

Report of the Science Board Meeting

Science Board met in Nanaimo, Canada from 12:30-14:00 on October 13, 2013. Science Board Chairman, Dr. Sinjae Yoo, welcomed members and guests, Dr. Linda Stevenson (APN), Dr. Yutaka Michida (IOC/WESTPAC) and Dr. Nicholas Owens (SAHFOS) to the meeting (*SB Endnote 1*) and called it to order. The agenda was revised prior to the second meeting, held after the Closing Session, from 14:00–18:00 on October 18, to accommodate the schedules of invited guests, Dr. James Irvine (Co-Chairman SG SC-NP) and Dr. Keith Criddle (Co-Chairman S-HD) reporting on expert group activities, and Dr. Gordon Kruse (acting for FIS Chairman, Dr. Elizabeth Logerwell) reporting on FIS activities. A third, full-day, meeting was held from 9:00–19:00 on October 20. The revised meeting agenda times can be found in *SB Endnote 2*.



Participants of the PICES-2013 Science Board meeting (back row, from left): Atsushi Tsuda (BIO), Toru Suzuki (TCODE), Sinjae Yoo (Science Board Chairman), Hiroya Sugisaki (MONITOR), Hal Batchelder (representing AP-SOFE), Igor Shevchenko (representing Russia), (front row, from left): Thomas Therriault (AP-AICE and Science Board Chairman-elect), Hiroaki Saito (AP-COVE), Skip McKinnell (PICES Secretariat), Kyung-II Chang (POC). Absent in photo: Chuanlin Huo (MEQ).

Sunday, October 13, 2013

AGENDA ITEM 2

Procedures for Science Board Symposium, Session awards, and Closing

Procedures for judging presentations by Early Career Scientists were briefly discussed. Any presentations made by early career scientists at workshops will not be considered in future Annual Meetings because they are held too far in advance of the main meeting when few Committee members are present to judge. Science Board agreed not to judge the small pool of posters in the Science Board Symposium at this meeting but instead, divide them among the MEQ- and MONITOR-sponsored topic sessions.

AGENDA ITEM 3

Relations with specific international programs/organizations

International Council for the Explorations of the Sea (ICES)

ICES representative, Dr. Adolf Kellermann was unable to attend, but sent a list of 25 potential theme sessions for the ICES 2014 ASC for PICES to consider for co-sponsorship.

International Oceanographic Commission of UNESCO and its Sub-commission for the Western Pacific (IOC/WESTPAC)

Dr. Yutaka Michida, Vice-Chair of IOC, discussed past WESTPAC-PICES collaborative activities and informed Science Board that WESTPAC will be celebrating its 25th anniversary in 2014 by holding an International Scientific Symposium on “*A healthy ocean for prosperity in the Western Pacific: Scientific challenges and possible solutions*” April 22-25, 2014 in Nha Trang, Vietnam in which PICES was invited to participate. Deadline for abstract submission is November 30, 2013.

Science Board agreed that Drs. David Checkley (AP-CREAMS member) and Sanae Chiba (MONITOR, AP-CPR member) should represent PICES at the GOOS Biogeochemical Workshop to be held late fall in Townsville, Australia. It is anticipated that the workshop will lead to the formation of a new GOOS working group. MONITOR will provide guidance to them on PICES representation.

Scientific Committee on Oceanic Research (SCOR)

Committee Chairs were requested by the Science Board Chairman to review (1) a short list of SCOR working group proposals and (2) SCOR suggestions for joint capacity building activities at their Committee meetings before Science Board convened its second meeting. Once Science Board has finalized its selection for working group associate membership, Dr. Yoo will inform SCOR after the Annual Meeting. A document outlining PICES decisions on capacity building activities with SCOR will be prepared by Drs. Yoo, Thomas Therriault, and Harold (Hal) Batchelder. Dr. Batchelder, who is also a member of the SCOR capacity building team, will present it at the team meeting in November.

Asia-Pacific Network (APN)

Dr. Linda Stevenson, representing the Asia-Pacific Network, discussed APN activities in the Asia-Pacific area that could be linked with PICES. APN's major activities for the next year are to fund regional research and capacity building projects. It is presently focusing on three activities, one being the Biodiversity and Ecosystem Services framework which APN would like to collaborate on with PICES and NOWPAP, although no formal proposal was presented.

Sir Alister Hardy Foundation for Ocean Science (SAHFOS)

Dr. Nicholas Owens, Director of SAHFOS, informed Science Board that SAHFOS has been making CPR surveys since 1931 and a goal is to fill in the gaps in surveys. This can be done because the samples have been archived, and the collected data are proving to be useful in policy making. A future objective is to have a full suite of oceanographic sensor instrumentation on every CPR body and to do molecular-level surveys. Since most of the world ocean is undersampled, there is lots of opportunity to sample along the Pacific. SAHFOS is interested in maintaining its current E-W transect collaboration with PICES but suggested there were opportunities to also do sampling along north-south transects along the North and South American continents and that a line to Hawaii could also be considered.

Friday, October 18, 2013

AGENDA ITEM 3, CONTINUED

Relations with specific international programs/organizations

ICES (continued)

Dr. Batchelder, acting for AP-SOFE Chairman, Dr. Phillip Mundy, who could not be present, made a brief report on ICES activities on behalf of Dr. Kellermann. ICES is developing a new strategic plan which will be launched in early 2014. The new plan is very similar to PICES' integrated science plan, FUTURE, and will focus on providing integrated advice to clients. Once ICES SCICOM is in place, it will review the document for scientific cooperation between ICES and PICES that was prepared by the joint P/ICES Study Group on *Developing a Framework for Scientific Cooperation in Northern Hemisphere Science* formed in 2009.

Science Board reviewed the list of ICES theme sessions that were chosen for PICES to co-sponsor by the Standing Committees at their Committee meetings on Wednesday, October 16. The selections are listed under Science Board recommendations in Agenda Item 5.

AGENDA ITEM 4

Reports from expert groups under Science Board

Section on *Human Dimensions of Marine Systems*

S-HD Co-Chairman, Dr. Keith Criddle, presented the activities, of the Section in the last half year, and what the group expected to achieve in its 2014 workplan. S-HD convened a workshop in Hawaii (June 13–16, 2013) to select indicator time series observations to feed into an HD chapter in the next version of NPESR. Workshop participants committed to provide preliminary data (or web links) at the S-HD meeting on October 16, 2013. A white paper on the legal and regulatory foundations of fisheries management in PICES member countries is anticipated as a PICES Scientific report in 2014, pending data received from Korea.

Plans are to hold a topic session at the FUTURE Open Science Meeting in Hawaii (April 15-18, 2014) on "*Human dimension indicators of the status of the North Pacific ecosystem*" and a 1-2 day meeting to review the first draft of the human dimension time series observations indicator data tables and assign responsibilities for drafting sections of an HD chapter for the next version of NPESR. The Section expects to review the draft chapter during the S-HD meeting at PICES-2014. Dr. Criddle reported that no FUTURE Advisory Panels have communicated with the Section, and that advice would be welcomed. The Section is considering holding a symposium between 2015 and 2017 and requests guidance from Science Board.

S-HD proposed a Study Group on Marine Ecosystem Services which would be kicked off as a workshop on the "*Development of marine ecosystem service indicators for the North Pacific region*" to take place March 2014, in Qingdao, China. The workshop would attempt to reach consensus on MES indicators for each PICES country and a commitment to conduct analyses needed to develop estimates of the value of MES for inclusion in the NPESR chapter on human dimensions. Science Board agreed that a workshop be held, first at PICES-2014, but inter-sessionally if funding can be arranged by China.

Action: FUTURE Advisory Panels to communicate with S-HD.

Recommendation: Science Board recommends S-HD hold a 1-day workshop on marine ecosystem indicators.

Study Group on *Scientific Cooperation in the North Pacific Ocean*

SG SC-NP Co-Chairman, Dr. James Irvine, presented a brief update since the Study Group's formation in June 2013. He noted that the main reason for establishing a joint NPAFC/PICES Study Group was to form a

bottom-up approach to look at issues common to the two organizations. A final framework of enhanced collaboration to achieve better and/or more rapid understanding of natural and anthropogenic variability in marine ecosystems related to anadromous fish stocks will be developed in the spring of 2014. PICES-NPAFC expertise will be used to try to address a number of questions of mutual interest. In 2015 NPAFC will be hosting an NPAFC symposium which would be an ideal mechanism for the two organizations to address at least one of these questions.

Saturday, October 19, 2013

AGENDA ITEM 3 (CONTINUED)

Relations with specific organizations

SCOR (continued)

Out of a list of 11 SCOR working group proposals that were reviewed by the Standing Committees after ISB-2013, three were chosen by Science Board for further discussion, based on the criterion of at least 2/3 of the Committees approving a proposal. All Committees subsequently supported the selection of:

1. Standard protocols for the development of an atlas of marine plankton biogeography;
2. Zooplankton production measurement methodologies and their application;
3. Studying ocean acidification effects on continental margin ecosystems.

Science Board agreed with SCOR's suggestions for strengthening cooperation through additional approaches besides those that are already maintained. Drs. Yoo and Batchelder will attend the SCOR Annual Meeting in November to discuss further means of SCOR-PICES collaboration.

Action:

- Dr. Yoo to submit the proposals to SCOR, and request to include Pacific representation if #3 is selected by SCOR);
- Dr. Batchelder to provide outcome of SCOR-PICES discussions from SCOR Annual Meeting.

International Indian Ocean Expedition (IIOE-II)

Science Board agreed that participating in updating Indian Ocean observations with the new technology now available would be interesting but the new initiative did not have direct relevance to PICES' interests at this time, although PICES would be interested to see a dipole connection between the Indian Ocean and western Pacific and/or ITF. Science Board would also be interested in tracking the progress of IIOE plans and agreed it would be worthwhile to send a local PICES representative to the IIOE-II planning meeting in Qingdao, China, November 20–21, 2013.

Action: Dr. Yoo to ask Dr. Fangli Qiao to attend IIOE-II planning meeting and provide Science Board with a report.

Convention on Biological Diversity (CBD)

In response to CBD's request from PICES for more information on identifying ecologically or biologically significant areas in the North Pacific (proposed at the CBD workshop to develop EBSAs in the North Pacific in Moscow, February 25– 1, 2013), Dr. Therriault and PICES Chairman, Dr. Laura Richards, prepared a draft terms of reference for a study group to identify the types of scientific activities currently under way or being planned for the North Pacific and any gaps where PICES might make a significant contribution. The proposal will be presented to Governing Council for review at PICES-2013 before being given to Science Board for comments. The top-down approach through Council versus the bottom-up approach through Committee expert groups for gathering EBSA information was briefly debated. Science Board recommended first to review

MEQ's proposal for a new expert group on biodiversity to see if it could do the work advocated in the CBD (see *SB Endnote 4*).

Science Board reviewed the 2012–2013 standing list of international and regional organizations and programs PICES identifies for interaction and agreed with the Secretariat's decision to delete:

- Arctic Climate Impact Assessment Program (ACIA of AMAP),
- American Fisheries Society Program on Climate and Aquatic Resources (AFSCAR),
- International Geosphere-Biosphere Program (IGBP),
- International Human Dimensions Program on Global Environmental Change (IHDP),
- South Asian Regional Committee for the System for Analysis, Research and Training (START),
- United Nations Environment Program (UNEP),

and to add the North Pacific Fisheries Commission to the standing list. Science Board requested the addition of Future Earth to the list (see GC Appendix B in the Report of Governing Council for the standing list elsewhere in the 2013 Annual report).

AGENDA ITEM 5

Reports from Scientific and Technical Committees

Science Board recommendations

Changes in chairmanship

- Dr. Thomas Therriault replaces Dr. Sinjae Yoo as Science Board Chairman;
- Dr. Hiroaki Saito was elected Science Board Vice-Chairman;
- Dr. Angelica Peña (Canada) replaces Dr. Atsushi Tsuda (Japan) as BIO Chair;
- Dr. Atsushi Tsuda (Japan) replaces Dr. Michael Dagg (USA) as BIO Vice-Chairman;
- Dr. Jennifer Boldt (Canada) replaces Dr. Hiroya Sugisaki (Japan) as MONITOR Chair;
- Dr. Sanae Chiba (Japan) replaces Dr. Phillip Mundy (USA) as MONITOR Vice-Chair;
- Dr. Steven Bograd (USA) replaces Dr. Thomas Therriault (Canada) as AP-AICE Chairman.

Membership changes/additions

- Dr. Anya Dunham (Canada) to be FIS representative to AP-AICE;
- Dr. Young Jae Ro (MONITOR) be taken off the list of AP-AICE membership;
- BIO member to be appointed to S-CCME.

Proposed new expert groups

- Study Group on *Socio-Ecological-Environmental Systems* (SG-SEES; *SB Endnote 3*);
- Study Group on Biodiversity Conservation (SG-BC; *SB Endnote 4*);
- Working Group on *Emerging Topics in Marine Pollution* (WG 31; *SG-MP Endnote 2*).

Expert groups to be disbanded upon completion of their final report

- Study Group (SG-MP) on *Marine Pollutants*;
- Working Group (21) on *Non-indigenous Aquatic Species*;
- Working Group (26) on *Jellyfish Blooms around the North Pacific Rim*.

Extension of existing expert groups

- Working Group (WG 27) on *North Pacific Climate Variability and Change*;
- Working Group (WG 29) on *Regional Climate Modeling*.

Expert groups to undergo progress review

- Section on *Carbon and Climate*;
- Section on *Ecology of Harmful Algal Blooms in the North Pacific*.

Joint theme sessions at the ICES 2014 Annual Science Conference in A Coruña, Spain

- *Ecological consequences of reduced body size of organisms in the future ocean* (theme session M) [later withdrawn for PICES co-sponsorship];
- *Gelatinous zooplankton on a global perspective: interactions with fisheries and consequences for socio-economics* (theme session A);
- *The increasing importance of biofouling for marine invasions: an ecosystem altering mechanism* (theme session I);
- *Physical and biological consequences of exchanges between the Atlantic* Subarctic and the Arctic* [*PICES requested “North Pacific” to be added to the title; (theme session Q). Subsequently, the request could not be implemented in the title (later renamed as “*Physical and biological consequences of North Atlantic circulation patterns*”) but was referenced in the abstract description.];
- *Pelagic ecosystem dynamics from integrated monitoring surveys* [not accepted for co-sponsorship by Governing Council];
- *The big (ocean) data journey – All aboard?* [not accepted for co-sponsorship by Governing Council]

Inter-sessional symposia/sessions/workshops/meetings

- 2-day inter-sessional Science Board meeting, April 19–20, 2014, Kohala Coast, Hawaii, USA;
- 2-day meeting of the Evaluation Team to assess progress of FUTURE, April 19–20, 2014, Kohala Coast, Hawaii, USA;
- ½-day joint meeting of the Evaluation Team and Science Board, April 21, 2014, Kohala Coast, Hawaii, USA.;
- 29th Lowell Wakefield Fishery Symposium on “*Fisheries bycatch: Global issues and creative solutions*”, May 13–16, 2014, Anchorage, U.S.A. (co-sponsored by PICES).

Capacity building

- IMBER ClimECO4 Summer School on “*Delineating the issues of climate change and impacts to marine ecosystems: Bridging the gap between research, assessment, policy and management*”, August 4–9, 2014, in Shanghai, China (co-sponsored by PICES);
- 2014 PICES Summer School on “*Ecological modeling for marine resources management and research*” [now named “*End-to-end models for marine resources management and research*”], August 26–29, 2014, Seoul, Korea (approved in 2012).

Priority items with funding implications

Inter-sessional events

- PICES associate member (Dr. Lisa Miller) of SCOR WG 140 on *Biogeochemical Exchange Processes at the Sea-Ice Interfaces* to attend the WG 140 meeting (March 16, 2014, Hobart, Australia);
- PICES convener and invited speaker (Dr. Heui Chun An, Korea) to participate in the 29th Lowell Wakefield Fishery Symposium on “*Fisheries bycatch: Global issues and creative solutions*” (May 13–16, 2014, Anchorage, USA);
- PICES convener (Dr. Thomas Therriault) for the joint IMBER/PICES Theme Session on “*Responses of society to marine and global changes as a core mandate for IMBER: ways forward*” at the IMBER Open Science Conference (June 23–28, 2014, Bergen, Norway);
- PICES representative (Dr. Shoshiro Minobe) to attend the 1st Pan-CLIVAR meeting (July 17–18, 2014, The Hague, The Netherlands);
- PICES representatives and convenors for the joint Theme Sessions to participate in the ICES Annual Science Conference (September 15–19, 2014, A Coruña, Spain).

Facilities

- Renew rent of remote server for PICES TCODE geo-spatial portal site.

Publications

Special issues of primary journals (2014-2015)

- Review paper based on findings from the 2013 PICES/ICES/GEOHAB workshop on “*Harmful algal blooms in a changing world*” (Lead Author: M. Wells) to be published in *Harmful Algae*.
- Special issue of *Progress in Oceanography* based on selected papers from the 2012 Topic Session on “*Advances in understanding the North Pacific Subtropical Frontal Zone ecosystem*” (Guest Editors: T. Ichii, S. McKinnell and M. Seki) to be submitted in 2014;
- Special issue of *ICES Journal of Marine Science* based on selected papers from the 2013 PICES/ICES workshop on “*Global assessment of the implications of climate change on the spatial distribution of fish and fisheries*” and the ICES/PICES Theme Session on “*Responses of living marine resources to climate change and variability*” at the 2013 ICES Annual Science Conference (Lead: A. Hollowed) to be published in late 2014–early 2015;
- Special issue of *Progress in Oceanography*, dedicated to Dr. Bernard Megrey, on modeling and observational approaches to understanding marine ecosystem dynamics (Guest Editors: E. Curchitser, S.I. Ito, M. Kishi, M. Peck and K. Rose) to be published electronically in late 2014 and hard copy in early 2015.

PICES Scientific reports

- Final report of Working Group (WG 21) on *Non-indigenous Aquatic Species*
- Final Report of Working Group (WG 26) on *Jellyfish Blooms around the North Pacific Rim: Causes and Consequences*;
- Final Report of Study Group (SG-MP) on *Marine Pollutants*
- S-HAB report on “*Economic and Social impacts of HABs on aquaculture and fisheries*”
- AP-CREAMS EAST-II project on “*Oceanography of Yellow and East China Sea*”
- Report of the 2012 GLOBEC/PICES/ICES Workshop on “*Forecasting ecosystem indicators with process-based models*”;
- S-HD white paper report on legal and regulatory foundations of fisheries management in PICES member countries.

Other

- Brochures on 6 themes from the PICES/ICES workshop on “*Global assessment of the implications of climate change on the spatial distribution of fish and fisheries*” (May 22–24, 2013, St. Petersburg, Russia)

Brief highlights of Committee activities and plans are provided below. High priority items from Committees are listed under relevant categories above. Detailed reports of each Committee can be found elsewhere in the [2013 Annual Report](#).

BIO

BIO Committee Chairman, Dr. Atsushi Tsuda, reported that he will step down as Chairman of BIO but will take up the elected position of Vice-Chairman. Dr. Angelica Peña was elected as Chair. The final reports of Working Group (WG 22) on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific* and Working Group (WG 23) on *Comparative Ecology of Krill in Coastal and Oceanic Waters around the Pacific Rim* were published July 2013.

The Committee agreed with the format of a joint FUTURE meeting being held first at this Annual Meeting followed by separate FUTURE Advisory Panel meetings.

BIO agreed with the new direction being proposed in the reporting process for the North Pacific Ecosystem Status Report (NPESR) but felt the schedule was not realistic. Since Status Reports are one of the top priorities of PICES, BIO felt the planning of such products must be done carefully and fully, and involve as many PICES members as possible. In this regard, BIO regarded the open NPESR meeting held half an hour

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prior to the scheduled Wednesday Committee meetings too short and would have liked SOFE to plan for a more complete presentation to all Committees and allow for more open discussion.

BIO agreed with AP-MBM's request to continue sending Dr. Hirohito Kato as a PICES representative to IWC meetings. BIO requested a BIO member be added to S-CCME to enhance tighter cooperation. BIO agreed in principle with the Section on *Carbon and Climate*'s development of its next workplan to focus on acidification and hypoxia and coastal carbon cycles.

FIS

FIS member, Dr. Gordon Kruse, acting for the FIS Chair, Dr. Elizabeth Logerwell, who could not be present, presented the Committee report. A convention was signed to establish a new Regional Fishery Management Organization called the North Pacific Fisheries Commission (NPFC). Its scope includes high seas fishery resources, except those covered by other organizations, and includes important fishery resources such as Pacific saury and cephalopods. FIS recommended that PICES establish linkages to the new organization starting in 2014 when an NPFC scientific working group is established.

FIS recommended that PICES support ICES theme session "*Gelatinous zooplankton on a global perspective: interactions with fisheries and consequences for socio-economics*". The Committee felt there were other topics that would be relevant to FIS' Action Plan, but did not have the information needed to make a decision at PICES-2013, and requested that ICES provide further details and FIS be allowed to vote on the sessions via email. FIS ranked PICES Topic Sessions for PICES-2014 and suggested that the proposal on "*Recent assessments of climate change impacts on marine ecosystems*" be a Science Board sponsored topic session. Alternatively, in lieu of a topic session, two keynote speakers could headline the Science Board symposium to present comprehensive overviews on the topic.

FIS requested that "fisheries" be added to a list of keywords for the development of topic sessions for the proposed international Symposium on the "*Effects of climate change on the world's oceans*" to be held in Santos, Brazil, March 25–27, 2015. It was also noted that most climate change forecasts are based on single-species projections, so moving beyond single species to communities is more desirable, and therefore, a second area for a topic session could be "climate-driven ecological changes".

FIS requested travel support for Dr. Heui Chun An (Korea) to attend the Lowell Wakefield fisheries symposium on "*Fisheries bycatch: Global issues and creative solutions*" in Anchorage, Alaska (May 13–16, 2014). Dr. An is serving as a PICES SSC member and would serve as a co-convenor and invited speaker.

FIS agreed in principle with SOFE's plenary on the process for NPESR, but raised questions about whether all countries will agree to provide data, and what will happen if some countries do not agree to do so. FIS supported the new process but only if there are data sharing agreements between all PICES member countries. FIS also requested clarification on the financial costs of developing and maintaining databases and servers; how differences would be dealt with between the proposed process and the first two NPESRs; what type of information the website would host.

MEQ

MEQ Chairman, Mr. Chuanlin Huo, reviewed the main achievements of the Committee over the past year, including the establishment of the Working Group (WG 30) on *Assessment of Marine Environmental Quality of Radiation around the North Pacific* and the publication of the final report of Working Group (WG 24) on *Environmental Interactions of Marine Aquaculture* in August 2013. The Study Group on *Marine Pollution* submitted its final report to MEQ and requested the establishment of a section or working group on emerging topics on marine pollutants.

- WG 28 requested a 2-day business meeting at PICES-2014;
- WG 28 requested \$1500 support for 2 invited speakers (from Western and Eastern Pacific)

- WG 21 requested \$3000 travel support for speaker/convenor for a joint ICES/PICES theme session on “*The increasing importance of biofouling for marine invasions: an ecosystem altering mechanism*” at ICES ASC 2014;
- SG-MP requested \$2000 travel support for 2 invited speakers (from Western and Eastern Pacific) for topic session on “*Marine debris in the Pacific Ocean: Source, transport, fate and effects of macro- and micro-plastics*” at PICES-2014
- S-HAB requested \$3000 travel support for a “Climate and HABs” SSC member to attend an IPHAB meeting in April;
- S-HAB requested \$1500 travel support for 2 invited speakers for ½-day topic session and 1-day workshop at PICES-2014
- WG 30 requested a 1½-day business meeting at PICES-2014
- WG 21 requested the establishment of a section on biodiversity conservation including NIS

Action: MEQ to instruct S-HAB to prepare a progress report for its tri-annual review by Science Board.

MEQ supported the new approach to publishing NPESR, but had concerns as to how the datasets would be identified, how quality control would be ensured, and how analysis would be conducted. The Committee also felt that SOFE’s suggested timeline of 20 months was too ambitious.

POC

POC Chairman, Dr. Kyung-II Chang, was re-elected as Chairman for another term. POC supported the request of WG 27 member, Dr. Shoshiro Minobe, to attend the first Pan-CLIVAR meeting in July 17–18, 2014 in the Hague, The Netherlands, to look for ways to strengthen PICES-CLIVAR collaboration. Dr. Lisa Miller, representing SOLAS, reported that the 6th international SOLAS Summer School in Xiamen, China (August 23–September 2, 2013) was a success, with 36% of the participants from PICES member countries, and PICES supporting 3 students. As IGBP sponsorship of SOLAS will be winding down, SOLAS will transition to the Future Earth initiative, which has a large human dimensions component. SOLAS has a number of research themes it would like to address under the new initiative, and welcomes comments and suggestions from PICES by November 2013. Dr. Miller is seeking travel support to attend the SCOR WG 140 (Biogeochemical Exchange Processes at the Sea-Ice Interfaces II) in Hobart in March 2014.

AP-CREAMS recommended the supplementary chapter to the second version of NPESR be published without further delay. In the case of any delay, AP-CREAMS will initiate efforts to publish outside of PICES, possibly as a book. However, the publication is not intended to act as a replacement for the supplementary chapter, and PICES should continue efforts for completing it before the third version of NPESR. AP-CREAMS requested support for 5 lecturers and 5 students for 2014 PICES Summer School on “*Ecological modeling for marine resources management and research*”, August 26–29, 2014, Seoul, Korea.

Working Group (WG 29) on *Regional Climate Modeling* began discussions on the final WG report. FUTURE products will include scientific papers, an inventory of modeling efforts, analysis of CMIP5 output, derived quantities (e.g., MLD), and model data, if possible, but there are still gaps to fill, especially for ecosystems. Since RCMs are complex and take time to develop and since there is little expertise in modeling human activity, WG 29 requested a 1-year extension, in part, to examine the latest available models from the CMIP5 effort. The WG suggested better communication between the expert groups, e.g., S-CCME, S-HD to understand what and how to achieve those products. WG 29 also requested clarification from Science Board/TCODE as to how the model data might be served.

Action: FUTURE Advisory Panels to promote communication between WG 29 and other expert groups.

Working Group (WG 27) on *North Pacific Climate Variability and Change* FUTURE products will include a final report, website repository for archiving data of ocean circulation anomalies from regional models and from IPCC outputs. Suggestions to filling identified gaps included entraining more climate modelers, developing critical datasets, sharing information among expert groups, continuing to be connected to large

programs/organizations (e.g., CLIVAR, ICES), and improving communication with other expert groups (e.g., S-HD). WG 27 requested a 1-year extension, in part, to examine the latest available models from the CMIP5, analyze further FUTURE gaps, and organize contributions for the 3rd international symposium on the “*Effect of climate change on the world’s oceans*” in 2015. WG 27 proposed a new Study Group on *Socio-Ecological-Environmental Systems* to look at developing an integrated model that would allow the study of dynamics between climate, marine ecosystems and the human dimension, and the exploration of sensitivity of the integrated systems to perturbation in key controls.

POC recommended that Science Board support the 1-year extensions of WG 27 and WG 29, and the proposal for a new Study Group on *Socio-Ecological-Environmental Systems*.

The Section on Carbon and Climate (S-CC) will prepare a document on accomplishments and future activities to be reviewed by BIO and POC, at PICES-2014, in accordance with the PICES Rules of Procedures in which parent Committees will review their Sections every 3 years. S-CC was last reviewed in 2010. The Section objectives will re-focus around acidification and de-oxygenation issues in support of FUTURE. The PACIFICA data synthesis is complete, but not yet published.

POC proposes to offer more physics-focused topic sessions at future Annual Meetings to encourage more early career scientists majoring in physical oceanography to attend and be involved in PICES Annual Meetings.

POC approved the new process for NPESR in principle, but would like to know more details, especially the level of commitment and engagement of the PICES community to make it achievable.

MONITOR

MONITOR Chairman, Dr. Hiroya Sugisaki, reported that PICES members, Drs. Sonia Batten (AP-CPR) and Sanae Chiba (MONITOR, AP-CPR) attended the second GACS (Global Alliance of Continuous Plankton Recorder Surveys) in Paris, France, in September. Dr. Batten is also Vice-Chair of GACS. Contributions by all members of the CPR consortium for the North Pacific CPR survey is stable until mid-2014.

Dr. Chiba accepted the request to represent PICES at the First Technical Expert Workshop for the GOOS Biology and Ecosystem, and GOOS Biogeochemistry Panels in November 2013 in Townville, Australia. MONITOR will provide her with information on PICES monitoring activities.

MONITOR agreed in principle with SOFE’s proposal for the new process of producing NPESR, but the Committee needed more time to consider mechanisms and timelines for reporting.

TCODE

TCODE Chairman, Dr. Toru Suzuki, reported that the TCODE-sponsored Workshop (W4) on “Tools, approaches and challenges for accessing and integrating distributed datasets” was cancelled due to the lack of US representation due to the US government shutdown that coincided with the Annual Meeting. TCODE recommends holding the same workshop at PICES-2014. TCODE asked guidance on the benefits of *ex officio* TCODE membership with the IODE Associate Data Unit (ADU) if all TCODE can share are data that are readily available on other platforms.

TCODE agreed with the new process of producing NPESR and will assist in the data management aspect, but had concerns regarding such items as the amount of time it will take to update time series, metadata and provide interpretation, the cost breakdown of the report, and where the data will reside.

AGENDA ITEM 6

PICES-2014, Yeosu, Korea

The theme for PICES-2014 is “*Toward a better understanding of the North Pacific: Reflecting on the past and steering for the future*” and the Annual Meeting will be held from October 17–26, 2014, in Yeosu, Korea. The following topic sessions and workshops were recommended by Science Board:

¾-day Science Board Symposium

Toward a better understanding of the North Pacific: Reflecting on the past and steering for the future

½-day BIO Contributed Paper Session

½-day BIO Topic Session

Strengths and limitations of habitat modeling: techniques, data sources, and predictive capabilities

1-day BIO/MEQ Topic Session

Tipping points: defining reference points for ecological indicators of multiple stressors in coastal and marine ecosystems

½-day BIO/TCODE/MONITOR Topic Session

Use of long time series of plankton to inform decisions in management and policy concerning climate, ecosystems and fisheries

½-day FIS Contributed Paper Session

½-day FIS Topic Session [to be co-sponsored by ICES]

Ecosystem considerations in fishery management of cod and other important demersal species

½-day FIS/FUTURE Topic Session [to be co-sponsored by ICES]

Climate change impacts on spatial distributions of marine fish and shellfish

1-day FIS/TCODE/FUTURE Topic Session [to be co-sponsored by ICES]

Recent assessments of climate change impacts on marine ecosystems

2-day FIS Workshop [to be co-sponsored by ISC]

Dynamics of pelagic fish in the North Pacific under climate change

½-day FIS Workshop [later changed to 1 day; to be co-sponsored by NPAFC]

Towards improved understanding of linkages between Pacific salmon and their marine ecosystems [later renamed to Linkages between the winter distribution of Pacific salmon and their marine ecosystems and how this might be altered with climate change]

½-day MEQ Contributed Paper Session

½-day MEQ Topic Session

Marine debris in the Pacific Ocean: Source, transport, fate and effects of macro- and micro-plastics

1-day MEQ Workshop [to be co-sponsored by ICES]

Mitigation of harmful algal blooms: Novel approaches to a decades long problem affecting the viability of natural and aquaculture fisheries

½-day POC Contributed Paper Session

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1-day POC/MONITOR Topic Session [to be co-sponsored by ESSAS]
Variability in advection and its biological consequences for Subarctic and Arctic ecosystems

1-day POC/TCODE/FUTURE Topic Session
Regional climate modeling in the North Pacific

½-day POC Workshop [to be co-sponsored by SOLAS]
SOLAS into the Future: Designing the next phase of the Surface Ocean-Lower Atmosphere Study within the context of the FutureEarth Program

1½-day MONITOR Workshop [to be co-sponsored by Ocean Networks Canada, U.S. CLIVAR]
Networking ocean observatories around the North Pacific Ocean

1-day TCODE Workshop [to be co-sponsored by IODE]
Tools, approaches and challenges for assessing and integrating distributed datasets

½-day MarWeb Topic Session
Ecological and human social analyses and issues relating Integrated Multi Trophic Aquaculture

1-day Science Board Workshop
Marine Ecosystem Services

Science Board was generally pleased with the process of submitting proposals for topic sessions and workshops, now in its second year of application. A couple of suggestions were presented for improvement of online ranking.

Action:

- Secretariat delete third column (*i.e.*, Committee/Panel) of the summary table for submissions to avoid being mistaken as an endorsing group;
- Secretariat increase ranking scale from 3 to 4 levels (no, ok, good, very good).

AGENDA ITEM 7

3rd International Symposium on the “Effects of climate change on the world’s oceans”

In response to the email request from symposium co-convenor, Dr. Jacquelynn King (representing PICES) just prior to PICES-2014, Committees provided the following session descriptions or list of key words for symposium topics.

- fisheries,
- session on “climate-driven ecological change”
- biodiversity,
- predator-prey relations
- oxygenation/de-oxygenation
- session on “climate change and eastern boundary currents: evidence for change”

The 3rd PICES/ICES/IOC Symposium will take place March 23-27, 2015 in Santos, Brazil.

AGENDA ITEM 8

Status of proposed inter-sessional workshops/symposia

Science Board recommended supporting:

- Dr. Fangli Qiao (China) to represent PICES at the IIOE-II meeting in Qingdao, China (November 20–21, 2013) [later confirmed that Professor Dejun Dai, First institute of Oceanography, SOA would attend];
- Lowell Wakefield fisheries symposium on “*Fisheries bycatch: Global issues and creative solutions*” in Anchorage, Alaska (May 13–16, 2014);
- joint IMBER/PICES Theme Session on “*Responses of society to marine and global changes as a core mandate for IMBER: ways forward*” at the IMBER Open Science Conference in Bergen, Norway (June 23–28, 2014).

Action: Dr. Therriault to confirm invited speaker for IMBER/PICES theme session at IMBER OSM.

AGENDA ITEM 9

Capacity building

Science Board recommended co-sponsoring:

- IMBER ClimECO4 Summer School on “*Delineating the issues of climate change and impacts to marine ecosystems: Bridging the gap between research, assessment, policy and management*”, August 4–9, 2014, in Shanghai, China;
- 2014 PICES Summer School on “*Ecological modeling for marine resources management and research*”, August 26–29, 2014, Seoul, Korea. Science Board recommended travel support for 2 lecturers from the eastern Pacific and 5 students.

Science Board recommended not to support the Pacific Ecology and Evolution Conference (March 2014, Bamfield, British Columbia) because of its local focus on early career scientists from the eastern Pacific.

AGENDA ITEM 10

Early Career Scientist Conference in 2017

No formal proposal was issued on what Asian country will hold an Early Career Scientist Conference in 2017. China expressed interest but cannot make plans because it was reviewing its budget. However, it would be willing to provide support to any country undertaking the event. Korea also expressed interest, but no decision was forthcoming at the time of the Science Board meeting.

Action: PICES to discuss a contingency plan with ICES and make decision by ISB-2014.

AGENDA ITEM 11

PICES 25th Anniversary activities

Science Board briefly discussed activities to celebrate PICES’ 25th Anniversary in 2016. Potential considerations could be to conduct a pan-Pacific cruise to mark the building of a Korean research vessel (which will to be completed in 2016) or to inaugurate a PICES scientific journal. Dr. Yoo instructed the Committee Chairs to discuss other potential scientific activities with their members.

Action: Committee Chairs to provide feedback from their Committees on celebration activities at ISB-2014.

AGENDA ITEM 12

Revision of Wooster/POMA awards description

The PICES Ocean Monitoring Service Award (POMA) was revised by Drs. Sugisaki and Mundy to broaden the range of nominations. Both the Wooster award (revised for clarity by the Secretariat) and POMA changes were accepted by Science Board.

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AGENDA ITEM 13

Election of Science Board Vice-Chair

Deputy Executive Secretary, Dr. Skip McKinnell, conducted elections to name the next Vice-Chairman of Science Board to replace Dr. Therriault, who will take up duties as Science Board Chairman after PICES-2014. Dr. Hiroaki Saito accepted the position of Vice-Chairman of Science Board after being nominated by MONITOR. Science Board unanimously approved the decision.

AGENDA ITEM 14

Review of Action Plans for Standing Committees and Science Board

Due to lack of time, Committee Action Plans were not finalized. Dr. Yoo briefly referred to nominal changes he had made to the Plans to have a more consistent format, and to the more substantial action and tasks added to Goal 10 to emphasize the connection between Committees and FUTURE Advisory Panels, and asked that these changes be reviewed and any modifications made before sending the finalized Plans to the Secretariat for posting on the Committee webpages.

Action: Committee Chairs to review changes and make any adjustments before submitting final Action Plans to the Secretariat.

AGENDA ITEM 15

FUTURE OSM 2014

The topic sessions and workshops, times and convenors were in place but national delegates needed to be contacted to provide a review of current national activities and future activities they would like to see in the FUTURE program.

Four out of six potential members of a FUTURE Evaluation Team who were contacted after ISB-2013 (St. Petersburg, Russia) agreed to be part of the Team. Two potential members, Dr. Vyacheslav Lobanov and Dr. James Overland (members of the former FUTURE Implementation Plan Writing Team) still needed to be approached. Alternate contacts will be made in case Dr. Lobanov and/or Dr. Overland are unable to accept. [Correspondence after the meeting resulted in Dr. Lobanov and alternates, Dr. Shin-ichi Ito and Jacquelyne King, tentatively accepting but were unable to commit due to internal institute restructuring or travel commitments.]

Action:

- Drs. Yoo and Therriault to draft a letter to PICES member countries regarding current and future role of national programs in FUTURE;
- Dr. Yoo to contact Dr. Lobanov and Overland to be part of the Evaluation Team.

AGENDA ITEM 16

Presentation and discussion of current status of FUTURE Advisory Panels

AP-AICE

Participation by members continued to be an issue, as in previous years. AICE requested the removal of Dr. Young Jae Ro from membership on the PICES website to reflect his removal from the Panel in 2012. Active members representing BIO, FIS, S-CMME and S-HD needed to be identified and added to AICE membership.

AICE requested expert groups to start identifying specific products they are producing or have completed. AICE also requested expert groups to identify specific data products needed or desired from other expert groups. This will allow the FUTURE APs to determine connections between groups and provide a reliable means of communication and delivery of FUTURE products.

AICE recommended that the proposed Study Group on *Socio-Ecological-Environmental Systems* be allowed to develop a case study pilot for a specific region to test how an integrated team product can be delivered. In addition, it was suggested that intermediate products be developed to be used as a link between desired FUTURE products and actual products being made by expert groups. AICE recommended that expert groups identify linkages to Ecosystem Services to be used by the Section on *Human Dimension of Marine Systems*.

AP-COVE

Member representation at the AP-COVE meeting was good. Overall, the COVE-related expert groups, WG 27, WG 28, WG 29, S-CC and S-CCME are very active and have, or are, producing many products. WG 29, in particular, needs to know what type of products would be useful to deliver and requested the development of proper infrastructure to facilitate changes.

COVE recommended:

- FUTURE gaps be identified after the FUTURE Open Science Meeting (April 15–18, 2014) and determine the expert groups that are needed to cover these gaps;
- A tool be provided on the PICES website to track products;
- A close linkage between AP-CREAMS, AP-CPR, and AP-MBM to FUTURE-related expert groups;
- A formal expert groups/FUTURE session during the next Annual Meeting to exchange information and discuss how to advance FUTURE science.

AP-COVE, Chairman, Dr. Saito, requested that in future all Standing Committees convey to proponents of future expert groups that they:

1. Make clear in their proposal only those members appointed by their national delegates who will be eager to contribute to the proposed activity;
2. Describe what products will be the outcome of their group;
3. Provide a timeline when that product is expected to be produced.

AP-SOFE

SOFE reported that member participation was good at their business meeting. SOFE received positive feedback from the community on the proposed new process of presenting information for the next version of the NPESR but acknowledged there were still issues that needed to be resolved. In response to particular concerns raised by FIS, SOFE reported that a preliminary budget for starting up and maintaining the new reporting process was prepared but little feedback had been received so far on how realistic it was. To deal with the disparity between the previous two reports focusing on continental shelves and the new process on LMEs, it was noted that each PICES country typically has continental shelves and would put together their own LMEs and map their data for it. The finer details of data presentation on the web would be handled by datasets and graphics as well as identification by title and abstract; data integration and synthesis could also be done if Science Board chose this approach.

AGENDA ITEM 17

Issues with FUTURE implementation

Science Board agreed to wait until after the Evaluation Team meeting at the FUTURE Open Science Meeting to discuss remaining gaps in the FUTURE roadmap. In the meantime it was important to have synergy between expert groups so that linkages could be established and products defined by AICE, COVE and SOFE. It was agreed that in place of individual Advisory Panel meetings at the next Annual Meeting, a ½ day will be

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devoted to a joint FUTURE Advisory Panel and expert group meeting. [This was later revised to ¼-day concurrent meetings of the FUTURE Advisory Panels preceded by a ¾-day joint meeting of these Panels.]

Action: FUTURE SSC to discuss FUTURE products at PICES-2014.

AGENDA ITEM 18

Other FUTURE matters

Science Board agreed with the concept of SOFE's proposal for a web-based approach for producing version 3 of the North Pacific Ecosystem Status Report and agreed to present it to Governing Council for review and feedback. SOFE will update the report in incremental stages similar to the second version of NPESR. Dr. Mundy thanked Science Board for their comments and suggestions.

AGENDA ITEM 19

Status of proposed publications

This item was not discussed due to lack of time.

SB Endnote 1

Science Board participation list

Members

Harold (Hal) Batchelder (representing AP-SOFE)
Kyung-Il Chang (Korea)
Chuanlin Huo (MEQ)
Xianshi Jin (FIS Vice-Chairman, Oct. 13)
Gordon Kruse (representing FIS, Oct. 18)
Hiroaki Saito (AP-COVE)
Igor Schevchenko (representing Russia)
Hiroya Sugisaki (MONITOR)
Toru Suzuki (TCODE)
Thomas Therriault (AP-AICE, Chairman-elect)
Atsushi Tsuda (BIO)
Sinaje Yoo (Science Board Chairman)

PICES

Alexander Bychkov (Oct. 13)
Skip McKinnell

Observers

Yutaka Michida (IOC/WESTPAC)
Nicholas Owens (SAHFOS)
Linda Stevenson (APN)
James Irvine (Co-Chairman, SG SC-NP)
Keith Criddle (Co-Chairman, S-HD)

SB Endnote 2**Science Board agenda**

Friday, October 18, 2013 (14:00 – 18:00) Nanaimo River Room A

1. Welcome and adoption of agenda
2. Review of procedures for Science Board Symposium and Session awards, and Closing Session
3. Relations with specific international programs/organizations (Yoo, international organization representatives)

Friday, October 18, 2013 (14:00 – 18:00) Nanaimo River Room A

3. Relations with specific international programs/organizations, continued (Yoo, international organization representatives)
4. Reports from Expert Groups under Science Board

Saturday, October 19, 2013 (09:00 – 18:00) Nanaimo River Room A

3. Relations with specific international programs/organizations, continued (Yoo, international organization representatives)
5. Reports from Scientific and Technical Committees (Committee Chairs)
6. PICES-2014, Yeosu, Korea theme and description, draft schedule of scientific sessions and workshops
7. Preparation for 3rd International Symposium on the “*Effects of Climate Change on the world’s ocean*”
8. Status of proposed inter-sessional workshops/symposia (All)
9. Capacity building/Plan for PICES summer schools in 2013 and 2014 (Yoo and McKinnell)
10. Planning Early Career Scientist Conference in 2017
11. PICES 25th Anniversary activities
12. Revision of Wooster/POMA Awards description
13. Election of Science Board Vice-Chair
14. Review of Action Plans for Standing Committees and Science Board
15. FUTURE OSM 2014
16. Presentation and discussion of current status of the FUTURE APs (FUTURE SSC)
17. Issues with FUTURE implementation (FUTURE SSC)
18. Other FUTURE matters (AICE (Therriault), COVE (Saito), SOFE (Mundy))
19. Status of proposed publications
20. Other business

SB Endnote 3**Study Group on Socio-Ecological-Environmental Systems**

Parent Committee: Science Board

Duration: 1 year

Terms of Reference

1. Assemble a team of experts for all the components that make up a Social-Ecological-Environmental System (SEES) and initiate a tighter communication among the experts to understand the challenges of conducting integrated science that include the climate, marine ecosystem and human dimensions explicitly.
2. Develop an integrated model of SEES case study for hypoxia and acidification in the coastal ocean and select a suitable focus region.
3. Conduct a meeting at the FUTURE Open Science Meeting (April 2014) and implement the steps needed to initiate the development of the integrated model.

4. Conduct a meeting at the PICES Annual Meeting (October 2014) to finalize a report with recommendations for how the Organization can advance in this field of coupled SEES modeling in the near future.

SB Endnote 4

Study Group on *Biodiversity Conservation*

Parent Committee: Science Board

Duration: 1 year

Terms of Reference

1. Review the scope of key drivers of biodiversity change in the North Pacific Ocean, including, but not limited to: non-indigenous marine species, climate change, fishing, and eutrophication.
2. Identify potential mechanisms to advance biodiversity-based scientific research and/or conservation related to drivers of biodiversity change in the North Pacific Ocean.
3. Review the research activities, past and present, undertaken by PICES and other international organizations on biodiversity in the North Pacific Ocean.
4. Identify opportunities for collaboration, new research opportunities for PICES, and the potential to provide science-based advice that could be used to inform decisions related to the conservation and management of biodiversity in the North Pacific Ocean.
5. Prepare a final report that includes an assessment of the merits of establishing an expert group focused on biodiversity science within PICES, and provide recommendations on the role(s) of such a group.