

REPORT OF SCIENCE BOARD

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The Science Board met on October 7, 2001 (12:30-13:30), to develop recommendations to the Governing Council from the initial items on the agenda. The second meeting was held on October 12 (08:30-17:30), to deal with the remainder of the agenda, including items with financial implications for 2002 and beyond. Dr. Stewart M. McKinnell served as rapporteur for all meetings. (See *SB Endnote 1* for list of participants).

October 7, 2001

The Science Board Chairman, Ms. Patricia Livingston, welcomed members and observers and called the meeting to order. The agenda was discussed and adopted as presented (*SB Endnote 2*).

Letters from the *Exxon Valdez Oil Spill Trustee Council* (EVOS) concerning potential areas of cooperation between PICES and EVOS were distributed to Science Board members for discussion at the meeting on October 12.

Best Presentation Awards and Closing Session (Agenda Item 3)

The Science Board Chairman reviewed the criteria for Best Presentation Awards and the procedure for the Closing Session, based on recommendations made at PICES IX. It was re-iterated that young scientists should be the recipients of all but the Science Board award. At PICES X, Committee Chairmen would identify potential “young scientists”. It was decided inappropriate to provide an award for the 2001 Science Board Symposium because all invited speakers were distinguished scientists. Science Board decided on a procedure to determine a Best Poster Award. Each Committee would nominate one poster for consideration, and the Science Board would meet informally at the “wine and cheese” Poster Session to determine the winner.

It was re-iterated that the Closing Session would consist of Best Presentation Awards to be given by each Committee, the Science Board Chairman describing the theme and possible Topic Sessions for the next Annual Meeting, and a few final words of thanks from the PICES Chairman. Committee Chairmen were reminded to provide a list of Topic Sessions approved by their Committee to the Science Board Chairman before the Closing Session. As was agreed last year, the Science Board Chairman will give an overview of the PICES meeting at the end of the Science Board Symposium to inform the audience about the structure of the meeting.

Election of Science Board, TCODE and CCCC Chairmen (Agenda Item 4)

Chairmanships of the Science Board, TCODE and CCCC were becoming vacant after the Tenth Annual Meeting. Inter-sessionally, the Science Board conducted elections, and Dr. R. Ian Perry (Canada) was elected as the Science Board Chairman, Dr. Igor I. Shevchenko (Russia) as the TCODE Chairman, and Dr. Harold P. Batchelder (U.S.A.) as the CCCC-IP Co-Chairman. Science Board members welcomed the new Chairmen and thanked outgoing Chairmen for their service. Ms. Livingston reminded the outgoing Chairmen that their obligations were fulfilled only after the Committee reports were finalized. Formal elections for BIO and POC Chairmen were held at Committee meetings at PICES X.

Publication Committee (Agenda Item 5)

The Science Board discussed, via e-mail, the ongoing need for a PICES Publication Committee, and noted that this Committee had not conducted substantive business in the last two years. Therefore, it was recommended to disband this Committee until an ongoing need for such a Committee had been shown. The Science Board agreed to review the need for a

Publication Committee and a PICES scientific journal in two years.

Governing Council decisions and Science Board recommendations from PICES IX (Agenda Item 6)

Science Board reviewed and accepted the status report on decisions and recommendations from PICES IX, which were of relevance to the Science Board (*SB Endnote 3*).

Other business (Agenda Item 11)

PICES Anniversary publication

The Science Board noted that the efforts of the Executive Secretary in publishing the *Historical Atlas of the North Pacific Ocean* provided a significant contribution to the celebration of the PICES tenth anniversary.

Documenting PICES science

The Science Board discussed a proposal to enhance the documentation of PICES science (*SB Endnote 11*), and noted that revisions of the Chairman's Handbook would be required to implement the proposal. The Science Board Chairman volunteered to draft those changes for consideration by the Science Board at its next meeting. Science Board members agreed that Session Convenors should be asked to summarize Topic Session discussions that occurred at PICES X even though the changes to the Chairman's Handbook had not yet been adopted.

CCCC Integration Plan

Dr. Makoto Kashiwai, CCCC Co-Chairman, brought a proposal for a CCCC Integration Plan to the attention of the Science Board, so that Committees could discuss the proposal in light of its links to the North Pacific Ecosystem Status Report.

October 12, 2001

Ms. Livingston opened the second Science Board meeting and welcomed the newly elected Chairmen of POC (Dr. Kuh Kim, Korea) and BIO (Dr. Vladimir I. Radchenko, Russia).

The Science Board extended thanks to outgoing Chairmen, Mr. Robin Brown (TCODE), Dr. Tsutomu Ikeda (BIO), Dr. Vyacheslav B. Lobanov (POC), and David W. Welch (CCCC-IP) for their much appreciated service to PICES.

Items with financial implications for 2002 and beyond (Agenda Item 7)

Science Board discussed agenda items with financial implications to PICES. The following lists of inter-sessional meetings, travel support requests, publications, and related items were endorsed by the Science Board and forwarded to the Governing Council for approval.

Inter-sessional workshops, Working Group and CCCC Program meetings (Agenda Item 7a)

Meetings to be convened in 2001-2002:

- An IRI/IPRC/PICES *Pacific climate – fisheries* Workshop, Honolulu, Hawaii, U.S.A., November 14-17, 2001 (*SB Endnote 4*);
- A MODEL/REX Workshop to build a NPZF (nutrient-phytoplankton-zooplankton-fish) version of the PICES NEMURO model, Nemuro/Yokohama, Japan, January 24-27, 2002 (postponed from 2001);
- A 2-day inter-sessional meeting of WG 14 on *Effective sampling of micronekton*, Honolulu, Hawaii, U.S.A., February 2002;
- A 2-3 day MONITOR Workshop on *Voluntary observing systems*, Corvallis, Oregon, or Seattle, Washington, U.S.A., February 2002;
- A NPAFC/NASCO/IBSFC/PICES/ICES Symposium on *Causes of marine mortality of salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea*, Vancouver, Canada, March 14-15, 2002 (*SB Endnote 5*);
- An International Symposium (co-sponsored by CIBNOR and CICIMAR) on *North Pacific transitional areas*, La Paz, Mexico, April 24-26, 2002 (*SB Endnote 6*);
- A *North Pacific Ecosystem Status Report* Workshop, Sidney, B.C., Canada, June 2002;
- A 3-day inter-sessional meeting of WG 16 on *Climate change and fisheries*

management, Qingdao, People's Republic of China, June 2002;

- A PICES/CREAMS/ONR workshop on *Recent progress in studies of physical processes and impact to the Japan/East Sea ecosystem*, in Seoul, Korea, July-August 2002;
- A 2-day TCODE/GOOS Workshop in conjunction with NEAR-GOOS meeting, Vladivostok, Russia, August 2002;
- A 1-day CCCC Integration Workshop, Qingdao, People's Republic of China, October 2002 (in conjunction with PICES XI);
- MONITOR Workshops on *Requirements and methods for early detection of ocean change (½-day)* and *Monitoring from moored and drifting buoys (½-day)*, Qingdao, People's Republic of China, October 2002 (in conjunction with PICES XI);
- A 1-day TCODE/GLOBEC Workshop on *Inventory and archival of GLOBEC data* Qingdao, People's Republic of China, October 2002 (in conjunction with PICES XI);
- A 2-day WG 15 on *Ecology of harmful algal blooms in the North Pacific* Workshop on *Development of common data standards for HAB data*, October 2002 (just prior to PICES XI);
- A 1-day PICES/CLIVAR Workshop on *Implementation of CLIVAR in the North Pacific* in 2002 (postponed from 2001);
- A ½-day meeting of WG 14 on *Effective sampling of micronekton*, Qingdao, People's Republic of China, October 2002, prior to PICES XI;
- A ½-day meeting of the *Marine Birds and Mammals* Advisory Panel, Qingdao, People's Republic of China, October 2002, prior to PICES XI;
- A PICES/JGOFS Symposium on *Biogeochemical cycles in the North Pacific*, Nagoya, Japan, December 4-6, 2002.

Meetings planned or anticipated for 2003:

- An ICES/PICES/GLOBEC International Symposium on *Role of zooplankton in global ecosystem dynamics: comparative*

studies from the world oceans, in Gijón, Spain, May 20-23, 2003;

- The Third PICES Workshop on *Okhotsk Sea and adjacent areas*, Vladivostok, Russia, June 2003;
- CCCC Workshops just prior to PICES XII, Seoul, Republic of Korea, October 2003 (e.g. a BASS/MODEL/REX Workshop on *Approaches for linking basin scale models*);
- A WG 14 Workshop just prior to PICES XII, Seoul, Republic of Korea, October 2003;
- A *North Pacific Ecosystem Status Report* Workshop, Sidney, B.C., Canada, November 2003.

Proposed publications (Agenda Item 7b)

PICES Scientific Report Series:

- a. 2002 (approved in 2000):
 - Proceedings of the 2001 CCCC Task Team Workshops;
 - Proceedings of PICES X Anniversary Symposium;
 - Final report of WG 13 on *CO₂ in the North Pacific*;
 - National reports on *Harmful algal blooms in the PICES region of the North Pacific* (Orlova/Taylor/Trainer).
- b. 2003:
 - Proceedings of the 2002 CCCC Task Teams Workshops;
 - North Pacific Ecosystem Status Report (*SB Endnote 7*);
 - Final report of WG 16 on *Climate change and fisheries management*.
- c. 2004:
 - Final report of WG 14 on *Effective sampling of micronekton*;
 - Final report of WG 15 on *Ecology of harmful algal blooms in the North Pacific*.

Special issues of primary journal:

- a. 2002 (approved in 2000):
 - *Journal of Oceanography* – selected papers from the 2001 POC/BIO/FIS Topic Session on *The physics and biology of eddies, meanders and rings in the PICES region*;

- *Marine Environmental Research* - papers that resulted from the 1999 MEQ Practical Workshop.
- *Progress in Oceanography* – selected papers from the 2001 CCCC Topic Session on *A decade of variability in the physical and biological components of the Bering Sea ecosystem: 1991-2000*;
- *Progress in Oceanography* - selected papers from 2001 BIO Topic Session on *Plankton size-classes, functional groups, and ecosystem dynamics: Causes and consequences*;
- *Canadian Journal of Fisheries & Aquatic Sciences* – selected papers from the 2001 FIS Topic Session on *Migration of key ecological species in the North Pacific Ocean*.

b. 2003 and beyond:

- *Progress in Oceanography* - selected papers from the PICES/CREAMS/ONR workshop on *Recent progress in studies of physical processes and impact to the Japan/East Sea ecosystem*;
- *Journal of Oceanography* – invited papers from the 2002 PICES/JGOFS Symposium *Biogeochemical cycles in the North Pacific*;
- *Fisheries Oceanography* – selected contributions to the GLOBEC Open Science Meeting;
- *Progress in Oceanography* – selected papers from the 2002 POC/FIS Topic Session on *Detection of regime shifts in physics and biology*;
- *Marine Ecology Progress Series* – selected papers from the BIO/FIS/CCCC Topic Session on *Responses of upper trophic level predators to variations in prey availability: An examination of trophic level linkages*.

Other:

- CD-ROM Oceanographic Atlas of Okhotsk Sea, Bering Sea, and Japan/East Sea.

The Science Board endorsed the publishing of the above items. The Science Board Chairman

noted the request by the Secretariat that material from the CCCC Workshops should be submitted to the Secretariat **by February 1, 2002**, to be published in the PICES Scientific Report Series in a timely fashion. Committee Chairmen were reminded to identify Guest Editors and to develop a publication timetable for papers destined for primary journals.

Travel support requests (Agenda Item 7c)

- a. The CCCC Program requested support for 8 people to attend inter-sessional meetings: MODEL/REX Workshop (3), MONITOR Workshop on *Voluntary observing systems* (3), ICES Cod and Climate Change meeting (1), MONITOR Workshop just prior to PICES XI (1);
- b. One invited speaker per Scientific Committee and Program for Topic Sessions at PICES XI. Additional requests for travel support were: BIO (3), FIS (2), POC (1), and SB (4) for the SB Symposium;
- c. Co-sponsorship of the Symposium on *North Pacific transitional areas* in La Paz, Mexico, should take the form of travel support;
- d. Other travel requests included: inter-sessional meetings of WG 14 (2) and WG 16 (2-3), *North Pacific Ecosystem Status Report* meeting (2-3), and WG 15 Workshop (1);
- e. Trust Fund travel requests were: 1-2 scientists to attend the PICES/CREAMS Workshop in Seoul, Republic of Korea; Russian scientists to attend the meeting of the Marine Birds and Mammals Advisory Panel (1) and the WG 15 meeting (1) at PICES XI;
- f. Science Board Chairman to attend the IABO/IABSO Assembly and SCOR Meetings (October 24-31, 2001, Mar del Plata, Argentina); the Ninth NPAFC Annual Meeting (November 1-2, 2001, Victoria, Canada); the IRI/IPRC/PICES Climate-Fisheries Workshop (November 14-17, 2001, Honolulu, Hawaii, U.S.A.); the joint NPAFC/NASCO/IBSFC/PICES/ICES Symposium on *Causes of marine mortality of salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea*

(March 14-15, 2002, Vancouver, Canada); the International Symposium on *North Pacific transitional areas* (April 23-25, 2002, La Paz, Mexico); the ICES Annual Conference and Centenary (October 1-8, 2002, Copenhagen, Denmark); and the Second GLOBEC Open Science Meeting (October 13-18, 2002, Qingdao, People's Republic of China).

Science Board reviewed the above requests and suggested the following criteria be used by the Science Board Chairman to assist in prioritizing the requests:

1. Consider whether the proposed activity will result in useful products for PICES;
2. Balance travel support requests among PICES Committees and Programs; and
3. Use PICES funds to bring people to PICES rather than for sending them to other meetings.

Future of Working Groups and Scientific Programs (Agenda Item 8c)

Science Board recommended that:

- Study Group on *North Pacific Ecosystem Status Report and Regional Analysis Centers (RACs)* complete its task in December 2001, and be disbanded (See *SB Endnote 7* for Study Group report and recommendations);
- WG 12 on *Crabs and shrimps* and WG 13 on *CO₂ in the North Pacific* should complete their final reports and be disbanded;
- WG 14 on *Effective sampling of micronekton* continue its activities and produce a final report in 2003;
- WG 15 on *Ecology of harmful algal blooms in the North Pacific* continue for at least 1 more year; and
- WG 16 on *Climate change, shifts in fish production and fisheries management* convene its final meeting at PICES XI, and prepare a final report for publication in 2003.

New PICES groups (Agenda Item 8d)

POC proposed that PICES form two new groups:

- WG on *Biogeochemical data integration and synthesis*, under POC (see *GC Appendix C* for the terms of reference). TCODE will identify a member to sit on the Working Group.
- *North Pacific Data Buoy* Advisory Panel, co-sponsored collaboratively by POC and the WMO-IOC Data Buoy Co-operation Panel (see *GC Appendix C* for the terms of reference). Members considered that it fit well with the PICES definition of an Advisory Panel and PICES' aims with regard to data exchange and technology improvement.

The Science Board recommended that these two new groups be approved.

FIS will be proposing a Working Group in 2002 on *Ecosystem considerations in fisheries management* (see *FIS Endnote 4*).

PICES re-structuring

Science Board discussed the possibility of creating entities that operate in ways that were not consistent with the original structure outlined in the PICES Convention: virtual technical committees, persistent working groups, etc. It was agreed to review the current organizational structure of PICES and to develop a discussion document on that structure and its ability to serve PICES over the next decade by September 15, 2002.

Relations with other programs and organizations (Agenda Item 8f)

The Standing List of International Organizations and Programs facilitates PICES interactions with other programs and indicates high priority organizations/programs to which PICES should regularly send a representative (See *SB Endnote 8* for the revised list).

PICES Committees and Programs identified the following organizations/programs as having the highest priority:

BIO: ICES (WGZE), GLOBEC, GOOS
MEQ: ICES, AMAP, SCOR/GEOHAB, APEC MRC WG

FIS: AFS Program on Climate and Aquatic Resources, IPCC, ICES, NPAFC, GLOBEC/SPACC
POC: CLIVAR, Argo, CREAMS, WESTPAC, NEAR-GOOS, JGOFS, GOOS, GCOS, WMO/DBCP;
CCCC: GLOBEC, GOOS, NEAR-GOOS, GEM, SAHFOS, CoML, ICES-GLOBEC, NPAFC, IATTC, IPHC, ISC;
TCODE: GLOBEC, GOOS, JGOFS

Considering that ICES and PICES have a Memorandum of Understanding on scientific cooperation, and in light of recent informal communications between some representatives of ICES, ICES/CCC and PICES/CCCC, Science Board recommended that PICES develop potential areas of cooperation based on specific proposals for interaction between ICES and PICES.

PICES XI Annual Meeting (Agenda Item 9)

The following list of Topic Sessions to be convened at PICES XI was endorsed:

Science Board Symposium (³/₄-day)
Technological advancements in marine scientific research (Committee Chairmen will serve as Convenors) (*SB Endnote 9*)

BIO/MEQ Topic Session (1-day)
Food web dynamics in marginal seas: Natural cycles and human impacts (Convenors: Paul J. Harrison (Canada) and Korean/Chinese MEQ convenor)

BIO/FIS/CCCC Topic Session (½ day)
Responses of upper trophic level predators to variability in prey availability: An examination of trophic linkages (Potential Convenors: Hidehiro Kato (Japan), Elizabeth A. Logerwell (U.S.A.), Gordon A. McFarlane (Canada), and Sun Song (China))

BIO/POC/FIS Topic Session (½ day)
Topographic influences on micronekton and interactions with higher trophic levels (Potential Convenors: Richard D. Brodeur (U.S.A.), John

F. Dower (Canada), David L. Musgrave (U.S.A.), and Orio Yamamura (Japan))

FIS Topic Session (½ day)
Physical forcing of walleye pollock life history and population structure: New approaches to identifying critical temporal and spatial scales (Potential Convenors: Martin Dorn (U.S.A.), Suam Kim (Korea), Akira Nishimura (Japan), and Mikhail Stepanenko (Russia))

FIS Topic Session (½-day)
Comparison of the productivity of marginal seas with emphasis on the western Pacific (Japan/East Sea, Yellow Sea, and East China Sea) with a focus on small pelagics (Potential Convenors: Vladimir Belyaev (Russia), Suam Kim (Korea), Hideaki Nakata (Japan), and Qi-Sheng Tang (China))

MEQ Topic Session (½-day)
Advances in harmful algal bloom monitoring and mitigation (Potential Convenors: TBA (China) and Vera Trainer (U.S.A.))

MEQ Topic Session (½-day)
Effects of environmental changes on harmful algal bloom events (Potential Convenors: Edward Black (Canada) and Ming Jiang Zhou (China));

POC/FIS Topic Session (1-day)
The nature, detection, and impact of regime shifts in physics and biology (Potential Convenors: Jacquelynne R. King (Canada) and James E. Overland (U.S.A.))

POC Paper Session (½-1 day)

TCODE Electronic Poster Session
Data systems to support technological advances in observing systems (Potential Convenors: Vicky Lingwood (U.S.A.), Igor Shevchenko (Russia), and Ling Tong (China))

CCCC Poster Session
Recent results of GLOBEC and GLOBEC-like studies (Convenors: Harold P. Batchelder (U.S.A.) and Makoto Kashiwai (Japan))

Theme for PICES XII (Agenda Item 10)

Science Board discussed the proposed theme of *Human dimensions of ecosystem variability* for PICES XII, and accepted the theme with two suggested changes: “*What are the effects of ecosystem change on human societies?*” and “*What are the implications of fisheries management decisions affecting the nature and functions of ecosystems?*” (SB Endnote 10).

High priority scientific projects (Agenda Item 8e)

At the request of the PICES Fund-Raising Committee, Science Board developed written descriptions of three high priority scientific projects that could be furthered through fundraising efforts:

1. North Pacific Ecosystem Status Report;
2. International Zooplankton Monitoring Program; and
3. Workshop/Symposium series on *Effect of human and climate interactions on fish production*.

Science Board noted that the last project was already encompassed within the current North Pacific Ecosystem Status Report.

Some Science Board members felt that the schedule for preparing the pilot North Pacific Ecosystem Status Report was too ambitious, and that the target for preparing the first draft should be delayed until fall 2002. Even with the revised schedule, the production of the pilot report will require that member nations provide the support and data necessary to its completion.

Science Board discussed two letters from the Executive Director of the *Exxon Valdez Oil Spill Trustee Council* that described (1) EVOS' wishes to support and to contribute financially to the development of the North Pacific Ecosystem Status Report; (2) their views on the editorial process; and (3) their desire to include *human dimensions* as a subject of the report. Science Board agreed to include additional external review of the North Pacific Ecosystem Status Report, when desirable, but noted that at present, the EVOS suggestion to include the subject of

human dimensions was beyond the scope of the report.

Strategic Plans (Agenda Item 8a)

The Science Board Strategic Plan was updated to include last year's activities and the list of possible future themes for PICES Annual Meetings.

The Scientific Committees of PICES were challenged by the incoming Science Board Chairman, Dr. R. Ian Perry, to consider their scientific vision for the upcoming half decade, to be prepared to discuss and develop this inter-sessionally for consideration at PICES XI.

Other business (Agenda Item 11)

Science Board discussed a proposal to provide better documentation of PICES science and agreed to the procedures outlined in *SB Endnote 11*. Revisions to the Chairman's Handbook were proposed to describe the responsibilities of session convenors to document Topic Sessions and their discussions, and to ensure that convenors are aware of these duties before the Annual Meeting.

Science Board accepted the proposed changes to the Chairmen's Handbook that included revisions to convenors' duties and a formal definition of a PICES Study Group (*SB Endnote 12*).

Science Board noted the complete lack of attendance by all Committee members from the People's Republic of China. MEQ and POC participation was the worst in many years. CCCC noted that many members were absent.

MODEL Task Team requested access to the PICES webserver to post and access working documents related to MODEL activity. Science Board recommended that the Secretariat explore options to provide access to all Committees and Task Teams as necessary.

Science Board discussed the availability and accessibility for seabird data, following a request from MBMAP, and suggested that this should be

deferred until after the pilot North Pacific Ecosystem Status Report was finished and data issues were identified more generally.

Proposed membership changes - CCCC Program (Agenda Item 8c)

- Dr. Harold P. Batchelder (U.S.A.) will replace Dr. David W. Welch (Canada) as CCCC Co-Chairman;
- More time is needed to locate a replacement for Dr. Andrei Krovnin (Russia) as BASS Co-Chairman. Dr. Gordon A. McFarlane (Canada) will continue for one additional year as BASS Co-Chairman to provide continuity;
- Dr. Francisco E. Werner (U.S.A.) will replace Dr. Michio J. Kishi (Japan) as MODEL Co-Chairman; it was also recommended that when Dr. Bernard A. Megrey (U.S.A.) completes his term, that a new Co-Chairman be appointed from the western Pacific;
- Dr. Thomas C. Wainwright (U.S.A.) will replace Ms. Patricia Livingston (U.S.A.) on MODEL Task Team;
- Dr. William T. Peterson (U.S.A.) will remain as REX Co-Chairman for one additional year (through PICES XI), and Dr. Yoshiro Watanabe (Japan) will replace Dr. Tokimasa Kobayashi (Japan) as the other Co-Chairman of REX.

Best Poster Award

Ms. Sonia Hamilton (U.S.A.) was awarded the Best Poster Award for her electronic poster presentation entitled “The Bering Sea and North Pacific Ocean Theme Page: A web-based ocean information system”.

Science Board Symposium

The Science Board Symposium theme was *Ten years of PICES science: Decadal-scale scientific progress and prognosis for a regime shift in scientific approach* (PICES X Anniversary Special Symposium). Co-Convenors: Patricia Livingston (SB), Tsutomu Ikeda (BIO), Douglas E. Hay (FIS), John E.

Stein (MEQ), Susan E. Allen (POC), Thomas C. Royer (TCODE) and David W. Welch (CCCC).

This Science Board Symposium was a celebration and reflection on the first ten years of scientific progress by PICES. In-depth overviews of the scientific activities and results of PICES Committees and Scientific Programs were given by invited speakers on topics related to climate variability, ocean impacts at lower and top trophic levels, factors influencing fish stock fluctuations, human activities and marine environmental quality, and North Pacific ecosystem structure and function. These overviews consolidated our current information and framed new and better questions for future investigation.

A look to the future of marine science in the North Pacific was provided through thought-provoking invited talks on various topics, which ranged from the future of ocean sensing technologies and our predictive capabilities to human perspectives on ocean uses; broadening our scientific disciplinary focus; and improving the links between marine science and policy. Contributed perspectives on marine ecosystem science and new directions for PICES were welcomed in the accompanying poster session. Invited talks will be compiled into an issue of the PICES Scientific Report Series.

Invited talks

Paul H. LeBlond, Y. Nagata and V.B. Lobanov
The Physical Oceanography and Climate Committee: The first decade

D.E. Harrison and N. Smith
Ocean observing systems and prediction: The next ten years

Tsutomu Ikeda and P.A. Wheeler
Ocean impacts from the bottom of the food web to the top: Biological Oceanography Committee retrospective

Timothy R. Parsons
Future needs for biological oceanographic studies in the Pacific Ocean

Richard F. Addison, J.E. Stein, A.V. Tkalin, J.-Y. Zhou and U. Varanasi
PICES Marine Environmental Quality Committee: The first ten years

Robie W. MacDonald, B. Morton, and R.F. Addison

Marine environmental issues in the Northwest Pacific: trends and consequences

Douglas E. Hay, R.J. Beamish, G. Boehlert, V.I. Radchenko, Q.-S. Tang, T. Wada, D.W. Ware, and C.-I. Zhang

Ten years of PICES: An introspective, retrospective, critical and constructive review of fisheries science in PICES

Steven A. Murawski

Ecosystem considerations in fisheries management: The future of science and policy

R. Ian Perry and A.B. Hollowed

A review of the PICES Climate Change and Carrying Capacity Program

Berrien Moore III

Marine science-IGBP: Partners in the 21st century

Posters:

Daniel L. Bottom, J.D. Rodgers and X. Augerot
A classification of salmon biogeographic zones of the North Pacific Ocean

Svetlana V. Davidova and Y.I. Zuenko
Changes of the mass of subtropical fishes in the Japan Sea under the match/mismatch control

Charles W. Fowler and S.M. McCluskey
Sustainability, ecosystems and fishery management

Salvador Lluch-Cota, Y.M. Tourre, W.B. White, A. Bakun, D. Lluch-Belda, J. Alheit, D.B. Lluch-Cota, C. Colin and F.P. Chavez
Exploring mechanisms underlying global climate and fisheries variations in the PICES region

SB Endnote 1

Participation List

Members:

Patricia Livingston (Chairman, Science Board)
Tsutomu Ikeda (Chairman, BIO)
Douglas E. Hay (Chairman, FIS)
John E. Stein (Chairman, MEQ)
Vyacheslav B. Lobanov (Chairman, POC)
Makoto Kashiwai (Co-Chairman, CCCC)
David W. Welch (Co-Chairman, CCCC)
Robin M. Brown (Chairman, TCODE)

Invited Observers:

Harold P. Batchelder (Co-Chairman-elect, CCCC)
Kuh Kim (Chairman-elect, POC)
R. Ian Perry (Chairman-elect, Science Board)
Vladimir I. Radchenko (Chairman-elect, BIO)
Igor I. Shevchenko (Chairman-elect, TCODE)
Stewart (Skip) M. McKinnell (Assistant Executive Secretary, PICES, rapporteur)

SB Endnote 2

Science Board Agenda

October 7 and 12, 2001

October 7, 2001 (12:30 – 13:30)

1. Welcome and opening Remarks
2. Adoption of agenda
3. Review of procedures for Best Presentation Awards and Closing Session
4. Election of new SB, TCODE and CCCC Chairmen
5. Publication Committee – proposal for disbanding

6. Completion of PICES IX decisions and recommendations by Governing Council and Science Board

October 12, 2001 (08:30 – 17:30)

7. Reports of the Science Board Chairman, Scientific, Technical, and Standing Committees, CCCC IP, Working and Study Groups with regard to items having financial implications for 2001 and beyond

- a. Inter-sessional meetings proposed for 2002 and beyond (workshops, Working Group and CCCC Program meetings)
 - b. Proposed publications (PICES Scientific Report series and primary journals) for 2002 and beyond
 - c. Travel support requests
 - d. Other items with financial implications
8. Reports of Science Board Chairman, Scientific and Technical Committees, CCCC IP, Working and Study Groups with regard to other items
- a. Brief summary report of the groups' activities in the past year (including progress with regard to Strategic Plan items)
 - b. Proposed titles for Topic Sessions and Symposia for the next Annual Meeting
 - c. Proposed future status of existing groups (changes in duration of active groups, membership, terms of reference)
 - d. Proposed list of any future groups along with terms of reference and a list of potential members
- e. High priority scientific projects
 - i. North Pacific Ecosystem Status Report
 - ii. International Zooplankton Monitoring Program for the North Pacific
 - iii. Workshop/Symposium series on *Effect of human and climate interactions on fish production*
 - f. Relations with other international programs/organizations
 - g. Proposed recommendations and draft text on other items that would be included in the Science Board Report to Council (e.g., recommendations for letters of support to various research efforts)
 - h. Other items
9. PICES XI Annual Meeting
- a. PICES XI theme and Science Board Symposium
 - b. Topic Sessions
10. Selection of PICES XII theme
11. Other business
12. Adoption of the Science Board Report and recommendations to Council

SB Endnote 3

Progress on PICES IX decisions and Science Board recommendations

00/S/1: Intersessional meetings, Working Group and CCCC Program workshops

The following inter-sessional meetings were convened:

- NPAFC/PICES Workshop on *Factors affecting production of juvenile salmon: Comparative studies on juvenile salmon ecology between east and west North Pacific Ocean*, October 29, 2000, Tokyo, Japan (hosted by NPAFC);
- WG 13/TCODE Test Workshop on *CO₂ data integration*, January 20-22, 2001, Sidney, B.C., Canada (hosted by the Institute of Ocean Sciences, Fisheries and Oceans Canada);
- BASS/MODEL Workshop on *Quantification of a food web model for the eastern Pacific gyre*, March 5-6, 2001, Honolulu, Hawaii, U.S.A. (hosted by the NOAA/NMFS Laboratory);
- Workshop on *Impact of climate variability on observation and prediction of ecosystem and biodiversity changes in the North Pacific*, March 7-9, 2001, Honolulu, Hawaii, U.S.A. (co-sponsored by the Census of Marine Life and the International Pacific Research Center, and hosted by IPRC);
- *Third International Argo Science Team Meeting*, March 20-22, 2001, Sidney, B.C., Canada (co-sponsored by PICES and hosted by the Institute of Ocean Sciences, Fisheries and Oceans Canada);
- WG 13/TCODE Implementation Workshop on *CO₂ Data Integration*, July 31-August 2, 2001, Tokyo, Japan (co-sponsored by the National Institute for Environmental Studies and Marine Information Research Center, and hosted by JODC);
- NEAR-GOOS *Forecasting Workshop* in conjunction with the Fifth IOC/WESTPAC

Scientific Symposium, August 27-31, 2001, Seoul, Korea (co-sponsored by PICES);

- Series of CCCC Task Team Workshops: BASS Workshop to *Review ecosystem models for the subarctic Pacific*; REX/MODEL Workshop to *Implement improvements and include higher trophic levels to the PICES NEMURO Model*; and REX Workshop on *Temporal variations in size-at-age for fish species in coastal areas around the Pacific Rim*, October 5-6, 2001; Victoria, B.C., Canada (in conjunction with PICES X);
- WG 15 Workshop on *Taxonomy and identification of HAB species*, October 5-6, 2001, Vancouver, B.C., Canada (hosted by the University of British Columbia);
- PICES/CLIVAR Workshop on *Implementation of CLIVAR in the North Pacific*, October 5, 2001, Victoria, Canada, postponed because of delay in formation of the Pacific Panel of CLIVAR;
- TCODE Workshop on *Data management methods and issues for the 21st century*, October 5, 2001, Victoria, Canada, cancelled due to travel problems for some of the organizers and participants;
- MODEL Workshop on *Improvements to the PICES NEMURO Model*, summer 2001, Nemuro, Japan, postponed to January 2002.

00/S/2: Travel support

Full or partial travel support was provided to:

- One keynote speaker for the PICES X Opening Session and five invited speakers for the Science Board Anniversary Symposium;
- Twenty invited speakers (paid by PICES and co-sponsoring programs and organizations) for various Topic Sessions at PICES X;
- Eight scientists to attend various CCCC Task Team Workshops;
- Up to two Co-Chairmen of Working Groups to meet inter-sessionally. Funding was not requested;
- Three scientists to attend the WG 13/TCODE Test Workshop on *CO₂ Data Integration*;
- One scientist to attend the NEAR-GOOS Forecasting Workshop on behalf of the

CCCC/MONITOR Task Team. The Assistant Executive Secretary to discuss PICES emerging plans to develop a North Pacific Ecosystem Status Report;

- Two scientists to attend the 3rd International Argo Science Team meeting.

00/S/3: Publications

- The final report of WG 8 on *Practical Assessment Methodology* was published as PICES Scientific Report No. 16. The annual report of the CCCC Program activities for 2000/2001 was published as PICES Scientific Report No. 17. Proceedings of the PICES/CoML/IPRC Workshop was published as PICES Scientific Report No. 18;
- Thirty-two papers from the *Beyond El Niño Conference* held in La Jolla, U.S.A., in March 2000, were published in “Climate variability and marine ecosystem impacts, from the tropics to the Arctic”, a special issue of *Progress in Oceanography*, Vol. 49 (1-4);
- The final report of WG 12 on *Crabs and Shrimps and Results from the 1999 and 2000 PICES method inter-comparisons for carbonate parameters* will be published in the PICES Scientific Report Series by the end of 2001;
- *Historical Atlas of the North Pacific Ocean: Maps of discovery and scientific exploration 1500-2000*, was published for the Tenth Anniversary of PICES.

00/S/4: Future of current Working Groups and Scientific Programs

- WG 12 on *Crabs and shrimps* completed collation of results. After approval by FIS, the WG 12 final report will be published in late 2001, and the Working Group will disband;
- WG 13 had its final meeting at PICES X and will be disbanded after completion of its final report in spring 2002;
- WG 14 had a meeting just prior to PICES X, and will continue for 2002 and produce a report in 2003;

- WG 15 had a meeting just prior to PICES X, and will continue for at least one more year;
- WG 16 had a meeting just prior to PICES X, and will have a final meeting at PICES XI and produce report for publication in 2003.

00/S/5: New PICES groups

- The Study Group on *Ecosystem Status Report and RACs* completed its work and submitted its report to Science Board for consideration.

00/S/6: Relations with other organizations and programs

- NPAFC hosted a joint NPAFC/PICES Workshop on *Factors affecting production of juvenile salmon: Comparative studies on juvenile salmon ecology between east and west North Pacific Ocean*, in Tokyo, in October 2000.
- The Science Board Chairman, MEQ Chairman, and the Assistant Executive Secretary met with representatives from the GIWA Secretariat in December 2000, in Seattle, to discuss areas of mutual interest and potential cooperation between PICES and GIWA;

- Dr. Yoshioki Oozeki (MONITOR Task Team), Dr. Hyung-Tack Huh (PICES Chairman), Dr. Vyacheslav Lobanov (POC Chairman) and Dr. Skip McKinnell (Secretariat) attended the IOC/WESTPAC NEAR-GOOS Forecasting Workshop in Seoul, Korea, in August 2001;
- GLOBEC (Open Science Conference) and PICES (Eleventh Annual Meeting) are harmonizing their plans to meet in Qingdao, People's Republic of China, in October 2002;
- ICES, PICES and GLOBEC will organize and co-sponsor a major symposium on *Comparative Zooplankton Ecology* from May 20-23, 2003, in Gijón, Spain. PICES designed and produced the poster and first announcement for distribution to ICES and PICES before their Annual Meetings;
- PICES Chairman attended the IOC General Assembly in Paris, France, in July 2001;
- CCCC Program invited NPAFC researchers to participate in the REX Workshop at PICES X;
- A PICES delegation participated in a meeting with directors of various Mexican marine science institutions in La Paz, Mexico, May 3-5, 2001, to discuss future Mexican participation in PICES.

SB Endnote 4

Proposal for PICES co-sponsorship of IRI/IPRC Workshop

Title: IRI/IPRC/PICES *Pacific climate – fisheries* Workshop

Date/Location: November 14-17, 2001, East/West Center, Honolulu, Hawaii, U.S.A.

Justification: The International Research Institute for Climate Prediction (IRI), which is located at Lamont Doherty Earth Observatory, Columbia University, is interested in expanding its role in applications to climate-fisheries issues. This workshop is the first in a series of planned events to provide IRI a useful entry into this new area of applications of its widely recognized climatic expertise. One of the main workshop goals is to investigate the feasibility and potential advantages of attempting to extend

some of the insights and results that have been accumulating, with respect to small pelagic fishes and fisheries to large pelagics and also to marine resources and fisheries of island ecosystems.

Description: Observations and modeling have led to recent advances in understanding the influence of climate variability on ocean processes, and to the recognition of inherent variability of marine biological communities on various temporal and spatial scales. In parallel, there have been dramatic improvements in our ability to conduct biological sampling and genetic identification. But with few exceptions, there has been little progress in bringing together results from these related frontiers in a comprehensive framework, that can consistently

rationalize the accumulating store of information and experience, so as to provide a reliable basis for sorting out the various effects of fishing, natural climatic variability, and chronic alterations of environment and/or habitat. The result is that “sustainable fisheries” remains a theoretical ideal rather than a realistic operational goal. One of the major obstacles involves the large component of climate-associated variance, that commonly acts to obscure the results of human actions and to defeat attempts at prediction. Ways need to be found to more effectively involve climate scientists in interdisciplinary research collaborations. Furthermore, the time may have arrived to begin to question some of the conventional dogmas, postulates and working assumptions that have guided, but also constrained, fishery science through the twentieth century. (These may include, among others, (1) long-term stationarity of basic fish--environment linkages, (2) absolute uniqueness of specific regional situations, (3) a predominant effect of trophic interactions, (4) an expectation that a climate-driven stock oscillation should have essentially the same period as the climatic variation driving it, etc.).

Climate variability (on a variety of scales) can provide us with “experiments” to probe the real mechanistic “workings” of these ecological-biological-social systems, for which ordinary experimental controls are usually impractical (sustainable fisheries development requiring a more accurate understanding of those basic internal mechanisms). Further, a better

understanding of the interdependent spatial and temporal scales of “openness” or “closedness” of the resource systems on the ecological side (i.e., on population exchanges and changes in spatial pattern dynamics), may provide opportunities to explore additional options on the -management side.

Workshop foci:

1. To identify alternative conceptual frameworks and ideas that may better support fruitful interdisciplinary collaborations (particularly between climate scientists and fishery scientists);
2. To explore associated implications for innovative fisheries management approaches;
3. To consider potential applications of the comparative method as a means for effective multilateral research on climate, ecosystems and fisheries issues in the Pacific basin;
4. To explore in this regard, the potential utility of certain newly available technologies and methodologies.

Relationship to PICES goals: The workshop goals align with PICES needs with regard to refining/enhancing contributions to our proposed North Pacific Ecosystem Status Report and to further our collaboration with international organizations examining climate change and ecosystem responses.

Form of co-sponsorship: Participation of PICES Science Board Chairman.

SB Endnote 5

Proposal for PICES co-sponsorship of a NPAFC/NASCO/IBSFC/ICES/PICES Symposium

Title: *The causes of marine mortality of salmon in the North Pacific and North Atlantic Oceans and in the Baltic Sea*

Date/Location: March 14-15, 2002, Vancouver, British Columbia, Canada

Cosponsors: North Pacific Anadromous Fish Commission (NPAFC), North Atlantic Salmon Conservation Organization (NASCO), International Baltic Sea Fishery Commission (IBSFC),

International Council for the Exploration of the Sea (ICES), and North Pacific Marine Science Organization (PICES)

Description: The focus of the meeting is to review new information on the causes behind recent changes in the ocean mortality of salmon. Its objective is to compare the increased marine mortality of salmon stocks observed in recent years in the North Pacific and North Atlantic Oceans and in the Baltic Sea. It is hoped that

the comparison of this information will lead to a better understanding of the mechanisms that have caused increased marine mortality in recent years, identify research priorities, and stimulate increased cooperation and exchange of information in the future.

Provisional Agenda (Final Agenda will be available in the Second Announcement):

1. Introduction (Opening remarks)
2. Status of salmon stocks and fisheries
3. Possible factors associated with increased marine mortality
 - a. Climate
 - b. Fish farming, enhancement, and ocean ranching
 - c. Predation and competition

- d. Migration, post smolt survival, and ocean rearing areas
- e. Ecosystem changes and effects on salmon
- f. Freshwater life-history
- g. Other relevant factors

Speakers: The speakers will be nominated by NPAFC, NASCO, IBSFC, and other international organizations and selected by the organizing committee. The names of the speakers will be announced in the Second (Final) Announcement.

PICES involvement: PICES involvement will consist of nominating one or two members to the organizing committee for the symposium.

SB Endnote 6

Proposal for a PICES-sponsored Symposium on *North Pacific transitional areas*

Title: An international symposium on *North Pacific transitional areas*

zones and in the open Pacific, as well as the role of mixing in the productivity of the ecosystems.

Date/Location: April 24-26, 2002, La Paz, BCS, México

Convenors: Daniel Lluch-Belda (Mexico), Jeffrey J. Polovina (U.S.A.), William T. Peterson (U.S.A.), and Takashige Sugimoto (Japan)

Co-sponsors: North Pacific Marine Science Organization (PICES), Centro de Investigaciones Biológicas del Noroeste, SC (CIBNOR), and Centro Interdisciplinario de Ciencias Marinas del IPN (CICIMAR)

Symposium structure:

Session 1: Western Pacific transitional areas
Session 2: Central Pacific transitional areas
Session 3: Eastern Pacific transitional areas

Description: Convergence and divergence regions along the continental margins (e.g. Oyashio/Kuroshio) and in the open Pacific Ocean (e.g. Subarctic/Subtropic Transition Zone) create very dynamic and interesting places for physics and biology. Seasonal and interannual variability in the location of major fronts that delineate different water masses, can alter many aspects of regional ecosystems including everything from the local climate to the species composition at any particular location. The stronger the gradient, the more dramatic the change. This symposium will examine recent advances in understanding the dynamics of marine ecosystems in high gradient regions of the Asian and North American coastal

Each session will include 2 to 3 invited lectures (to be defined by the end of October 2001), a series of contributed lectures, a poster session, and each day a 1-hour plenary discussion based on topics identified by selected rapporteurs (who will provide main conclusions).

Key dates and notes

- First announcement will be published by late October;
- Abstract submission deadline will be set by early February;
- To accomplish peer-reviewed publication of selected papers by mid-2003, manuscripts should be submitted before summer 2002.

Local contact: Salvador E. Lluch-Cota

SB Endnote 7

Study Group Report: North Pacific Ecosystem Status Report and Regional Analysis Center

Membership

Patricia Livingston (Science Board Chairman), David L. Mackas (BIO), Chang-Ik Zhang (FIS), Richard F. Addison (MEQ), Vyacheslav B. Lobanov (POC), Bernard A. Megrey (TCODE), Makoto Kashiwai (CCCC), Warren S. Wooster (GOOS representative), Stewart M. McKinnell (PICES Secretariat)

Background

A Study Group was established at PICES IX to consider the needs for implementation of the North Pacific Ecosystem Status Report and Regional Analysis Center. This group should report its findings to PICES X. Suggested items for consideration would be to:

- Devise a detailed outline for the first Status Report
- Identify key contributors (individuals and organizations)
- Identify existing data sources for inclusion
- Examine the process and implications of how those data would be synthesized into the report
- Estimate the production, printing, and distribution costs of the document
- Examine the function, products and positive and negative implications of RACs

Accomplishments

Report outline

Based on an examination of a variety of status reports, a draft outline (attached) was prepared. The outline was reviewed by the Study Group and passed through Committees for review and revision.

Key contributors and data sources

A workshop was held March 7-9, 2001, in Honolulu, Hawaii, U.S.A., co-sponsored by PICES, Sloan Foundation's Census of Marine Life program, and the International Pacific Research Center. The primary purpose of the workshop was to identify data sources and key

contributors to the ecosystem status report. The workshop had over 60 participants, who identified many sources and types of time series data for inclusion into the report, along with existing diagnostic and predictive models presently in use. It was recommended that information about the data sources identified at the workshop be put into a North Pacific ecosystem meta-database to aid future efforts to compile the status report. The workshop report will be used to identify the individuals, organizations, and data sources for the first ecosystem status report. Refer to the workshop report (PICES Scientific Report No. 18) for details of the participants and data sources.

Process and implications of report synthesis

There was general recognition at the PICES/CoML/IPRC Workshop that the initial North Pacific Ecosystem Status Report would take the form of a "quick" report that might omit substantial interpretation of the observed trends. Some components of the report, such as physical oceanography and atmospheric information, might be updated more frequently (e.g., quarterly) than other components, such as fish stock assessments that might be carried out on an annual time frame. Thus, one possibility is that the report might be updated quarterly on the PICES web site for some components, but less frequently for other components. There would also need to be further work on future reports to decide how to provide objective interpretation and expert opinion of the trends to decision-makers. This is an area that is actively being worked on in some PICES countries and by ICES. We may need to have future workshops to refine a set of quantitative ecosystem change indicators and methods for synthesizing and interpreting results of these change indicators for a target audience that might consist of the interested public and policy- and decision-makers in PICES countries.

Two main ways to produce the report were suggested: (i) a report produced solely by PICES or (ii) using co-lead authors representing a geographic balance to author report sections

(similar to the IPCC process). Involving other international organizations in the assessment process was also recommended. The CCCC Program was mentioned as a possible lead group for report production.

Based on discussions at the workshop, the following process for report synthesis is proposed:

1. Compilation of a list of coordinating lead authors and contributing authors for each major section of the report by December 31, 2001. Co-lead authors for each major section would be drawn from each side of the North Pacific. This list of authors would be drawn from members of PICES Committees and Programs and key international organizations, and would represent a balance of scientific discipline and geographic representation;
2. Preparation of draft report by June 30, 2002;
3. Report review by the Science Board by August 15, 2002;
4. Preparation of final draft report by September 15, 2002;
5. Acceptance of report by the Science Board in October 2002;
6. Publication of report in 2003.

Printing and distribution costs

The PICES Secretariat estimated the costs of printing and distributing the report to be CDN\$ 10,000.

Production

In order to enhance regional contributions of the reports in the future, we suggest asking appropriate member nations to host 2-day regional workshops for a region of interest. Possible regions to cover are:

- Bohai/Yellow/East China Sea hosted by Korea or China
- Japan/East/Okhotsk Sea hosted by Japan, Korea, or Russia
- Oyashio/Kuroshio hosted by Japan or Russia
- Bering Sea hosted by U.S.A. or Russia
- Alaska Current hosted by Canada (British Columbia) or U.S.A. (Alaska)
- California Current hosted by U.S.A. or (Mexico)

- Pacific Basin/Transition Zone - hosted by U.S.A. (Hawaii, Honolulu)

Each workshop would have 1 day of presentations from about a dozen or so contributors (each with a written report) on the historical and current information about ecosystem status with everything from physics to whales, and 1 day to develop the key ideas for the current status, add limited interpretation for this year, and sketch out a summary report. In addition, there could be contributions by IPHC, NPAFC and IATTC on single species or taxonomic groups. The costs to the Secretariat for production would be participation of the project leader(s) in regional meetings. It would be about 7 workshops for report development in hopefully less than 7 trips as some of these could be combined if the dates were coordinated. We also want to consider a meeting of a "Review Committee" at the Secretariat. This would be 4-5 scientists (ecosystem specialists, not national representatives) at a cost of about \$8K. So, if we assume that the costs of production are only travel for one Project Leader and the Review Committee meeting, the total for production should be approximately CDN\$ 23,000.

Function, products, and implications of Regional Analysis Centers

The concept of Regional Analysis Centers was discussed at the PICES/CoML/IPRC workshop. The concept of Regional Analysis Centers (RACs) was discussed as a way for PICES to have a central focus for supporting the work involved in producing an Ecosystem Status Report. Participants mentioned two different ways of viewing these centers. One type of RAC would be an actual geographic location and building with staff assigned to it. The other view was that it could be thought of as a virtual where a variety of organizations and individuals contribute to the work even though they may not be housed in a common center.

The "Space Environment Database and Analysis Tools" project was mentioned as another model. This project is carried out by the Central Laboratory of the Research Councils of the United Kingdom, which provides the building space for outside researchers plus its own

technical experts to work on joining and interpreting data. Funding for this Central Laboratory is provided mainly by the other Research Councils of the U.K.

Finally, participants thought that although the RAC concept would draw heavily upon a distributed network of scientists to contribute to the work, some central support would still be required to accomplish the work. Initially, one person in the PICES Secretariat might be sufficient to organize and coordinate the work involved in producing an Ecosystem Status Report.

The Study Group recommends that PICES should initially implement the “virtual” RAC concept of a distributed network of scientists contributing to the work, with initially one or two people in the PICES Secretariat to organize and coordinate the work involved in producing an Ecosystem Status Report. These people might be provided through secondment of experienced scientists from PICES member nations through the proposed PICES Visiting Scientist Program.

Proposed outline

1. Introduction and scope
2. Status of monitoring and databases
3. Hydrography and climate
 - a. Large scale features and indices (e.g., ENSO, PDO, NPI indices)
 - b. Regional features and indices (e.g., regional seas ice cover indices, annual air and ocean temperature anomalies, salinity anomalies, precipitation anomalies)

4. Chemistry
 - a. CO₂ concentration
 - b. Dissolved oxygen levels
 - c. Nutrient levels and sources
 - d. Trace metals and organic pollutants: sources and levels in seawater, sediments and biota
5. Biology
 - a. Phytoplankton (chlorophyll, production, species composition and distribution, size composition, timing of spring bloom, harmful algal bloom number and extent)
 - b. Zooplankton (biomass, species composition and distribution, size composition, production)
 - c. Non-commercial benthos (biomass, species composition and distribution, size composition, summarized by feeding type)
 - d. Fish, shellfish and squid {catch - including bycatch and discards), mariculture activities, biomass, recruitment, species composition and distribution, size or age composition, mean weight at age, stock condition (number of stocks that are increasing, decreasing, stable), rates of fish disease occurrence, diet, larval and egg stage abundance and distribution}
 - e. Marine mammals and birds (number, reproductive performance, diet)
 - f. Number and type of non-native species
6. Ecosystem analysis and predictions
 - a. Status of modeling
 - b. Identification of human and natural processes influencing ecosystem change (diagnostic models)
 - c. Prediction of future ecosystem status (prognostic models)
7. Outstanding scientific questions and recommendations

SB Endnote 8

Revised Standing List of International Organizations and Programs

PICES is expanding its relationships with international scientific organizations and programs around the world. At the same time, there is the need to improve integration, coordination, and communication with regional scientific research 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 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.

ACIA	Arctic Climate Impact Assessment Program (ACIA of AMAP)
AFS CAR*	American Fisheries Society Program on Climate and Aquatic Resources
AMAP*	Arctic Monitoring and Assessment Program (AMAP)
APEC*	Marine Resources Conservation WG (MRC), Asia Pacific Economic Cooperation
APFIC	Asia-Pacific Fisheries Commission
Argo*	International Program for deployment of profiling floats (linked with GOOS)
CLIVAR*	Climate Variability and Predictability Program
CoML*	Census of Marine Life
CREAMS*	Circulation Research in the East Asian Marginal Seas
DBCP	Data Buoy Cooperation Panel
ECOR	Engineering Committee on Oceanic Resources
FAO	Food and Agriculture Organization
GCOS*	Global Climate Observing System
GEM*	Gulf of Alaska Ecosystem Monitoring and Research Program
GESAMP	Group of Experts on Scientific Aspects of Marine Pollution
GIPME	Global Investigation of Pollution in the Marine Environment
GLOBEC*	Global Ocean Ecosystem Dynamics
GOOS*	Global Ocean Observing System
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
IOC*	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IPCC*	International Panel on Climate Change
IPHC*	International Pacific Halibut Commission
ISCTNP*	Interim Scientific Committee for Tuna and Tuna-like Species in the North Pacific
JGOFS*	Joint Global Ocean Flux Study
NAFO	North Atlantic Fisheries Organization
NASCO	North Atlantic Salmon Conservation Organization
NEAR-GOOS*	North East Asian Regional GOOS
NOWPAP	Northwest Pacific Action Plan
NPAFC*	North Pacific Anadromous Fish Commission
PORSEC	Pacific Ocean Remote Sensing Conference
PSC	Pacific Salmon Commission

PSG	Pacific Seabird Group
SAHFOS*	Sir Alister Hardy Foundation for Ocean Science
SCOPE	Scientific Committee on Problems of the Environment
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
WOCE	World Ocean Circulation Experiment

2001 additions to list are Data Buoy Cooperation Panel and Surface Ocean Low Atmosphere Study.

SB Endnote 9

Science Board Symposium – PICES XI

Title: *Technological advances in marine scientific research*

Co-convenors: R. Ian Perry (SB), Vladimir I. Radchenko (BIO), Douglas E. Hay (FIS), John E. Stein (MEQ), Kuh Kim (POC), Igor I. Shevchenko (TCODE), and Makoto Kashiwai and Harold P. Batchelder (CCCC)

This symposium will explore the potential for new technologies to advance the scientific activities conducted by PICES researchers. Technological advancements are occurring in a variety of research areas. For example, microscopic laser ablation techniques, nuclear DNA techniques, “smart” tags, and acoustical tags for fish and mammals, are all improving stock identifications. For population assessments there are new developments in laser technology that can scan the upper 20-30m from aircraft and satellite technology and associated data analyses. Plankton studies are advancing

through bio-optical recording and analysis systems. There are continuing developments in acoustical tools, such as towed vehicles with upward- and downward-looking transducers, and long-range sidescan SONAR. Some of the most rapid advancements are occurring in physical oceanography with the development of “smart” drifters. New chemical techniques are also being developed to assess stable organochlorines, with implications for marine mammals and human health. This emphasis on technological advancements also includes new developments in information technology, numerical modeling, data processing and visualization. Invited talks on some of the most recent advancements in the scientific areas of physical/chemical oceanography and climate, biological oceanography, fisheries science, marine environmental quality, and ecosystem dynamics will be presented. Contributed talks and posters on this topic are also encouraged.

SB Endnote 10

PICES XII theme: Human dimensions of ecosystem variability

Marine ecosystems are dynamic in terms of climate and physical features, and the species that inhabit them. Human relationships and interactions with the ocean have been long-

lasting and changing in their nature and strength over the years. Even though natural variability in marine systems is thought to be large, separating natural climate variability from

human-induced sources is an ongoing challenge. Physical oceanography, chemistry and climate indices are being examined in relationship to living marine resource production. *What is our understanding of how these indicators are influenced by global climate warming?* Various human activities have the effect either of removing, altering or adding nutrients or species to areas. *How do these changes in nutrient composition and amounts, fishery removals or discards, habitat alteration, introduction of*

nonnative species or pollutants change ecosystem structure and production? What are the effects of ecosystem change on human societies? What are the implications of fisheries management decisions affecting the nature and functions of ecosystems? This theme seeks to highlight the many ways that humans interact with marine ecosystems and the scientific efforts to quantify and predict human impacts on such dynamic systems.

SB Endnote 11

Proposal to enhance documentation of PICES scientific sessions

The last few years, PICES has only included the proposed Topic Sessions for the upcoming year in its annual report, and has not provided details regarding the scientific meeting sessions after their conclusion, particularly with regard to any key discussions or recommendations that such sessions might have generated. It became clear to those who are preparing reviews of PICES scientific accomplishments over the last decade, that we have not well-documented the science contained in our Annual Meetings, with the exception of papers that were compiled later into PICES Scientific Reports or other publications.

If we are to better track the state of our knowledge and future needs for improvement, it seems we should have a better system for documenting our scientific sessions and the discussions and recommendations that come from those. One possible system would be that employed by ICES in their Annual Report. (See a copy of their latest annual report on the web at <http://www.ices.dk/pubs/annualrep/annrep.htm>). The section devoted to the Annual Science Meeting puts forth the following information:

- keynote lectures and abstracts
- science meeting agenda (session schedules)
- details of each scientific session

The last item, details of each scientific session, contains an organized description of each session that includes:

- purpose of the session (derived from the initial session description);
- details of the content of the papers presented in summary form;
- summary of the discussions and conclusions of the session with regard to: research gaps that need to be filled; recommendations for future sessions or groups, or work; recommendations for other actions; and
- list of the documents (author and title) presented.

PICES has struggled to enhance the discussions at our Topic Sessions, and if we ask convenors to document the sessions and the discussions, we may see a better organization of Topic Sessions in this regard. We would also have a more organized way to provide scientific recommendations for action to the parent Committee(s) that sponsored the session.

Recommendation: Session convenors be asked to provide a summary of their session that includes the four points listed above, and these summaries be included in the PICES Annual Report. This practice would begin with the PICES 2002 Annual Meeting. Also, session convenors should be requested to include a fixed amount of discussion time at the end of their sessions (15 minutes) in order to provide for proper discussion of the papers and issues raised by the papers.

SB Endnote 12

Chairmen's Handbook Revisions 2001

- Add sentence at beginning of Publication Committee description that says:

This Committee was disbanded in 2001, and will be re-activated (possibly with changes in the terms of reference) when an ongoing need for such a Committee is demonstrated.

- Add Item B in the definition of Other Groups as follows:

B. Study Groups

The purpose of a Study Group is to analyze the scientific, policy, and/or financial implications of a proposal made by Science Board or Governing Council, and provide recommendations for Science Board or Council on the proposal. This type of group would typically be formed for a period of one-year and would provide a report of their findings and recommendations to Science Board or Council prior to the Annual Meeting after it was formed.

- Revise "Section IX - Scientific Sessions" item 2 "Responsibility of Convenors" as follows:

Add sentence at the end of paragraph (a): The program for each Topic Session should allow sufficient time for discussion of each paper and discussion time at the end of the session to consolidate scientific opinion regarding scientific findings, gaps, and recommendations for future work.

Add new paragraph (d): Convenors are responsible for preparing a report on their Topic Session that summarizes the purpose of the session (taken from the original session description), the information presented at the session (both oral and poster presentations), and the scientific findings, gaps, and recommendations for future work. The Secretariat will provide the final list of paper titles and authors to be included in the report. The report will be provided to the main sponsoring Committee and will be included in the Committee's final report to the Science Board.

