

2023 Report of Fisheries Science Committee

The Fisheries Science (FIS) Committee held two Business Meetings: October 9, 2023 (Chaired by Prof. Xianshi Jin via Zoom) and October 21, 2023 (Chaired by Dr. Jackie King in Seattle, WA, USA at the PICES Annual Meeting); agendas *FIS Endnote 2*. Dr. Jackie King served as rapporteur at both meetings. All PICES member nations were represented at the October 9, 2023 virtual meeting; however, China and Russia were not represented at the October 21, 2023 in person meeting (*FIS Endnote 1*). Since all nations were represented at the October 9 meeting, it was decided that Chair and Vice Chair Elections would be held at the end of the meeting instead of at the October 21 meeting as initially planned.

AGENDA ITEM 3

REPORTS OF FIS-SPONSORED EXPERT GROUPS

Working Group 45: Joint PICES/ICES Working Group on Impacts of Warming on Growth Rates and Fisheries Yields (GRAFY)

Shin-Ichi Ito (Japan), Co-Chair of WG45, provided an overview of the past year accomplishments achieved by WG45. Major highlights include:

- Engaged ECOPs to WG-45 (GRAFY) (e.g. an ECOP co-convenor of the topic session at PICES 2023, Chenying Guo) and published an article of WG-45 (GRAFY) by a lead author of ECOP Zhen Lin.
- Proceed comparative studies on fish size between North Sea, Gulf of Alaska and western North Pacific and found regional specific responses of fish size to changing environmental temperatures.
- Applied a state-space modelling to the fish weight interannual fluctuations in the western North Pacific and found out the importance multiple effects of stratification enhancements and density dependence.

Unfortunately, the WG45 proposal for a session at ICES 2024 meeting was not supported by ICES and the decision was communicated to WG45 Chairs too late to submit a Theme Session proposal to PICES 2024. FIS received the proposal “Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries” and supported WG45 for late submission consideration (*FIS Endnote 3*).

FIS supported the WG45 request for a half day business meeting to be held in person at PICES 2024.

Joint PICES/ICES Section on Climate Change Effects on Marine Ecosystems (S-CCME)

Kirstin Holsman (USA), Co-Chair of S-CMME provided an overview of the past year accomplishments, which include the following highlights:

- S-CCME sponsored S7 at PICES 2022, WK5 at ECCWO5, W10 at PICES 2023 (upcoming) and sessions at both ICSE 2022 and ICES 2023.
- S-CCME /SICCME chair K. Holsman co-led, and chairs Kathy Mills and Alan Baudron participated in WKCLIMAD. The workshop report is now available online including specific recommendations for climate informed advice. Chairs Mills (lead author) and Holsman (Author) also contributed to the US 5th National Climate Assessment. K. Mills is leading FISHSCORE, aimed at climate change adaptation for fisheries and fishing communities.
- S-CCME members shared information about recent sessions, workshops and meetings, National programs (e.g., Aquatic Climate Change Adaptation Services program, Canada; Climate Ecosystem and Fisheries Initiative, USA), UN Decade programs (e.g., Ocean to climate Seamless Forecasting System (China), Ocean Negative Carbon Emission (China), SUPREME (USA), and integrated modeling projects or assessments focused on evaluating climate change impacts, risk and adaptation.

The S-CCME Chair emphasized that they are still waiting to have a Canadian member named as a replacement for a member that resigned from S-CCME in 2023. FIS agreed to request that the SB convey to GC the need for a Canadian member, preferably with higher trophic level or socioeconomic modeling expertise.

Working Group 43: Joint PICES/ICES Working Group on Small Pelagic Fish

Ryan Rykaczewski (USA), Co-Chair of WG43, provided an overview of the past year accomplishments achieved by WG43. The term of WG43 ends October 2023, and for the final year many accomplishments were achieved:

- WG co-chairs (in collaboration with members, including those of the ICES sibling committee) published a review article on research developments: Peck, MA, J Alheit, A Bertrand, IA Catalán, S Garrido, M Moyano, RR Rykaczewski, A Takasuka, and CD van der Lingen. 2021. Small pelagic fish in the new millennium: a bottom-up view of global research effort. *Progress in Oceanography* 191:102494, doi:10.1016/j.pocean.2020.102494.
- A networking environment was created based on the kick-off meeting of the joint PICES-ICES working group. Discussions have continued at the activity-group level.
 - “Task Force 1 - Ecological Process Knowledge (EPK)” and “Task Force 2 - Translating Process Knowledge (TPK)” including the following activity groups.
 - Task Force 1
 - Activity 1: Critical review, evaluation and testing of hypotheses
 - Activity 2: Life cycle closures - bottlenecks and gaps in knowledge
 - Activity 3: Drivers of spatial distribution and phenology
 - Activity 4: Food-web dynamics
 - Activity 5: Internal and external drivers of growth, reproduction, and survival
 - Activity 6: Survey design and monitoring
 - Activity 7: Improving short-term forecasts and/or long-term projections
 - Activity 8: Improvements to management

The achievements of the activity groups were summarized during the post-symposium meeting in fall 2022 to identify, prioritize, and coordinate research topics which potentially contribute to predicting future trends of population dynamics of SPF.

- Symposium on “Small Pelagic Fish: New Frontiers in Science and Sustainable Management” was held at Calouste Gulbenkian Foundation in Lisbon, Portugal, during November 7–11, 2022 (rescheduled from 2021 to 2022). The post-symposium meeting was held in Lisbon during November 12–13, 2022. In addition, the group members convened several sessions and workshops at the Annual Meetings. The events were conducted by the joint ICES/PICES Working Group in cooperation with FAO.

WG43 has completed all of its Term of Reference, with exception of TOR4: Provide recommendations for strategies of marine ecosystem monitoring and fisheries management of SPF which will contribute to sustainable ecosystem-based fisheries management, through biophysical, ecosystem and/or socio-economic models. However, recommendations will be included in the introductory editorials of the two special issues that are in preparation. The final report of WG43 will be delivered at October 2024 Annual Meeting. It is anticipated that a new Expert Group will be proposed at ISB2024 or at the 2024 Annual Meeting.

Working Group 44 Joint PICES/ICES Working Group on Integrated Ecosystem Assessment for the Northern Bering Sea-Chukchi Sea

Libby Logerwell (USA), Co-Chair of WG44, reported on the final year for WG44 (term ends October 2023). In April 2023, WG44 met to review Terms of Reference completed and outstanding. Several setbacks related to the pandemic and international conflicts, along with the lack of capacity with committee members, were acknowledged and some deliverables were removed. The Working Group has been able to develop a conceptual model for the Northern Bering Sea-Chukchi Sea ecosystem, which falls short of initial expectations but will

serve as a good starting point for IEA to be undertaken by others. A final report is under preparation and will be completed by the 2024 Annual Meeting.

AGENDA ITEM 4 (VIRTUAL MEETING)

PROPOSED 2024 ANNUAL MEETING THEME SESSIONS AND WORKSHOPS

FIS Committee supported three Theme Session proposals:

- Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries (Score 4)
- Innovation in using integrated approaches to detect and manage for the effects of climate change tipping points and critical thresholds in marine ecosystems (Score 3)
- Advanced tools to monitor, observe, and assess small pelagic fish populations in support of ecosystem-based fisheries management and maintaining ecosystem services (Score 3)

FIS Committee supported three Workshop proposals:

- Integrating biological research, fisheries science and management of flatfish species in the North Pacific Ocean in the face of climate and environmental variability (Score 4)
- Exploring international knowledge co-production: Lessons learned from international marine science organizations at the science-policy interface (Score 4)
- North Pacific Plankton Time Series Data Analyses and Synthesis (Score 2)

PROPOSED NEW EXPERT GROUPS

Sei-Ichi Saitoh (Japan) provided an overview of the proposal for a new Advisory Panel on the Arctic Ocean and the Pacific Gateways (AP-ARC). The proposal was developed by the Study Group Arctic Ocean and the Pacific Gateways and addresses the need for a liaison between WGICG and WGIEANBS-CS ICES/PICES joint activities after the conclusion of both WG39 and WG44. PICES needs to understand the impacts of Arctic changes on its marine ecosystem and biodiversity and the linkages to Sub-Arctic and midlatitude oceans. A new Advisory Panel could deliver more comprehensive scientific information on this subject including monitoring activities in the Arctic Ocean and Pacific. FIS supports the proposal for AP-ARC and noted that it would be very useful if there were linkages to the new Central Arctic Ocean RFMO in terms of providing scientific information particularly as that group moves forward on mapping and monitoring activities in the Central Arctic Ocean.

AGENDA ITEM 5 (VIRTUAL MEETING)

EARLY CAREER SCIENTIST AWARD FOR BEST PRESENTATION (ORAL OR POSTER)

FIS Committee members, Jackie King, Sukgeun Jung, and Libby Logerwell volunteered to judge ECOP Oral presentations and Jessica Miller and Chris Rooper volunteered to judge ECOP Poster presentations in S3: Responses of Small Pelagic Fish to Extreme Events in Pacific Ecosystems, S9: Understanding the implications of body size change for stock productivity and fisheries management and FIS Contributed Paper Session.

ELECTIONS (VIRTUAL MEETING)

Observers and Expert Group members were requested to leave the meeting in order for FIS Committee members to conduct Elections for Chair and Vice-Chair. Elections were conducted by Sanae Chiba (PICES). Sanae Chiba reported that a single Chair nomination, for Jackie King, had been received. Secret ballot confirmed votes numbering more than half of the Contracting Parties, and Jackie King was elected Chair. Sanae Chiba reported that a single Vice-Chair nomination, for Naoki Tojo, had been received. Secret ballot confirmed votes numbering more than half of the Contracting Parties, and Naoki Tojo was elected Vice-Chair.

AGENDA ITEM 4 (IN-PERSON MEETING)

PRESENTATIONS FROM OTHER ORGANIZATIONS

North Pacific Fisheries Commission (NPFC)

Alex Zavolokin (Science Manager) provided an overview of the connections between NPFC and PICES, which in this past year have included NPFC co-sponsorship of PICES events.

Pacific Salmon Commission (PSC)

John Field (Executive Secretary) provided background on the bilateral commission between Canada and US. Some of the recent interests of the PSC have included renegotiation of most fishery management measures by 2029, monthly seminar series on environmental variation and implications for salmon management, readiness assessment for climate change and uncertainty, and Traditional Ecological Knowledge. FIS Committee discussed how develop linkages between PSC and PICES and suggestions included inviting Japanese, Korean, or Russian PICES members to present on environmental linkages to their salmon stocks in the PSC seminar series via zoom. FIS Committee also advised that summer 2024 would be a good time for the PSC to reach out to FIS Committee in order to develop a PICES/PSC Workshop proposal for the 2025 Annual Meeting since proposals are usually due in September.

AGENDA ITEM 5 (IN-PERSON MEETING)

FUTURE SCIENCE PROGRAM

Sukjung Kang (Korea) provided an update on the FUTURE Science Program and the activities of the Steering Committee. Notable for the 2024 Annual Meeting will be the FUTURE Open Science Meeting will be held on Monday (October 28, 2024) after the opening session, replacing the SB Symposium. A special panel on the future of PICES will be held on Friday November 1, 2024.

AGENDA ITEM 6 (IN-PERSON MEETING)

ADDITIONAL RECOMMENDATIONS TO SCIENCE BOARD

There were no additional recommendations from FIS Committee to Science Board

AGENDA ITEM 7 (IN-PERSON MEETING)

OTHER BUSINESS

There was no Other Business to discuss

FIS Committee Endnote 1

FIS Committee participation list

October 9 Participants

Members

Jackie King (Canada, Chair)
 Naoki Tojo (Japan, Vice-Chair)
 Chris Rooper (Canada)
 Xianshi Jin (China)
 Xiujuan Shan (China)
 Nobuaki Suzuki (Japan)
 Sukgeun Jung (Korea)

October 21 Participants

Members

Jackie King (Canada, Chair)
 Naoki Tojo (Japan, Vice-Chair)
 Chris Rooper (Canada)
 Nobuaki Suzuki (Japan)
 Sukgeun Jung (Korea)
 Sukyung Kang (Korea)
 Steve Lindley (USA)

Sukyung Kang (Korea)
Elena Dulepova (Russia)
Mikhail Stepanenko (Russia)
Steve Lindley (USA)
Jessica Miller (USA)

Libby Logerwell (USA)
Jessica Miller (USA)

Members unable to attend

China: Zhuojun Ma
Japan: Shiroh Yonezaki
Korea: Hwansung Ji, Sung Il Lee
Russia: Akexabder Glubokov
USA: Libby Logerwell

Members unable to attend

China: Xianshi Jin, Zhuojun Ma, Xiujuan Shan
Japan: Shiroh Yonezaki
Korea: Sung Il Lee, Hwansung Ji
Russia: Elena Dulepova, Alexander Glubokov,
Mikhail Stepanenko

Observers

Sanae Chiba (PICES Secretariat)
Shin-Ichi Ito (Japan, WG45)
Sei-Ichi Saitoh (Japan, AP-ARC)
Ryan Rykaczewski (USA, WG43)

John Field (PSF)
Alex Zavolokin (NPFC)
Kirstin Holsman (USA, S-CCME)
Ryan Rykaczewski (USA, WG43)

*FIS Committee Endnote 2***FIS Committee provisional meeting agendas**

October 9, 2023 (via Zoom)

East Pacific Monday, October 9, 18:00-21:00 PDT	Japan & Korea Tuesday, October 10, 10:00-13:00 JST & KST
China Tuesday, October 10, 09:00 – 12:00 CST	Russia (Vladivostok) Tuesday, October 10, 11:00-14:00 VLAT

1. Welcome and Introductions**2. Adoption of Agenda****3. Reports of FIS-sponsored Expert Groups with requests to SB**

- a. **Working Group 45: Joint PICES/ICES Working Group on Impacts of Warming on Growth Rates and Fisheries Yields (GRAFY) (Shin-Ichi Ito).**

4. Recommendations to Science Board

- a. Proposed 2024 Annual Meeting Theme Sessions and Workshops
- b. Proposed Expert Groups
 - i. PICES Advisory Panel on the Arctic Ocean and the Pacific Gateways AP-ARC) (Sei-Ichi Saitoh)
- c. Requested financial assistance or sponsorship from other organizations

5. Early Career Scientist Award for Best Presentation (Oral or Poster)

Judges for ECOP in FIS sponsored Workshops/Sessions required:

- a. **W7:** Integrating biological research, fisheries science and management of flatfish species in the North Pacific Ocean in the face of climate and environmental variability (**Sunday**, Oct 22; 9:00-17:30 and **Thursday**, Oct 26 Poster Session)
- b. **W10:** Integrating biological research, fisheries science and management of flatfish species in the North Pacific Ocean in the face of climate and environmental variability (**Saturday**, Oct 21; 14:00-17:30 and **Sunday**, Oct 22; 9:00-12:30 and **Thursday**, Oct 26 Poster Session)

- c. **S3:** Responses of Small Pelagic Fish to Extreme Events in Pacific Ecosystems (**Tuesday**, Oct 24; 9:00-12:30 and **Thursday**, Oct 26 Poster Session)
- d. **S9:** Understanding the implications of body size change for stock productivity and fisheries management (**Thursday**, Oct 26; 9:00-17:30 and **Thursday**, Oct 26 Poster Session)
- e. **FIS** Contributed Paper Session (**Wednesday**, Oct 25; 14:00-17:30 and **Thursday**, Oct 26 Poster Session)

6. Other Business

<p>Saturday, October 21, 2023 18:00-20:30 The Westin Seattle, Room: St. Helen's (2F) Seattle, USA</p>

1. Welcome and Introductions

2. Adoption of Agenda

3. Reports of FIS-sponsored Expert Groups

- a) S-CCME Joint PICES/ICES Section on Climate Change Effects on Marine Ecosystems (**Agenda Addendum 1**)
- b) Working Group 43: Joint PICES/ICES Working Group on Small Pelagic Fish (Ryan Rykaczewski; **Agenda Addendum 2**)
- c) Working Group 44: Joint PICES/ICES Working Group on Integrated Ecosystem Assessment for the Northern Bering Sea-Chukchi Sea (Libby Logerwell; **Agenda Addendum 3**)

4. Presentations from Other Organizations

- a. North Pacific Fisheries Commission (Janelle Curtis and Alex Zavolokin)
- b. Pacific Salmon Commission (John Field and Fiona Martens)

5. FUTURE Science Program (Sukyung Kang)

6. Additional Recommendations to Science Board

Note: FIS Committee recommendations to SB for 2024 Annual Meeting Theme Sessions and Workshops, Proposed Expert Groups or Requested financial assistance or sponsorship from

other organizations will have already been decided at the Virtual Meeting (Oct 9/10).

7. **Other Business**

FIS Committee Endnote 3

Proposal for a Topic Session on “*Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries*” at PICES-2024

Potential Committee/Panel: FIS, WG-45 (GRAFY), AP-ECOP, S-CCME

Title: Impacts of warming-induced changes in body sizes on marine fish ecology and their consequences for ecosystems and associated fisheries

Duration: one day

Convenors: Shin-Ichi Ito, Japan, goito@aori.u-tokyo.ac.jp
 Alan Baudron, UK, Alan.baudron@gov.scot
 Paul Spencer, USA, paul.spencer@noaa.gov

Corresponding convener: Shin-Ichi Ito, Japan, goito@aori.u-tokyo.ac.jp

Potential Invited Speakers: Dr. Julia Indivero, USA, jindiv@uw.edu (ECOP)

Session description (300 words):

As sea temperatures keep rising, warming impacts on marine fisheries have become increasingly prevalent. For example, temperature-induced changes in fish distribution and movement across management boundaries impact management of multi-jurisdictional fisheries. Additionally, changes in phenology can lead to mismatch between larva abundances and plankton blooms, thereby affecting recruitment and fish stocks productivity. In contrast, warming-induced changes in fish body sizes have been increasingly documented but their potential impacts have received comparatively less attention.

Changes in body size can impact other life history traits such as maturity, fecundity, diet, habitat preferences, and predator-prey interactions; all of which can alter the functioning of size-structured ecosystems and commercial fisheries. While research has thus far mainly focused on understanding how warming seas affect fish growth, the magnitude of the consequences of changes in body size and what it could mean for ecology, fisheries and ecosystems is yet to be explored.

As global warming is likely to lead to further changes in fish body sizes there is a need to assess the possible consequences facing marine ecosystems and fisheries in order to understand the challenges that lie ahead. This session aims at assessing the future consequences of changing fish body sizes occurring in warming seas. We are seeking contributions on (but not limited to) the following topics:

1. Interrelations between fish growth and other life history traits
2. Impacts of fish body sizes on species mobility, use of habitat, and migrations/distributions
3. Evidence of changes in fish body sizes affecting predator-prey interactions and their consequences on size-structured food webs
4. Impacts on commercial fisheries, including changes in yield, fishery practices, and management measures
5. Examples accounting for changes in fish body sizes in fish stocks assessment and management
6. Impacts on markets and fish sales, changes in nutritional value, and implications for food security