

Report of the Biological Oceanography Committee

The meeting of the Biological Oceanography Committee (BIO) took place from 18:00–20:00 h on Sunday September 24 and 14:00–18:00 h on Wednesday September 27, 2017, in Vladivostok, Russia. The Chair, Dr. Se-Jong Ju, called the meeting to order and welcomed members and observers (*BIO Endnote 1*). All members in attendance introduced themselves and absent members were noted. Members from the USA were not able to attend this year's meeting and were represented by Dr. Seki (U.S. delegation). The draft agenda was circulated. There were no changes/additions offered and the agenda was adopted (*BIO Endnote 2*). Dr. Sastri agreed to act as rapporteur.



BIO participants at PICES-2017, from left: Michael Seki, Hye-Won Moon, Se-Jong Ju, Angelica Peña, Akash Sastri, Kaoru Hattori and Motomitsu Takahashi.

AGENDA ITEM 2

Membership changes

- **BIO:** Prof. Yingjie Liu is a new member of BIO Committee representing China.
- **Section on *Marine Birds and Mammals* (S-MBM):** Dr. Patrick O'Hara (Canada) replaced Dr. Rolf Ream (USA) as Co-Chair; Dr. Miran Kim (Korea) is a new member replacing Drs. Kyum Joon Park and Hawsun Sohn; and Drs. Robert Suryan and Jaime Jahncke (USA) have been invited as new members for S-MBM.
- **WG 32:** Dr. Go Suzuki (Japan) is a new member replacing Dr. Takeo Kurihara.
- **WG 33:** Prof. Youhei Yamashita is a new member representing Japan.
- **WG 37:** Mr. Todd D. O'Brien and Dr. Hui Liu (USA) and Dr. Kazuaki Tadokoro (Japan) are new members; the addition of *ex-officio* member (Dr. Lidia Yebra; Spain) from the ICES Working Group on Zooplankton Ecology (WGZE) was approved by Governing Council.

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AGENDA ITEM 3

Annual review of BIO activities

a) PICES-2017 BIO Paper/Topic Sessions and Workshop

At PICES-2017, BIO sponsored:

- A ½-day BIO Paper Session;
- A ½-day Topic Session (S12): *Seasonal and climatic influences on prey consumption by marine birds, mammals and predatory fishes*;
- A 1-day Topic Session (S13): *Joint PICES-ICES Session on Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Impact on ocean ecosystem services*;
- A ½-day Workshop (W6): *Advantages and limitations of traditional and biochemical methods of measuring zooplankton production*.

b) 2017 Inter-sessional symposia/sessions/workshops/meetings

Dr. Ju presented a brief summary of the PICES/ICES 3rd Early Career Scientist Conference on “*Climate, oceans and society: Challenges and opportunities*” (May 20–June 2, 2017, Busan, Korea). He noted that the event was successful and well attended.

Dr. Ju also presented slides on behalf of Drs. Ken Drinkwater (Norway), Franz Mueter (USA), and Sei-Ichi Saitoh (Japan) summarizing recent ESSAS (*Ecosystem Studies of Subarctic and Arctic Seas*) activities: 1) an ESSAS-sponsored RACArctic Workshop (1), which took place March 1–3, 2016 in Hakodate, Japan. The primary goal of the RACArctic program was to “...*assess the resilience and adaptive capacity of these arctic marine systems in a changing climate from both a natural and social science perspective*.” Objectives included a review and synthesis of potential for changes in the physical and chemical oceanography under future climate conditions with an emphasis on implications for fisheries in the subarctic-arctic transition and resilience of fish populations and their zooplankton prey; 2) Key outcomes from Workshop 2, which took place March 21–23, 2017 in Juneau, Alaska, USA, included recognition of climate change challenges by stakeholders (industry and communities) and the need to enhance flexibility of management system with climate change challenges; and 3) the Open Science Meeting held June 11–15, 2017 in Tromsø, Norway. Three synthesis papers (Physical and chemical changes; Marine food webs and fish stocks; and Fisheries and fishery management systems) were outlined during the Meeting. The ESSAS OSM consisted of 4 workshops and 9 scientific theme sessions.

c) Publications

- PICES Scientific Report No. 50 of AP-MBM on “Spatial ecology of marine top predators in the North Pacific: Tools for integrating across datasets and identifying high use areas” (Editors: Y. Watanuki, R. Suryan, H. Sasaki, T. Yamamoto, E. Hazen, M. Renner, J.A. Santora, P.D. O’Hara, W.J. Sydeman);
- PICES Scientific Report No. 49 of the Study Group on *Biodiversity Conservation* (Editor: Janelle M.R. Curtis);
- Final report of the WG 28 on *Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors: ‘in progress’* (Editors: Ian Perry and Motomitsu Takahashi) ;
- Final report of the WG 29 on *Regional Climate Modeling*: submitted to the Secretariat in 2016; waiting for publication (Editors: Chan Joo Jang and Enrique Curchitser);
- PICES Scientific Report No. 51 of the Working Group (WG 26) on *Jellyfish Blooms around the North Pacific Rim: Causes and Consequences*: additional comments by one of the editors on the first technical edits of the report were received by the Secretariat for evaluation and synthesis just prior to PICES-2017.

AGENDA ITEM 4

Selection of Best ECS presentations for BIO

Volunteers evaluated oral (Dr. Ju, Dr. Michael Seki (U.S. delegation, acting as BIO member), Dr. Motomitsu Takahashi, and Dr. Kaoru Hattori) and poster (Dr. Ju, Dr. Angelica Peña, and Dr. Akash Sastri) presentations for sessions sponsored by BIO. Rankings were compiled by the Chair before the Closing Ceremony. The Best Presentation Award for BIO-sponsored topic sessions (S12 and BIO-Paper) was given to Ms. Soeon Ahn (Title: ‘Environmental predictors of habitat suitability and spatial distribution of Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) in Jeju waters’) and BIO Best Poster Award was given to Mr. Yusuke Ikawa (Title: ‘Seasonal and year-to-year variations in the surface copepodid population and egg production rate of *Eucalanus californicus* (Copepoda: Calanoida) in Sagami Bay, Japan’).

AGENDA ITEM 5

Progressive reports and future plans of BIO active groups:

a) Dr. Anne Hollowed (Co-Chair, S-CCME) presented a S-CCME activity report for the Joint PICES/ICES Section on *Climate Change Effects on Marine Ecosystems* and proposed a 1-day workshop at PICES-2018. Dr. James Christian (Co-Chair, S-CC) presented an update on S-CC (Section on *Carbon and Climate*) activities.

b) Drs. Kaoru Hattori and Patrick O’Hara (Co-Chairs, S-MBM) presented an update on S-MBM (Section on *Marine Birds and Mammals*) annual activities:

- Changes to membership: see Agenda Item 2;
- PICES-2017 activities included: 1) a business meeting convened on September 23, 2017 and a BIO Topic Session (S12) “*Seasonal and climatic influences on prey consumption by marine birds, mammals and predatory fishes*” held on September 26, 2017;
- Publication of PICES Scientific Report No. 50, “*Spatial ecology of marine top predators in the North Pacific*”;
- Recent and upcoming International symposia related to S-MBM activities: Pacific Seabird Group Annual Meeting (February 22–25, 2017, Tacoma, USA, and February 21–24, 2018, La Paz, Mexico); PICES/ICES International Symposium on “*Drivers and dynamics of small pelagic fish resources*” (March 6–11, 2017, Victoria, Canada); Biennial Conference for the Society of Marine Mammology (October 22–27, 2017; Halifax, Canada); Workshop (W7) on “*What do seabirds reveal about climate change impacts on the world’s oceans?*” to be convened at the PICES/ICES/IOC/FAO 4th International Symposium on “*The Effects of Climate Change on the World’s Oceans*” (June 4–8, 2018, Washington, DC, USA);
- Linkages with other PICES expert groups (WGs 35, 36, and 38);
- Presentation of the S-MBM 5-year work plan, “*Climate and Trophic Ecology of MBM’s*”;
- Other activities: 1) Report on WWF Russia activities by Dr. K. Zgurovsky on “*Results of positive partnership of WWF, scientist and fishermen in the Vulnerable Marine Ecosystems conservation in the Arctic*” at the PICES-2017, 2) S8/HD topic session; 3) a proposal for a 1-day business meeting and 1-day workshop at PICES-2018.

c) Working Group on *Biodiversity of Biogenic Habitats* (WG 32). Neither Co-Chair, Dr. Masashi Kiyota nor Dr. Janelle Curtis was available to report.

- WG 32 requested a 1-year extension to its term.

d) Dr. Richard Rivkin (Co-Chair, WG 33) presented an update on WG 33 (Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration*) activities:

- Participation of WG members at the Gordon Research Conference (GRC) on “*Ocean biogeochemistry*” was held June 12–17, 2016 in Hong Kong, China;
- The first formal WG meeting was held in Hong Kong on June 17, 2016 following the GRC; reviewed ToR

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and discussed time-line for future activities. Subsequent meetings included: the 2016 ICES ASC in Riga, Latvia; PICES-2016 in San Diego, USA; 2017 ASLO Aquatic Sciences Meeting in Honolulu, Hawaii; WG meetings in Qingdao and Beijing September 2017; Business meeting and BIO Topic Session (S13), “*Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Impact on ocean ecosystem services*” (11 contributed talks and well attended) held at PICES-2017 in Vladivostok, Russia;

- The WG will convene a theme session (S3) entitled, “*Linking ocean acidification, hypoxia, and carbon sequestration with ecosystem dynamics under climate change*” [now renamed “*Carbon uptake, ocean acidification, and ecosystems and human impacts*”], at the PICES 4th International Symposium on “*The effects of climate change on the world’s oceans*”.
- Three review manuscripts targeting the *National Science Review* as well as a special issue of *Science China-Earth Sciences* (~15 papers related to WG 33’s ToR).
- Publication of Legendre, L., Rivkin, R.B. and Jiao, N. (2017) Advanced experimental approaches to marine water-column biogeochemical processes. *ICES J. Mar. Sys.* Doi:10.1093/icesjms/fsx146

e) Dr. Akash Sastri (Co-Chair, WG 37) presented an update on the first year of activities for WG 37 (Working Group on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions*).

AGENDA ITEM 6

Relation with other international organizations/programs

See Agenda item 4b.

AGENDA ITEM 7

FUTURE program

Dr. Sukyung Kang (FUTURE SSC Co-Chair) presented an update on the FUTURE Science Program, emphasizing linkages within PICES and how to raise prominence of FUTURE.

AGENDA ITEM 8

Progress on WG 35’s North Pacific Ecosystem Status Report

Dr. Sinjae Yoo (Co-Chair, WG 35) presented an update on the WG activities. The WG objectives are to 1) Publish the 3rd edition of the North Pacific Ecosystem Status Report (2009–2015) and 2) establish an online data submission system. The lead authors for each of the 15 regional classifications have been identified. However, Dr. Yoo noted that the online data submission has not been as successful as hoped, since only 60 to 70 Environmental Time Series Observations have been submitted.

AGENDA ITEM 9

Review proposals of new Expert Groups (if any proposals submitted)

BIO supported the proposal for a PICES/NPFC (North Pacific Fisheries Commission) Joint Study Group on *Scientific Cooperation in the North Pacific Ocean*, and for the establishment of a Working Group on *Marine Ecosystem Services* (WG-MES/WG 41) proposed by the Human Dimensions Committee. A proposal for a Study Group on *Marine Microplastics* was a late submission which BIO did not have a chance to review.

AGENDA ITEM 10

Planning for PICES 2018 Annual Meeting

The next PICES Annual Meeting with the theme, “*Toward integrated understanding of ecosystem variability in the North Pacific*”, will be held October 25–November 4, 2018 in Yokohama, Japan.

BIO members revised and discussed all the proposed topic sessions and ranked them according to relevance. BIO assigned the highest ranks to the follow topic sessions:

- “*Indicators for assessing and monitoring biodiversity of biogenic habitats*”;
- “*Fish production through food web dynamics in the boundary current systems*”;
- “*Ocean acidification and deoxygenation and their impact on ocean ecosystems: synthesis and next steps*”;
- “*Applying ecosystem considerations in science advice for managing highly migratory species*”;
- “*Ocean mixing processes and its impact on biogeochemistry, climate and marine ecosystems*”.

BIO members revised and discussed all the proposed workshops and ranked them according to relevance. BIO assigned the highest ranks to the follow workshops:

- “*Diets, consumption, and abundance of marine birds and mammals in the North Pacific*”;
- “*Synthesizing projected climate change impacts in the north Pacific*”;
- “*Regional evaluation of secondary production observations and application of methodology in the North Pacific*”;
- “*Ecological roles of gelatinous zooplankton: Evaluation, integration and future prospects in a more gelatinous ocean*”.

AGENDA ITEM 11

Proposed inter-sessional meetings for the end of 2017 and beyond

The following meetings will be held in the near future:

- PICES/ICES/IOC/FAO 4th Climate Change Symposium on “*The effects of climate change on the world’s oceans*” (June 4–8, 2018, Washington, DC, USA). Dr. Anne Hollowed (PICES) is the Chair of the SSC.
- NPFC/FAO Workshop on “*Protection of Vulnerable Marine Ecosystems in the North Pacific Fisheries Commission Area: Applying global experiences to regional assessment*” (March 12–15, 2018, Yokohama, Japan), to be co-sponsored by PICES. BIO did not identify a member from the Committee or from WG 32 to participate in the workshop.
- A PICES-organized International Symposium on “*Understanding changes in transitional regions of the Pacific*” (April 22–26, 2018, La Paz, Mexico).

AGENDA ITEM 12

Documenting business meetings, topic sessions and workshops

The BIO Chair recalled the request to convenors to submit their session/workshop summaries and for BIO and its expert groups submit their business meeting reports to the Secretariat within one month after the Annual Meeting.

AGENDA ITEM 13

Other business

No other business was discussed.

BIO Endnote 1

BIO participation list

Members

Kaoru Hattori (Japan)
 Se-Jong Ju (Korea, Chair)
 Angelica Peña (Canada)
 Akash Sastri (Canada)
 Michael Seki (USA, acting BIO member)
 Motomitsu Takahashi (Japan)

Members unable to attend

Canada: Janelle Curtis
 China: Yingjie Liu, Song Sun, Ping Zhuang
 Japan: Atsushi Tsuda
 Korea: Taewon Kim, Wongyu Park
 Russia: Boris Kotenev, Alexei Orlov
 USA: Debora Iglesias-Rodriguez, Julie Keister

Observers

Yanlong Chen (China)
 James Christian (Canada, S-CC Co-Chair)
 Tatiana Dautova (Russia)
 Anne Hollowed (USA, S-CCME PICES Co-Chair)
 Sukyung Kang (Korea, FUTURE-SSC Co-Chair)
 Kirill Kivva (Russia)
 Renyan Liu (China)
 Hye Won Moon (Korea)
 Patrick D. O'Hara (Canada, S-MBM Co-Chair)
 Richard Rivkin (Canada, WG 33 PICES Co-Chair)
 Ryan Rykaczewski (USA, WG 40 CLIVAR Co-Chair)
 Sinjae Yoo (Korea, WG 35 Co-Chair)
 Jinhui Wang (China)

BIO Endnote 2

BIO meeting agenda

1. Welcome, introductions, opening remarks, changes to, adoption of, agenda and appointment of rapporteur
2. Membership changes
3. Annual review of BIO activities
 - a) PICES-2017 BIO Paper/Topic Sessions and Workshop
 - b) 2017 Inter-sessional symposia/sessions/workshops/meetings
 - c) Publications
4. Selection of Best ECS presentations for BIO
 - 2017 PICES BIO Paper/Topic Sessions and Workshop and selection of judges for BIO Early Career Scientist Best Presentation from BIO-sponsored sessions/workshops S12, S13 (no ECS), BIO paper session) and Poster Award (from S12, S13 (no ECS), BIO paper session and W6)

Poster session will be held in the evening of Sep. 28.

Title	Convenors	Invited speakers	Duration (day)	Date	Committees (Sponsors)
S12: Seasonal and climatic influences on prey consumption by marine birds, mammals, and predatory fishes	Andrew Trites (Canada) Rob Suryan (USA) Michael Seki (USA) Tsutomu Tamura (Japan)	Jock Young (Australia)	1	Sep. 26	BIO (3 orals for ECS) 9 orals
S13: Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Impact on ocean ecosystem services	Richard B Rivkin (Canada) Louis Legendre (France) Nianzhi Jiao (China) Robin Anderson (Canada)	Farooq Azam (USA)	1	Sep.26	BIO (No ECS) 6 orals
BIO Contributed Paper Session	Se-Jong Ju (Korea) Debora Iglesias-Rodriguez (USA)		1/2	Sep. 29	BIO (5 orals and 2 posters for ECS) 7 orals & 1 poster

W1: The role of the northern Bering Sea in modulating the arctic II: international interdisciplinary collaboration	Matthew Baker (USA) Lisa Eisner (USA) Kirill Kivva (Russia)	Maria Pisareva (Russia)	1	Sep.23	BIO/FIS/POC/MONITOR* (No ECS posters)
W6: Advantages and limitations of traditional and biochemical methods of measuring zooplankton production	Toru Kobari (Japan) Akash Sastri (Canada)	Andrew Hirst (UK)	1	Sep. 22	BIO* (No ECS posters)

* ECS who make oral presentations at workshops will not be judged, and are not eligible for Best Oral awards (Science Board decision at PICES-2013, Nanaimo)

5. Progressive reports and future plans of BIO active groups (S-CCME, S-CC, S-MBM, WG-32, WG-33, WG-37) (* Business meeting for EG should not be longer than one day.)
 - a) S-CCME and S-CC will report to FIS and POC, respectively.
 - b) S-MBM: Section on *Marine Birds and Mammals* (K. Hattori or P. O'Hara) : ?
 - c) WG32: Working Group on *Biodiversity of Biogenic Habitats* (J. Curtis or M. Kiyota) One year extension requested
 - d) WG33: Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration* (R. Rivkin or N. Jiao)
 - e) WG37: Working Group on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions* (A. Sastri or T. Kobari)
6. Relation with other international organizations/programs
7. FUTURE Program
8. Progress report on WG 35's North Pacific Ecosystem Status Report (Sinjae Yoo)
9. Review proposals of new Expert Groups (if any proposals submitted)
10. Planning PICES 2018 Annual Meeting (Yokohama, Japan but Theme and Dates TBA)
11. Proposed inter-sessional meetings for end of 2017 and beyond
12. Documenting business meetings, topic sessions and workshops
13. Other business
14. Adoption of BIO report and recommendations to Science Board