Draft Framework for a Joint Program of Scientific Research and Monitoring for the Central Arctic Ocean

Purpose

The Framework serves the purposes of the five Arctic coastal states (Canada, the Kingdom of Denmark, the Kingdom of Norway, the Russian Federation, and the United States of America) and other interested parties as a means to foster coordination and collaboration on scientific research and monitoring in the Arctic. Scientific research and monitoring activities in the Arctic relevant for fish resources in the central Arctic Ocean are conducted by research institutions from a number of nations, the Arctic coastal states in particular. This draft Joint Scientific Research and Monitoring Program Framework is a step in the process of identifying, defining, and implementing joint national research activities in the Arctic Ocean and adjacent areas that are relevant to fish resources. Additionally, this Framework is meant to begin to address the gaps in knowledge identified in the Status Report on Arctic Research and Monitoring produced at the Third Meeting of Scientific Experts on Fish Stocks in the central Arctic Ocean held in Seattle, Washington, in April 2015.

Terms of Reference

There is a need for further scientific research and monitoring on the state and nature of fishes and invertebrates and other living marine resources and associated ecosystems in the central Arctic Ocean and its fringing seas, as well as an increased understanding of the impact of climate change on Arctic ecosystems in general and fishes and shellfishes in particular. To meet this objective, the Arctic coastal states have entered into a process for developing this Framework for a Joint Program of Scientific Research and Monitoring. Such a Framework is identified in the Terms of Reference for the Third Meeting of Scientific Experts on Fisheries of the Central Arctic Ocean. The Terms of Reference state:

> *2. Developing a framework for a Joint Program of Scientific Research and Monitoring for the Central Arctic Ocean, including the definition of baseline information needs and methods necessary to determine the likelihood of sustainable fisheries being present. Additionally, this framework should include one or more components that investigate the role of fishes and shellfish in the marine ecosystems (and vice versa) in the Central Arctic Ocean, as well as linkages with the shelf areas and likely impacts of climate change.*
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> *3. Considering the development of an action plan (e.g., notional schedules, areas of operations, costs) for the Joint Program of Scientific Research and Monitoring.*

Area

The primary geographic focus of this Scientific Research and Monitoring Framework is the central Arctic Ocean. The central Arctic Ocean is defined for present purposes as the high seas portion of the Arctic Ocean that is entirely surrounded by waters under the fisheries jurisdiction of Canada, the Kingdom of Denmark (in respect to Greenland), the Kingdom of Norway, the Russian Federation, and the United States of America and consists of the Central Arctic Large Marine Ecosystem (LME) and portions of adjacent Arctic LMEs in international waters (see Figure 2 in Appendix C of final meeting report). The geographic focus may be expanded during

the course of scientific investigations whenever necessary to understand the ecological linkages of the central Arctic Ocean to adjacent waters.

Key Questions
Meeting participants identified the following key questions to be answered through this Joint Scientific Research and Monitoring Program:

1. Are there harvestable fish resources in the central Arctic Ocean at present? If fishable concentrations of commercial species of interest are observed in the central Arctic Ocean, what are their distributions and abundances?

2. If so, can the central Arctic Ocean fish resources be harvested sustainably with respect to both the target fish stocks and the dependent parts of the ecosystem? If not, what are the prospects for the development of fisheries in the future?

3. What are the mechanisms that enable key ecological linkages between the fish stocks of the central Arctic Ocean and adjacent shelf ecosystems? What do those mechanisms teach about how fisheries in the central Arctic Ocean may affect the adjacent shelf ecosystems, including fish stocks, marine mammals, birds, and fisheries-dependent communities (which include those communities that are dependent on subsistence harvests of fish, birds, and mammals)?

4. Over the next 20-30 years, what changes in fish populations, dependent species, and the supporting ecosystems may occur in the central Arctic Ocean and the adjacent shelf ecosystems?

Action Plan
The following are initial thoughts for an action plan associated with this Draft Framework for a Joint Program of Scientific Research and Monitoring in the Central Arctic Ocean. However, additional workshops to allow for the development of a more detailed Action and Science Plan associated with this Draft Framework and to address specific issues related to this Draft Framework are necessary, such as the development of methodology to assess fish under ice.

Some of the components and/or follow-up items for this Action Plan include:

- Prioritization of the areas of the central Arctic Ocean which require attention, especially areas where northward species expansion is expected (i.e., likely best with respect to projected ice changes to all first-year, limited advection of multi-year ice into the area, and thus likely earlier access. We may want to focus attention on the Chukchi Cap area first as it is the first most likely area; although some locations on the Russian ends of the ridges also may become accessible. Prioritization should also include potential for fishing (i.e., depths less than 2000 m; although this is more relevant on the Pacific side than the Atlantic side).
- Development of key scientific questions/hypotheses to be investigated is necessary.
- Development of a timeline that captures generalities between now and 3-5 years out and 5+ years out for ship deployment; longer-term items could also be mentioned but should be structured sequentially.

- The two primary general activities that should be pursued at this time include:
    - Synthesis and Integration of Current Knowledge
    - Baseline Studies: Development and deployment of vessels and other platforms explicitly to research the fish and shellfish populations and their supporting ecosystems with inter-annual variability.

List of Breakout Group Report Participants

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