

REPORT OF SCIENCE BOARD

The Science Board met on October 26, 2008 (12:30–14:00) to review the agenda and to discuss procedures for the Science Board Symposium and Topic Session awards, the Closing Session, other items relating to the PICES scientific sessions at the Annual Meeting, and the FISP Open Forum. A meeting between members of the Future Integrative Science Plan Writing Team (FISP-WT) and Science Board members took place on October 28 from 18:00–20:00 to review and discuss the second draft of the Implementation Plan of FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems) prior to Committee meetings and Open Forum. The Open Forum on the Implementation Plan of FUTURE took place on October 30 from 17:00–18:30 and was convened by Dr. John E. Stein. Co-Chairmen of the Writing Team of the Implementation Plan (IP-WT) of FUTURE, Drs. James Overland and Hiroaki Saito, presented the status of the second draft of the Plan, and Committee Chairmen gave their perspectives, followed by comments and suggestions by the broader scientific community. The Science Board met again on November 1 (9:00–17:00) to discuss the remainder of the agenda. (See *SB Endnote 1* for list of participants.)

October 26, 2008

Science Board Chairman, Dr. John E. Stein, welcomed Science Board members and guests and called the meeting to order. The agenda was discussed and adopted as presented in *SB Endnote 2*.

AGENDA ITEM 2

Review of procedures for Science Board Symposium, awards, FISP Open Forum and Closing Session

Procedures were reviewed and it was agreed that the format of the previous year would be used in judging presentations for the Science Board Symposium, Topic Sessions, and posters. Each Committee Chairman was responsible for selecting the award recipients. The time and place of the Open Forum was confirmed by the Science Board Chairman.

AGENDA ITEM 3

Relations with specific international programs/organizations (Agenda Item 3)

Invited guest, Dr. Adolf Kellermann (Head, ICES Science Programme) gave an update of the ICES Strategic Plan which included the need to establish effective mechanisms of collaboration within ICES and with other organizations to deliver and add value to ICES science and advisory programs. Dr. Kellermann described six ICES events where PICES collaboration was being sought.

Dr. Patricio Bernal, Director, Intergovernmental Oceanographic Commission (IOC), UNESCO, addressed Science Board to discuss IOC joining the efforts of PICES and ICES in addressing the effects of climate change on the oceans. He noted the importance of looking at the impact of climate change on ecosystems of the North Pacific and the need to package this information into an integrated report for policy makers. Science Board endorsed IOC collaborating with PICES in joint efforts to understand the vulnerability of fisheries to climate variability and change as a potential contribution to the fifth IPCC Assessment Report; in cooperating in forming an information network on ocean acidification and a common database on natural iron in the ocean; and in having PICES become involved in the Programme Committee for the OceanObs'09 conference.

Science Board endorsed MONITOR Chairman, Dr. Hiroya Sugisaki, to co-convene an ICES/GOOS Scientific Session on “*Global ocean observing systems*” at the ICES Annual Science Conference, September 21–25, 2009, Berlin, Germany. (This session was later postponed until 2010.)

SB-2008

Science Board agreed that there were common interests and potential linkages between PICES and PAG (Pacific Arctic Group), an independent discussion/information sharing forum for countries bordering the Pacific Arctic region. It was recommended that PICES explore collaboration with this group, and keep it in the Standing List of International and Regional Organizations and Programs (*SB Endnote 3*).

Science Board agreed with the criterion to remove an organization or program from the Standing List if no reply has been received by the Secretariat after the third year of trying to establish contact.

AGENDA ITEM 4

Report of the FUTURE Implementation Writing Team

IP-WT Co-Chairmen, Drs. Hiroaki Saito and James Overland, were invited to update Science Board and to discuss the second draft of the Implementation Plan. Dr. Overland indicated that Governing Council was interested in expanding the vision of PICES to have more outreach in disseminating information to resource managers. He described three layers of products—Status, Outlooks, and Forecasts—that were the objectives of FUTURE and gave expected timelines for the completion of tasks under these objectives.

AGENDA ITEM 5

Implementation of Science Board recommendations and Governing Council decisions from PICES XVI and the 2008 inter-sessional SB meeting

Science Board accepted the report on decisions and recommendations that were of relevance from PICES XVI (see *GC Endnote 3*) and the 2008 inter-sessional Science Board meeting.

AGENDA ITEM 6

Status of action items from the 2008 inter-sessional Science Board meeting

BIO Committee Chairman, Dr. Michael Dagg, reported that the modified terms of reference proposed by the Advisory Panel on *Marine Birds and Mammals* (MBM-AP) was reviewed and accepted by the Committee. The request that MBM-AP member, Dr. Hidehiro Kato, permanently serve as a liaison between PICES and the International Whaling Commission (IWC) at their annual scientific meetings was approved by BIO. There were no items to report in regard to the status of the final report by the Advisory Panel on *Micronekton Sampling Inter-calibration Experiment* (MIE-AP) for the PICES Scientific Report series.

MEQ Committee Chairman, Dr. Glen Jamieson, informed Science Board that the Working Group on *Non-indigenous Aquatic Species* (WG 21) had revised its terms of reference so that it could extend its duration to address the work required to complete the MAFF (Ministry of Agriculture, Forestry and Fisheries, Japan), project that was funded for 5 years (from April 1, 2007 to March 31, 2012).

November 1, 2008

AGENDA ITEM 7

Report of elections of new Committee Chairmen

The following are changes and continuations in Chairmanship/Vice-Chairmanship for Scientific and Technical Committees and expert groups:

- Dr. Mikhail Stepanenko (Russia) to replace Dr. Gordon H. Kruse as FIS Committee Chairman;
- Dr. Gordon Kruse to become Vice-Chairman of FIS;
- Dr. Phillip R. Mundy (U.S.A.) to replace Dr. Charles B. Miller as CPR-AP Chairman.

AGENDA ITEM 8

Reports from Scientific and Technical Committee and IP CCCC Program Chairmen

Reports were presented by Committee and IP CCCC Program Chairmen to Science Board. Included in the reports were proposals for inter-sessional activities, including travel and publications for 2009. Specific details of the individual reports can be found elsewhere in this Annual Report.

Inter-sessional activities

- A 3rd Argo Science Workshop: The future of Argo, (co-sponsored by PICES and several Chinese agencies and organizations) March 25–27, 2009, Hangzhou, China;
- The 11th Salmon Ocean Ecology Workshop, April 7–8, 2009, Juneau, U.S.A.;
- North Pacific Ecosystem Status Report Workshop on “*Status and trends in East Asian marginal seas*”, April 21–22, 2009, Busan, Korea, in conjunction with the 15th Pacific–Asian Marginal Seas (PAMS) meeting on “*Observations, understanding and prediction of climate variability in PAMS*”, April 23–25;
- A workshop to develop an Implementation Plan for the new PICES science integrative program, FUTURE, April 26–27, 2009, and an inter-sessional Science Board meeting, April 28, 2009, Qingdao, China;
- A meeting of PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish*”, June 21, 2009, Victoria, Canada;
- GLOBEC/PICES workshop on “*Krill biology and ecology in the world’s oceans*” June 22–23, 2009, Victoria, Canada;
- A 3rd PICES summer school on “*Satellite oceanography*” (co-sponsored by SCOR and several Korean agencies and organizations), August, 25–28, 2009, Seoul, Korea;
- A 6th International Conference on “*Marine bioinvasions*” (co-sponsored by ICES, PICES, U.S. National Sea Grant College Program, Pacific States Marine Fisheries Commission, and Portland State University), August 24–27, 2009, Portland, U.S.A.;
- CIAC '09 Symposium on “*The effects of environmental variability on cephalopod populations*” (co-sponsored by ICES, PICES), September 3–11, 2009, Vigo, Spain;
- OceanObs '09 conference on “*Ocean information for society: Sustaining benefits, realizing the potential*” (with PICES as endorsing organization), September 21–25, 2009, Venice, Italy;
- ICES/PICES Theme Sessions on “*Climate impacts on marine fishes: Discovering centennial patterns and disentangling current processes*” and “*Global ocean observing systems*” at the ICES Annual Science Conference, September 21–25, 2009, Berlin, Germany (the latter session was postponed until 2010);
- PICES Rapid Assessment Survey (RAS-2009) for non-indigenous aquatic species, October 19–22, 2009, various ports in Korea;
- International Symposium on “*Rebuilding depleted fish stocks: Biology, ecology, social science and management strategies*” [carried over from last year’s Annual Science Board Report] (primary sponsors: ICES, PICES and UNCOVER; co-sponsoring organizations: NAFO, DFO and IMR), November 3–6, 2009, Warnemünde, Germany;
- A PICES/ICES Symposium on “*Forecasting climate change impacts on fish and shellfish*”, April 26–29, 2010, Sendai, Japan;
- The 26th Lowell Wakefield Symposium on “*Ecosystems 2010: Global progress on ecosystem-based fisheries management*” (co-sponsored by Alaska Sea Grant College Program, ICES, PICES, FAO), spring or fall, 2010, Anchorage, U.S.A.;
- An ICES/PICES Symposium on “*Carrying capacity what does it mean in a changing ocean?*” 2010, Portugal;
- A 5th International Zooplankton Production Symposium (co-sponsored primarily by ICES and PICES), March 2011, Pucon, Chile.

Travel requests

PICES-2009

- Invited speakers for the Science Board Symposium and Topic Sessions;
- 2 invited speakers for BIO workshop on “*Natural supplies of iron to the North Pacific and linkages between iron supply and ecosystem responses*”;
- 2 invited speakers for BIO workshop on “*Marine ecosystem model inter-comparisons (II)*”.
- 1 invited speaker for the BIO workshop on “*Standardizing methods for estimating jellyfish concentration and development of an international monitoring network*”;
- 1 invited speaker for the BIO workshop on “*Integrating marine mammal populations and rates of prey consumption in models of climate change-ecosystem change in the North Pacific*”;
- 1 invited speaker for the FIS Workshop on “*Understanding the links between fishing technology, bycatch, marine ecosystems and ecosystem-based management*”;
- 1 invited speaker for MEQ (HAB-S) workshop on “*Review of selected harmful algae in the PICES region: V. Cyst forming HAB species*”;
- 1 invited speaker for the MEQ/FIS Workshop on “*Advanced aquaculture strategies and technologies and interactions between aquaculture activity and environment*” [later renamed as “*Interactions between aquaculture and marine eco-systems*”];
- 2 invited speakers for the POC workshop on “*Exploring the predictability and mechanisms of Pacific low frequency variability beyond inter-annual time scales*”;
- 1 invited speaker for the POC/BIO workshop on “*Carbon data synthesis*”;
- 1 invited speaker for POC/BIO workshop on “*Mesoscale eddies and their roles in North Pacific ecosystems*”;

Inter-sessional meetings

- Dr. Sonia Batten, Principle Investigator of the PICES North Pacific Continuous Plankton Recorder (CPR) project, to introduce CPR activities to the Asian scientific community and to develop joint projects, spring 2009, in Yokohama, Japan;
- 1 MONITOR representative to attend the 9th session of the IOC/WMO/UNEP Intergovernmental Committee for GOOS (I-GOOS-IX), June 10–12 2009, Paris, France;
- A WG 20 member to attend the 2009 ESSAS Annual Meeting, June 15–21, 2009, Seattle, U.S.A.;
- 2 PICES scientists to attend a GLOBEC/PICES workshop on “*Krill biology and ecology in the World’s oceans*” June 22–23, 2009, Victoria, Canada (in conjunction with the 3rd GLOBEC Open Science Meeting);
- Invited speakers (up to \$10,000) from the Pacific and early career scientists from PICES member countries to attend the 6th International Conference on “*Marine bioinvasions*”, August 24–27, 2009, Portland, U.S.A.;
- 1 guest lecturer and 5 non-Korean students for the 3rd PICES summer school on “*Satellite oceanography*”, August 25–28, 2009, Seoul, Korea;
- 1 PICES convenor for the CIAC ’09 Symposium on “*The effects of environmental variability on cephalopod populations*” September 3–11, 2009, Vigo, Spain;
- 1 PICES convenor for ICES/PICES Theme Session on “*Climate impacts on marine fishes: Discovering centennial patterns and disentangling current processes*” at the ICES Annual Science Conference, September 21–25, 2009, Berlin, Germany;
- 1 PICES member to be on the Program Committee for the IOC OceansObs ’09 conference on “*Ocean information for society: Sustaining benefits, realizing the potential*”, September 21–25, 2009, Venice, Italy;
- 1 PICES member to attend the ICES Annual Science Conference, September 21–25, 2009, Berlin, Germany;
- 2 non-American PICES members to co-convene the 26th Lowell Wakefield Symposium on “*Ecosystems 2010: Global progress on ecosystem-based fisheries management*”, spring or fall, 2010, Anchorage, U.S.A.;
- 1 Pacific invited speaker for the ICES/PICES Symposium on “*Carrying Capacity what does it mean in a changing ocean?*” 2010, Portugal.

Publications

Special issues of primary journals (2009–2010)

- *Journal of Marine Systems* (2009; Guest Editors: K.-I. Chang, C. Mooers, J.-H. Yoon and S.-I. Ito) – special issue of selected papers from the 2006 CREAMS/PICES Workshop on “*Model–data inter-comparison for the Japan/East Sea*”;
- *ICES Journal of Marine Science* (2009; Guest Editors: F. Mueter and E. North) – Special section in a regular issue of selected papers from the ICES/PICES Early Career Scientists Conference on “*New frontiers in marine science*” (approved in 2007);
- *Journal of Northwest Atlantic Fishery Science* (2009; Guest Editors: R. Brodeur, M. Dickey-Collas and E. Trippel) – special issue of selected papers from the NAFO/PICES/ICES Symposium on “*Reproductive and recruitment processes of exploited marine fish stocks*” (the electronic version was published in 2008; a hard copy run is expected in April 2009);
- *Journal of Oceanography* (2009; Guest Editor: T. Saino) – selected papers from the PICES XV Topic Session on “*Decadal changes in carbon biogeochemistry in the North Pacific*” (approved in 2007);
- *Fisheries Research* (2009; Guest Editors: G.H. Kruse, Y. Ishida, T. Perry, V. Radchenko and C.-I. Zhang) – Special issue of selected papers from the PICES XVI Topic Session on “*Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks*”;
- *Deep-Sea Research II* (2009; Guest Editors: W. Peterson and S. Kawaguchi) – Special issue of selected papers on krill from the 4th International Zooplankton Production Symposium on “*Human and climate forcing of zooplankton populations*” (approved in 2007);
- *Deep-Sea Research II* (2009; Guest Editors: A. Tsuda, M. Wells, M. Uematsu and H. Saito) – Special issue of selected papers from the SEEDS-II experiment;
- *Deep-Sea Research II* (2009 or early 2010; Guest Editors: A. Yamaguchi and C. Miller) – Special issue of selected papers from the PICES XVII workshop on “*Oceanic ecodynamics comparison in the subarctic Pacific*”;
- *Progress in Oceanography* (2009; Guest Editors: B.A. Megrey, J.S. Link and E. Moksness) – Special issue of selected papers from the ICES/PICES Theme Session on “*Comparative marine ecosystem structure and Function: Descriptors and characteristics*” at the 2007 ICES Annual Science Conference;
- *Progress in Oceanography* (2010; Guest Editors: P. Pepin, D. Mackas and H. Verheye) – selected papers from SCOR Working Group on *Zooplankton Time Series*;
- *Continental Shelf Research* (2010; Guest Editors: A. Rabinovich, B. Kagan, M. Foreman and J. Cherniawsky) – Special issue of selected papers for “*Tides in Marginal Seas - A Volume in Memory of Prof. Alexei Nekrasov*” (approved in 2008);
- *Marine Ecology Progress Series* (2010; Guest Editor: W. Sydeman) – Special issue of selected papers from PICES XVI Topic Session on “*Phenology and climate change in the North Pacific*” (special or regular issue TBD);
- *ICES Journal of Marine Science* (2011; Guest Editors: A. Hollowed, S. Kim, M. Barange and H. Loeng) – selected papers from the 2010 PICES/ICES Symposium on “*Forecasting Climate Change Impacts on Fish and Shellfish*” (approved in 2008).

PICES Scientific Report series (2009–2010)

- Proceedings of the 4th PICES Workshop on “*The Okhotsk Sea and adjacent areas*” (Editors: M. Kashiwai and G. Kantakov);
- Final report of WG 19 on *Ecosystem-based Management Science and its Application to the North Pacific* (Editors: G. Jamieson, P. Livingston and C.-I. Zhang);
- Final report for the Climate Change and Carrying Capacity Program (Editor: M. Kishi);
- A summary of the activities of the CFAME Task Team (may be merged with CCCC report);
- Final report of the Advisory Panel on Micronekton Sampling Inter-calibration Experiment (Editors: E. Pakhomov and O. Yamamura).

PICES Special Publications (2010)

- North Pacific Ecosystem Status Report.

Other publications (2009–2010)

- WG 19 Brochure on “*Ecosystem-based management science and its application to the North Pacific*” (2009; G. Jamieson, P. Livingston and C.-I. Zhang);
- Brochure on “*The status and trends of the North Pacific Ocean*” – summary of the second North Pacific Ecosystem Status Report for policy makers, managers, commercial stakeholders and other interested members of society
- Results from the CCCC Program distributed among several chapters of the GLOBEC Synthesis Book (2009/2010; H. Batchelder and S. Kim).

Other

- PICES Secretariat time and resources for printing and shipping a Book of Abstracts for the 3rd Argo Science Workshop, March 25–27, 2009, Hangzhou, China;
- Contract extension to rent AdHost server for hosting TCODE data and PICES NPESR chapters (US \$2340 for 1 year).

AGENDA ITEM 9

Recommendations for new and existing working groups and other subsidiary bodies

Science Board recommended:

- that the BIO Committee assume responsibilities for the existing Marine Ecosystem Model Inter-comparison Project from the CCCC Program which is ending;
- that MONITOR revise its third term of reference in order to comply with procedures accepted for the production of the next North Pacific Ecosystem Status Report;
- establishing a new PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish* (WG-FCCIFS) under the parent FIS and POC Committees, subject to revising its terms of references (*POC Endnote 3*).
- establishing a new Working Group on *Environmental Interactions of Marine Aquaculture* (WG-EIMA (WG 24)) under the direction of FIS and MEQ (*GC Appendix B*).
- extending the lifetime of the Working Group on *Non-indigenous Aquatic Species* to October 2012 in order to complete the MAFF project that was funded for 5 years;
- extending the lifetime of the Working Group on *Evaluations of Climate Change Projections* (WG 20) for one more year to October 2010 so it can provide WG-FCCIFS with the climate projection information they request;
- having the Section on *Carbon and Climate* to expand their membership by adding two new members from Japan who will provide missing expertise in data integration. Suggested appointments are Dr. Masao Ishii and Dr. Akihiko Murata;
- forwarding the MEQ Committee proposal to form a PICES Understanding, Linking and Synthesis of Ecosystems Task Team (PULSE) to the IP-WT of FUTURE for evaluation on where best to place it.
- deferring the proposal by MEQ to form a Study Group on *Indicators of Human Well-being* until the next Science Board inter-sessional meeting when plans for the Study Group will be more fully developed;
- deferring the proposal for a FIS Working Group on *Management Strategies to Address the Implications of Climate Variability and Climate Change on Trends in Fish and Shellfish Production* until next Annual Meeting so that POC/WG 20 could be involved.

AGENDA ITEM 10

PICES XVIII theme and description, draft schedule of scientific sessions and workshops

Science Board agreed that the theme for PICES-2009, to be held in Jeju, Korea, from October 23 to November 1, 2009, should be “*Understanding ecosystem dynamics and pursuing ecosystem approaches to management*” (*SB Endnote 4*). The following sessions and workshops, in order of Committee/Program, were recommended to be convened.

¾-day Science Board Symposium

Understanding ecosystem dynamics and pursuing ecosystem approaches to management

1-day BIO Contributed Paper Session

¾-day BIO Workshop

Natural supplies of iron to the North Pacific and linkages between iron supply and ecosystem responses

½-day BIO Workshop

*Integrating marine mammal populations and rates of prey consumption in models of climate change-ecosystem change in the North Pacific [after ICES agreed to co-sponsor the workshop, it was renamed to *Integrating marine mammal populations and rates of prey consumption in models and forecasts of climate change-ecosystem change in the North Pacific and North Atlantic Oceans*]*

½-day BIO Workshop

Standardizing methods for estimating jellyfish concentration and development of an international monitoring network

2-day BIO Workshop

Marine ecosystem model inter-comparisons (II)

1-day FIS Topic Session

Ecosystem-based approaches for the assessment of fisheries under data-limited situations

½-day FIS/BIO Topic Session

Early life stages of marine resources as indicators of climate variability and ecosystem resilience

1-day FIS Contributed Paper Session

1-day FIS Workshop

*Understanding fisheries bycatch, fishing technology, marine ecosystems and new technology for ecosystem based management [renamed to *Understanding the links between fishing technology, bycatch, marine ecosystems and ecosystem-based management*]*

½-day MEQ Topic Session

Mitigation of harmful algal blooms

½-day MEQ Topic Session

The role of submerged aquatic vegetation in the context of climate change

1-day MEQ/FIS Topic Session

Marine spatial planning in support of integrated management – tools, methods and approaches

½-day MEQ Workshop

Review of selected harmful algae in the PICES region: V. Cyst forming HAB species and a 1-day laboratory demonstration

1-day MEQ/FIS Workshop

*Advanced aquaculture strategies and technologies and interactions between aquaculture activity and environment [renamed as *Interactions between aquaculture and marine eco-systems*] and ½-day field trip*

1-day MONITOR Topic Session

State of the art of real-time monitoring and its implication for the FUTURE oceanographic study

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1½-day POC/ FUTURE Topic Session

*Future marine ecosystem predictions from an earth system science perspective [renamed as *Outlooks and forecasts of marine ecosystems from an earth system science perspective: Challenges and opportunities*]*

1-day POC/BIO Topic Session

Anthropogenic perturbations of the carbon cycle and their impacts in the North Pacific

1-day POC Contributed Paper Session

1-day POC Workshop

Exploring the predictability and mechanisms of Pacific low frequency variability beyond inter-annual time scales

1-day POC/BIO Workshop

Mesoscale eddies and their roles in North Pacific ecosystems

1½-day POC/BIO Workshop

Carbon data synthesis

AGENDA ITEM 11

Selection of PICES 2010 theme and description

Science Board agreed in principle with the proposed theme for PICES-2010 in the U.S.A. in 2009, entitled “*North Pacific Ecosystems Today, and Challenges in Understanding and Forecasting Change*” (see *SB Endnote 5* for a description).

AGENDA ITEM 12

High Priority activities

In addition to the implementation of PICES future integrative scientific program, FUTURE, the second initiative identified as a high priority project by Science Board was production of the a North Pacific Ecosystem Status Report (NPESR). Dr. McKinnell apprised Science Board of the status of the report. BIO Chairman, Dr. Michael Dagg, who volunteered to co-edit the report with Dr. McKinnell, will make two separate one-week visits to the PICES Secretariat to collaborate (He has separate funding for involvement in the project from the North Pacific Research Board). MONITOR Chairman, Dr. Hiroya Sugisaki proposed that the Technical Committee assist in reviewing the report outline, draft regional chapters, and draft synthesis. The revision of MONITOR’s third term of reference will reflect these tasks (see *MONITOR Endnote 4*). Dr. McKinnell agreed to address any MONITOR matters pertaining to the regional chapters. MONITOR will have an opportunity to review the draft chapters prior to the next annual meeting, and MONITOR was invited by the editors to participate in a NPESR workshop scheduled for April 2009 to review the draft synthesis as it is being developed. Dr. Sinjae Yoo proposed that PICES organize a summer school on “*Satellite oceanography*” from August 24 to 27, 2009 in Seoul (*SB Endnote 6*) as part of its capacity building activities, and Science Board endorsed it.

AGENDA ITEM 13

Next inter-sessional Science Board meeting

Science Board identified a need to have an inter-sessional workshop on the FUTURE Implementation Plan before the next Annual Meeting. It was agreed that an inter-sessional Science Board meeting would be scheduled after the workshop.

AGENDA ITEM 14

Other business

CCCC Program Co-Chairman, Dr. Harold P. Batchelder proposed that PICES change its practice of naming PICES Annual Meetings from the Roman numeral system to a more modern one "PICES-2009." It received nearly unanimous support from Science Board. For consistency, a similar approach will be used for inter-sessional meetings of Science Board.(ISB-2009).

CCCC Program Co-Chairman, Dr. Michio Kishi, announced that he would be stepping down as a member of the BIO Committee.

Best Presentation and Poster Awards

Dr. Emanuele di Lorenzo (U.S.A.) received the Best Presentation Award at the Science Board Symposium for his paper on *North Pacific decadal variability in the future*. Names of the other Award recipients can be found in their respective Committee and Program reports.

SB Endnote 1**Science Board participation list**Members

Harold P. Batchelder (Co-chairman, CCCC-IP)
 Michael J. Dagg (Chairman, BIO)
 Michael G. Foreman (Chairman, POC)
 Glen Jamieson (Chairman, MEQ)
 Michio J. Kishi (Co-chairman, CCCC-IP)
 Gordon H. Kruse (Chairman, FIS)
 Bernard Megrey (Chairman, TCODE)
 John E. Stein (Chairman, Science Board)
 Mikhail Stepanenko (representative of Russia)
 Hiroya Sugisaki (Chairman, MONITOR)
 Fangli Qiao (Science Board, representative of China)
 Sinjae Yoo (Vice-Chairman, Science Board,
 representative of Korea)

Invited Observers

Patricio Bernal (General Secretary, Inter-governmental Oceanographic Commission, UNESCO)
 Adolf Kellermann (Head, ICES Science Programme, ICES)
 James Overland (Co-Chairman, IP-WT)
 Hiroaki Saito (Co-Chairman, IP-WT)

PICES Secretariat

Skip McKinnell (Deputy Executive Secretary)

SB Endnote 2**Science Board meeting agenda****Sunday, October 26, 2008 (12:30 – 14:00)**

1. Welcome and adoption of agenda
2. Review of procedures for Science Board Symposium and Session awards, FISP Open Forum, and Closing Session
3. Relations with specific international programs/organizations
4. Report of the FUTURE Implementation Writing Team
5. Implementation of Science Board recommendations and Governing Council decisions from PICES XVI and the 2007 inter-sessional SB/GC meeting
6. Status of Action items from the 2008 inter-sessional SB meeting

Tuesday, October 28, 2008 (18:00 – 20:00)

Discussion of FUTURE Implementation Plan prior to Committee meetings and Open Forum

Thursday, October 30, 2008 (17:00 – 18:30)

FISP Open Forum

Saturday, November 1, 2008 (9:00 – 18:00)

7. Report of elections of new Committee Chairmen
8. Reports from Scientific and Technical Committees
9. Recommendations for new working groups and other subsidiary bodies
10. PICES 18 (Jeju) theme and description, draft schedule of scientific sessions and workshops
11. Selection of PICES 2010 (USA) theme and description
12. High priority activities
13. Next inter-sessional Science Board meeting
14. Other business

SB Endnote 3

Standing List of International and Regional Organizations and Programs

PICES is expanding its relationships with international scientific organizations of regional and global scale, and with regional scientific and monitoring efforts in the North Pacific that are aligned with the PICES ecosystem research focus. These regional programs may involve several PICES member countries and cover international areas of high ecological importance. Annually, the Science Board examines and revises the *Standing List of International and Regional Organizations and Programs*. Additionally, it selects a subset of organizations and programs that are considered to have the highest priority (marked by *) for PICES with respect to scientific cooperation and facilitation in the coming year.

This list will be used, in part, to assist the Executive Secretary and Science Board in decisions regarding travel to meetings of other international organizations.

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| ACIA | Arctic Climate Impact Assessment Program (ACIA of AMAP) |
| AFSCAR | American Fisheries Society Program on Climate and Aquatic Resources |
| AMAP | Arctic Monitoring and Assessment Program |
| AOOS* | Alaska Ocean Observing System |
| APEC-MRC* | Marine Resources Conservation WG, Asia Pacific Economic Cooperation |
| APEC-FWG* | Fisheries Working Group, Asia Pacific Economic Cooperation |
| APFIC | Asia-Pacific Fisheries Commission |
| APN | Asia-Pacific Network for Global Change Research |
| Argo* | International Program for deployment of profiling floats (linked with GOOS) |
| BEST* | Bering Ecosystem Study |
| CLIVAR* | Climate Variability and Predictability Program |
| CoML* | Census of Marine Life |
| ESSAS* | Ecosystem Studies of Sub-Arctic Seas |
| EVOSTC | <i>Exxon Valdez</i> Oil Spill Trustee Council (EVOSTC) |
| FAO | Food and Agriculture Organization |
| GCOS* | Global Climate Observing System |
| GEM* | Gulf of Alaska Ecosystem Monitoring and Research Program of <i>Exxon Valdez</i> Oil Spill Trustee Council (EVOS) |
| GEOSS | Global Earth Observing System of Systems |
| GESAMP | Group of Experts on Scientific Aspects of Marine Pollution |
| GLOBEC* | Global Ocean Ecosystem Dynamics |
| GOOS* | Global Ocean Observing System |
| IAMSLIC | International Association of Marine Science Libraries |

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| IASC | International Arctic Science Committee |
| IATTC | Inter-American Tropical Tuna Commission |
| ICES* | International Council for the Exploration of the Sea |
| ICSU | International Council of Scientific Unions |
| IGBP* | International Geosphere-Biosphere Program |
| IGOSS | Integrated Global Ocean Services System |
| IMBER* | Integrated Marine Biogeochemistry and Ecosystems Research (former OCEANS) |
| IMO | International Maritime Organization |
| IOC* | Intergovernmental Oceanographic Commission |
| IODE | International Oceanographic Data and Information Exchange |
| IPCC* | Intergovernmental Panel on Climate Change |
| IPHC | International Pacific Halibut Commission |
| IWC | International Whaling Commission |
| NAFO | Northwest Atlantic Fisheries Organization |
| NANOOS | Northwest Association of Networked Ocean Observing Systems – Integrated Ocean Observing System |
| NASCO | North Atlantic Salmon Conservation Organization |
| NEAR-GOOS* | North East Asian Regional GOOS |
| NOWPAP* | Northwest Pacific Action Plan |
| NPAFC* | North Pacific Anadromous Fish Commission |
| NPFMC | North Pacific Fishery Management Council |
| NPRB* | North Pacific Research Board |
| PaCOOS* | Pacific Coast Observing System |
| PAG | Pacific Arctic Group |
| PSA | Pacific Science Association |
| PSC | Pacific Salmon Commission |
| PSG | Pacific Seabird Group |
| SAHFOS* | Sir Alister Hardy Foundation for Ocean Science |
| SCOR* | Scientific Committee on Oceanic Research |
| SOLAS* | Surface Ocean Low Atmosphere Study |
| SPC | South Pacific Commission |
| SPREP | South Pacific Regional Environmental Program |
| START | South Asian Regional Committee for the System for Analysis, Research and Training |
| UNEP | United Nations Environment Program |
| WCRP | World Climate Research Program |
| WESTPAC* | Cooperative Study of the Western Pacific, IOC Sub Committee for the Western Pacific |
| WMO | World Meteorological Organization |

SB Endnote 4

Theme for PICES XVIII (Jeju, Korea)

Understanding ecosystem dynamics and pursuing ecosystem approaches to management

PICES undertakes a new science program, FUTURE, to understand the responses of marine ecosystems in the North Pacific to climate change and human activities, having the major questions: 1) how does ecosystem structure and function determine an ecosystem's response to natural and anthropogenic forcing; 2) how do physical and chemical processes respond to natural and anthropogenic forcing and how are ecosystems likely to respond to these changes in abiotic processes; 3) how do human activities impact coastal marine ecosystems and their interactions with offshore and terrestrial systems. We have only a limited ability to forecast how marine ecosystems will be affected by the changing global climate. Consequently, we still have limited knowledge on the assessment and management of marine ecosystems. Under this situation, it is necessary to

improve our understanding of ecosystem structure and function, ecosystem stability and resilience, and to understand and quantify the impacts of human activities and climate on marine ecosystems. It is urgent that we develop and adopt a comprehensive ecosystem-based approach which will be required to manage depleted and deteriorated marine ecosystems. To this end, breakthroughs have to be made in many areas, including evaluation of ecosystem status. We encourage submissions that describe indicators of atmospheric and oceanographic variability, habitat quality, biodiversity, productivity, sustainability, carrying capacity and socioeconomic benefits on geographic scales ranging from marine ranching systems to large marine ecosystems.

SB Endnote 5

Theme for PICES-2010 (U.S.A.)

North Pacific ecosystems today, and challenges in understanding and forecasting change

Climate change and the increase in coastal and watershed development are two of the most important threats to the marine ecosystems of the North Pacific, and the potential for non-linear interactions between these two stressors is high. Our understanding of the sensitivity and adaptability of natural and managed ecosystems to climate change is limited and confounded by the interaction of climate change with other stressors such as fishing and pollution. In addition, while inter-annual and decadal variability is likely to dominate climate forcing in the North Pacific, over the longer term the influence of global warming will likely contribute significantly to climate conditions in the North Pacific. It is imperative that we improve our understanding of marine ecosystems of the North Pacific, identify the contribution of climate change to overall change, and strengthen our ability to forecast how these ecosystems will adjust to continued stresses from climate change and other human activities.

PICES 2010 will focus on major issues that are affecting North Pacific marine ecosystems including but not limited to: changes in cycling of carbon and other elements, increasing acidification, decreasing oxygen concentrations, eutrophication, chemical pollution, changing patterns of oceanic circulation, changes in the productivity and distribution of species including shifts in migratory routes, shifts in species interactions, increased sea-level rise, and coastal erosion. Ideally, the contribution of climate change to these ecosystem characteristics can be separately quantified so that the knowledge and information from this symposium will contribute to the next report of the Intergovernmental Panel on Climate Change scheduled for 2013.

SB Endnote 6

**Draft proposal for a third PICES summer school on
*Satellite oceanography***

Purpose: Remote sensing is being used as an important tool in many areas in oceanography, broadening the spatio-temporal scales of observation in the ocean. In this course, principles and applications in the three major areas (optical, infra-red, and microwave) of satellite oceanography will be introduced to students who have little experience in the field. In addition to lectures and seminars, hands-on training of image-processing will be provided.

Date: 24-27 (Monday ~ Thursday) August, 2009

Venue: Seoul National University

Lecture & Workshop: Bd. 25-1/1st floor International Conference Room

Hands-on Exercise: Bd. 25-1/2nd floor Room 210 (SEES Computer Room)

Students: maximum 30

Lecturers: up to 10 (including 5 foreign lecturers)

Organizing committee: TBD

Request for financial support from PICES: travel costs for five non-Korean students and one foreign lecturer.

Tentative Syllabus I

| Day | Time | Type | Title | Lecturer |
|--------------------------|-------------|----------|--|---------------|
| Monday Optical RS | 09:00-09:15 | Address | Welcome Address I | PICES Rep. |
| | 09:15-09:30 | Address | Welcome Address II | RIO |
| | 09:30-11:00 | Lecture | Introduction of satellites and sensors for oceanography -Basic processing for sensor calibration, geometric correction, geophysical calibration | Hae-Yong Shin |
| | 11:00-12:30 | Lecture | -Radiometric Calibration and validation of satellite sensors | |
| | 12:30-13:30 | | Lunch | |
| | 13:30-15:30 | Exercise | Introduction of Terascan Software | Kota Prasad |
| | 15:30-17:30 | Exercise | Terascan MODIS module for Ocean Color | Kota Prasad |
| Tuesday Optical RS | 09:00-10:30 | Lecture | Introduction of Optical Remote Sensing | Kota Prasad |
| | 10:30-12:00 | Lecture | Case I & II Algorithms for Chlorophyll-a and Validation | |
| | 12:00-13:30 | | Lunch | |
| | 13:30-16:00 | Exercise | How to use Terascan MODIS module for Ocean Color | Kota Prasad |
| Wednesday Infrared RS | 09:00-10:30 | Lecture | Introduction of Infrared remote sensing | Hae-Yong Shin |
| | 10:30-12:00 | Lecture | SST Retrievals from IR data | |
| | 12:00-13:00 | | Lunch | |
| | 13:00-15:30 | Lecture | Terascan MODIS module for SST Estimation | Hae-Yong Shin |
| Thursday Infrared RS | 09:00-10:30 | Lecture | Application studies using satellite SST data I | |
| | 10:30-12:00 | Lecture | Application studies using satellite SST data II | |
| | 12:00-13:00 | | Lunch | |
| | 13:00-15:30 | Lecture | Terascan MODIS module for SST Estimation [continued] Some examples of environmental variable retrieval process using MODIS module | Hae-Yong Shin |