

Report of the PICES/ICES/PAME Working Group on an *Integrated Ecosystem Assessment for the Central Arctic Ocean*

PICES joined an existing ICES/PAME (Protection of the Arctic Marine Environment) Working Group on an Integrated Ecosystem Assessment for the Central Arctic Ocean (WGICA) in 2016. Preparing an Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean (CAO) is a step needed to provide scientific advice on issues such as the prospect for future fisheries in the Arctic Ocean and sensitivity and vulnerability in relation to shipping activities.

The joint PICES/ICES/PAME Working Group on an *Integrated Ecosystem Assessment for the Central Arctic Ocean* (WG 39) had its fourth meeting on September 14, 2020 (16:00–18:00 Pacific Standard Time), virtually, at PICES-2020. Co-Chair (PICES), Dr. Sei-Ichi Saitoh, chaired the meeting.

AGENDA ITEMS 1 AND 2

Welcome, introductions, review WG 39 terms of reference

Following self-introductions of the participants (*WG 39 Endnote 1*), the meeting agenda (*WG 39 Endnote 2*) was reviewed by the participants and the terms of reference were briefly described by Dr. Saitoh (see <https://meetings.pices.int/members/working-groups/wg39>) and reviewed by the WG members. Dr. Saitoh also introduced the history and schedule of the joint WG.

AGENDA ITEM 3

Review of programs and meetings on the Central Arctic Ocean

Dr. Saitoh gave an overview of the 5th WGICA meeting which was held virtually on April 27–28, 2020. He also reported on the Workshop “*How does the Pacific Arctic gateway affect the marine system in the Central Arctic Ocean (CAO)?*” (VW4) that was held virtually on October 13, 2020 (18:00–21:00 Pacific Standard Time), at PICES-2020. More detail about this workshop is available in PICES Press Vol. 29, No. 1, [pp. 22–24](#).

AGENDA ITEM 4

Status of 1st WGICA report

Dr. Saitoh reported the status of 1st WGICA report. The main product from the work of WGICA is a first version of an Integrated Ecosystem Assessment of the Central Arctic Ocean.

A working title for the 1st WGICA report is: “*Integrated Ecosystem Assessment of the Central Arctic Ocean: Ecosystem description.*” The subtitle is intended to explain the scope and content of the report, which is to provide an integrated account of the ecosystem of the Central Arctic Ocean.

The final stages are in preparation and review (September 2020) and a final draft will be submitted to ICES in December 2020, then will be published as an ICES Cooperative Research Report, including peer review and technical editing.

AGENDA ITEM 5

Plan of 2nd WGICA report and Ecosystem Overview (EO) report

Work on the various ToRs of the 2019–2021 Work Plan will be drawn together and used as components of a 2nd IEA report for the CAO ecosystem. Report 2 part 2 will build on the first and second report and will contain a description of the ecosystem and a first vulnerability characterization. Report 2 part 1 will provide an assessment of human activities and their pressures and impacts on the ecosystem. This will include climate change, contaminants and pollution, shipping (including tourism), and potential future fisheries.

An Ecosystem Overview (EO) will be prepared in 2021 and submitted to ICES.

AGENDA ITEM 6

Relevant national and international research programs

Relevant national and international research programs were introduced, and key aspects were discussed. Ecosystem Studies of Subarctic and Arctic Seas (ESSAS), one of the regional programs of the Integrated Marine Biosphere Research project (IMBeR) has a goal to compare, quantify and predict the impact of climate variability on the productivity and sustainability of Subarctic and Arctic marine ecosystems. Although the ESSAS Annual Science Meeting (ASM) scheduled in June 2020 had to be canceled due to COVID-19, the 2021 ASM will be held from May 30 to June 3, 2021 as a webinar (virtual) meeting.

AGENDA ITEM 7

Meetings and workshops

As a follow-up to WG 39's third workshop at PICES Annual Meetings, as well as a wrap-up, a one-day WG39/WG44 joint workshop (*WG 39 Endnote 3*) is proposed to take place at PICES-2021 to consolidate the WG's findings and advice, connect it to those from ICES and to report to the wider PICES community.

WG 39 requests travel support for an expert inside of PICES to attend the workshop at PICES-2021.

WG 39 has proposed an inter-sessional activity to hold the 6th WGICA as a virtual meeting on April 12–13, 2021. Dr. Lis Lindal Jørgensen, Dr. Martine van den Heuvel-Greve (New Co-Chair of WGICA from 2020 replace to Dr. John Bengtson), and Dr. Saitoh, will promote the meeting as virtual meeting organizers. We have also proposed to hold an in-person meeting for WGICA in October 2021, in Copenhagen.

AGENDA ITEM 8

Closing

The meeting concurred that further communication would be necessary and should be held on-line. The Co-Chair thanked the attendees and closed the successful meeting of WG 39.

WG 39 Endnote 1**WG 39 participation list**Members

Sei-Ichi Saitoh (Japan, Co-Chair/PICES)
 Fujio Ohnishi (Japan/PICES)
 Hyoung Chul Shin (Korea/PICES)

Observers

Takafumi Hirata (Japan/WG 44)
 Natsuhiko Otsuka (Japan)
 others

Members unable to attend

China: Zhongyong Gao, Guangshui Na, Fang Zhang

PICES

Sonia Batten (Executive Secretary)
 Harold (Hal) Batchelder (Deputy Executive Secretary)

WG 39 Endnote 2**WG 39 meeting agenda**

1. Welcome, introductions, opening remarks
2. Review WG 39 terms of reference
3. Review of programs and meetings on the Central Arctic Ocean
4. Status of 1st WGICA report
5. Plan of 2nd WGICA report and Ecosystem Overview (EO) report
6. Relevant national and international research programs
7. Meetings and workshops
8. Closing

WG 39 Endnote 3

**Proposal for a WG39/WG44 joint Workshop¹ on
 “Integrated Ecosystem Assessment (IEA) to understand the present and future of the Central
 Arctic Ocean (CAO) and Northern Bering and Chukchi Seas (NBS-CS)”
 at PICES-2021**

PICES sponsors: SB and FIS

Duration: 1.0 day (0.5 day + 0.5 day). There will be two sessions with focus on CAO and NBS-CS, and a session for joint deliberation will be prepared.

Convenors: Sei-Ichi Saitoh (Japan), Hyoung Chul Shin (Korea), Libby Logerwell (USA), Yury Zuenko (Russia)

Suggested invited speaker: Lis L. Jørgensen (Norway/PAME)

The target LMEs of WG 39 and WG 44 are the Central Arctic Ocean (CAO) and the Northern Bering Sea-Chukchi Sea (NBS-CS) respectively. These two regions are geographically and dynamically connected. The CAO is in rapid transition, driven by North Pacific environmental

¹ This may be back-to-back with the WGICA in-person meeting planned in October 2021.

changes. The rapid loss of sea ice cover has opened up the CAO to a range of activities, including potential fishing opportunities. In this context, the agreement to Prevent Unregulated High Seas Fisheries in the CAO has been signed and will be soon entered into force, which will necessitate joint research and monitoring. The NBS-CS is also experiencing unprecedented warming and loss of sea ice as a result of climate change. Declines of seasonal sea ice and warming temperatures are prominent in the northern Bering and Chukchi seas as in most regions of the Arctic. Chronic and sudden changes in climate conditions in this Arctic gateway are clearly altering the system and its food-webs, and enlarging opportunities for commercial activities (shipping, oil and gas development and fishing), with uncertain and potentially wide-spread cumulative impacts. An integrated ecosystem assessment (IEA) is a useful approach in this circumstance, particularly with substantial science and policy challenges emerging in the Arctic, and thus a coordinated IEA of the CAO and NBS-CS should be a priority. WG 39 has published IEA Report No.1, which provides a description of the ecosystem in the CAO and is beginning to prepare IEA Report No.2, which will deal with impacts from human activities as well as vulnerability characterization. WG 44 was formed in spring 2020 and is just beginning its work. The communication and interaction between WG 39 and WG 44 are warranted to promote overall understanding of the Arctic and neighboring oceans. The main objectives for the workshop are to describe and discuss present ecosystem processes (sources, signals, significance) in the CAO and the NBS-CS based on achievements from existing and future research programs such as MOSAiC and SAS, numerous NBS-CS programs, and Indigenous Knowledge. In addition, it will help to explore and develop future approaches for IEA and jointly organized monitoring in both regions.