

## **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 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/WGICA) had its third meeting on October 20, 2019, at PICES-2019 in Victoria, Canada. Co-Chair (PICES), Dr. Sei-Ichi Saitoh, led the meeting.

### **AGENDA ITEMS 1 and 2**

#### **Welcome and review WG 39 terms of reference, history and time plan**

Following self-introductions of participants (**WG 39 Endnote 1**), the meeting agenda (**WG 39 Endnote 2**) was reviewed by the members, and the terms of reference were briefly described by Dr. Skjoldal (Co-Chair/PAME) (see **WG 39 Endnote 3**) and reviewed by members. Dr. Saitoh also introduced the history and time plan of the joint WG.

### **AGENDA ITEM 3**

#### **Review of programs and meetings on the Central Arctic Ocean**

Dr. Skjoldal reported the overview of the 4<sup>th</sup> WGICA which was held on Sapporo, Japan on May 8-10, 2019. Dr. Saitoh reported the outcome of the Workshop (W7) on “*PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Third)*” held on October 17 at PICES-2019 (see [PICES-2019 Session and Workshop Summaries](#)).

### **AGENDA ITEM 5**

#### **Status of 1<sup>st</sup> WGICA report**

Dr. Skjoldal reported the status of the 1<sup>st</sup> WGICA report. He is the lead author and chief editor of the 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 1<sup>st</sup> WGICA report is: “*Integrated Ecosystem Assessment of the Central Arctic Ocean: Ecosystem description and vulnerability characterization*.” 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, and to consider aspects of vulnerability of this ecosystem and its components to climate-related changes and increasing human activity.

Final stages of preparation and review (November 2019) and final draft will be submitted to ICES in the end of March, 2020, then will be published one of *ICES Cooperative Research Report*, including peer review and technical editing.

**AGENDA ITEM 5**

**Plan of 2<sup>nd</sup> WGICA report**

The work on the various terms of reference of the 2019–2021 work plan will be drawn together and used as components of a 2<sup>nd</sup> IEA report for the CAO ecosystem. This will build on the first report, which contains a description of the ecosystem and a first vulnerability characterization, to go in more detail into 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.

**AGENDA ITEM 6**

**Relevant national and international research programs**

Relevant national and international research programs were introduced, and key aspects were described. Dr. Nishino presented “Updates on the recent Synoptic Arctic Survey (SAS) activities and results”, including cruise plan of the R/V *Mirai* cruise, 2020, a part of SAS activities, and cruise report of the R/V *Mirai* cruise, 2017, focusing on ice-edge system in the Arctic ocean. Dr. Hyoung Chul Shin presented “Central Arctic Ocean Fisheries Agreement and science: where to now?”, including a summary report on the Arkhangelsk Scientific Researchers Conference held May 22–28, 2019.

**AGENDA ITEM 7**

**Meetings and workshops**

As a follow-up to third workshop of WG 39 as well as a wrap-up, a ½-day workshop (**WG 39 Endnote 4**) is proposed to take place at PICES-2020 to consolidate the WG’s findings and advice, connect it to those from ICES and to report to the wider PICES community. It will be desirable to engage other PICES committees, at least MONITOR and FIS.

We proposed an inter-sessional activity to hold the 5<sup>th</sup> WGICA meeting in Tromsø, Norway. A plan of meeting period is middle April or middle May 2019 (avoiding golden week of Japan). Dr. Lis Lindal Jørgensen (new Co-Chair of WGICA from 2020 replacing Dr. Hein Rune Skjoldal), Institute of Marine Research, will promote the meeting as one of local organizers.

**AGENDA ITEM 7**

**Closing**

The meeting concurred that further communication would be necessary and should be made by on-line. Dr. Saitoh thanked the attendees and closed a successful meeting of WG 39.

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

Sei-Ichi Saitoh (Japan, Co-Chair/PICES)  
 Hein Rune Skjoldal (Norway/Co-Chair/PAME)  
 Guangshui Na (China/PICES)  
 Hyoung Chul Shin (Korea/PICES)

Observers

Betsy Baker (NPRB)  
 Lee Cooper (IASC)  
 Hyoung Sul La (Korea)  
 Shigeto Nishino (Japan)  
 Hiromichi Ueno (Japan/WG 38 Co-Chair)  
 others

Members unable to attend

China: Zhongyong Gao, Fang Zhang  
 Japan: Fujio Ohnishi

**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 1<sup>st</sup> WGICA report
5. Plan of 2<sup>nd</sup> WGICA report
6. Relevant national and international research programs
7. Meetings and workshops
8. Closing

**WG 39 Endnote 3*****WG 39 revised Terms of Reference (2019)***

1. Review and consider approaches and methodologies for conducting an IEA of the CAO ecosystem;
2. Review and report on ongoing and recent changes and events in the CAO ecosystem associated with changes such as in sea ice, oceanographic circulation, and hydrographic properties;
3. Continue to examine the effects of climate change on the CAO ecosystem by compiling and reviewing information on changes in response to the ongoing ‘Great melt’, and assess likely consequences to the CAO ecosystem of projected future changes associated with further loss of sea ice and other climate-related changes (*i.e.*, a climate impact assessment);
4. Assess the consequences of recent and ongoing climatic and oceanographic changes on transport pathways (physical and biological) and potential effects of contaminants in the CAO ecosystem;
5. Review and report on new studies on fish as well as other biological components of the CAO ecosystem.
6. Continue to identify priority research needs and monitor how identified knowledge gaps (needed to improve IEA and management effectiveness) are being addressed and filled.
7. Prepare an Ecosystem Overview for the CAO ecosystem.

**WG 39 Endnote 4**

**Proposal for a Workshop on**  
***“How does the Pacific Arctic gateway affect the marine system in the Central Arctic Ocean (CAO)?”***  
**at PICES-2020**

Duration: ½ day

Conveners: Sei-Ichi Saitoh (Japan), Hyoung Chul Shin (Korea), Guangshui Na (China), Lisa Eisner (USA), Libby Logerwell (USA)

Suggested invited speaker: Jacqueline M. Grebmeier (PAG)

The Central Arctic Ocean (CAO) is in rapid transition, largely driven by North Pacific environmental change, allowing it to become accessible to a range of activities. Rapid loss of sea ice cover has opened up the CAO for potential fishing opportunities. The agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAO) has been signed and is expected to enter into force soon. Scientific research in the CAO to inform and support policy decisions, however, remains scarce in contrast to an abundance of research in the neighboring North Pacific Ocean. With substantial science and policy challenges occurring in the Arctic, an integrated ecosystem assessment of the CAO is a priority task. PICES joined forces with ICES and PAME for such an assessment by forming the WGICA/WG 39 with its mission period ending 2021. The goals of the Pacific Arctic Gateway activity in the WGICA are to describe the status and trends of ecosystem components in the region and the connection of these parameters to the Central Arctic Ocean. The Pacific Arctic Gateway has experienced rapid environmental change in recent years due to reduced sea ice extent and seawater warming that can impact shelf-basin exchange of water mass components and biological taxa into the offshore Arctic basin. The main objective for the workshop is to describe and discuss ecosystem processes in the Pacific Arctic Gateway and how physical and biological components extend into the CAO, with spatial focus on the outer shelf/slope regions to the basin.