

2025 Report of the Advisory Panel on the Arctic Ocean and the Pacific Gateways (AP-ARC)

PICES established the AP-ARC to coordinate and integrate PICES scientific activities on Arctic issues and to further advance the understanding of the Arctic system and linkages and impacts to the North Pacific in May 2024.

The Advisory Panel on the Arctic Ocean and the Pacific Gateways (AP-ARC) had a hybrid meeting on November 11, 2025 (14:00-16:00 Japan Standard Time, in Yokohama, Japan), at PICES-2025. Co-Chair (PICES), Dr. Sei-Ichi Saitoh, led the meeting.

AGENDA ITEMS 1 and 2

Review AP-ARC terms of reference, history, and time plan

Following self-introductions of participants (*AP-ARC Endnote 1*), the meeting agenda (*AP-ARC Endnote 2*) was reviewed by all participants. Dr. Saitoh also introduced the history and timeline of the AP.

AGENDA ITEM 3

Review publication plan and schedule

Dr. Saitoh went over the planned report on observation programs for PICES nations in Arctic gateways; co-authors have been identified. Plans are to finalize the structure by November 30, draft writing by June 30, review by September 30, with publication by March 30.

Each national report should include past, present, and future programs (brief summaries) as well as information on available polar vessels/icebreakers. Dr. Sei-Ichi Saitoh will draft a guideline for nations to follow for increased consistency and balance among the sections. Dr. Nadja Steiner will join Dr. Sei-Ichi Saitoh as a co-editor.

AGENDA ITEM 4

Workshop 2025 summary and synthesis

A co-sponsored workshop was held on November 9th, 2025 at PICES 2025: W3:

HD/MEQ/FUTURE Workshop on “Present and Future Pressures and Human Activities in the Arctic Ocean and Pacific Gateways”. Many participants attended the workshop. We had an excellent line up of presentations, including two invited talks and two discussion sessions. Dr. Sei-Ichi Saitoh summarized the presentation line up and content and Dr. Nadja Steiner briefly summarized the discussion sessions. A summary of the report was developed and shared as an article of PICES Press (see below). One discussion session briefly touched on a potential workshop for 2026. At the time there was active discussion on data-sharing and repository happening, hence the idea to hold a data

workshop, however this was not considered for PICES 2026 due to limited expertise in the group (see below).

We submitted an article to **PICES Press** as Nadja Steiner, Sei-Ichi Saitoh, and Hyoung-Chul Shin: “Present and Future Pressures and Human Activities in the Arctic Ocean and Pacific Gateways”.

AGENDA ITEM 5

Discussion on the proposal of a workshop for PICES 2026

We discussed a workshop proposal for PICES 2026. With input from WGICA chairs, which highlighted the need for Pacific input into the CAO stressor assessment, the proposed theme of the workshop is: “Connections between the Arctic Gateways and the Central Arctic Ocean – Key research questions for the next 10 years”. The final proposal is summarized in *AP-ARC Endnote 3*.

AGENDA ITEM 6

Thought on "perception of time" workshop or possibly sub-group within AP-ARC => perspective paper

At the previous online meeting, the topic of a workshop on "perception of time", discussing different perceptions of future projections from Indigenous and academic perspectives was raised. However, the topic was deemed too specific for a workshop, and we have no Indigenous presence to organize a workshop around it at this point. Nadja to meet with Henry and discuss before the next intersessional meeting to see if we have capacity to form a subgroup and/or if we have enough material to write a perspective paper.

AGENDA ITEM 7

Timeline/workplan update

Dr. Sei Ichi Saitoh showed the WG timeline. No updates were made and the time plan continued as previously prepared.

AGENDA ITEM 8

WGICA 10th Anniversary Celebration Meeting (November 8, 2025)

The WGICA 10th Anniversary Celebration Meeting was held November 8, 2025. Sei-Ichi reported on the meeting and showed the line-up of presenters. The team successfully celebrated their 10th anniversary. The meeting agenda is summarized in *AP-ARC Endnote 4*.

Dr. Saitoh submitted an article to **PICES Press** as Sei-Ichi Saitoh, Lis L. Jørgensen, and Martine van den Heuvel-Greve, “WGICA 10th anniversary celebration meeting in PICES 2025”.

AGENDA ITEM 9

Comments for the WGICA ToR in 2026-2028

WGICA developed new ToR of WGICA for the next three years. Drs. Lis L. Jørgensen and Martine van den Heuvel-Greve, co-chair of WGICA, introduced the new ToR for work to be addressed in the next three years and called for participants from AP-ARC to help address/contribute to the ToR, particularly from the Pacific side. Drs. Taka Hirata and Nadja Steiner expressed interest. A WGICA meeting was held at PICES-2025 with interested AP-ARC members invited and attending.

AGENDA ITEM 10

Closing

The meeting concluded that further communication would be necessary and should be made online. The Co-Chairs, Drs. Sei-Ichi Saitoh and Nadja Steiner, thanked the attendees and closed the successful meeting of AP-ARC.

AP-ARC Endnote 1

AP-ARC participation list

Members

Nadja Stefanie Steiner (Canada, Co-Chair)

Sei-Ichi Saitoh (Japan, Co-Chair)*

Hyoung Chul Shin (Korea, co-chair)

Takafumi Hirata (Japan)*

Fujio Ohnishi (Japan)

Hyoung Sul La (Korea)

Kirill Kivva (Russia)*

*in person

Members unable to attend

China: Zhongyong Gao, Yongjun Tian, Fang
Zhang

Japan: Kohei Matsuno, Shigeto Nishino

Russia: Yury I. Zuenko (Russia)

USA: Kelia Axle, David Lincoln Fluharty,
Henry Huntington, Kathleen Stafford, Eduard
Zdor

Observers

Lis L. Jørgensen*

Inigo Martinez*

Martine van den Heuvel-Greve*

* in person

AP-ARC Endnote 2

AP-ARC business meeting agenda

Agenda (JST)

November 11, 2025

14:00-14:10

(1) Welcome and introductions Co-Chairs and participants

(2) Review of agenda

14:10-14:20

(3) AP-ARC reports and publications - status and updates

14:20-14:40

(4) Workshop 2025 summary & synthesis

14:40-15:10

(5) Workshop planning for 2026

- summarize notes from Workshop

- data workshop for the Arctic gateways and connections to the CAO

- including data WG(T-CODE), WG-ICA? Others

17:10-17:25

(6) Thought on "perception of time" workshop or possibly sub-group within AP-ARC => perspective paper

17:25-17:30

(7) Timeline/workplan update

17:30-17:35

(8) WGICA 10th Anniversary Celebration Meeting (November 8, 2025)

17:35-17:55

(9) Comments for the WGICA ToRs in 2026-2028

17:55-18:00

(10) Close of meeting

S.-I. Saitoh

AP-ARC Endnote 3**SB(AP-ARC)/HD/WGICA (PICES/ICES/PAME) joint workshop proposal for PICES 2026**

Title: Connections between the Arctic Gateways and the Central Arctic Ocean – Key research questions for the next 10 years

Duration: 1.0 day

Co-conveners:

Nadja Stefanie Steiner, Canada, nadja.steiner@dfo-mpo.gc.ca;

Sei-Ichi Saitoh, Japan, ssaitoh@arc.hokudai.ac.jp (corresponding);

Hyoung Chul Shin, Korea, hcshin@kopri.re.kr;

Karen Hunter, Canada, karen.hunter@dfo-mpo.gc.ca;

Lis Lindal Jørgensen, Norway, lislin@hi.no

Workshop description

With advanced sea ice retreat, the Arctic gateways show early and intense physical and ecological changes in marine waters. These changes transfer into the Central Arctic Ocean (CAO), where internationally-coordinated efforts assess capacity, feasibility, and ecological and societal impacts of exploratory fishing under the auspices of the Central Arctic Ocean Fisheries Agreement (CAOFA). Understanding the connections and transports from the Pacific and Atlantic Arctic gateways, either directly or via Arctic coastal seas, are crucial in understanding how climate change and other human pressures impact the ecosystem and fisheries potential of the CAO. Particularly, input from the Pacific has been identified as a gap by the joint PICES/ICES/PAME Working Group on an Integrated Ecosystem Assessment for the Central Arctic Ocean.

From 1974-2014, the date of summer sea ice retreat occurred earlier, at a rate of approximately 0.7 d/yr. The years 2017-2019 were identified as anomalously warm in the Pacific Arctic region and were characterized by substantial winter sea ice loss. Additional physical changes in the Pacific Arctic include increased heat transport of Pacific water through the Bering Strait, increased occurrences of marine heat waves, and increased storm activities in the High Arctic. Enhanced bird and mammal mortalities have also been reported. In the Atlantic, North Atlantic water influences the Arctic Ocean climate, a process referred to as “Atlantification”. Boreal Atlantic fish have extended their range northwards (e.g., Atlantic cod have been observed within the CAO) and other large predatory fish (e.g., haddock, beaked redfish) have been observed in the vicinity of the CAO. Sea temperatures in the Barents Sea have increased gradually since 1980 and include occurrences of marine heatwaves. Longer durations of the ice-free season increased the primary productivity of the Barents Sea and biomass of small copepods and early life stages has increased. This may reflect a combination of factors due to local effects and progressing Atlantic influences. Changes in Arctic

cod (*Boreogadus saida*) are expected to experience changes in habitat and abundance with warmer waters and changes in predator-prey interactions through Arctic gateways. Ecological impacts linked to physical changes range from phytoplankton and marine bacteria to marine mammals and, ultimately, Indigenous Peoples.

Through a combination of invited and contributed talks, we will synthesize and advance research on the connectivity and transport of physical and ecological indicators, environmental and ecosystem changes, and pollutants from the Arctic gateways to the CAO. Building on these presentations, we will use discussion sessions (e.g., group discussions, world café) to identify the key questions to be addressed in the next 10 years to understand how the Arctic gateways impact ecosystems and fisheries potential in the CAO and how these impacts may influence equitable adaptation, policy, and conservation pathways.

Co-organizations: SB and HD (TBD)

Location: Venue of PICES 2026 – Nanaimo, Canada

Date: PICES 2026 workshop period

Budget request: USD 3000 (travel for one or two invited speakers at the workshop and miscellaneous)

Name of Invited Speakers:

TBD (the speaker list will be further developed and updated)

Publication plan:

TBD (Scientific Report, Review paper, etc.)

AP-ARC Endnote 4

WGICA 10th Anniversary Celebration Meeting

17:00-19:30, 8 November 2025

PCICS 2025 Yokohama

Room: Euphony (B1F)

Meeting: hybrid

Conveners: Sei-Ichi Saitoh (PICES), Lis L. Jørgensen (PAME), Martine van den Heuvel-Greve (ICES)

17:00 Opening Remarks: Sei-Ichi Saitoh (in person) (together with Lis L. Jørgensen and Martine van den Heuvel-Greve)

17:05 Greeting from ICES: Alan Heynie (ICES) (in person)

17:15 Greeting from PICES: Sonia Batten (PICES) (in person)

17:25 Greeting from PAME: Natsuhiko Otsuka (PAME) (in person)

17:35 Overview of WGICA 10 years Activities: Sei-Ichi Saitoh (in person)

18:00 Memories Talk 1: Hein Rune Skjoldal (online)

18:20 Memories Talk 2: John Bengston (online) *Canceled*

18:40 WGICA new products: Martine van den Heuvel-Greve (in person) (together with Sei-Ichi and Lis L. Jørgensen)

19:00 Future Prospective of WGICA: Lis L. Jørgensen (in person) (together with Sei-Ichi Saitoh and Martine van den Heuvel-Greve)

19:20 Closing Remarks and Anniversary Toast: Martine van den Heuvel-Greve (in person) (together with Lis L. Jørgensen and Sei-Ichi Saitoh)