

ICES WGICA REPORT 2018

INTEGRATED ECOSYSTEM ASSESSMENTS STEERING GROUP

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REF SCICOM AND ACOM

Interim Report of the ICES/PICES/PAME Working Group for Integrated Ecosystem Assessment of the Central Arctic Ocean (WGICA)

24-26 April 2018

St. John's, Newfoundland, Canada



ICES

International Council for
the Exploration of the Sea

CIEM

Conseil International pour
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Executive summary

The Working Group for Integrated Ecosystem Assessment of the Central Arctic Ocean – WGICA – was established jointly by ICES and PAME in 2016. PICES joined as a co-sponsor of the group in 2017. WGICA met the first time at ICES headquarters in Copenhagen in June 2016 and for its second meeting in Seattle in April 2017. The 3rd meeting was held in St. John's, Newfoundland, Canada.

WGICA has been working to produce a first version of an Integrated Ecosystem Assessment (IEA) report for the central Arctic Ocean (CAO). At the third meeting, compiled material to be used in the IEA was presented and reviewed, and a plan for the further work to complete the IEA during 2018 was drawn up. This administrative meeting report provides a summary of the meeting and the agreed arrangements for completion of the IEA report.

1 Administrative details

Working Group name

ICES/PICES/PAME Working Group for Integrated Ecosystem Assessment of the Central Arctic Ocean – WGICA

Year of Appointment within the current three-year cycle

2015

Reporting year concluding the current three-year cycle

3

Chairs

John Bengtson, (ICES), USA

Sei-Ichi Saitoh (PICES), Japan

Hein Rune Skjoldal (PAME)

Meeting venues and dates

24–26 April 2018, Newfoundland, Canada, number of participants: 21

19–21 April 2017, Seattle, USA, number of participants: 33

24–26 May 2016, ICES HQ, Denmark, number of participants: 18

2 Terms of Reference a) – e)

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Consider approach and methodology (-ies) for doing an IEA for the CAO (based on the outcome of WKICA).	Basis for carrying out IEA for the CAO; draw upon experiences in other IEA groups (WGNARS, WGINOSE, WGEAWESS, WGINOR, WGIBAR and WGIAB)	SP Goal 1	Year 1	Summary on approach and methodology in interim report
b	Assemble data and information and carry out appropriate statistical and other types of analyses including mathematical modelling	Initial steps in an IEA	SP Goal 1	Years 1 and 2	Summary on data sources in interim report Draft (incomplete) IEA of the CAO
c	Prepare an IEA outline for the current status of the CAO ecosystem (CAO LME and adjacent slope waters including Atlantic and Pacific inflows and relevant shelf-basin exchanges) and effects, potential effects and vulnerability in relation to climate variability and change and human	IEA is an essential component of the EBM approach to human activities. Will provide a basis for advice in an ecosystem context on future Arctic marine shipping and fisheries taking into account ongoing and future climate change	SP Goal 1 and 2	Years 2 and 3	Draft (incomplete) outline of an IEA in interim report 2 nd year First complete outline for an IEA for the CAO at the end of the 3 rd year

	activities such as Arctic shipping and potential future fisheries				
d	Consider requirements and design of monitoring of the CAO to meet the need for repeated IEA in the near future as well as other types of assessments (which can be modular components of IEAs)	The first approach towards an IEA of the CAO builds on existing data and information, mostly from research and modelling activities. There is a need to consider improved and additional monitoring to better meet the need for refinements and update of the IEA	SP Goals 1 and 2	Years 1, 2 and 3	Summaries in interim reports 1 st and 2 nd years Summaries in final report after 3 rd year
e	Identify priority research issues which, when addressed, can improve the knowledge base for the future iterations of the IEA	Carrying out an IEA will reveal gaps in knowledge that forms the basis for identifying priority research issues	SP Goals 1, 2 and 3	Year 3	Summary in final report

3 Summary of Work plan

Year 1	Consider approach and methodology for IEA, start assembling of data and information, and consider monitoring requirements
Year 2	Continue assembling of data and information and carry out analyses. Prepare an initial and incomplete draft of IEA
Year 3	Finalize IEA report and consider monitoring requirements and priority research issues

4 Conduct of the meeting

The meeting was held at Alt Hotel St. John's, in St. John's Newfoundland, with Nadine Templeman from the Department of Fisheries and Oceans Canada as local host. She provided nice weather, and St. John's proudly displayed it's historical setting near the southern tip of Newfoundland. The meeting started at 9 am on Tuesday 24 April and closed at 3 pm on Thursday 26 April.

The meeting was attended by 14 participants from 5 countries (Canada, Japan, Norway, Russia, and United States of America). In addition, three members of the working group gave remote presentations to the meeting. The list of participants is included as Annex 1.

The agenda for the meeting is given in Annex 2. In presentations and discussion, information on the various parts of the ecosystem of the central Arctic Ocean (CAO), from physics through lower trophic levels to birds and mammals, was considered with emphasize on spatial aspects and trophic linkages. The issues of vulnerability and linkages between ecosystem components (species and groups of organisms) and human sectors, activities and pressures in the context of Integrated Ecosystem Assessment (IEA) were also on the agenda.

The presentations given at the meeting will be uploaded on the ICES SharePoint site for WGICA.

5 Outcome of the meeting

5.1 The report from WGICA on 'Integrated Ecosystem Assessment of the CAO'

The main product from the work of WGICA is a first version of an Integrated Ecosystem Assessment of the Central Arctic Ocean. The meeting agreed on an outline of the IEA report as detailed in Annex 3.

A working title for the IEA 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. This will include spatial information on vulnerability to shipping, in response to the need for such information by shipping experts in their work in PAME. This first version will not be a fully fledged IEA, but will form a basis for further iterations and development towards that end.

The report will have four main parts, in addition to an introduction, which explains the background and scope of the report:

1. A synthesis description of the ecosystem of the CAO (consisting of the basins and slopes, and including influences and interactions with surrounding shelves and the Atlantic and Pacific gateways), highlighting key features of the ecosystem with emphasis on spatial aspects and trophic linkages;
2. A description of various parts of the ecosystem (climate and ice, plankton, ice biota, benthos, birds, mammals) with emphasis on spatial aspects and trophic linkages (production 'hot spots', advection, and migratory patterns and habitat use by species). The descriptions will include information on changes over time in relation to climate change, and sensitivity of species and habitats to further climate change and human activities and pressures;
3. A section on vulnerability including consideration of vulnerability of the CAO ecosystem to ongoing climate change and the associated loss of sea ice, and to stressors related to human activities such as shipping and potential fisheries in future;
4. A section on knowledge gaps and monitoring in relation to an improved basis for future iterations of IEAs of the CAO and subsequent management decisions.

Draft material for the various sections of the IEA report have been, or are in the process of being, prepared and drafted. These include oceanography and sea ice, primary production, zooplankton, fish, birds, marine mammals, and initial parts of the vulnerability section. The draft texts and material will be uploaded on the ICES SharePoint site for WGICA.

Based on the expertise available in WGICA, this is a list of authors, contributors and reviewers of the various sections of the report (the list is preliminary and can be adjusted):

- Oceanography and ice – Ingvaldsen, Ivanov, Nishino, Overland, Saitoh
- Lower trophic level – Bluhm, Grebmeier, Hop, Melnikov, Nishino, von Quillfeldt, Skjoldal, Saitoh, Shin
- Fish – Gjørseter, Hedges, Hop, Logerwell, Lejonmalm, Lunford, Skjoldal
- Marine birds – Gavriilo, Kuletz, Skjoldal
- Marine mammals – Bengtson, Frie, Skjoldal

- Vulnerability – Gavriilo, Grebmeier, Hedges, Otsuka, Skjoldal, Speer, Stevenson, Templeman, van Pelt, von Quillfeldt

The three co-chairs will oversee the process of finalizing the draft IEA report and its publication as a joint ICES/PICES/PAME report. The target date for publication is before the end of 2018, with a complete draft by 1 October.

John Bengtson will explore if his organization can assist with layout and preparation for publication. While the report will be available as an electronic version, it was agreed that we should aim to have it also as a printed version. The secretariats of ICES, PICES and PAME need to consider how this can be achieved.

5.2 Timeline for completion of the IEA report

- The co-chairs will have monthly coordination meetings by Skype or similar, to follow the progress of preparing the IEA report.
- First week of June (date to be determined) – coordination meeting of authors and contributors to review progress.
- Late August (date to be determined) – 2nd coordination meeting of authors and contributors.
- 1 October – Complete draft available.
- Late December – IEA report completed and available as electronic version, if possible also as printed version.

5.3 Terms of Reference (ToRs) for continuation of WGICA

The meeting agreed that the work of WGICA should continue for another 3-years term (2019-2021). It was noted that IEA is a core component of the Ecosystem Approach to management (EA), and that the work of WGICA is contributing to the basis for developing EA for the central Arctic Ocean ecosystem.

Elements of ToRs were identified and discussed:

- Consider approach and methodology for doing IEA of the CAO ecosystem.
- Review and report on ongoing and recent changes and events in the CAO ecosystem associated e.g. with changes in sea ice, circulation, and hydrographic properties.
- Continue to examine effects of climate change on the CAO ecosystem by compiling and reviewing information on changes in response to the 'Great melt' with substantial loss of sea ice up to now, and assess likely consequences to the CAO ecosystem of projected future changes associated with further loss of sea ice and other climate-related changes (Climate impact assessment).
- 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.
- Review and report on new studies on fish as well as other biological components of the CAO ecosystem.
- Monitor how identified knowledge gaps (needed to improve EIA and management effectiveness) are being addressed and filled.

These (and any additional) ToR elements will be elaborated over the next months and presented to ICES, PICES and PAME at their meetings in late September or early October.

The meeting considered that it would be advantageous if more experts from the networks of expertise in AMAP and CAFF could take part in the work of WGICA. AMAP and CAFF were invited to join as co-sponsors in the first period of WGICA, but they declined for workload reasons. When the mandate and ToRs for WGICA are renewed for another three-year period starting in 2019, AMAP and CAFF could be invited once more to make WGICA an even stronger joint effort among scientific and policy-oriented organizations.

Annex 1: List of participants

Name	Institute	E-mail
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Shigeto Nishino	Japan Agency for Marine-Earth Science and Technology	nishinos@jamstec.go.jp
Todd Stevenson	Ocean Conservancy, USA	tstevenson@oceanconservancy.org
<i>Remote presentations</i>		
James E. Overland	NOAA Fisheries, USA	James.E.Overland@noaa.gov
Kathy Kuletz	US Fish and Wildlife Service, USA	Kathy_Kuletz@fws.gov
Pauline Snoeijis Leijonmalm	Stockholm University, Sweden	pauline.snoeijis-leijonmalm@su.se

Annex 2: Agenda

Tuesday 24 April – Day 1

- 9:00 Welcome and introductions
- 9:20 Terms of reference and agenda
- 10:00 Key features of the Central Arctic Ocean ecosystem
- 10:30 Break
- 11:00 Pacific gateway
- Updates (Jackie Grebmeier)
 - Climate, physical and chemical oceanographic, and lower trophic level ecosystem aspects in the Pacific Gateway (Shigeto Nishino)
- 12:00 Lunch break
- 13:00 **Climate, oceanography and sea ice**
- The big melt – outside the previous envelope of experience (Jim Overland – remote)
- 13:45 **Primary production** (Hein Rune Skjoldal)
- Light, Nutrients; New studies and updates on rates of primary production; Photosynthetic capacity (Pvs.I); Upwelling, Spatial patterns
- 14:45 Zooplankton and ice biota
- Overview of zooplankton in the central Arctic Ocean (Hein Rune Skjoldal)
 - Zooplankton studies in the Pacific gateway area (Sei-Ichi Saito with contributions from Hyoung Chul Shin)
- 15:30 Break
- 16:00 **Marine birds**
- Overview of marine bird species in the CAO with special emphasis on ivory gull and Ross's gull (Maria Gavriilo)
 - Marine birds in the Pacific gateway and Canada Basin (Kathy Kuletz – remote)
- 17:30 End meeting day 1

Wednesday 25 April – Day 2

- 09:00 Summary day 1
- 09:30 **Fish**
- Overview of fish species in CAO (Hein Rune Skjoldal)
 - The mesopelagic layer in the Atlantic gateway area (Harald Gjøsæter)
 - 10:30 Break
 - Acoustic records of fish from Swedish ice-breaker 'Oden' (Pauline S. Lejonmalm, presented by Harald Gjøsæter)
 - Update on fish investigations in the Canadian Beaufort Sea (Kevin Hedges)
- 12:00 Lunch
- 13:00 **Marine mammals**
- Overview of species and their occurrence in the CAO (John Bengtson)

14:00 Vulnerability characterization and identification of sensitive areas to shipping (ToR c)

- Vulnerability characterization – linkages between activities/pressures and ecosystem components (Lisa Speer)
- Perspective of shipping activity along the Northern Sea Route (Natsuhiko Otsuka)
- Transpolar shipping (Todd Stevenson)
- General discussion on concepts and approaches

17:00 Close of meeting day 2

Thursday 26 April – Day 3

08:30 Summary day 2

08:45 **Structure of the WGICA Report 2016-2018**

10:30 Break

10:50 **Terms of Reference for continuation of work by WGICA (2019-2021)**

12:15 Lunch

13:00 **Future monitoring** (ToR d)

13:30 **Identify priority research issues** (ToR e)

14:00 **Summary**

15:00 Close of workshop