

Report of the 2018 Inter-sessional Science Board meeting

The sixteenth inter-sessional Science Board meeting took place in Sidney, Canada, from May 8 to 10, 2018. Ten of the 12 Science Board members attended the 2½-day meeting (*ISB-2018 Endnote 1*). POC Chair, Dr. Emanuele Di Lorenzo, participated by Skype, and Dr. Thomas Therriault, MEQ Vice-Chair, represented Dr. Chuanlin Huo who was unable to attend. Science Board Chair, Dr. Hiroaki Saito, called the meeting to order and welcomed the participants. After self-introductions were made, the draft agenda was reviewed by Science Board. At the request of Dr. Therriault, an item on selection of a Science Board Chair-elect was added to Agenda Item 20 (Other business) as well as an item requested by Mr. Brown on a PICES representative for the UN Convention on the Law of the Sea meeting in New York, and some agenda items were rearranged before being adopted (*ISB-2018 Endnote 2*).

Dr. Carmel Lowe, Director of the Fisheries and Oceans Canada, Pacific Region, also welcomed Science Board and guests to the meeting and made a brief announcement that the Institute of Ocean Sciences is within the traditional territory of one of Canada's First Nations, and hoped that participants would enjoy the cultural aspects of local First Nations during their stay in the region. Dr. Lowe also remarked that a new federal government has been in place for the last two years and there is a move to include marine ecosystems introduced DFO work and the work done in this regard by PICES is of great relevance.



Science Board meeting participants, standing, from left: Igor Shevchenko (representing Russia), Jennifer Boldt (MONITOR), Joon-Soo Lee (TCODE), Steven Bograd (FUTURE SSC), Keith Criddle (HD), Harold (Hal) Batchelder (Deputy Executive Secretary), Tetsuo Fujii (Governing Council, Japan), Sukyung Kang (FUTURE SSC), Motomitsu Takahashi (representing Japan), Junichiro Otaka (Governing Council, Japan), Ken Fujimoto (Advisor, Governing Council, Japan), Chieko Kondo (Advisor, Governing Council, Japan), Nobuaki Suzuki (F&A); sitting, from left: Se-Jong Ju (BIO), Thomas Therriault (Acting Chair, MEQ), Hiroaki Saito (Science Board Chair), Chul Park (PICES Chair), Xianshi Jin (FIS), Robin Brown (Executive Secretary). Missing: Emanuele di Lorenzo (POC), but who participated at the meeting via WebEx. In the background, the Canadian Coast Guard Ship Sir Wilfrid Laurier is tied to the dock.

Monday, May 8, 2018

AGENDA ITEM 2

Mid-year reports from expert groups that report directly to Science Board

1. PICES-NPFC Study Group on *Scientific Cooperation in the North Pacific Ocean* (SG-NPFC)

SG-NPFC was late in starting up due to delays in filling in PICES membership. The PICES and NPFC SG Co-Chairs, Mr. Edward Kennedy (PICES/Canada) and Dr. Vladimir Kulik (NPFC/Russia) were only recently appointed. The SG will likely request an extension to its term at PICES-2018 so it can complete its terms of reference. A NPFC/FAO Workshop on the “*Protection of Vulnerable Marine Ecosystems in the North Pacific Fisheries Commission Area*” was held March 12–15, 2018 in Yokohama, Japan. Discussions involved potential collaboration with other organizations, such as PICES, to provide expertise, scientific advice and assistance with some of the scientific analyses related to assessing impacts of fishing on vulnerable marine ecosystems (VMEs) and the development of tools for spatial management measures to assist in decision-making.

Some members questioned why NPFC scope was not broader given that NPFC was working on VMEs outside the EEZ and WG 32 was working on VMEs within the EEZ, but it was argued that since the SG was slow to work up, only VMEs outside EEZs were the focus at the workshop, and other areas and topics for scientific cooperation will likely be discussed at PICES-2018.

Science Board noted that SG-NPFC was looking for options for web-based communications among its members, and for organizing materials and documents. Science Board also noted that this was an issue for PICES groups, as currently there was not one platform that could include all member countries.

Action:

- Science Board to revisit SG request for a 1-year extension at PICES-2018;
- Secretariat to investigate how other organizations such as NPFC, NPAFC, and NOWPAP communicate during its remote business conferences so all member countries can be included.

2. Study Group on *Marine Microplastics* (SG-MMP)

SG-MMP was late in starting up due to delays in receiving nominations for membership. Dr. Wonjoon Shim (Korea) was only recently appointed Chair of the SG. Six members of SG-MMP had a chance to meet informally at the International Marine Debris Conference (March 12-16, 2018) in San Diego to discuss SG activities. Dr. Shim met with the Co-Chairs of the ICES Group on Marine Litter (WGML) at the San Diego meeting and discussed the potential to collaborate, including the formation of a joint PICES/ICES working group. Both groups agreed to keep in touch for future joint activities. Dr. Shim received an invitation for one or two SG-MMP members to participate in a WGML workshop on April 23-27, 2018, in Copenhagen, but due to the short notice, and SG member schedule conflicts, no SG member was able to attend. WGML agreed to provide a workshop report to SG-MMP.

3. PICES/ICES/PAME Working Group on an *Integrated Ecosystem Assessment for the Central Arctic Ocean* (WG 39/WGICA)

WG 39 held two meetings recently. Dr. Sei-Ichi Saitoh (Co-Chair/PICES) attended both: the first was a workshop on “*PICES contributions to Central Arctic Ocean (CAO) ecosystem assessment*” in Sapporo, Japan (March 22–23, 2018) and the second was the third meeting of WG 39, in St. John’s, Newfoundland, Canada (April 24–26, 2018). The Sapporo workshop dealt with how to synthesize observations and research in the CAO and adjacent ocean areas by PICES member countries, how much to contribute to the report of WG 39, and how PICES could

contribute to monitoring and mapping of CAO in the future. The St. John's workshop included a presentation Prof. Otsuka on “*Perspective of shipping activity along the Northern sea route*”.

MONITOR Chair, Dr. Jennifer Boldt, noted that the Committee supported both the inter-sessional Sapporo workshop and Workshop (W2) on “*PICES contribution to Central Arctic Ocean (CAO) ecosystem assessment (Second)*” for the Scientific Program at PICES-2018, and asked how this would be recorded (see Agenda Item 9).

Action: Secretariat to send message of support to the workshop co-chairs and look into how to address this in the future.

AGENDA ITEM 3

Mid-year report from FUTURE SSC

FUTURE SSC Co-Chair, Dr. Steven Bograd, reported that members met for an inter-sessional meeting on April 10–12, 2018, in Honolulu, Hawaii. The SSC reviewed FUTURE's presence on the PICES web site and recommended a number of improvements to give it more prominence and a cleaner look. A new FUTURE logo has been created for branding.

Recommendation: Science Board recommends updating the FUTURE website

Action: Executive Secretary to work with FUTURE Co-Chairs and web master to provide a new look after the Washington symposium (June-July).

The SSC has made good progress on identifying and linking to FUTURE research themes for the product matrix. Members will continue to work on it through the summer and have it finalized by PICES-2018.

Action: FUTURE to continue working on matrix and finalize a draft by July 1.

The SSC proposes to survey Science Board and Governing Council as to what key national issues are on emerging issues. Science Board suggested that the questions be targeted to specifics rather than open-ended questions. A draft survey has been prepared (see Agenda Item 18).

The SSC is preparing a FUTURE synthesis paper for submission in a special issue in *Frontiers of Marine Science* in October. All page charges have been waived.

The SSC plans to resurrect the FUTURE Mini-Symposium at PICES-2018. Five-minute presentations by all expert groups will be replaced by presentations by only FUTURE's expert groups, and working groups that have recently ended their term will have a chance to show off their products. Other anticipated outreach products will be a 5-minute walk-through video of the FUTURE schematic presented by the SSC Co-Chairs, and a FUTURE handout for the registration package at PICES-2018. [COMPASS](#) does science communication training and is sponsoring a Town Hall speaker at the 4th International Symposium on “*The effects of climate change on the world's oceans*” (ECCWO) in Washington, DC (June 4-8, 2018); Science Board suggested inviting them to PICES-2019. A FUTURE synthesis symposium is expected for 2020.

Action:

- FUTURE to prepare detailed budget on symposium for discussion at PICES-2019;
- Secretariat to invite COMPASS to be an observer at PICES-2019.

ISB-2018

1. Working Group on *Ecosystem Reference Points as Common Currency across PICES Member Countries* (WG 36)

WG 36 is sponsoring a Workshop (W11) on “*Quantifying thresholds in driver-response relationships to identify reference points*” at ECCWO. Dr. Jennifer Boldt is a member of WG 36 and is one of the co-convenors but travel approval for her to attend has not been issued yet.

2. Working Group on *Climate and Ecosystem Predictability* (WG 40)

See report under POC report in Agenda Item 7.

3. Working Group on *Marine Ecosystem Services* (WG 41)

See report under HD in Agenda Item 7.

4. Working Group on the *Third North Pacific Ecosystem Status Report* (WG-NPESR3/WG 35)

Mr. Peter Chandler, Co-Chair of WG 35, gave a brief account of where the WG stands in regard to environmental time series collected from each member country and the tasks ahead for the ETSO Editorial Board. So far, 119 ETSOs from all member countries have been submitted to the NPESR3 website, the majority being from regions 11, 12, 13 on the eastern Pacific side and regions 19 and 20 on the western side. Most regional chapters have ETSOs submitted in draft form and have a team of authors working on them, and chapters for two regions have information and are anticipated to proceed. However, two chapters have data but one lead author is uncommunicative and one is a reluctant to lead the chapter. Region 25 has no data, and the WG will decide whether or not to include it. Mr. Chandler estimated WG 35 is about 6 months behind in its timeline to have the Editorial Board review the ETSOs, which will affect the timing of the synthesis workshop. A test run of one or two chapters will be done by the Editorial Board to understand the process and time needed to conduct a review. The Editorial Board will most likely act as the peer reviewers for the completed chapters since the membership can draw on experts from all disciplines. The regional numbering system will be used for the chapters, and it was suggested that a thumbnail biogeographical map be included for each chapter for easy referral.

5. S-CC report on the PICES Special Publication on ocean acidification

Dr. James Christian, S-CC Co-Chair, gave a brief history on the publication outputs of S-CC, including PICES Special Publication 3, Guide to Best Practices for Ocean CO₂ Measurements (2007) and PACIFICA database (2013), since the formation of the Section in 2005. During S-CC’s second (renewal) phase, the Section agreed to conduct an ocean acidification assessment that would include deoxygenation and productivity. A request to Science Board at PICES-2016 for funding to add graphics was accepted but denied by Governing Council. Funds were obtained from DFO to do much of the design but S-CC requested additional funding to complete the work which will be published as a PICES Special Publication by PICES-2019. The target audience for the publication will be scientifically literate people, *i.e.*, teachers and policy makers. A draft of the report was provided for Science Board review. Science Board recommended a brochure be produced after the report has been published.

Recommendation:

- FUTURE SSC approves in principle the completion of the OA report, pending FUTURE branding;
- Science Board recommends up to 5 k, in principle, for the publication of the report as a PICES Special Publication;
- Science Board recommends peer review of the report by BIO and POC to ensure scientific integrity and to make sure it targets the appropriate audience;

Action:

- BIO and POC parents to act as reviewers of the report; Dr. Christian to provide some written text on a plan for peer-review.
- Secretariat to work with S-CC to make a brochure.

AGENDA ITEM 4

Expert Group status*New Groups recently or incompletely formed*

Executive Secretary, Mr. Robin Brown, reported that the Advisory Panel on *Marine Non-indigenous Species* (AP-NIS; established June 2016) and Working Group on *Marine Ecosystem Services* (WG 41; established September 2017) still had vacancies in membership, preventing the appointment of co-chairs. He is working with national delegates to resolve the issue.

AGENDA ITEM 5

Review/Decision of proposed new mariculture Study Group

Science Board reviewed the changes made to the terms of reference since the proposal was first presented at PICES-2017. In general, Science Board was favourable to its establishment, but recommended the terms of reference be more narrowly focused to tackle one or two issues and not to repeat the mistakes that presented problems for aquaculture WGs 18 and 24. Science Board suggested canvassing the member countries to determine what their interests were, and exploring the potential for collaborating with other organizations to form a joint expert group.

Recommendation: SG proponents to work with MEQ and FUTURE to revise TORs and present a revised proposal for PICES-2018.

Action:

- FIS to take proposal back to SG proponent who will work with MEQ, HD, FUTURE SSC to categorizing issues by country or issues that overlap by country, and explore potential for collaboration with other organizations to form a joint expert group;
- MEQ, HD, and FUTURE SSC to look for potential candidates for membership, depending on the focus of the SG.

AGENDA ITEM 6

Mid-year reports from Scientific and Technical Committees

Progress reports from Standing Committees since PICES-2017 highlighting high priority items or financial implications of Committees and their expert groups are provided below.

Biological Oceanography Committee (BIO)

BIO Chair, Dr. Se-Jong Ju, reported on the following BIO expert groups:

ISB-2018

1. Section on *Marine Birds and Mammals* (S-MBM)

Dr. Chao Song (China) stepped down in April. No replacement has been suggested. S-MBM is holding a Workshop (W7) on “*Diets, consumption, and abundance of marine birds and mammals in the North Pacific*” at PICES-2018.

2. Working Group on *Biodiversity of Biogenic Habitats* (WG 32)

WG 32 members are in the process of preparing a number of publications related to the Group’s objectives, including predicting the distribution of six groups of biogenic taxa in the northeast Pacific Ocean, developing species distribution models of glass sponges at different spatial scales in the North Pacific Ocean, reviewing methods for assessment of biogenic species, and understanding the patterns and drivers of biodiversity associated with glass sponge reefs. These publications will be presented at 2018 PICES-2018.

Dr. Chris Rooper represented PICES at the NPFC/FAO Workshop on the “*Protection of Vulnerable Marine Ecosystems in the North Pacific Fisheries Commission Area*” in March 2018. During that workshop, he shared code written by WG 32 members to help NPFC members develop species distribution models of biogenic species in western Pacific Ocean.

WG 32 is convening a ¾-day Topic Session (S4) on “*Indicators for assessing and monitoring biodiversity of biogenic habitats*” (postponed from PICES-2017) at PICES-2018.

3. Joint PICES/ICES Working Group on *Climate Change and Biologically-driven Ocean Carbon Sequestration* (WG 33)

Dr. Pavel Tischenko was appointed new member of WG 33 by Russia. WG 33 PICES Co-Chair/PICES, Dr. Nianzhi Jiao, is co-convening with S-CC Co-Chair, Dr. Tsuneo Ono, and Drs. Masahiko Fujii (Hokkaido University), Libby Jewett (NOAA) and Galen McKinley (Columbia University), a Theme Session (S3) on “*Carbon uptake, ocean acidification, and ecosystems and human impacts*” at the 4th PICES/ICES/IOC/FAO Symposium on “*The effects of climate change on the world’s oceans*” (June 2018, Washington DC, USA).

In 2018, Dr. Nianzhi Jiao and co-authors published two papers in *National Science Review* and Co-Chair/ICES, Dr. Louis Legendre, published a paper in the *ICES Journal of Marine Science*. No acknowledgement to PICES was made in their publications.

4. Working Group on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions* (WG 37)

Dr. Lidia Yebra became an *ex officio* member, representing ICES, of WG 37. Drs. Hyung-Ku Kang and Dr. Min-Chul Jang, representing Korea, became new members of WG 37. Co-Chairs, Drs. Toru Kobari and Akash Sastri, convened a Theme Session on “*Zooplankton productivity as a function of trophodynamics in marine ecosystems*” in February at the 2018 Ocean Science Meeting in Oregon, USA. WG 37 will hold a Practical Workshop on “*Methodologies and measurements for in situ zooplankton production: Phase 1*” just prior to PICES-2018, in Manazuru, Japan, and a Workshop (W6) on “*Regional evaluation of secondary production observations and application of methodology in the North Pacific*” chaired by Drs. Kobari and Sastri. The Co-Chairs are proposing a follow-up course on “*Methodologies and measurements for in situ zooplankton production: Phase 2*” just before PICES-2019 (Victoria, Canada) and a workshop at PICES-2019. The Co-Chairs have already circulated a draft meeting agenda to WG members for PICES-2018.

Request: BIO requests more active participation of its members.

Fishery Science Committee (FIS)

FIS Chair, Dr. Xianshi Jin, reported that since PICES-2017, new FIS members Drs. Zhoujun Ma (China) replaced Mr. Jiahua Cheng, Sukyung Kang (Korea) replaced Dr. Chang-Ik Chang, and Nobuaki Suzuki (Japan) replaced Dr. Tetsuichiro Funamoto.

FIS supports Dr. Gordon Kruse's request for PICES to co-sponsor an international ICES/NAFO Symposium on "Shellfish – Resources and invaders of the North" (see Agenda Item 16)

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

Since its establishment at PICES-2011, S-CCME has held 25 workshops and symposia, and is well aligned with PICES and ICES Strategic Plans. Since PICES-2017, S-CCME members, Kirstin Holsman, Anne Hollowed, Shin-ichi Ito (S-CCME Co-Chair/PICES), Steven Bograd, Elliott Hazen, Jacquelynne King (S-CCME Co-Chair/PICES), Franz Mueter and Ian Perry) have completed and submitted for review Chapter 6: North Pacific in support of the FAO update to Technical Paper 530 (published in 2009) on Climate Change Implications for Fisheries and Aquaculture.

Planning is underway for a S-CCME Workshop on Political, Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling (WKPESTLE), to be held on June 9, 2018 directly after 4th PICES/ICES/IOC/FAO Symposium on "*The effects of climate change on the world's oceans*" (June 2018, Washington DC, USA). Dr. Ito is a Symposium co-convenor and Drs. Anne Hollowed and Kirstin Holsman (PICES/USA), Angelica Peña (PICES/Canada), Motomitsu Takahashi (PICES/Japan), Myron Peck (SICCME Co-Chair/ICES) and John Pinnegar (SICCME Co-Chair/ICES) are on the Scientific Steering Committee.

At PICES-2018, S-CCME will hold a 1-day Workshop (W4) on "*Synthesizing projected climate change impacts in the North Pacific*". This work will finalize Phase II of S-CCME Implementation Plan.

2. Joint PICES/ISC Working Group on *Ocean Conditions and the Distribution and Productivity of Highly Migratory Fish* (WG 34)

Dr. Gerard DiNardo, WG 34 Co-Chair/PICES, was on the Scientific Steering Committee for the International Symposium on "*Understanding changes in transitional areas of the Pacific*" held April 24-26, 2018, in La Paz, Baja California Sur, Mexico. WG 34 will hold a ¾-day Topic Session (S12) on "*Applying ecosystem considerations in science advice for managing highly migratory species*" at PICES-2018.

Action: Mr. Brown, in consultation with Dr. Bograd, to explore ways to better communicate with WG 34.

Human Dimensions Committee (HD)

HD Chair, Dr. Keith Criddle, announced that HD now has representation from all member countries. Since PICES-2017, Drs. Shion Takemura and Aoi Sugimoto, representing Japan, and Ms. Karen Hunter and Dr. Natalie Ban, representing Canada, have been added to the Committee.

Request: HD requests the addition of another member from Canada to be added.

Working Group on *Marine Ecosystem Services* (WG 41)

Membership has not been completed (representation needed from Canada and Russia) so Co-Chairs have not been appointed yet. An inter-sessional workshop planned for spring 2018 in Qingdao, China, did not take place due to lack of membership, but the WG will hold a Workshop (W8) on "*Taking stock of Marine Ecosystem Services in the North Pacific - Exploring examples and examining methods*" at PICES-2018.

HD is making some progress in its preparation for MSEAS II. The conference organizers are working on a draft budget for the conference and are contacting organizations for potential co-sponsorship. So far, PICES, ICES, CSIRO and NOAA have confirmed support for the conference. Mr. Brown will contact FRA to look for support. The organizers will have a conference call after ISB-2018 to settle on a date and finalize the venue for the conference.

Action: Mr. Brown to communicate with FRA regarding MSEAS II funding.

Marine Environmental Quality Committee (MEQ)

MEQ Vice-Chair, Dr. Thomas Therriault, reported on the following:

1. Section on *Ecology of Harmful Algal Blooms in the North Pacific* (S-HAB)

S-HAB nominated Dr. Mark Wells (USA) to be eastern Pacific Co-Chair, replacing Dr. Vera Trainer, who has completed her terms as Co-Chair. MEQ supports the nomination and requests Science Board approval. Canadian member, Ms. Jennifer Martin, has retired but still wishes to remain an active member of S-HAB.

An Open Course Series on “*Harmful algal blooms in the present and future ocean*” (May, 21–25, 2018) followed by an International Workshop on “*Harmful algal blooms and hypoxia in the present and future ocean*” (May 26–27, 2018), will be held in Hangzhou, China, and organized by SOED (State Key Laboratory of Satellite Ocean Environment Dynamics). Several S-HAB members will be involved, including Dr. Wells.

Recommendation:

- Science Board approves the nomination of Dr. Wells as Co-Chair of S-HAB;
- Science Board approves the removal of Ms. Martin from S-HAB membership.

2. Working Group on *Development of Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors* (WG 28)

The final report of WG 28 is nearing completion, but no date has been set for submission to MEQ and BIO. Data from the report has been sent to WG 36 who is using it to fill their terms of reference.

3. Working Group on *Assessment of Marine Environmental Quality of Radiation around the North Pacific* (WG 30)

WG 30 had a 1-year extension to complete its final report. It is in its final stages of corrections and revisions, and MEQ is expecting it in July 2018. MEQ is working to identify reviewers for the report, and will provide its assessment at PICES-2018. Content for a brochure has been sent to MEQ but Dr. Therriault recommended the brochure be tabled until MEQ received the report. Dr. Therriault also requested clarification on who would work with WG 30 on the brochure.

Action:

- Science Board to revisit the WG 30 brochure when final report is completed;
- Secretariat to work with WG 30 on the brochure after the completion of the report.

4. Working Group on *Emerging Topics in Marine Pollution* (WG 31)

WG 31 had a 1-year extension to complete its final report. The final report was submitted to MEQ in March 2018. MEQ is working to identify reviewers for the report.

5. Advisory Panel on *Marine Non-indigenous Species* (AP-NIS)

AP-NIS still needs to populate its membership. A potential candidate from the U.S. has been identified but Russia has not identified a candidate at this time.

Dr. Therriault had productive discussions with ICES on making WG 21 data available to ICES through their AquaNIS database. Tom will make sure PICES biogeographical regions are represented properly in their scheme. Tom will update on this activity at PICES-2018.

Action: Dr. Therriault to provide update at PICES-2018 on progress in incorporating WG 21 NIS data into ICES database.

The date for an International Conference on Marine and Freshwater Invasive Species, co-sponsored by PICES, to be held in Beijing, China, has shifted from May to August 27–29, 2018. Dr. Therriault will confirm that most of the AP-NIS members can still attend (the original intent was for members to hold an inter-sessional meeting in conjunction with the conference). Dr. Therriault will investigate if there can be a role for AP-NIS to play in a proposed ICES/PICES Symposium on “*Shellfish – Resources and invaders of the North*” (see Agenda Item 16).

Physical Oceanography and Climate Committee (POC)

POC Chair, Dr. Emanuele Di Lorenzo, reported on the following:

1. Section on *Carbon and Climate* (S-CC)

Dr. Chen-Tung Arthur Chen has stepped down as *ex officio* member representing the International Geosphere-Biosphere Programme. See Agenda Item 3 for S-CC’s report on the status of the PICES Special Publication on ocean acidification.

2. Working Group on *Mesoscale and Submesoscale Processes* (WG 38)

Dr. Irina Rypina, representing USA, and Dr. Yoshikazu Sasa, representing Japan, are new members of WG 38. The WG will hold a Topic Session (S5) on “*Seasonal to interannual variations of meso-/submeso-scale processes in the North Pacific*” at PICES-2018. The WG will draft a plan for a synthesis paper based on the outcome of S5. The WG requested two or three modellers who can cover the physical and biogeochemical aspects be added to its membership.

Recommendation: POC strongly recommends the addition of Dr. Yisen Zhong (Shanghai Jiao Tong University) to WG 38.

3. Working Group on *Climate and Ecosystem Predictability* (WG 40)

WG 40 intended to convene a workshop at ECCWO but since only 2–3 members are attending the symposium, the workshop was cancelled. Instead, WG 40 PICES Co-Chairs, Drs. Michael Jacox and Masami Nonaka, are co-convening Theme Session (S2) on “*From prediction to projection: the role of seasonal to decadal forecasts in a changing climate*” with Drs. Mark Payne (Technical University of Denmark) and Erica Ombres (NOAA). The WG will hold a Topic Session (S7) on “*Ecological responses to variable climate changes and their applicability to ecosystem predictions*” at PICES-2018.

4. Advisory Panel for a *CREAMS/PICES Program in East Asian Marginal Seas* (AP-CREAMS)

AP-CREAMS held a 2-day inter-sessional meeting May 4–5, 2018, in Hangzhou, China, to discuss business, including status of the EAST-II publication, and to report on international cooperation regarding joint cruises and capacity building activities planned for 2019. The PICES/AP-CREAMS Summer School on “*Satellite*

oceanography” scheduled for 2018 in Seoul, Korea, was cancelled due to insufficient time for planning. There are preliminary plans to hold a Summer School on physical processes in China in 2019.

Action: POC to obtain more information for 2019 summer school in China for discussion at PICES-2018.

Technical Committee on Monitoring (MONITOR)

MONITOR Chair, Dr. Jennifer Boldt, reminded Science Board that at PICES-2017 MONITOR had recommended a U.S. member to replace Dr. Jeffrey Napp who had stepped down, but so far no replacement has been determined and Dr. Napp is still listed as a member on the MONITOR webpage. MONITOR members, Dr. Sanae Chiba and Kazuaki Tadokoro, have been named to Group of Experts for relevant chapters or sections in World Ocean Assessment II.

Action: Secretariat to request GC removal of Dr. Napp from MONITOR membership.

1. Advisory Panel on *North Pacific Coastal Ocean Observing Systems* (AP-NPCOOS)

Mr. Yingze Sun (China) stepped down as AP-NPCOOS member in April 2018. Preparations for a PICES Summer School on “*Coastal ocean observatory science*” is on track for July 9-13, 2018, in Victoria. One hundred and three applications were received and 63 were forwarded to the AP-NPCOOS selection committee for further vetting. Invitations were sent to 26 qualified applicants and all except four accepted the invitation. Invitations have been sent to applicants on the wait list to bring the number back up to 26. Dr. Batchelder noted that three more University of Victoria students have been added to date and they will receive course credit for participating in the Summer School, which is the first time for PICES to receive this type of recognition in the capacity building arena. All PICES member countries except Japan are represented (there was one application from Japan). It was noted that Japan was also under-represented at the 2017 Early Career Scientist Conference in Busan, Korea. Dr. Ju also noted that the number of oceanography students in Korea was decreasing and requested statistics on Korean participation in PICES-related training workshops and summer schools so Korea could mitigate this trend. Dr. Saito asked Science Board to urge their senior scientists to better advertise PICES events to their students and post-docs.

Action:

- Mr. Brown to discuss with Japanese delegates how to increase Japanese ECS recruitment in capacity building activities;
- Secretariat to provide statistics on Korean ECS participation in PICES-related events;
- Committee Chairs to remind their members to better advertise PICES capacity building events to their students and post-docs.

Continuous Plankton Recorder (CPR) program

SAHFOS, the parent of the CPR program, merged with the UK Marine Biological Association on April 1, 2018, to become the CPR Survey of the Marine Biological Association. A new field sampling transect between British Columbia and Asia began in April 2018 with a new container vessel, the *APL Qingdao*, and funding (namely NPRB, EVOSTC and SAHFOS) for sampling is fairly stable for the next two years. Dr. Sonia Batten, *ex officio* member representing SAHFOS in MONITOR, has produced two publications recently in *Deep-Sea Research II* (Vol. 147, 2018) and *Fisheries Oceanography* (in press).

GOOS Biology and Ecosystem (BioEco) Panel

BioEco Panel members, Drs. Sanae Chiba and Sonia Batten, were co-authors on a recently published paper on Essential Ocean Variables (EOVs) in *Global Change Biology Journal* (Vol. 24, 2018).

Technical Committee on Data Exchange (TCODE)

TCODE Chair, Dr. Joon Soo Lee, reported that Dr. Tony Koslow (USA) stepped down in early May, 2018. TCODE is convening a Workshop (W3) on “*Development of a systematic approach to data management in PICES*” at PICES-2018. The workshop will review all PICES data and data products, look at ways to better manage the data, and finalize PICES’ Data Management Policy.

Dr. Lee is a member of the Project Science Team for the PICES/MAFF project on “*Building capacity for monitoring by local small-scale fishers*” (FishGIS). The first PST meeting took place in January 2018 in Yokohama. A second meeting took place in March in Jakarta, Indonesia. The team visited three sites in western Indonesia and demonstrated to local small-scale fishers how to download and use HydroColor app on their smart phones to take pictures of the sky and water which will calculate backscattering in the water so that they can monitor water quality. The information can then be used for detecting fish. A questionnaire was given to the fishers so the team could assess what kind of difficulties they faced in the fisheries.

TCODE supports Dr. Yutaka Michida, Co-Chair of IOC-IODE, to be an *ex officio* member of the Committee.

Action:

- Dr. Lee to provide a letter of request to the Secretariat recommending Dr. Michida as an *ex officio* member of TCODE.
- Dr. Saito reminded Science Board to encourage their expert groups to focus on completing their final reports at the end of their term.

AGENDA ITEM 7

Review outcome of La Paz Transitions Symposium

Dr. Batchelder reported on the outcome of the international PICES symposium on “*North Pacific Transitional Areas*” held April 4-8, 2018, in La Paz, Mexico. Approximately 150 participants from 17 countries attended. A ½-day PICES-Mexico Special Session followed by a roundtable discussion was held one day prior to the Symposium to introduce PICES to the Mexican scientific community and Mexican activities and achievements in marine science to PICES. Mexican scientists showed great interest in joining PICES but limited funding and the need for domestic consensus for international oceanographic activities were the main drawbacks. The Mexican and South American countries faced issues similar to those of PICES member countries, including the need to increase monitoring efforts through standardized methods. The Closing Session summarized the outcomes from the meeting sessions followed by an open forum to discuss the evidence of climate variability and change on transitional areas and measures to improve observations and models. It was suggested that one way Mexico could continue to be engaged with PICES was through transitional front topic sessions at PICES Annual Meetings. The symposium had a good mix of countries, early career vs senior scientists, and range of transitional area topics.

ISB-2018

AGENDA ITEM 8

Status of the 4th Climate Change Symposium

Mr. Brown reported that registration was up to 650, but had declined slightly. Weekly conference calls among the conference organizers were continuing to be held. An ICES-led communication team will provide communication and information updates at the meeting.

AGENDA ITEM 9

Status of PICES-2018, Yokohama, Japan

Dr. Batchelder reported that there was a full schedule of workshops planned. Of the 8 workshops originally scheduled, the S-HAB workshop on emerging toxic dinoflagellate blooms was postponed until next Annual Meeting due to conflicting schedules between PICES-2018 and the International Conference on Harmful Algae (October 21–26, 2018, Nantes, France). A late request for a workshop from WG 41 brought the total back to 8. All workshops will be held in the Workpia except for TCODES's W3 which will be held in another building. S-HAB members returning from the ISSHA conference, will hold their meeting along with FUTURE SSC during the Sports Event on Tuesday evening. A 3-day practical workshop run by WG 37 will be held at Yokohama National University from October 22–24.

Science Board noted that the scheduling of meetings was becoming more complex as PICES business was increasing. There was less time for Science Board to explore collaborations with other organizations, and as the number of expert groups was increasing their efficiency was being compromised by having less contact time to make progress on their terms of reference and/or by members serving on more than one group meeting at the same time. The Annual Meeting also needed to be attractive to early career scientists. Options would be to conduct a survey (this would need someone to design the questionnaire), and making them members of expert groups. Options to accommodate PICES business included reducing the amount of time for meetings, increasing the number of inter-sessional meetings, reducing the length of topic sessions, reducing the time for S1 and moving the FUTURE Plenary after it, or alternating Annual Meeting schedules to have more topic sessions one year and less time for meetings and vice versa.

Action:

- Committee/Program Chairs to canvas their expert groups to see if meeting time is fulfilling their requirements to get business done;
- Secretariat to add an online question to registration regarding having more emphasis on business meetings or on topic sessions;
- Secretariat to send a follow-up poll to ECS after the Annual Meeting on what would attract them to PICES.

Dr. Boldt requested that Committees be given recognition as sponsors of topic sessions or workshops that they have given priority ranking to in the Annual Meeting program, and that another method be sought for denoting which Committee is to judge a session or workshop where early career scientists are presenting.

Action:

- Secretariat to replace 'judging' Committee/Program to 'sponsoring' Committee/Program before a Topic Session and Workshop in the Scientific Program on the Annual Meeting website.
- Dr. Batchelder to contact nominated S1 invited speaker again, and select next speakers on the nomination list if first choice declines or does not respond.

Wednesday, May 9, 2018

AGENDA ITEM 10

Wooster and POMA Awards

Two nominations each for the Wooster Award and POMA were submitted to the Secretariat by the deadline of March 31, 2018. MONITOR and TCODE provided their opinion on the POMA nominations to Science Board during the *in camera* to select a recipient for each award. The recipients will be announced during the Opening Session at PICES-2018.

AGENDA ITEM 11

Format and date for ISB-2019

Japan and Russia both offered to host ISB-2019. It was unclear what meetings the ISB could be linked to.

Action: Secretariat to work with Russia and Japan to look at logistics, in association with other potential meetings, by September.

AGENDA ITEM 12

Status of planning for PICES-2019

Dr. Boldt presented Canada's proposal for a PICES-2019 theme entitled "*Connecting science across communities in a changing North Pacific*" for comments. In general, Science Board viewed the theme and description favourably, but requiring some minor edits.

Action: Science Board to provide comments to Dr. Boldt on theme and title by May 23.

AGENDA ITEM 13

PICES Publications

Publications approved by Science Board that were recently completed, are in preparation, or have been submitted were reviewed. Science Board was pleased with the output of publications from expert groups and the ADRIFT project. Some recent literature on hypoxia was forwarded to Dr. Di Lorenzo from Dr. Batchelder to help him complete the SG-SEES report for review at PICES-2018.

Action: Dr. Di Lorenzo to have amendment to SG-SEES report ready by PICES-2018.

Dr. Saito reviewed GC Decision 2016/A/13 on policy regarding funding for Open Access publications and instructed Science Board members to use the criteria when discussing future publications needing PICES financial support with their Committee/Program members.

Action: Committees to look at GC Decision 2016/A/13 (Policy regarding funding support for Open Access Publication in <http://meetings.pices.int/publications/annual-reports/2016/2016-GC-Decisions-San-Diego.pdf>) when evaluating requests from their expert groups for publications to be provided Open Access

AGENDA ITEM 14

Policy regarding the development and approval of special projects

Mr. Brown noted that guidelines were in place (GC Decision 2017/A/7) regarding policy for approval and management of Special Projects less than \$50,000 and for projects greater than \$50,000.

AGENDA ITEM 15

Interactions with other organizations

Organizations having action items are discussed below. Reference to other organizations are under other Agenda Items.

1. *ICES (International Council for the Exploration of the Sea)*

Mr. Brown noted that with a change in leadership in both organizations, there has been a lack of communication or miscommunication regarding a number of collaborative activities between PICES and ICES. He is holding regular conference calls with ICES on strategic planning, and present and future joint activities, and reviewed them with Science Board.

▪ UN World Ocean Assessment-II

The UN has relaxed its approach for providing nominations to the pool of experts since the first WOA so that scientists can be drawn from organizations such as PICES and ICES, rather than only through member nations. Dr. Ju has been nominated by Korea to the pool of experts and Dr. Chiba has been nominated by Japan to a Group of Experts.

Action: Each Committee Chair to suggest a name for the pool of experts and submit to the Science Board Chair prior to PICES-2018.

▪ ICES UN Observer Status

Action: Mr. Brown to provide a name of an Asian scientist from PICES to ICES to make a 10-minute presentation on climate change–ecosystems to promote ICES application for observer status.

▪ Ecosystem prediction

Action: FUTURE to work with Secretariat to set up a joint WebEx meeting between S-CCME and WG 40 to ensure S-CCME activities are not overlapping with HD and WG 40.

▪ Aquaculture working groups

Action: Mr. Brown to contact Dr. Mike Rust for input on PICES SG proposal.

Future Joint ICES-PICES Annual Meeting

Science Board was not sure what could be achieved by holding a joint annual meeting that was not already being done through current joint symposia and expert groups. A suggestion was to prioritize what PICES wants to achieve with other organizations.

2. NPAFC (North Pacific Anadromous Fish Commission)

Action: Mr. Brown to reply to Mark Saunders' request to hold a PICES/NASCO/NPAFC meeting in the summer.

3. *SCOR (Scientific Committee on Oceanic Research)*

Dr. Batchelder sent nine proposals for SCOR working groups to Science Board for evaluation on potential PICES affiliate status on May 24.

Action: Committee Chairs to discuss with their members and provide Dr. Batchelder with rankings by August 1.

IMBeR

Dr. Saito asked for comments on a proposed theme session entitled “*Lessons from the extreme events of the North Pacific’s 2010s about the future oceans*” for PICES co-sponsorship at an IMBeR Open Science Conference to be held in 2019 in Brest, France.

Action:

- Science Board to review and revise proposal for a PICES-sponsored theme session at IMBeR 2019 OSC and submit to Dr. Saito by end of week (May 11);
- Science Board to revisit IMBeR collaboration with PICES at PICES-2018.

4. *NOWPAP*

NOWPAP has taken a new direction on emerging issues since a PICES-NOWPAP framework agreement was implemented at PICES-2014, and is keen on PICES input to help shape its policy. Dr. Toyomitsu Horii will represent PICES at the CEARAC Focal Point meeting in May in Toyama, Japan.

Action: revisit NOWPAP-PICES collaboration at PICES-2018.

5. *CLIVAR*

CLIVAR is restructuring and is developing a new Science Plan and Implementation Strategy to revert back to understanding coupled ocean-atmosphere processes from the sociological aspects of the ocean.

Action:

- Dr. Di Lorenzo to read CLIVAR Science Plan and flag PICES-related items for Science Board to review;
- Dr. Saito to submit comments to José Santos on Science Plan by Monday (May14);
- Secretariat to add CLIVAR as co-convenor for S7 (Topic Session on “*Ecological responses to variable climate changes and their applicability to ecosystem predictions*” at PICES-2018

6. *Future Earth FE-KAN*

Dr. Di Lorenzo is a member of the Future Earth Ocean Development Team whose purpose is to give advice and feedback on activities and the development of the Ocean Knowledge-Action Network. The team met in Portland in February to focus on creating terms of reference for a Working Group on Knowledge Mobilization (WG-KM) as part of the Ocean Knowledge-Action Network. Dr. Di Lorenzo used PICES as an example of taking a socio-ecological approach. As WG-KM comes into force, Dr. Di Lorenzo will encourage it to co-sponsor a topic session at PICES-2019.

Action: Dr. Di Lorenzo to encourage WG-KM to co-sponsor a topic session at PICES-2019.

Thursday, May 10, 2018

AGENDA ITEM 16

PICES-sponsored conferences/symposia in 2018 and beyond

1. MSEAS II

See Agenda Item 4 under Human Dimensions Committee (HD).

2. S-CCME Workshop on “*Political, economic, social, technological, legal and environmental scenarios used in climate projection modelling*”

The workshop is the first component of S-CCME’s Phase 3. The Section will meet at the climate change symposium venue on June 9, after the symposium.

3. OceanObs'19

Action: Secretariat to contact Program Committee Chairs, Dr. Minhai Dai and Sanae Chiba, regarding any requests to PICES for co-sponsorship.

4. ICES International Shellfish Symposium

Recommendation: Science Board supports, in principle, the request for 2-3 ECS and Dr. Gordon Kruse to attend the ICES International Symposium on “Shellfish – Resources and invaders of the North”.

Action:

- Dr. Therriault to contact Dr. Kruse to discuss the inclusion of NIS in the symposium theme;
- Mr. Brown the contact Dr. Kruse on outcome of request.

5. NEOBIOA 2018

Recommendation: Science Board recommends travel support for Dr. Jim Carlton to attend NEOBIOA 2018 to highlight ADRIFT accomplishments.

Action: Mr. Brown the contact Dr. Carlton on outcome of request.

AGENDA ITEM 17

Capacity building

1. *PICES Summer School*

The PICES/AP-CREAMS Summer School on “*Satellite oceanography*” slated for 2018 was cancelled due to difficulties in preparing in time. A PICES/AP-CREAMS Summer School on physical processes for 2019 is being considered by China. Dr. Batchelder prepared a summer school proposal template which was sent to AP-CREAMS to assist in preparing the proposal. Mr. Brown remarked that PICES Summer Schools are proponent-driven and without the interest shown by proponents for capacity building events, PICES Summer Schools would be far fewer.

Action: Dr. Batchelder to contact Prof. Fei Yu about a summer school hosted by China.

2.2 *Summer schools co-sponsored by PICES*

PICES contributed \$1500 (GC Decision 2017/S/2) towards capacity building activities for the Pacific Ecology and Evolution Conference (PEEC 2018) at Bamfield, Vancouver Island. PICES poster was displayed at the Conference, and an article by the Conference organizer has been prepared for the Summer Issue of PICES Press. PICES agreed to provide travel support for up to 3 early career scientists each for IMBeR ClimEco6 and SOLAS 7th Summer School (GC Decision 2017/S/2).

Action: Secretariat to contact SOLAS and IMBeR regarding selection of summer school candidate applications.

2. *Training workshops*

The Working Group on *Zooplankton Production Methodologies, Applications and Measurements in PICES Regions* (WG 37) originally requested permission to hold a summer school, but since it was regional (Yokohama National University; mostly western Pacific students), it was suggested that it be made into a practical workshop on “*Production methodologies and measurements for in situ zooplankton*” (Phase 1), followed by Phase 2 workshop in 2019 on the estimation of zooplankton production (tentative venue: University of Victoria). It is unclear at this time if the same students from Phase 1 will attend the Phase 2 workshop. No funding was requested for the Phase 1 workshop.

AGENDA ITEM 18

Next integrative science program

A draft survey for what the next PICES integrative science program was prepared by Dr. Ryan Rykaczewski, and circulated to Science Board for comments. Science Board agreed that the survey should be short, simple, and focused, but there was no consensus on what the process would be for determining a new program or how long the program should last. It was agreed that FUTURE should be extended one or two years to allow the program to wrap up and get a new program in place so there was no hiatus. Suggestions for selecting a new program ranged from establishing a study group to having a second external evaluation or town hall meeting(s). Following through on a town hall meeting, it was agreed to allot 30 minutes in S1 (after the Keynote and one invited talk) for FUTURE SSC to showcase its accomplishments and devote time for questions and answers. In place of creating a new study group, FUTURE SSC will prepare a term of reference to identify the next program. It was also suggested to have FUTURE questions pre-identified as a poster, question board, or as a handout in the registration bag.

Action:

- FUTURE SSC to provide a 'lessons learned' self-evaluation and summary of synthesis paper to show at S1 before lunch break;
- Dr. Batchelder to schedule S1 to have Keynote followed by one invited speaker followed by two time slots for FUTURE presentation;
- FUTURE SSC to have new TOR ready at SSC business meeting at PICES-2018 for presentation to Science Board.

AGENDA ITEM 19

Implementation of Science Board recommendations and Governing Council decisions from PICES-2017

Mr. Brown reviewed GC Decisions from PICES-2017 and noted the items that were not yet done. The Secretariat will try to do a better job in the future on communicating the implementations to Science Board and to expert groups more quickly.

Action:

- Secretariat to relay implementation of SB recommendations/GC decisions back to Committees and expert groups as soon as they are completed;
- Mr. Brown and Dr. Saito to write a brief paragraph on requests for better attendance in Committees at PICES Annual Meetings.

AGENDA ITEM 20

Other business*Science Board Chair-elect position*

Science Board voiced no objection to continue a Science Board Chair-elect position one year in advance of the Science Board Chair completing his term. Individuals within or outside of PICES can be nominated or can apply. Applications need to be received by the Secretariat 60 days prior to the Annual Meeting. Dr. Saito encouraged Science Board to notify colleagues within and outside the Organization who they thought might be interested and would make good candidates.

Action:

- Mr. Brown to notify Governing Council of the intension of Science Board to hold a Science Board Chair-elect election at PICES-2018;

ISB-2018

- Mr. Brown to update candidacy criteria and post on the PICES website as soon as possible;
- Science Board to contact individuals within and outside PICES who would make good candidates.

ISB-2018 Endnote 1

ISB-2018 participation list

Members

Steven Bograd (Co-Chair, FUTURE SSC)
Jennifer Boldt (Chair, MONITOR)
Keith Criddle (Chair, HD)
Emanuele Di Lorenzo (Chair, POC; via skype)
Xianshi Jin (Chair, FIS)
Se-Jong Ju (Chair, BIO)
Sukyung Kang (Co-Chair, FUTURE SSC)
Joon-Soo Lee (Chair, TCODE)
Hiroaki Saito (Chair, Science Board)
Igor Shevchenko (representing Russia)
Motomitsu Takahashi (representing Japan)
Thomas Therriault (Vice-Chair, MEQ)

PICES

Chul Park (Chair, PICES)

Observers and Guests

Peter Chandler (Co-Chair, WG 35; May 8)
James Christian (Co-Chair, S-CC; May 8)
Carmel Lowe (GC, Chair, F&A; Canada)
Tetsuo Fujii (GC, Japan)
Chieko Kondo (GC Advisor, Japan)
Junichiro Otaka (GC, Japan)
Nobuaki Suzuki (GC, Japan)

Secretariat

Robin Brown (Executive Secretary)
Harold (Hal) Batchelder (Deputy Executive Secretary)
Rosalie Rutka (Administrative Assistant)

ISB-2018 Endnote 2

ISB-2018 meeting agenda

Tuesday, May 8, 2018

1. Welcome and adoption of agenda
2. Mid-year reports from expert groups that report directly to Science Board
3. Mid-year report from FUTURE SSC
4. Expert Group status
5. Review/Decision of proposed new mariculture Study Group
6. Mid-year reports from Scientific and Technical Committees
7. Review outcome of La Paz Transitions Symposium
8. Status of the 4th Climate Change Symposium
9. Status of PICES-2018, Yokohama, Japan

Wednesday, May 9, 2018

10. Wooster and POMA awards
11. Format and date for ISB-2019
12. Status of planning for PICES-2019
13. PICES Publications
14. Policy regarding the development and approval of special projects
15. Interactions with other organizations and programs

Thursday, May 10, 2018

16. PICES-sponsored conferences/symposia in 2018 and beyond
17. Capacity building/Plan for PICES summer schools
18. Next integrative science program
19. Implementation of Science Board recommendations and 2017 Governing Council Decisions
20. Other business

ISB-2018 Endnote 3

Proposal for a Study Group on *Impacts of Mariculture on Coastal Ecosystems*

Parent Committees: FIS and HD

Background

Mariculture, especially large-scale mariculture, is an important factor affecting coastal ecosystem. Studies on genetic and biological variables of mariculture and coastal ecosystem will reveal the impacts of culture activities. The working group aims to improve the understanding of microbial composition and quantities in both mariculture and coastal ecosystem, focusing on the impacts of genetics and pathogenic or harmful organisms to the coastal ecosystems. There has been no systematic and synergistic attempt to study the effects of pathogenic and harmful organism derived from mariculture on coastal marine ecosystem, which is a primary goal of the PICES FUTURE science plan. The new PICES working group will leverage the international expertise within PICES to “identify the impacts in coastal ecosystems that arise from regional- and large-scale mariculture.”

Terms of Reference

To develop the outline and terms of reference for a Working Group which will consider:

1. Information and changes of large-scale mariculture physical and biological variables.
2. Information and changes of coastal microbials.
3. The impacts of pathogenic organisms to the natural population.
4. Suggestion to improve the impacted ecosystems.
5. Hatchery effects to the population genetics.
6. Human dimensions aspects of mariculture on coastal communities.

Proposed membership:

Canada:

China: KONG Jie (kongjie@ysfri.ac.cn), Bao Zhenmin (zmbao@ouc.edu.cn), Li Qi (qili66@ouc.edu.cn),

Meng Xianhong (mengxianhong@ysfri.ac.cn)

Japan: not decided

Korea: Jiang Jungshi, Jang In-Kwon, jangik2001@gmail.com,

Russia:

USA: Kevain Main, KMain@mote.org

Proposed Chair: Jie KONG

Products: The workshop summary and presentations of WG-IMCE