

## Report of the Biological Oceanography Committee

The meeting of the Biological Oceanography Committee (BIO) took place from 18:00–20:00 h on October 18 and 14:00–20:00 h on October 20, 2015 in Qingdao, China. BIO Chair, Dr. Angelica Peña, called the meeting to order and welcomed members and observers (*BIO Endnote 1*). Dr. Peña introduced the new BIO members, Dr. Motomitsu Takahashi representing Japan, Dr. Janelle Curtis representing Canada, and Prof. Debora Iglesias-Rodriguez representing the USA. It was noted that although several members were not present at the meeting, all countries were represented this year. Because none of the BIO members from the USA were able to attend the meeting on October 20, a member from the U.S. delegation, Dr. Rooper, was temporarily appointed as BIO member. This was the first time an appointee from a member country was temporarily allowed to represent a missing member at the meeting. The Chair suggested that when none of the members from a member country are able to attend the annual BIO business meeting, a member of their delegation be appointed as temporary member to ensure the active participation of all PICES countries at the meeting.

The draft agenda was circulated and two items were added to the agenda: i) election of vice-chair, and ii) review proposals for new Expert Groups. No additional changes/additions were offered and the agenda was revised and adopted (*BIO Endnote 2*). Dr. Curtis agreed to act as rapporteur.

### AGENDA ITEM 4

#### Annual review of BIO activities

##### a) *PICES-2015 BIO Paper/Topic Sessions and Workshop and selection of judges for BIO Best Presentation and Poster Award*

At PICES-2015 BIO sponsored:

- a ½-day BIO Paper Session (oversubscribed and well attended);
- a 1-day Workshop (W3): *Linking climate change and anthropogenic impacts to higher trophic levels via primary producers*;
- 1-day Topic Session (S2): *The 2014/15 El Niño and anomalous warming of the North Pacific: What happened?*;
- 1-day Topic Session (S6): *Ocean Acidification: Observation Network for the North Pacific and adjacent areas of the Arctic Ocean*;
- 1-day Topic Session (S7): *Past, present, and future climate in the North Pacific Ocean: Updates of our understanding since IPCC AR5*.

The “Procedures for Documenting PICES Sessions” were circulated among members. Two volunteers were appointed for the evaluation of oral presentations (Dr. Atsushi Tsuda and Dr. Peña) and four volunteers for poster evaluation (Dr. Se-Jong Ju, Dr. Alexei Orlov, Dr. Shin-ichi Uye and Dr. Chris Rooper) given the large number of posters (44) that were presented. Rankings were compiled by the Chair before the closing ceremony. The Best Presentation Award for a BIO-sponsored topic session was given to Yunyun Zhuang (*Using 454 pyrosequencing to analyze the in situ diet of the marine copepod Calanus sinicus*) and BIO Best Poster Award to Sachihiko Itoh (*Mixed layer depth and chlorophyll a: Profiling float observations in the Kuroshio-Oyashio Extension region*) see also list of Best Presentations in the [2015 Summary of Scientific Session and Workshops](#).

##### b) *2015 Inter-sessional symposia/session/workshop/meetings*

A brief summary and the highlights of the 3<sup>rd</sup> PICES/ICES/IOC Symposium on “*Effects of climate change on the world’s oceans*” (March 21–27, 2015, Santos City, Brazil) were reported by Dr. Peña, a member of the Symposium SSC and session co-convener. Overall, the meeting was a success with a diverse range of theme sessions and a good mix of social/natural scientists attending.

## BIO-2015

A review of the International Scientific Conference “*Our common future under climate change*” (July 7–10, 2015, Paris, France) was provided by Dr. Shin-ichi Ito. The conference explored the current understanding of all dimensions of the climate change challenge plus the full range of mitigation and adaptation options that can lead to sustainable, equitable solutions across all nations and regions. Dr. Ito gave a presentation on work related to S-CCME and WG 29 at the ICES/PICES (S-CCME) Session on “*Transformative pathways to sustain marine ecosystems and their services under climate change*”.

### c) Publications.

Dr. Uye presented an update on the final report of WG 26 on *Jellyfish Blooms around the North Pacific Rim*. The table of contents for the report was circulated among BIO members and the content of the report was briefly discussed. Two volunteers, Dr. Iglesias-Rodriguez and Dr. Tsuda, were identified to review the report which will be submitted to BIO in the next few months.

A draft of the PICES Scientific Report prepared by AP-MBM on “Spatial Ecology and Conservation” (Editors: Y. Watanuki *et al.*) was submitted to BIO during the PICES meeting. BIO members, Dr. Curtis and Dr. Ju, volunteered to review the report to determine if any changes/additions are needed before BIO recommend its publication to Science Board.

## AGENDA ITEM 5

### Reports of BIO active groups

#### Section on *Climate Change Effects on Marine Ecosystems* (S-CCME)

S-CCME Co-Chair, Dr. Ito, presented the report of this joint PICES/ICES Section. He reviewed the activities carried out in 2015, which included participation of S-CCME members at:

- i) The 3<sup>rd</sup> Symposium on “*Effects of climate change on the world’s oceans*”, Santos City, Brazil,
- ii) International Scientific Conference “*Our common future under climate change*”, Paris, France,
- iii) ICES/PICES Theme session G on “*Managing marine ecosystem services in a changing climate*” at the ICES Annual Science Conference, Copenhagen, Denmark, and
- iv) 2<sup>nd</sup> International Ocean Research Conference on “*One planet one ocean*”, (Nov. 17–21, 2014) Barcelona, Spain. S-CCME also organized an ICES/PICES Workshop on “*Modeling effects of climate change on fish and fisheries*” (WKSICCME; August 10–12, 2015, Seattle, USA). The workshop was successful and will result in at least 4 papers that will be submitted to the peer reviewed literature. A website for this workshop and on-going work will be developed.

For 2016, S-CCME is proposing an ICES/PICES inter-sessional workshop on socio-economic pathways (WKSICCME\_Econ, May 30–June 3, 2016, Brest, France), an ICES/PICES workshop on SICCME modeling updates at the 2016 ICES ASC, and a PICES/ICES workshop on S-CCME modeling updates at PICES-2016. S-CCME requests BIO to consider supporting two or more invited speakers to attend the ICES/PICES inter-sessional WKSICCME\_Econ workshop, one invited speaker to attend the ICES workshop on SICCME modeling updates, and one invited speaker to attend the PICES workshop on S-CCME modeling updates.

#### Section on *Carbon and Climate* (S-CC)

A summary of the activities carried out and planned for next year was given by S-CC Co-Chair, Dr. Tsuneo Ono. In the last two years of their current authorization period (2013–2016), S-CC has been focusing on producing a basin-wide ocean acidification assessment (referred to as Outlook). At PICES-2015, interim reports were presented that included:

- i) an overview of open ocean data and projections (well constrained),
- ii) national inventories of observing programs/systems,
- iii) evaluation of regional issues in coastal zones and marginal seas: variability is much greater in coastal regions but the reasons differ greatly among regions,
- iv) identification of points of greatest biological vulnerability, and
- v) identification of observation and technology gaps and opportunities.

At PICES-2015, S-CC organized Topic Session (S6) on “*Ocean Acidification Observation Network for the North Pacific and adjacent areas of the Arctic Ocean*”. For PICES-2016, S-CC proposed a Topic Session on “*New stage of ocean acidification studies: responses of oceanic ecosystem including fisheries resources*” and a Workshop on “*Acidification of the North Pacific Ocean: A basin-wide assessment*” to complete the Outlook which is expected to be published as a PICES Scientific Report in late 2016 or early 2017 with highlights summarized in a peer-reviewed publication.

#### Advisory Panel on *Marine Birds and Mammals* (AP-MBM)

As a result of a review of PICES expert groups by Science Board in 2015, Science Board proposed the establishment of a Section on *Marine Birds and Mammals* (S-MBM) to Governing Council at PICES-2015 to replace the existing AP-MBM. The Co-Chairs of the AP-MBM were informed of this change prior to the meeting and were requested to prepare Term of Reference (ToRs) for a Section for approval by Science Board at the end of the Annual Meeting. Dr. Kaoru Hattori, the newly elected Co-Chair of MBM presented the ToRs in addition to a summary of last year’s activities and future plans. BIO discussed the ToRs and requested that changes be made before they were submitted to SB for approval. Since it was not possible for the members to discuss the requested changes, it was agreed that S-MBM members will have the opportunity to revise the modified ToRs at the next PICES annual meeting. The main activity of last year was the preparation of a PICES Scientific Report on the work carried out in 2012–2014 on Spatial Ecology of Top Predators which was submitted to BIO for consideration (see Agenda Item 4c). For 2015–2019, the plan is to work on a project on “*Climate and Trophic Ecology of Marine Birds and Mammals*”. They are proposing two Topic Sessions for the next Annual Meeting in 2016, one on “*Understanding our changing oceans through species distributions and habitat models based on remotely sensed data*” and one on “*What factors make or break trophic linkages?*”. They are also proposing a Workshop on “*Consumption of North Pacific forage species by marine birds and mammals*”.

#### Working Group 28 on *Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors*

WG 28 had their final meeting at PICES-2015 where they reviewed last year’s activities and discussed the completion of their final report. Co-Chair Dr. Motomitsu Takahashi presented a detailed outline of WG 28’s final report and main results of their work. The final version of the report will be completed in the spring of 2016 before ISB-2016. WG 28 had no requests for funding, meetings, or sessions. WG 28 supports the proposal by Dr. Jameal Samhuri *et al.* for the establishment of a Study Group on *Ecosystem Reference Points as a Common Currency across PICES Member Countries*.

#### Working Group 29 on *Regional Climate Modeling*

Co-Chair, Dr. Chan Joo Jang, presented a summary of the year’s activities, which included organizing a Theme Session on “*Regional models for predictions of climate change impacts*” co-chaired by Drs. Shoshiro Minobe and Enrique Curchitser at the 3<sup>rd</sup> PICES/ICES/IOC Symposium on “*Effects of climate change on the world’s oceans*” (March 2015, Santos City, Brazil), participation of WG member Dr. Shin-ichi Ito as invited speaker at the meeting “*Our common future under climate change*” (July 2015, Paris, France) and Drs. Ito and Jang as invited speakers at the S-CCME Workshop on “*Modeling effects of climate change on fish and fisheries*” (August 2015, Seattle, USA), and a Topic Session (S7) on “*Past, present, and future climate in the North Pacific Ocean: Updates of our understanding since IPCC AR5*” at PICES-2015. Dr. Jang also presented plans for the WG’s final report, to be completed in the spring of 2016, and the WG 29 discussions on possible topics for a next phase of the WG, since they had their final WG meeting at this annual meeting.

#### Working Group 32 on *Biodiversity of Biogenic Habitats*

Co-Chair Dr. Janelle Curtis, presented a summary of last year’s activities and answered questions from BIO members regarding the importance of the WG, the importance of glass sponge reefs, and about focusing on seagrasses/kelps. Their activities included: i) reviewing the ToR and identifying research questions of mutual interest that span shallow and deep-sea corals and sponges, ii) assessing the amount, quality and sources of available species data, iii) identifying sources of available environmental data, iv) reviewing methodological

## BIO-2015

approaches for modeling distributions of corals and sponges, and v) developing a workplan for 2015–2016 and a proposal for a workshop on biogenic habitat distribution. Dr. Se-Jong Ju suggested they follow up with ISA on databases related to deep-sea biodiversity surveys that were carried out as part of environmental assessments. For the next Annual Meeting in 2016, they are proposing a 2-day Workshop on “*Distributions of habitat-forming coral and sponge assemblages in the North Pacific Ocean and factors influencing their distributions*” and request funding to support 1–3 participant at the workshop. They also recommended the addition of members to the WG, in particular Dr. Jaebong Lee (Korea), Dr. John Guinotte (USA) and greater participation of Russian expert(s).

### AGENDA ITEM 6

#### **Update on FUTURE science program**

Dr. Sinjae Yoo provided an update on the FUTURE science program. He presented the new Implementation Plan that includes a FUTURE Scientific Steering Committee (SSC). The SSC met in March 2015 to refine their Terms of Reference, to establish linkages between the FUTURE SSC and existing PICES expert groups, and to develop an initial FUTURE SSC Action Plan. Expert group liaisons were formed to improve communication and coordination among expert groups. Drs. Yoo and Ian Perry are the FUTURE SSC liaisons to BIO. To contribute to this effort, BIO annual meeting agendas will now include at item about FUTURE. These changes in implementation were well received by BIO.

### AGENDA ITEM 7

#### **Status of North Pacific Ecosystem Status Report**

Dr. Ju provided an update on activities, workshop proposal and Implementation Plan prepared by the Study Group on *North Pacific Ecosystem Status Report* (SG-NPESR3). The Third Ecosystem Status Report Implementation Plan (IP-NPESR) was circulated and discussed. BIO members asked questions related to the requirements of the data, how QA/QC and methodological differences will be considered, what information should be included in the metadata, how to compare new data with averages reported in NPESR 2, and how no-data or zero observations will be addressed. The BIO Chair requested that members read the proposal and provide comments to Dr. Ju. The IP-NPESR requests each Committee to nominate 6 or more time series deemed representative of ecosystem status and human dimensions, ideally one from each member country. The BIO chair requested BIO members to consider which time series would be appropriate to submit to NPESR and to submit at least one nomination per country. Time series submitted for nomination by Committees will be reviewed by an editorial board. SG-NPESR3 is planning to convene an inter-sessional NPESR workshop in 2016 to review candidate time series and methods of production, present a report on the status of NPESR in a plenary session at PICES-2016 as a final task of the SG, and to propose a synthesis working group to develop the NPESR-3 by PICES-2017.

### AGENDA ITEM 8

#### **Relation with other international organizations/programs**

Dr. Franz Mueter presented a summary of recent activities and future plans of ESSAS (Ecosystem Studies of Sub-Arctic and Arctic Seas). These included a PICES/ESSAS-sponsored Topic Session at PICES-2014 on “*Variability in advection and its biological consequences for Subarctic and Arctic ecosystems*”. Upcoming activities include sponsoring a session at the Ocean Sciences Meeting (February 2016, New Orleans, USA) on “*Biophysical processes at the Arctic-Subarctic interface*”, organizing the ESSAS Annual Sciences Meeting on “*Scientific challenges in a changing Subarctic and Arctic*” (March 2016, Yokohama, Japan) and a new project (Belmont Forum): Resilience and Adaptation to Climate Change in the Arctic. They are proposing a Topic Session at PICES-2016 on “*Resilience, transitions and adaptation in marine ecosystems under a changing climate*” and requested BIO to co-sponsor the session and provide financial support for 1–2 invited speakers.

BIO reviewed the information provided on theme sessions that have been approved by ICES for their 2016 ASC but did not identify any session that it would like to sponsor.

#### AGENDA ITEM 9

##### **Planning PICES 2016 Annual Meeting**

The next PICES Annual Meeting, “*25 years of PICES: Celebrating the past, imagining the future*” will be held November 1–13, 2016 in San Diego, USA,. Because it was not possible to retrieve the sessions and workshop being proposed from the PICES website, BIO members did not have enough time to revise all the proposals before the BIO meeting. This caused some delays and difficulties in the ranking of topic sessions and workshops during the meeting. Also, because many sessions were proposed by BIO expert groups, it was not possible to support/sponsor all of them. BIO gave the highest rank to the following Topic Sessions: “*Early life history stages as indicators and predictors of climate variability and ecosystem change*”, “*Understanding our changing oceans through species distributions and habitat models based on remotely sensed data*”, and “*Causes and consequences of 25 years of variability in ocean conditions on the ecosystems of the eastern North Pacific*”. The highest ranked Workshops were: “*Acidification of the North Pacific Ocean: A basin-wide assessment*”, “*Mesoscale and submesoscale processes in the North Pacific: History and new challenges*”, “*Distributions of habitat-forming coral and sponge assemblages in the North Pacific Ocean and factors influencing their distributions*”, and “*Consumption of North Pacific forage species by marine birds and mammals*”.

#### AGENDA ITEM 10

##### **Proposed inter-sessional meeting for 2015 and beyond**

BIO Vice-Chair, Dr. Atsushi Tsuda presented an overview of the PICES/ICES 6<sup>th</sup> International Zooplankton Production Symposium (May 9–13, 2016, Bergen, Norway). The meeting will focus on hot topics in zooplankton ecology. Abstracts are due at the end of October.

#### AGENDA ITEM 11

##### **Documenting sessions and workshops**

The BIO Chair recalled the request to convenors of BIO-sponsored sessions and BIO-related workshops to submit their reports to the PICES Secretariat by November 15, and meeting reports of BIO and its expert groups within one month after the Annual Meeting.

#### AGENDA ITEM 12

##### **Other business**

###### *a) Proposals for new expert groups*

###### *Study Group on Ecosystem reference points as a common currency across PICES social-ecological systems*

Dr. Motomitsu Takahashi presented a proposal for a study group that would be supported by FIS, and by BIO and POC. This study group would build upon the goals and outcomes of Working Group on *Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors* (WG 28) and would contribute to objective 1.1 of the FUTURE Science Plan to understand what determines “an ecosystem’s intrinsic resilience and vulnerability to natural and anthropogenic forcing.” The proposal was originally presented to BIO at PICES-2014 (but was deferred by Science Board until WG 28’s term ended). BIO discussed the draft Terms of Reference and supports the creation of this SG.

Joint Study Group for *Scientific Cooperation of ISC and PICES*

Dr. Cisco Werner gave a presentation on the ISC-PICES framework for scientific cooperation in the North Pacific Ocean. ISC (International Scientific Committee for Tuna and Tuna-like Species) was established in 1995 to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes. There are several scientific topics of joint interest to ISC and PICES, such as: oceanographic conditions and the distribution and productivity of pelagic fish, environmental interactions with fishers and fisheries, and effects of climate change on the distribution and productivity of pelagic fish. The SG is proposing a Joint PICES-ISC Working Group on *Oceanographic Conditions and the Distribution and Productivity of Highly Migratory Fish* with FIS as parent committee. The goal of the WG and Terms of Reference were presented and discussed by BIO. There was no formal request for BIO support, but because some of the proposed activities are relevant to BIO, it is useful to be informed.

Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration*

Dr. Nianzhi Jiao gave a presentation on a proposed PICES/ICES joint WG on carbon sequestration that would be parented by BIO. The proposal has been presented to ICES and is being considered. This WG would promote interdisciplinary collaboration by bringing together experts who have experience using observational, experimental and modeling approaches to study one or more of the biologically-driven ocean carbon pumps and their environmental and climate consequences. BIO members discussed the proposal and asked for clarification regarding the scope (microbial carbon pump only or three types of pumps), timescale to be considered, and linkage to the FUTURE program. BIO strongly supports the creation of this group and unanimously agreed to take the WG proposal to Science Board.

b) *Election of BIO Vice-Chair*

Dr. Se-Jong Ju (Korea) was elected as the Vice-Chair of the Biological Oceanography Committee to replace Dr. Atsushi Tsuda (Japan).

AGENDA ITEM 13

**Summary of BIO decisions regarding expert groups' important matters and financial requests**

*Important matters*

- a) BIO agrees that S-MBM should have the opportunity to revise its Terms of Reference at PICES-2016;
- b) BIO recommends the addition of two new members to WG 32, in particular, Dr. Jaebong Lee (Korea), Dr. John Guinotte (USA), and greater participation of Russian expert(s).
- c) The PICES Scientific Report prepared by MBM-AP on "Spatial Ecology and Conservation" (Editors: Y. Watanuki *et al.*) will be reviewed by BIO members, Dr. Curtis and Dr. Ju, before BIO recommends its publication to Science Board.
- d) The final report of WG 26 on *Jellyfish Blooms around the North Pacific Rim* will be submitted to BIO in before ISB-2016. Volunteers, Dr. Iglesias-Rodriguez and Dr. Tsuda, were identified to review the report.
- e) BIO supports the proposal of a Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration*.
- f) BIO supports the proposal of a Study Group on *Ecosystem Reference Points as a Common Currency across PICES Social-Ecological Systems* [later renamed as *Common Ecosystem Reference Points across PICES Member Countries*].

*Financial requests*

BIO recommends, in order of priority:

- 1) Travel support for invited speakers to BIO-sponsored sessions at PICES-2016;
- 2) Travel support for one S-CCME member to attend the 2016 ICES Annual Science Conference;
- 3) Travel support for two S-CCME invited speakers to attend the 2016 ICES Science Symposium on "Understanding marine socio-ecological systems: including the human dimensions in Integrated Ecosystem Assessments" May 30–June 3, 2016, in Brest, France.

**BIO Endnote 1**

**BIO participation list**

**Members**

Janelle Curtis (Canada, rapporteur)  
 Kaoru Hattori (Japan)  
 Debora Iglesias-Rodriguez (USA)  
 Se-Jong Ju (Korea)  
 Alexei Orlov (Russia)  
 Angelica Peña (Canada, Chair)  
 Chris Rooper (USA, acting BIO member, Oct. 22)  
 Akash Sastri (Canada)  
 Song Sun (China)  
 Motomitsu Takahashi (Japan)  
 Atsushi Tsuda (Japan, Vice-Chair)  
 Nam-Il Won (Korea)

**Observers**

Keyseok Choe (Korea)  
 Elliott Hazen (USA)  
 Shin-ichi Ito (Japan)  
 Nianzhi Jiao (China)  
 Yeseul Kim (Korea)  
 Kenji Konishi (Japan)  
 Soonmi Lee (Korea)  
 Carmel Lowe (Canada)  
 Franz Mueter (USA)  
 Sandra Neidetcher (USA)  
 Patrick O'Hara (Canada)  
 Tsuneo Ono (Japan)  
 Andrew Trites (Canada)  
 Shin-ichi Uye (Japan)  
 Cisco Werner (USA)  
 Kedong Yin (China)  
 Sinjae Yoo (Korea)

**BIO Endnote 2**

**BIO meeting agenda**

1. Welcome, introductions, opening remarks
2. Membership changes: Dr. Takahashi is a new member of BIO Committee replacing Dr. Saito and representing Japan. Dr. Janelle Curtis is a new member of BIO Committee representing Canada. Prof. Debora Iglesias-Rodriguez is as a new member of BIO Committee representing USA
3. Changes to, adoption of, agenda and appointment of rapporteur
4. Annual review of BIO activities
  - a) PICES-2015 BIO Paper/Topic Sessions and Workshop and selection of judges for BIO Best Presentation and Poster Award

Title	Convenors	Invited speakers	Duration (day)	Date	Committees (Sponsors)
<i>BIO Paper Session</i>	Angelica Peña (Canada) Atsushi Tsuda (Japan)		0.5	Oct. 20	BIO
<i>S2: The 2014/15 El Niño and anomalous warming of the North Pacific: What happened?</i>	Bill Peterson (USA) Lisa Eisner (USA) Tony Koslow (USA)	Nicholas Bond (USA) Emanuele Di Lorenzo (USA)	1	Oct. 21	BIO/ MONITOR/ TCODE
<i>S6: Ocean Acidification Observation Network for the North Pacific and adjacent areas of the Arctic Ocean</i>	Li-Qi Chen (China) Fei Chai (USA) Kitack Lee (Korea) Toru Suzuki (Japan)	Richard Bellerby (China) Richard Feely (USA) Kunshan Gao (China) Ja-Myung Kim (Korea)	1	Oct. 22	POC/BIO/ MONITOR/ TCODE
<i>S7: Past, present, and future climate in the North Pacific Ocean: Updates of our understanding since IPCC AR5</i>	Chan Joo Jang (Korea) Ho-Jeong Shin (Korea) Zhenya Song (China) Sukgeun Jung (Korea) Anne Hollowed (USA) Kyung-Il Chang (Korea) Angelica Peña (Canada) Shin-ichi Ito (Japan)	Jacquelynn King (Canada) Shoshiro Minobe (Japan) Yongqiang Yu (China)	1	Oct. 22	POC/BIO/ TCODE

W3: <i>Linking climate change and anthropogenic impacts to higher trophic levels via primary producers</i>	Joji Ishizaka (Japan) Angelica Peña (Canada) Sinjae Yoo (Korea)	Heather Bouman (UK)	1	Oct. 15	
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- b) 2015 Inter-sessional symposia/sessions/workshops/meetings
  - 3<sup>rd</sup> PICES/ICES/IOC Symposium on “Effects of climate change on the world’s oceans”, March 23–27, 2015. Santos City, Brazil.
  - ICES/PICES (S-CCME) Session at the International Scientific Conference on "Our common future under climate change" (in preparation for the 21st UNFCCC Conference of the Parties), July 7–10, 2015. Paris, France.
- c) Publications
  - Final report of WG 26 on *Jellyfish Blooms around the North Pacific Rim* (Editors: R. Brodeur and S. Uye)
  - PICES Scientific Report of MBM-AP on “Spatial Ecology and Conservation” (Editors: R. Suryan, B. Sydeman, R. Ream, and Y. Watanuki)
- 5. Progressive reports and future plans of BIO active groups
  - a) S-CCME: Joint PICES/ICES Section on *Climate Change Effects on Marine Ecosystems* (Shin-ichi Ito or A. Hollowed)
  - b) S-CC: Section on *Carbon and Climate* (J. Christian or T. Ono)
  - c) AP-MBM: *Marine Birds and Mammals Advisory Panel* (Y. Watanuki or R. Ream)
  - d) WG 26 on *Jellyfish Blooms around the North Pacific Rim: Causes and Consequences* (S. Uye or R. Brodeur)
  - e) WG28 on *Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors* (M. Takahashi or I. Perry).
  - f) WG 29 on *Regional Climate Modeling* (C.J. Jang or E. Curchister)
  - g) WG 32 on *Biodiversity of Biogenic Habitats* (J. Curtis or M. Kiyota)
- 6. Update on FUTURE science program (Sinjae Yoo)
- 7. Status of North Pacific Ecosystem Status Report (Se-Jong Ju)
- 8. Relation with other international organizations/programs
- 9. Planning PICES 2016 Annual Meeting, “25 years of PICES: Celebrating the past, imagining the future”, November 1–13, San Diego, USA
  - BIO-related sessions and workshops: discuss ranking, sponsorship and amount of funding for Topic Sessions
  - Structure of BIO-P Session
- 10. Proposed inter-sessional meetings for 2015 and beyond
  - a) PICES/ICES 6<sup>th</sup> International Zooplankton Production Symposium (May 9–13 2016, Bergen, Norway). Convenors: Atsushi Tsuda (Japan, PICES), Padmini Dalpadado (Norway, ICES) and Astthor Gislason (Iceland, ICES).
  - b) PICES/ICES Symposium on “*Drivers of small pelagic fish resources*” (March 6–11 2017, Victoria, Canada). BIO recommended Bill Peterson as SSC member.
- 11. Documenting business meetings, topic sessions and workshops
  - a) Business meeting summary (WG 26, WG 28, WG 29, WG 32, AP-MBM, S-CC, S-CCME) – Chairs are asked to submit the summary reports to secretariat within 1 month after the annual meeting.
  - b) Topic session summary – Convenors to submit reports to Secretariat by November 15.
- 12. Other business
  - a) Review proposals of new expert groups
  - b) Election of BIO Vice-Chair
- 13. Adoption of BIO report and recommendations to Science Board