

## Report of the Section on *Climate Change Effects on Marine Ecosystems*

The Section on *Climate Change Effects on Marine Ecosystems* (S-CCME) held a meeting on October 20, 2019, in Victoria, Canada. Fifteen members and observers from five PICES member countries attended (*S-CCME Endnote 1*). Drs. Jacquelynne (Jackie) King and Shin-ichi Ito chaired the meeting. The meeting agenda is detailed in *S-CCME Endnote 2*.

### AGENDA ITEM 3

#### **Introductions and new members**

Dr. Shin-ichi Ito (PICES, Japan) stepped down as Co-Chair after completing two terms. S-CCME expressed its gratitude for his leadership, and is grateful for his continued membership. Candidates for Co-Chair were solicited by email prior to the S-CCME meeting, and additional interest was solicited from the floor. S-CCME elected Dr. Xiujuan Shan (China) as Co-Chair.

Both Myron Peck (ICES, Germany) and John Pinnegar (ICES, UK) will finish their term as S-CCME Co-Chairs at the end of 2019. One new Co-Chair was elected by ICES members at the ICES 2019 SCICOM meeting, Christian Möllmann (ICES, Germany), and a second co-chair will be identified in upcoming months [later identified as Mark Payne (ICES, Denmark)].

For the second year, there was no Russian member (POC) participation at the S-CCME meeting.

**Request:** FIS or BIO propose an additional Russian member to help augment national representation.

### AGENDA ITEM 4

#### **2019 activities and accomplishments**

- a. Final Report of the ICES/PICES Workshop on Political, Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling (WKPESTLE), June 9, 2018

The report (ICES CM 2018/EPDSG:18) has been published by the ICES Ecosystem Processes and Dynamics Steering Group. The report and the Executive Summary are available on PICES [S-CCME homepage](#).

- b. IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) Fourth Lead Author Meeting (March 4–9, 2019, Kazan, Russia)

Dr. Anne Hollowed (PICES/USA) was selected as a lead author Chapter 3, “Polar Regions” (50 pages), and Dr. Manuel Barange (ICES/FAO) was selected as a Review Editor for Chapter 5, “Changing ocean, marine ecosystems, and dependent communities” (65 pages). The final draft was submitted to the IPCC Technical Support Unit on May 31, 2019; it underwent final government review June 14–August 9; the Summary for Policymakers, and the underlying report were approved at the 51st Session of the IPCC on September 20–23, 2019.

- c. IPCC AR6 2nd Lead Author Meeting (July 14–19, 2019: Kathmandu, Nepal)

S-CCME members, Drs. John Pinnegar (ICES/UK; lead author for the Small Islands chapter), Kristin Holsman (PICES/USA; lead author for the North America chapter), Shin-ichi Ito (PICES/Japan; lead author for the Ocean and Coastal Ecosystems and their Services chapter) and Christian Möllmann (ICES/Germany; lead author for the Europe chapter) attended the 2nd Lead Author meeting in Kathmandu, Nepal, where they reviewed initial comments on a ‘zero-order’ draft of the AR6 report.

- d. Third Meeting of the ICES Working Group on Seasonal-to-Decadal Prediction of Marine Ecosystems (WGS2D) (August 26–30, 2019, Copenhagen, Denmark)

The group was chaired by S-CCME member Mark Payne (ICES, Denmark) with additional ICES S-CCME members (Valerio Bartolino, Italy and Brian R. MacKenzie, Denmark). The Working Group considers ocean predictions on timescales from seasons to decades in order to support marine resource management. This group aligns with ongoing activities in the PICES/CLIVAR Working Group on *Climate and Ecosystem Predictability* (WG 40).

- e. Scenarios Forum 2019 (March 11–13, 2019, Denver, USA) Session on “Scenarios for the Future Ocean”

The Scenarios Forum involved a diverse set of participants using and developing scenarios to carry out research and policy analysis related to climate change and sustainability. This session made extensive use of outputs from the ICES/PICES Workshop on Political, “Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling” (WKPESTLE), published [June 9, 2018](#). S-CCME members Alan Haynie (PICES/USA) and John Pinnegar (ICES/UK) were Session co-convenors. Additional Session co-convenors included Tyler Eddy (University of South Carolina) and Jörn Schmidt (University of Kiel).

- f. CERES Annual Meeting (March 11–15, 2019, Bordum, Turkey)

ICES S-CCME members met at the CERES Annual Meeting to discuss bio-economic projections of climate impacts on European fisheries and aquaculture. CERES is coordinated by Myron Peck (ICES/Germany) with many S-CCME participants (including John Pinnegar (ICES/UK), Mark Payne, (ICES/Denmark). Anne Hollowed, (PICES/USA) and William Cheung (ICES/Canada) are members of the Research Advisory Board (RAB).

- g. ICES Annual Science Conference (ASC 2019; September 9–12, 2019, Gothenburg, Sweden)

Keynote Presentations by S-CCME members:

- Cisco Werner (PICES/USA): *Re-examining physical-biological linkages in a changing ocean: what will we need to know by 2030?*
- Manuel Barange (ICES/FAO): *The future of fish and its role in securing food for a 9-billion world*

PICES co-sponsored Theme Session D, “*Assessing ecosystem vulnerability to multiple drivers and pressures*”, co-convened by S-CCME member Kirstin Holsman (PICES/USA) along with David Reid (Ireland) and Mette Mauritzen (Norway). The Session focused on novel qualitative or quantitative approaches that enhance our understanding and assessment of the vulnerability of marine species, habitats, communities, and systems to multiple drivers and pressures. These approaches can be adapted to both situations with high data availability and good knowledge of impacts and responses, and to situations with limited data and knowledge. The Session also considered approaches relating vulnerability assessments to management objectives and management options for the advancement of EBM.

- h. PICES-2019 (October 21–25, 2019 Victoria, Canada)

S-CCME co-sponsored Topic Sessions included:

- S5: “*Trends in ocean and coastal ecosystems and their services and its future*” co-chaired by Shin-ichi Ito (Japan), Angelica Peña (Canada), Kirstin Holsman (USA), Xiujuan Shan (China) and non-S-CCME member Igor Yashayaev (Canada);
- S11: “*Incorporating ecosystem variability and climate change into fisheries management: Progress and challenges for EBFM in the 21st century*” co-chaired by Kirstin Holsman (USA), Sukyung Kang (Korea) and non-S-CCME members Barbara Muhling (USA), Carrie Holt (Canada).

## AGENDA ITEM 5

**Activities and events of interest in 2020**

- a. IPCC WG II AR6 Lead Authors' Third Meeting (January 27– February 1, 2020, Faro, Portugal)

S-CCME member lead authors Christian Möllmann, John Pinnegar, Kirstin Holsman and Shin-ichi (see Agenda Item 4c) will attend this meeting.

- b. MSEAS 2020: “Managing for Sustainable Use of the Earth’s Marine and Coastal Systems” May 25–29, 2020, Yokohama, Japan

S-CCME member Alan Haynie (PICES/USA) serves on the Symposium’s Scientific Steering Committee.

- c. (CERES) Final Meeting (January 20–24, 2020: The Netherlands)

S-CCME members will meet at the CERES (Climate change and European Aquatic RESources) Final Meeting to discuss bio-economic projections of climate impacts on European marine fisheries (see Agenda Item 4f for S-CCME members).

- d. BiodivERsA - SOMBEE (Scenarios Of Marine Biodiversity and Evolution under Exploitation and climate change) 2019-2021

This initiative is being led by Institut Français de Recherche pour l’Exploitation de la Mer (IFREMER) with strong links to Fish-MIP. It is designed to advance our capacity to forecast future changes in marine fish biodiversity. It addresses the role of eco-evolutionary dynamics and their consequences for the sustainable exploitation of fish resources in the future. The key open question addressed is whether exploited fish populations have the capacity of adapting swiftly enough to global change to ensure their persistence and their sustainable exploitation. It will use OSMOSE models for ICES and PICES regional seas: Black Sea, Gulf of Lions, Humboldt Current, North Sea, West Coast Canada, Yellow Sea. S-CCME members include William Cheung (Canada), Myron Peck (Germany) and Morgane Travers-Trolet (France).

- e. FutureMARES

This project is coordinated by the University of Hamburg (Myron Peck, ICES/ Germany). The initiative supports the EU proposal addressing LC-CLA-06-2019 ‘Inter-relations between climate change, biodiversity and ecosystem services’. If funded (decision pending, November 2019) it will contribute to regional climate modeling in S-CCME (CMIP5 Ensemble used in fisheries and aquaculture projections, RCP4.5, 8.5). The intent is to examine the inter-relationship among three Nature-based Solutions (NBS): NBS1- Effective Restoration, NBS2- Effective Conservation, NBS3-Sustainable harvesting.

- f. ICES ASC 2020 Theme Sessions (September 7–10, 2020, Copenhagen, Denmark)

Several theme sessions have been submitted for consideration that are of relevance to S-CCME (and which cite the Strategic Initiative). These include:

- i. Taking stock on ocean acidification research for provision of future efforts (S. Birchenough *et al.*);
- ii. Impacts of human pressures on ecosystem components assessed by dynamic modelling (Solfrid Sætre Hjøllø *et al.*);
- iii. The use of traits in management and conservation of marine ecosystems (E.D. Beukhof *et al.*);
- iv. Past, present and future of marine plankton assemblages and communities (D. Eerkes-Medrano *et al.*);
- v. Improvements and challenges in spatial fisheries management (S. Cerviño *et al.*);
- vi. Connecting economic, social science, and interdisciplinary research and management advice (A. Haynie);
- vii. ICES in a net-zero emission world (A Local / Remote Network Session) (B. Karp and B. Turrell);
- viii. Marine ecological forecasts – what do we need? (M. Payne and S. Sailley)

- g. PICES-2020 (October 22–November 1, 2020, Qingdao, China)

S-CCME supports the Topic Session: *Impacts of climate change on aquaculture*. Co-Convenors: Dr. Cody Suzowski (USA) and Dr. Xiujuan Shan (China)

**Request:** ½-day meeting at PICES-2020

h. Proposed expert groups

S-CCME supports the establishment of the following Working Groups:

- Joint ICES/PICES Working Group on Small Pelagic Fish (WGSPF) (see *FIS Endnote 5*);
- Joint ICES/PICES Working Group on Impacts of Warming on Growth Rates and Fisheries Yields (WGGRAFY; see *FIS Endnote 6*).

#### AGENDA ITEM 4

#### **Progress and planning for S-CCME Phase 4 key activities**

The current 3-year Phase 3 Implementation Plan will expire October 2020. Originally, the lifespan of S-CCME was to coincide with the lifespan of FUTURE Science Program. However, FUTURE will not be ending in 2020, so a Phase 4 Implementation Plan for S-CCME is required. S-CCME members noted that there is not enough time at PICES Annual Meetings to fit in a 1-day Implementation Plan discussion, and that fitting in additional inter-sessional meetings where many can attend every 3 years is overtaxing. Additionally, 3-year for planning cannot span a long enough time period to overlap with international projects or for IPCC AR cycles. For Phase 4, S-CCME proposes a 5-year Implementation Plan (2021–2025). Upcoming activities should include linkages to FishMIP and CMIP6, so the planning meeting can take advantage of the MSEAS Symposium in May 2020 in Yokohama; William Cheung (FishMIP) and Shoshiro Minobe (CMIP6) will be in Tokyo at that time. S-CCME members, Shin-ichi Ito (Japan), Jackie King (Canada), Kirsten Holsman (USA), Alan Haynie (USA) and Franz Meuter (USA) plan to attend MSEAS or another international symposium in Japan at the same time.

#### **Requests:**

- Renewal frequency for S-CCME to be revised from 3 to 5 years citing because the frequency with which S-CCME members need to meet to develop new IPs is overtaxing;
- Logistical support for room rental at MSEAS for May 30, 2020 for Phase 4 planning. The draft Implementation Plan will be circulated to members in summer 2020 for submission to Science Board at PICES-2020.

#### ***S-CCME Endnote 1***

#### **S-CCME participation list**

##### Members

Shin-ichi Ito (Japan, PICES Co-Chair/PICES)  
Jacquelynnne (Jackie) King (Canada, Co-Chair/PICES)  
Anne B. Hollowed (USA)  
Kirstin Holsman (USA)  
Phoebe Woodworth-Jefcoats (USA)  
Sukgeun Jung (Korea)  
Sukyung Kang (Korea)  
Guimei Liu (China)  
Franz Mueter (USA)  
Angelica Peña (Canada)  
Xiujuan Shan (China)  
Motomitsu Takahashi (Japan)

##### PICES members unable to attend

China: Chuanxin Qin, Jinhui Wang, Xuelei Zhang  
Japan: Hiroshi Kuroda  
Korea: Chung Il Lee  
Russia: Yury I. Zuenko  
USA: Alan Haynie, Cisco Werner

##### Observers

Elliott Hazen (USA)  
Xianshi Jin (China, FIS Chair)  
Hyunjoo Lee (Korea)

**S-CCME Endnote 2****S-CCME meeting agenda**

1. Introductions
2. Adoption of agenda
3. Election of new PICES Co-Chair and report on new ICES Co-Chairs
4. Reports on 2019 S-CCME activities and accomplishments
  - a. Final Report and Executive Summary ICES/PICES Workshop on Political, Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling (WKPESTLE) June 9, 2018 Final Report – for information only
  - b. IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) Fourth Lead Author Meeting (March 4,9, Kazan, Russia) (Hollowed)
  - c. IPCC AR6 2nd Lead Author Meeting (July 14-19, Kathmandu, Nepal) (Holsman and Ito)
  - d. Third Meeting of the ICES Working Group on Seasonal-to-Decadal Prediction of Marine Ecosystems (WGS2D) (August 26–30, Copenhagen, Denmark)
  - e. Scenarios Forum 2019 (March 11–13, Denver, US) Session on “Scenarios for the Future Ocean”
  - f. CERES Annual Meeting (March 11–15, Bordum, Turkey)
  - g. ICES Annual Science Conference (ASC): PICES Co-Sponsored Theme session D, “Assessing ecosystem vulnerability to multiple drivers and pressures” (Holsman)
  - h. PICES 2019 Annual Meeting Sessions
5. S-CCME activities and events of interest in 2020
  - IPCC WG II AR6 Lead Authors’ Third Meeting (January 27 – February 1: Faro, Portugal) (Holsman and Ito)
  - MSEAS 2020 “Managing for Sustainable Use of the Earth’s Marine and Coastal Systems” May: 25–29, Yokohama, Japan
  - CERES Meeting
  - 2020 ICES Annual Science Conference theme sessions (All)
  - 2020 PICES Annual Meeting and Expert Groups—suggested S-CCME sessions, workshops and requested feedback on proposed Expert Groups (All)
  - BiodivERsA - SOMBEE (Scenarios Of Marine Biodiversity and Evolution under Exploitation and climate change)
6. FutureMARES
7. PICES updates
 

FUTURE Science Program (King)

  - Frontiers in Marine Science Publication—for information only
  - Open Science Meeting (April 2021)
  - FUTURE lifespan and Science Integrated Plan
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8. S-CCME Phase 3 (2018–2020)
 

Phase 4 (2021–2023) (All)

  - Within PICES, the lifespan of S-CCME was to correspond to FUTURE end date of 2020, however FUTURE will extend past 2020
  - S-CCME will need to develop a Phase 4 Implementation Plan. Options include:
    - Intersessional Meeting in 2020: with Implementation Plan ready to present to ICES SCICOM (Sept 2020) and ICES SB (Oct 2020)
    - ½-day Implementation Plan meeting at PICES 2020 Annual Meeting. Implementation Plan presented to PICES Science Board at PICES Inter-sessional Meeting (April 2021) and ICES SCICOM (Sept 2021)
    - Others?

Close of meeting