ARC-Change researchers Leif Sandal and Diwakar Poudel. The aim of the research is to establish a measure of wealth held in the Barents Sea ecosystem, and promote this measure as an indicator for sustainability of management plans. The indicator summarizes both ecological and economic scarcity and substitution effects between different stocks of natural capital. Preliminary results suggest that alternative, ecosystem-based management plans can have significant effects on ecosystem wealth and ensure sustainable development of the resource stocks. The same research was also presented during the 2018 Nordic Annual Environmental and Resource Economics (NAERE) workshop, also held in Bergen, April 12-13.

IIFET 2018 The nineteenth international Biennial Conference of the International Institute of Fisheries Economics & Trade (IIFET) was held on the campus of the University of Washington, Seattle, Washington, USA, July 16 - 20, 2018. IIFET is a global professional organization devoted to improving understanding of all aspects of fisheries and aquaculture economics and seafood trade. Members include academics, fisheries managers and policy makers, seafood industry members, international organizations and national government representatives.

Nils-Arne Ekerhovd (ARC-Change) gave a presentation titled 'Marine food webs, environmental

variability, and coastal state conflicts: A game theoretic analysis'. The pelagic fisheries of the North East Atlantic are all harvested by the same countries/parties. For several years, there has been an unsolved dispute between these nations about the size of their respective quotas. Based on their importance and roles in the fisheries, we model the exploitation as consisting of three players, namely the EU, Norway, and Iceland. Internal and external stability conditions, for all possible coalition structures in steady state, are analyzed in order to find out which coalition structures are most likely to occur, with and without side-payments. The most likely outcome is full competition where everybody behave myopically. This is also the case which is most similar to real world observations. Cooperation and long-term maximization would increase total net revenue ten times. For this to happen, Norway would have to give the other two heavy side payments. This is not realistic, but the same effect could be achieved through quota negotiations involving other species.

Daniel V. Gordon (ARC-Change) presented a joint work with Nils-Arne Ekerhovd called 'Profit and Price Effects in a Rights Based Regime'. The current Norwegian regulatory system does allow for some transferability of license capacity in the purse seine fisheries. The study employ an index approach to investigate the result of changes in regulatory quota policy by decomposing vessel profitability by prices, productivity, vessel size and stock levels. The study uses a large individual vessel data set for the years 1994-2013. Results suggest that changes in the regulatory policy impacting the purse seine fleet has increased profitability, reduced the number of vessels and greatly increased vessel size. Nils-Arne presented preliminary results from this research at the 2018 NAERE workshop.

Note: Alf Håkon Hoel was until recently employed at the Norwegian Embassy in Washington DC, and his writings and his presence at various meetings is not exclusively as an ARC-Change researcher. The ARC-Change project nevertheless benefits greatly from the experience and insight he gains in his current work.

Main project partners:



HAVFORSKNINGSINSTITUTTET
INSTITUTE OF MARINE RESEARCH

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Web: goo.gl/rxMhHP