

REPORT OF SCIENCE BOARD

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The Science Board met on October 19 (17:30-18:30) to review the order of the agenda and set up tasks for Scientific and Technical Committees agendas and on October 25 (08:30-18:30) for the main discussion. (See Endnote 1 for participants.)

The Chairman Dr. Makoto Kashiwai called the meeting of the 19th to order and welcomed the members of Science Board and observers, and especially Dr. Chang-Ik Zhang (FIS Chairman), the newest member of the Board. Dr. Kashiwai outlined the objectives of the meeting, the timetable for reports on Committees and Group activities, and significant issues for discussion. The agenda was circulated prior to the meeting. The Chairman reviewed the agenda and asked for changes and additions. After the recommended changes were incorporated, the agenda was approved (Endnote 2).

The Scientific and Technical Committee, and the CCCC Implementation Panel Chairmen presented agendas for their meetings (Endnote 3). Additional items important for future general discussion were determined and recommended to be included into agendas. The Guidelines for the Science Board meeting from the draft Handbook for Chairmen and Convenors were briefly presented and the Executive Secretary proposed that these be partly adopted for use at this year's meeting.

The Chairman opened the meeting of the 25th and proposed the order in which to take up the various items. The Science Board discussed the Handbook for Chairmen and Convenors; reviewed the findings and recommendations of the Scientific Committees, Implementation Panel for the CCCC Program, TCODE, WG 9 and Study Group on PICES Communications; discussed implementation of PICES V and PICES IV decisions, and Science Board decisions from 1996; made arrangements for future activities and planned a program for the

Seventh Annual Meeting; discussed relations with other Organizations and Programs; and made recommendations to Governing Council.

Handbook for Chairmen and Convenors

Handbook for Chairmen and Convenors (Endnote 4) was prepared by the Secretariat and Science Board Chairman, to briefly specify the function and composition of the various PICES Committees and Groups, and outline the duties and responsibilities of their Chairmen and Convenors of the meetings organized or sponsored by PICES. Science Board approved the Guidelines in principle and recommended their circulation to Committee and Working Group Chairmen for use at annual and intersessional meetings. The Executive Secretary should develop the changes in the Rules of Procedure required for consistency with these Guidelines, for consideration by the Governing Council at PICES VII.

Reports and recommendations of the Scientific and Technical Committees, CCCC-IP/EC and Working Groups

Reports of the Scientific and Technical Committees, the Implementation Panel, WG 9 and Study Group were presented by their Chairmen and are summarized below (see reports for the full text). Although both TCODE and the CCCC/IP report to Science Board, for the purposes of the Annual Report, their accounts have been given more visibility under their own heading.

Fishery Science Committee (FIS) - Dr. Chang-Ik Zhang

The Committee met on October 22, 1997 under chairmanship of Dr. Chang-Ik Zhang. Dr. Anne B. Hollowed served as rapporteur.

Dr. Robert Otto summarized the activities of WG 12. He submitted a report of the inter-sessional workshop on Crabs and Shrimps held in Nemuro, Japan, September 9-18, 1997. Dr. Otto discussed several recommendations and concerns of WG 12. The major accomplishments of WG 12 were summarized. The WG prepared a comprehensive review of the major crustacean stocks in the North Pacific. The group identified the major zoogeographic provinces where crustacean species are found. Future WG 12 activities will focus on: a) processes underlying production of crustacean populations, b) comparative analyses of the variety of life history strategies used by crustacean stocks in the North Pacific, and c) methods of assessing crustacean stocks. FIS members reviewed the progress report of WG 12 and accepted it for publication in the PICES Annual Report. It was noted that, if possible, a draft report should be submitted prior to the next FIS meeting. The Committee recommended that the next 4-day meeting of WG 12 should be located in the western side of Pacific and the Co-chairmen of WG 12 in consultation with Science Board Chairman and PICES Secretariat would determine a suitable location for this meeting. FIS accepted the revised terms of reference for the Working Group and recommended encouraging the Chinese and North Korean scientists to participate in WG 12.

The status of the WG 3 inventory was reviewed. Dr. W. Doug McKone noted that all information has been received and will be put on the PICES web page in the near future.

FIS supported the proposal for a Science Board symposium on the 1997-98 El Niño to be sponsored by POC and the BASS Task Team. Dr. Gordon Kruse (FIS) will identify an individual with a background in fisheries science who will serve as a co-convenor for this symposium. FIS endorsed the proposal for a REX Symposium/Workshop on small pelagic species and climate change in the North Pacific to be convened immediately prior to the PICES VII meeting. The Committee approved the Model Task Team proposal to convene a small

workshop on lower trophic level modeling just prior to PICES VII. FIS also recommended that the time should be set aside for the CCCC Program to hold scientific sessions and that the topic session for 1998 should be research findings of GLOBEC and GLOBEC-like interdisciplinary research programs in the North Pacific. Time allotted to FIS Topic Session and the CCCC/IP Meeting should be combined to allow for a one-day topic session on this theme.

FIS Chairman Dr. Zhang reviewed the report of the activities of the SCOR Working Group 105. FIS recommended that PICES should provide funds for the FIS Chairman to participate in the next meeting of the SCOR WG in Hobart, Australia, January 1998.

FIS discussed the proposal by NPAFC to add fisheries catch statistics of non-anadromous fish to the NPAFC statistical yearbook. FIS supported NPAFC's suggestion to produce a database of fishery statistics for all PICES member nations and encouraged Governing Council to identify a mechanism for data exchange.

FIS reviewed a few proposals for the development of new Working Groups. The Committee recommended that no new Working Groups should be formed until WG 12 is closer to completing their activities.

FIS recognized the success of the joint BIO/FIS symposium on micronekton and encourages the symposium organizers to convene an intersessional workshop to follow-up on selected aspects of micronekton studies. FIS recommended that the inter-calibration and sampling standardization activities proposed could be considered by the CCCC MONITOR Task Team.

The winner of the FIS Best Presentation Award was Dr. Jin-Yeong Kim (Korea) for the paper entitled "Spawner-recruit relationship of anchovy, *Engraulis japonica*, and environmental factors in the southern waters of Korea".

Physical Oceanography and Climate Committee - Dr. Paul H. LeBlond

The Physical Oceanography and Climate Committee met on October 22, 1997, under the chairmanship of Dr. Paul H. LeBlond. The Chairman appointed Dr. Howard J. Freeland as rapporteur.

Drs. Yutaka Nagata and Vyacheslav B. Lobanov presented the Multilingual (Japanese-Russian-English) Nomenclature of the Places and Oceanographic Names in the region of the Okhotsk Sea. POC was satisfied with the progress and emphasized the need for simple and unambiguous (rather than linguistically sophisticated) equivalencies. The expected completion of this task is April 1998. The Marine Information research Centre (Japan) will cover publication costs of the Nomenclature to appear both as PICES and MIRC report.

Dr. Christopher N.K. Mooers outlined progress and the major activities of WG 10 on Circulation and Ventilation in the Japan/East Sea. The content of the final report was summarized. A draft report is scheduled to be circulated to POC members for external review by April 1, 1998, and the final report should be submitted to PICES for publication by July 1, 1998.

POC recognized the scientific value of CREAMS and its achievements on the ocean environment and climate change and sees it as a successful example of international cooperation among PICES member countries, and strongly supports CREAMS-II in 1998-2002 as its continuation. POC recommended that Science Board endorse CREAMS-II as a valuable component of research programs within the PICES framework.

A proposal to organize the 2nd Okhotsk Sea Workshop was raised at the POC meeting in 1996 and was supported by Science Board, but deferred to be reconsidered in 1997. Dr. Nagata proposed that a 4-day workshop to be held in November 1998, in Nemuro, Japan. Co-convenors would be Drs. Y. Nagata, V. Lobanov

and L. Talley. POC strongly supported this meeting and recommended as such to Science Board. The Committee also suggested that PICES consider supporting two invited speakers from its special meeting fund.

BASS recommended that WG 9 be reconstituted with new terms of reference and new membership as "MONITOR Task Team" under the CCCC-IP. The terms of reference were presented to POC, and POC was very supportive.

POC proposed the following activities for PICES VII:

- i. "El Niño: preliminary look" as a Science Board Symposium. POC Co-Convenor: Howard J. Freeland (Canada).
- ii. "Decadal variability of North Pacific Climate" as a 1-day POC topic session, Co-Convenors: James E. Overland (U.S.A.) and Masahiro Endoh (Japan). The Committee also suggested that PICES consider supporting two invited speakers to attend the meeting.
- iii. "CO₂ in the N. Pacific" as a 1-day joint POC/BIO topic session. POC Co-Convenor: Shizuo Tsunogai (Japan).

POC examined the proposed terms of reference for a new working group on "CO₂ in the North Pacific". POC supported this idea and proposed to Science Board that CO₂ Working Group follow WG 10.

The Committee debated the request for translation of a new book "Complex Studies of the Okhotsk Sea Ecosystem" from Russian into English. While supportive the idea, POC also suggested that Science Board provide policy guidance on the publication of translations, brochures, and other material.

The winner of the POC Best Presentation Award was Dr. Young-Jae Ro (Korea) for the paper entitled "Recent investigation of the polar fronts of the East Sea by CTD profiling and ADCP tracking".

Biological Oceanography Committee - Dr. Tsutomu Ikeda

The BIO Committee met on October 22, 1997, under the chairmanship of Acting Chairman Prof. Michael M. Mullin.

Drs. George Hunt and Hidehiro Kato presented the WG 11 progress report. The Working Group has tabulated estimated energy consumption by species of birds and mammals of various categories of prey in each of several sub-regions of the Bering Sea. The WG 11 will meet at the time of PICES VII (estimated 4 days needed), but will not have a complete draft of a report for the BIO Committee then. Some governments have appointed WG members and then not paid for travel, and one appointed member has been uncooperative. Dr. Hunt recommended that a letter of reprimand be sent.

Drs. Jeff Napp and Richard D. Brodeur proposed a new Working Group on micronekton to be sponsored jointly with FIS. They presented draft terms of reference, and modifications were suggested by the Committee to link the focus more closely to other PICES activities. It was recommended to establish a Working Group and hold a two-day meeting immediately prior to PICES VII.

Dr. Kenneth L. Denman proposed a joint Working Group with POC on CO₂ in the North Pacific, and presented the terms of reference agreed to by POC. He also suggested a joint POC/BIO topic session at PICES VII on the role of the North Pacific and shelf seas in the CO₂ budget. With respect to priorities for the two proposed Working Groups, the Committee put the micronekton Working Group as the higher priority by a slight margin.

The Committee considered 12 possibilities for its topic session at PICES VII, including 9 suggested last year. Voting by countries, the Committee recommended as a topic session "Controlling factors for lower trophic levels (especially phytoplankton stocks)". Possible co-convenors included Drs. Vera Alexander, Akira

Taniguchi, and Paul J. Harrison. The Committee also recommended a topic session co-sponsored with POC on CO₂ in the North Pacific (Dr. C.S. Wong is a possible co-convenor), and a topic session co-sponsored with MEQ on contaminants and populations dynamics of higher trophic levels (Dr. Linda Jones to consider possible convenors). The Committee also supported the POC/BASS proposal that the Science Board considered for its topic session the manifestations of El Niño 1997/98, since this topic bridges interests of all Scientific Committees.

The Committee reviewed papers and posters in the BIO/FIS topic session and the BIO paper session, and recommended that Dr. Atsushi Tsuda receive the Best Presentation award for his paper, "Life cycles of *Neocalanus flemingeri* and *N. plumchrus (calanoida, copepoda)* in the western Subarctic Pacific". The Committee also strongly recommended that the practice of making such awards continue.

A presentation was made on an international symposium on Management and Mitigation of Harmful Algal Blooms, and PICES support was requested. The Committee recommended non-monetary support by PICES. The Committee approved Dr. Jones' recommendation that Science Board establish a group to determine what PICES' role should be (if any) in increasing understanding of harmful algal blooms.

The issue of translating a Russian book on the Okhotsk Sea was discussed. PICES has earlier considered translating data tables, but the Russians apparently insisted that the whole book be translated, or nothing. The Committee was positive on non-monetary help in encouraging such translation, but was against monetary help (at least from BIO's perspective).

Marine Environmental Quality Committee - Dr. Richard F. Addison

The Marine Environmental Quality Committee met on October 22, 1997, under the

chairmanship of Dr. Richard F. Addison. Dr. C. Michael Watson was appointed as rapporteur.

Dr. John E. Stein reported on progress of WG 8. The revised Jiaozhou Bay Workshop workplan was accepted. During discussion of procedure for getting approval of Chinese authorities, both Profs. Ming-Jiang Zhou and Jia-Yi Zhou recommended against any formal approach through embassies. It was agreed that the MEQ Chairman should draft a letter for signature of the PICES Chairman noting (a) that approval had already been requested (spring 1997, but no reply yet); (b) emphasize comparative nature of Workshop – it is not an assessment of pollution in Jiaozhou Bay; (c) request approval no later than January 31, 1998, for planning purposes. Dr. Kwang-Woo Lee (Korea) offered to host a workshop at Masan/Chinhae Bay area if no Chinese approval by January 31. He felt that it could be mounted by September 1998, in Korea. Russians also offered to host workshop in Vladivostok area. The Committee agreed that PICES VII should have at least one overview paper from the workshop plus whatever other data are ready for presentation.

Five topics were discussed and proposed for PICES VII in order of priority (Convenors to be identified):

- i. Contaminants in high trophic level biota - linkages between individual and population responses (joint MEQ/BIO);
- ii. Science and technology for environmentally-sustainable mariculture;
- iii. Marine oil spills: case studies in assessing biological and ecosystem effects;
- iv. What are the mechanisms of toxicity of HAB toxins and the processes by which pollution affects the population dynamics of harmful algal species?
- v. Metal speciation and biogeochemical cycles.

The Committee discussed future directions of MEQ after Jiaozhou Bay and agreed on the following topics for discussion at the next MEQ meeting, or before: (i) Future activity re harmful algal blooms (paper to be prepared by Drs. J. Stein and U. Varanasi, jointly with BIO) and (ii)

GIWA proposal (paper to be prepared by Dr. R. Addison). Dr. Addison will provide a report on possible actions necessary from the GIWA proposal by January 31, 1998. The Secretariat will circulate the report to the Chairman and Chairman of Science Board for review and consideration as to what actions PICES may wish to take.

The Committee discussed about the International Symposium on Management and Mitigation of Harmful Algal Blooms, and agreed in principle, but without support for funding.

The winner of the MEQ Best Presentation Award was Dr. Dmitry L. Aminin (Russia) for the paper entitled "Use of fluorescent probes for biochemical monitoring of environmental contamination".

Implementation Panel on CCCC - Ms. Patricia Livingston

The CCCC-IP Panel met on Tuesday, October 21, 1997. Agenda for the meeting is attached. The Panel heard and accepted reports from the MODEL, REX, and BASS Task Teams. The proposals developed by REX, BASS, and MODEL for symposia and workshops to be held during 1997/1998 were discussed and accepted. The Panel received information about the current status of cooperation with other programs such as those of IPHC, ICES, IGBP, and NPAFC. The proposed terms of reference, statement of purpose, and structure for the Implementation Panel was discussed, revised and accepted by the group. A proposal for a new MONITOR Task Team and its terms of reference were discussed, revised, and accepted by the group. It was decided that a TCODE representative should be on the new task team. The group decided that CCCC-IP should contribute regularly to the PICES newsletter. The CCCC-IP heard a report from Mr. Robin Brown (TCODE) regarding data management and exchange issues of IGBP/GLOBEC. It was decided that Mr. Robin Brown and one of the CCCC-IP co-chairmen would draft a letter to each of the national GLOBEC programs in the

PICES area to determine the status of their data management and exchange policies.

The PICES CCCC/IP recommended:

1. WG 9 be reconstituted with new terms of references and membership as a MONITOR Task Team under the CCCC/IP.
2. A new set of terms of references and rules for IP member selection be adopted. The previous terms of reference for the CCCC Program referred to the development of an Implementation Plan. This new set of terms of references reflects the present activities and goals of the CCCC Program in actually carrying out the Implementation Plan.
3. Dr. Bruce Frost is approved as the CCCC representative to JGOFS North Pacific Task Team. Drs. Bernard Megrey (U.S.A.) and Michio Kishi (Japan) be approved as additional members of MODEL Task Team.
4. A new, peer-reviewed scientific report series of PICES be initiated.
5. Anticipated publications in the PICES Scientific Report Series are (a) BASS 1997 Symposium; (b) Task Team Reports, REX 1997 Workshop, and MODEL 1998 Workshop.
6. Proposed Workshops and symposia for 1998:
 - a. BASS should hold a one-day symposium sponsored by Science Board during the next Annual Meeting that will allow a preliminary identification of impacts of the 1997/1998 El Niño event;
 - b. REX should hold a two-day combination workshop and symposium on climate effects on small pelagic species to be convened just prior to PICES VII;
 - c. REX should hold a one-day scientific session at PICES VII that highlights research findings of GLOBEC and GLOBEC-like programs in the North Pacific (1/2-day FIS topic session, 1/2-day CCCC-IP session);
 - d. MODEL should hold a three-day workshop on lower trophic level process models in March 4-6, Tiburon, CA, U.S.A. (already approved 1996).

CCCC/IP suggested that PICES consider travel support for 3 scientists.

- e. MODEL should hold a two-day follow-up workshop on lower trophic level process models just prior to PICES VII.

Technical Committee on Data Exchange - Mr. Robin Brown

The Technical Committee on Data Exchange met on Oct 18 and Oct 23 under the chairmanship of Mr. Robin Brown. Participation was fairly good (all PICES parties represented).

TCODE has undertaken the assembly of two significant data inventories (Inventory of Long Time Series and Inventory of Internet Resources) which are now available on the PICES web server and in printed form from the PICES Secretariat. The Inventory of Long Time Series was described in a recent article in PICES Press.

The Inventory of Long Times Series provides a description of long-term data sets that might be relevant to climate change in the North Pacific. The inventory contains details on the area covered, measurements made and (when possible) publications that describe these data. Instructions on how to access these data (including uniform resource locators or URL's) are provided. There is no attempt to actually assemble these data - users are provided with "pointers" to the primary data holders. TCODE has solicited entries through TCODE members and from other PICES Working Groups and Committees, including MEQ and WG 11. If additional time-series data in these subject areas are forthcoming, it will be necessary to create additional subject areas. There is additional effort required (by PICES participants as well as TCODE members) to maintain, update and complete this inventory).

The Inventory of Internet Resources provides information on: international marine research programs (national and international program offices); real-time oceanographic and meteoro-

logical data sources; climate data, climatologies and visualization tools; on-line technical manuals and reports; numerical models/ocean forecasts; and mapping and bathymetric data and related software. A prototype of this inventory is now available on the PICES web server (also available as a printed document from the PICES Secretariat). Additional work is needed to add entries to these existing categories and to create new categories (where requested or required).

TCODE Work Plan for 1997/98 includes:

1. Updates and additions to Inventory of Long Time Series, including additional subjects areas (contaminants, birds, marine mammals) if this information is provided by MEQ and WG 11 members.
2. Updates and additions to Inventory of Other Internet Resources, including new subject areas suggested by other Committees.
3. Assemble inventory of GLOBEC (and GLOBEC-like projects), including investigators, institutions and activities (with REX), and ship activities/schedules.
4. Assemble descriptions of 1997/98 El Niño observation plans for all PICES nations (in conjunction with NPAFC, if possible).

Working Group 9 on Subarctic Monitoring - Dr. Bruce A. Taft

The Working Group met on October 17 and 18, 1997, to discuss implementation of the previous recommendations (96/S/4) and new monitoring initiatives. Science Board reviewed the WG 9 Report and accepted it for publication in the Annual Report (see Endnote 5).

Study Group on PICES Communications - Mr. Robin Brown

Science Board reviewed the Communication Study Group Report and accepted it for publication in the Annual Report (see Endnote 6). Science Board recommends that the Secretariat and Committees implement the PICES Communication Study Group recommendations.

Implementation of PICES V Decisions

- a. PICES-GLOBEC CCCC Program (96/S/1)
The REX Task Team workshop was held immediately prior to PICES VI (Oct. 17 and 18) to review the present status of national research programs and to identify areas for cooperative research experiments in support of the CCCC Program.

The MODEL Task Team workshop will be held March 4-6, 1997, at the Bay Conference Center, Tiburon, California to compare lower trophic level physiological process models (Co-Convenors: Sinjae Yoo (Korea) and Dick Dugdale (U.S.A.)). Based on Science Board recommendation TT Co-Chairmen will arrange the participation of experience modellers in addition to users of the results of models.

- b. Publications 1996-1997 (96/S/2)
The Working Group 5 final report was published in the 1996 Annual Report (January 1997).

The Working Group 9 progress reports 1 and 2 were published in the 1996 Annual Report (January 1997).

Summary of the workshop on Conceptual/Theoretical Studies and Model Development and the 1996 MODEL, BASS and REX Task Team Reports were published in the PICES Scientific Report No. 7 (April 1997).

- c. PICES Inter-session Meetings 1996-1997 (96/S/3)

The second meeting of Working Group 10 was held in Fukuoka, Japan, on January 31 to February 3, 1997, immediately following the Second International CREAMS (Circulation of Regional East Asian Marginal Seas) Symposium. The aim of the meeting was to advance the development of the WG 10 Report. The preliminary paired "Findings and Recommendations" were published in the PICES Press (July 1997).

The Working Group 12 meeting was held September 8-12, 1997, in Nemuro, Japan. The main targets were (a) to compile a multispecies compendium as to what appears to be driving population abundance fluctuations and what research is underway or planned in member countries, and (b) to prepare a list of organizations and key scientific experts along with their area of expertise from each member country.

The MEQ Committee and WG 8 had planned to hold a Practical Workshop on Methods to Assess Pollution Impact in Jiaozhou Bay in May/June 1997. Preliminary arrangements had been made to use facilities at the Institute of Oceanology for the Workshop. As a result of communication and funding (outside PICES) problems it was not possible to organize the Workshop in 1997.

- d. Implementation of WG 9 Recommendations (96/S/4)
See WG 9 Report (Endnote 5).
- e. Cooperation with SCOR: WG105 (96/S/5)
Dr. Chang-Ik Zhang, Chairman of the Fishery Science Committee, was appointed as a member of the SCOR Working Group 105 on The Impact of World Fisheries Harvests on the Stability and Diversity of Marine Ecosystem.
- f. PICES Perspectives, Interagency coordinating mechanism (96/S/6)
So far, the Secretariat has not received any indications that Contracting Parties have developed an interagency coordinating mechanism to facilitate the coordination of broad participation in PICES activities. Science Board is, however, aware of informal coordinating mechanisms in all PICES Parties.
- g. Access for Cooperative Research (96/A/8)
So far, PICES has not received any requests to assist in obtaining the permission for

access to undertake a cooperative research in Parties' EEZ.

Implementation of PICES IV Decisions

- a. Geographic Features of the Okhotsk Sea Region (95/S/3)
The expected completion of "Multilingual Nomenclature of Place and Oceanographic Names in the Region of the Okhotsk Sea" is April 1998. The Marine Information research Centre (Japan) will cover publication coats of the Nomenclature to appear both as PICES and MIRC report.
- b. Completion of WG 3 Inventory (95/S/6)
According to the Governing Council Decision (93/S/10) WG 3 was instructed to compile an inventory of scientists working on key pelagic fishes in various geographic areas of the PICES region. The inventory was completed for Canada, China, Japan and U.S.A. before the Working Group was disbanded. This year Korea and Russia have provided the Secretariat with a list of their scientists studying pelagic fishes. Science Board recommends the Secretariat complete the WG 3 inventory and place it on the PICES Home Page.
- c. Participation at Scientific Meetings (95/S/3,4)
The Secretariat drafted the schedule for the PICES Sixth Annual Meeting based on recommendation to spread out business and scientific meetings and circulated it to the members of Science Board. The version published in the final announcement and placed on the PICES Home Page takes into account all provided comments. Science Board reviewed participation in business meetings and found that the scheduling results in good participation.

In the beginning of September all contributors were notified on the acceptance of their papers for oral or poster presentation. They were requested to confirm by Sept. 19 if they will be able to

attend the meeting to present their paper or, in case of the poster presentation, to provide the Secretariat with the name of an associate who will be responsible for the paper. Science Board reviewed the process and recommended that the latter practice be discontinued.

Science Board stated that authors are encouraged to provide extended abstracts and they must bring at least 50 copies. Science Board requests the proposed Publication Study Group be given the task to consider ways to increase compliance with making available extended abstracts before presentation of their paper.

- d. Application of PICES Guidelines for oral and poster presentation (95/S/9)
Guidelines for oral and poster presentations were sent to all contributors together with a letter of acceptance.
- e. Best Presentation Awards
Science Board recommends continuing the Best Presentation Award practice having one award for each Scientific Committee and one for Science Board. The Secretariat should find funds (\$50-70 USD per award) to support this practice.

The Best Presentation Award for the Science Board/BASS Symposium was awarded to Dr. Paul J. Harrison (Canada) for the paper entitled "Phytoplankton dynamics in the northeastern subarctic Pacific Ocean: bottom-up and top-down model".

Implementation of 1996 Science Board Decisions

- a. Committee Membership (Annual Report 96, p.31)
Dr. Tsutomu Ikeda (Japan) was re-appointed to BIO Committee, but Dr. Timothy R. Parsons (Canada) on BIO Committee was replaced by Dr. Paul J. Harrison. Dr. George L. Hunt (U.S.A.) was appointed to

REX Task Team and Dr. Linda Jones (U.S.A.) to MODEL Task Team.

- b. High Resolution Bathymetry for PICES Region (Annual Report 96, p.31)
The Secretariat sent a letter to the U.S. Delegates requesting assistance to identify an appropriate contact in U.S. agencies to obtain access to high-resolution bathymetric data in the PICES region. The response indicates that the U.S. program dealing with bathymetric data is the NOAA National Geophysical Data Center (NGDC). The NGDC maintains a comprehensive bathymetric data set for public use that can be obtained in digital format on CD-ROMs at a nominal cost.
- c. Book on Complex Studies of the Okhotsk Sea Ecosystem (Investigations on the Ecosystem of the Okhotsk Sea) (Annual Report 96, p.31)
The Secretariat contacted VNIRO to obtain figure legends and table headings from this book so that they can be translated into English, but was informed that VNIRO prefers to translate the whole book with some financial support from PICES. The Secretariat requested and received abstracts for all papers included in the book and estimated a cost of publication.

Science Board considered the proposal and referred it to the proposed Publication Study Group.

- d. Relations with other Organizations (Annual Report 96, p.30)
SCOR WG 105 (see Implementation of PICES V Decisions, item e.)

PICES co-sponsored the ICES Symposium on the Role of Physical and Biological Processes in the Recruitment Dynamics of Marine Population. The Symposium was held September 22-24, 1997, in Baltimore, Maryland, U.S.A. Dr. Dan Ware represented PICES on the Scientific

Advisory Committee for this ICES Symposium.

PICES Seventh Annual Meeting

The Seventh Annual Meeting will be held in Fairbanks, Alaska, U.S.A. in October 1998. The program of the meeting will include sessions of invited and contributed papers organized by the indicated committees on the following topics (see *Endnote 7* for proposal):

- a. **Science Board Symposium:** “The impacts of the 1997/98 El Niño event on the N. Pacific Ocean and its marginal seas”. Co-Convenors: Howard J. Freeland (POC, Canada), William Peterson (BIO, U.S.A.) and TBD (FIS). The symposium should include reports on the changes of the physical and chemical environments, and the resulting impacts on the biological system including the entire ecosystem from the plankton to the commercial fisheries.

As the papers presented in PICES VII on the subject of the 1997/98 El Niño will, of necessity, be of a preliminary nature, another symposium was proposed as a means to expose data sets to public view and to encourage partnerships and co-operation among the PICES scientists. Science Board recommends that Drs. Paul H. LeBlond and Warren S. Wooster investigate opportunities to sponsor a major symposium on the 1997/98 El Niño in 1999 or 2000 in cooperation with other international organizations. The group will report to the Science Board Chairman and decision will be taken at the next Annual Meeting. Following the second symposium a volume of proceedings should be produced that will document the impact of the El Niño event on the regions of interest to PICES Nations.

- b. **Topic Sessions**

BIO Topic Session: “Controlling factors for lower trophic levels (especially phytoplankton stocks)”; Co-Convenors:

Vera Alexander (U.S.A.), Akira Taniguchi (Japan) and Paul J. Harrison (Canada);

POC Topic Session: “Decadal variability of the North Pacific climate”; Co-Convenor: James E. Overland (U.S.A.) and Masahiro Endoh (Japan);

POC/BIO Joint Topic Session: “CO₂ in the North Pacific”; Co-Convenors: Shizuo Tsunogai (Japan) and C.S. Wong (Canada)

MEQ Topic Session: “Science and technology for environmentally-sustainable mariculture”; Convenor: John E. Stein (U.S.A.)

MEQ/BIO Joint Topic Session: “Contaminants in high trophic level biota - linkages between individual and population responses”; Co-Convenors: Richard F. Addison (Canada) and Linda Jones (U.S.A.)

FIS/CCCC Joint Topic Session: “Climate change and carrying capacity of the North Pacific: recent findings of GLOBEC and GLOBEC-like programs in the North Pacific”; Co-convenors: Anne B. Hollowed (U.S.A.), Ian Perry (Canada) and Takashige Sugimoto (Japan).

- c. **Workshops and Working Group Meetings just prior to PICES VII**

REX Symposium/Workshop (2 days): “Small pelagic species and climate change in the North Pacific Ocean”. Steering Committee: Douglas Hay (Canada), Qi-Sheng Tang (China), Tokio Wada (Japan), J. Kim (Korea), Vladimir I. Radchenko (Russia) and L. Jacobson (U.S.A.); This Symposium/Workshop should be held in cooperation with GLOBEC-SPACC.

MODEL Workshop (2 days): “Lower trophic level modelling follow-up workshop”. Co-Convenors: Sinjae Yoo (Korea) and Richard Dugdale (U.S.A.);

Working Group 8 Meeting (2 days);
Working Group 11 Meeting (4 days);

Working Group 13 Meeting (2 days);
Working Group 14 Meeting (2 days)

d. **Annual Meeting Schedule**

Science Board and the Secretariat discussed the 1998 Annual Meeting schedule and agreed that the Committee business meetings should be scheduled Thursday afternoon October 22. The CCCC/IP meeting should be scheduled the morning of October 22.

Intersessional Meetings

Science Board reviewed the proposed intersessional meetings and made recommendation (see Decision *97/S/1*). The following meetings are to be convened:

- a. The MODEL Task Team Workshop on lower trophic level physiological process models should be held March 4-6, 1998, at the Bay Conference Center, Tiburon, CA, U.S.A. Co-convenors: Sinjae Yoo (Korea) and Richard Dugdale (U.S.A.).
- b. The second 4-day Okhotsk Sea Workshop should be held in November 1998 in Nemuro, Japan. Co-Convenors would be Yutaka Nagata (Japan), Vyacheslav B. Lobanov (Russia) and Lynne D. Talley (U.S.A.).
- c. MEQ Practical Workshop should take place for approximately two weeks in May/June 1998, in the Jiaozhou Bay (Quindao, China) or in September 1998, in the Masan Bay - Chinhae Bay region (Korea). Science Board recommended that the Chairman send letter to the Ministry of Agriculture and the State Oceanographic Administration (China) requesting approval for the Chinese Academy of Sciences to host the Workshop at the Institute of Oceanology at Qingdao. In the event that appropriate approval is not received by January 31, 1998, PICES should accept an offer from Korea to host the Workshop in the Masan Bay - Chinhae Bay region.

- d. The 4-day meeting of WG 12 should be held in the western side of Pacific, a suitable location for this meeting would be determined by the WG Co-Chairmen in consultation with Chairman of Science Board and PICES Secretariat.

Relations with Other Organizations and Programs

- a. The Secretariat reported that Governing Council has approved (*94/A/3*) a standing list of Organizations that are officially invited to participate in PICES activities. Letters inviting attendance at the Annual Meeting are sent by the Secretariat to these Organizations each year. Science Board recommends that Council expands the PICES Standing List to include Inter-Governmental Organizations and national and international research Programs, whose activities are of interests to PICES (see *97/S/2d*, Appendix D).
- b. Science Board reviewed a draft MOU with ICES prepared jointly by PICES and ICES Secretariat and recommends its approval by Council (see *97/S/2a*).

Science Board recommends that the Secretariat explore the possibility of developing a MOU with IPHC (see *97/S/2b*).

- c. PICES received three requests on co-sponsorship and financial support: on the International Symposium on Oceanic Fronts and Related Phenomena, on the Sixth International Congress on History of Oceanography and on the International Symposium on Management and Mitigation of Harmful Algal Blooms. Science Board reviewed all requests and recommends no financial support.

Proposal of FIS Committee that PICES co-sponsors the ICES-NAFO Pandalid Shrimp Symposium in 1999 was discussed and Science Board recommends that PICES

sponsor the symposium without funding (see *97/S/8*).

Discussion on this matter led to recommendation that the Secretariat in consultation with Science Board will develop Guidelines for co-sponsorship of conferences over the next year for consideration and approval by Governing Council at PICES VII.

- d. Science Board recognises the scientific value of CREAMS and its achievements on the ocean environment and climate change and sees it as a successful example of international cooperation among PICES member countries, and strongly supports CREAMS-II in 1998-2002 as its continuation. Science Board recommends Governing Council endorse CREAMS-II as a valuable component of research programs within the PICES framework. Science Board recommends that the Chairman write a letter accepting the CREAMS proposal to hold a workshop in conjunction with PICES VII. The letter should include a request to send a POC member, as an observer to the CREAMS planning meeting in February 1998 as PICES is interested in the direction of the research. The observer would report the results of the meeting to PICES (see *97/S/2e*).
- e. Science Board discussed the proposal by the Chairman of the Committee on Scientific Research and Statistics (CSRS) of the North Pacific Anadromous Fish Commission (NPAFC) to add fisheries catch statistics of non-anadromous fish to the NPAFC statistical yearbook. Science Board considered the NPAFC proposal regarding fish statistics and recommended that Council respond positively, indicating that after conclusion of a MOU, the two organizations should jointly work out requirements and procedures for developing a statistical database (see *97/S/2c*).

Proposed Travel

Science Board recommends Governing Council to approve financial support for the following scientists to participate in international meetings on behalf of PICES (see *97/S/7a*):

- i. Dr. Chang-Ik Zhang (FIS Chairman) - SCOR WG 105 meeting in Hobart (Australia) in January 1998;
- ii. Ms. Patricia Livingston (CCCC IP Co-Chairman) – First GLOBEC Open Science Meeting in Paris (France) in March 1998;

Science Board recommends to Council that the following requests for support be considered among others that may arise (see *97/S/7b*):

- i. two invited speakers for the Second Okhotsk Sea Workshop in Nemuro in November 1998;
- ii. one Chinese scientist, one Russian scientist and one non-PICES expert for the MODEL Workshop in California in March 1998;
- iii. two invited speakers for the POC Topic session at the PICES VII Annual Meeting;

PICES Publications

- a. Science Board reviewed a list of proposed publications and made recommendation (see Decisions *97/S/3*).
- b. Science Board reviewed the proposal of the CCCC Implementation Panel to initiate a new peer-reviewed scientific report series of PICES and proposal of POC to set translation policies for PICES and led to conclusion that PICES should create a Publication Study Group with the following terms of reference:
 1. Review questions of publication policy;
 2. Review questions of translation policy;
 3. Review desirability of establishing a peer review publication;
 4. Review desirability of establishing a PICES editorial board; and
 5. Review other matters concerning PICES publications.

Members of the Publication Study Group, which should report to PICES VII, are Drs.

Warren S. Wooster (Chairman), William G. Doubleday, Makoto Kashiwai, and Paul H. LeBlond.

PICES-GLOBEC CCCC Program Implementation Panel

The proposed statement of purpose, terms of reference and structure for the Implementation Panel were discussed, accepted by Science Board and recommended to Council for approval (see Decision *97/S/6a*, Appendix C (i)-(iii) to Council minutes).

New Technical Committees and Working Groups

Science Board discussed the future of the existing Working Groups and the proposed new Working Groups and Task Teams and made recommendations to Council (see Decisions *97/S/4*, *97/S/5* and *97/S/6b*, Appendix B (i)-(iii) and Appendix C (iv) to Council minutes).

Data Management for CCCC Program

Science Board recommends that the TCODE Chairman and one of the CCCC/IP co-chairmen draft a letter to each of the national GLOBEC programs in the PICES area to determine the status of their data management and exchange policies.

Preparation for Election of Science Board and Committees Chairmen

At PICES VII, October 1998, Chairmen of Science Board, BIO, MEQ and POC will be replaced. Science Board proposed that all Chairmen prepare a draft of a review of activities during his/her term of office and a proposal of strategic workplan for the next three years by intersessional communication for discussion at PICES VII prior to the election of new Chairmen. The discussion and revision of the strategic workplan should be completed during the Committee meeting and be reported to the Science Board for approval.

Science Board Recommendations

Discussion of Scientific and Technical Committee, Working Group and the CCCC Implementation Panel reports along with other issues considered led to a set of Recommendations for presentation to Council for approval (see Appendix to Council minutes, Decisions of Council).

Scientific Program

An interdisciplinary one-day BASS Symposium was organized by the Science Board to review contemporary knowledge of physical forcing and ecosystem response at all trophic levels, with a view to exploring the differences in response on the two sides of the Pacific. The following papers were presented and Dr. Paul Harrison won the Best Presentation Award for this session.

Ecosystem dynamics in the eastern and western gyres of the subarctic Pacific. Co-convenors: Richard J. Beamish (Canada), Suam Kim (Korea), Makoto Terazaki (Japan) and Warren S. Wooster (U.S.A.).

Y. Sekine

On the variation in subarctic circulation in the North Pacific.

P.J. Harrison, P. Boyd, S. Takeda, D.E. Varela & T. Odate

Phytoplankton dynamics in the northeastern subarctic Pacific Ocean: bottom up and top down control.

M.J. Kishi & B.W. Frost

Ecosystem dynamics in the eastern and western gyres of the subarctic Pacific - lower trophic modelling.

A Taniguchi

Possible differences in structure at lower trophic level of ecosystems in the eastern and western subarctic Pacific.

D.L. Mackas & A. Tsuda

Mesozooplankton in the eastern and western subarctic Pacific: community structure, seasonal life history, and interannual variability.

R.D. Brodeur, S. McKinnell, K. Nagasawa, W. Pearcy, V.I. Radchenko & S. Takagi
Epipelagic nekton of the North Pacific subarctic and transition zones.

R.J. Beamish & K.D. Leask
Midwater fishes of the North Pacific gyres: their ecology, distribution and abundance.

A.M. Springer, V.P. Shuntov, V. Vladimirov, A. Kuzin, A. Perlov & J.F. Piatt (presented by G. van Vliet)

Marine birds and mammals of the western and eastern subarctic gyres of the North Pacific).

Endnote 1

Participants

Makoto Kashiwai (Chairman, Science Board)
Tsutomu Ikeda (Acting Chairman, BIO)
Chang-Ik Zhang (Chairman, FIS)
Richard F. Addison (Chairman, MEQ)
Paul H. LeBlond (Chairman, POC)

Other

Robin Brown (Chairman, TCODE)
Yutaka Nagata (Co-Chairman, CCCC/IP)
Patricia Livingston (Co-Chairman, CCCC/IP)

Bruce A. Taft (Chairman, WG 9)
William G. Doubleday (Chairman, PICES)
Warren S. Wooster (Chairman ex officio, PICES)
W. Doug McKone (Exec. Secretary, PICES)
Alexander Bychkov (Asst. Exec. Secretary, PICES)

Lev N. Bocharov (Russia)
Satsuki Matsumura (Japan)
Igor Shevchenko (Russia)

Endnote 2

Science Board Agenda October 19 and 25, 1997

1. Welcome and Opening Remarks
2. Adoption of Agenda and Timetable
3. Tasks for Scientific and Technical Committees agendas
4. Handbook for Chairmen and Convenors
5. Reports of the Scientific and Technical Committees, CCCC-IP/EC and Working Groups
 - 5.1. Fishery Science Committee
 - 5.2. Physical Oceanography and Climate Committee
 - 5.3. Biological Oceanography Committee
 - 5.4. Marine Environmental Quality Committee
 - 5.5. Implementation Panel on CCCC
 - 5.6. Technical Committee on Data Exchange
 - 5.7. Working and Study Groups
 - 5.7.1. Working Group 9 on Subarctic Monitoring
 - 5.7.2. Study Group on PICES Communications

6. Reports and Recommendations on Implementation of PICES V Decisions
 - 6.1. PICES-GLOBEC CCCC Program (96/S/1)
 - 6.2. Publications 1996-1997 (96/S/2)
 - 6.3. PICES Inter-session Meetings 1996-1997 (96/S/3)
 - 6.4. Implementation of WG 9 Recommendations (96/S/4)
 - 6.5. Cooperation with SCOR: WG105 (96/S/5)
 - 6.6. PICES Perspectives, Interagency coordinating mechanism (96/S/6)
 - 6.7. Access for Cooperative Research (96/A/8)
7. Reports and Recommendations on Implementation of PICES IV Decisions
 - 7.1. Geographic Features of the Okhotsk Sea Region (95/S/3)

- 7.2. Completion of WG 3 Inventory (95/S/6)
- 7.3. Participation at Scientific Meetings (95/S/3,4)
- 7.4. Application of PICES Guidelines for oral and poster presentation (95/S/9)
- 7.5 Best Presentation Awards
- 8. Reports and Recommendations on Implementation of 1996 Science Board Decisions
 - 8.1. Committee Membership (Annual Report 96, p.31)
 - 8.2. High Resolution Bathymetry for PICES Region (Annual Report 96, p.31)
 - 8.3. Book on Biological and Fisheries Aspects of the Okhotsk Sea (Investigations on the Ecosystem of the Okhotsk Sea) (Annual Report 96, p.31)
 - 8.4. Relations with other organizations (Annual Report 96, p.30)
- 9. Proposed Scientific Sessions and Symposia for PICES Seventh Annual Meeting
 - 9.1. Science Board Symposium
 - 9.2. Topic Sessions
 - 9.3. Schedule 1998 Annual Meeting
- 10. Planned and Proposed Future Meetings / 1998-1999
 - 10.1. Plan of and preparation for meetings / Decisions 1996 MODEL Task Team Workshop (early 1998, California, U.S.A.)
 - 10.2. Okhotsk Sea Workshop (June 1998, Nemuro, Japan) [POC and CCCC-IP]
 - 10.3. MEQ Practical Workshop (spring, Qingdao, China) [MEQ]
 - 10.4. Proposed future meetings / for Decisions 1997
- 11. Reports and Recommendations on Relations with Other Organizations and Programs
 - 11.1. Cooperation with international research programs (96/S/6)
 - 11.2. Memorandum of Understanding with
 - 11.2.1. International Council for the Exploration of the Sea
 - 11.2.2. International Pacific Halibut Commission
 - 11.3. Policy for co-sponsorship of conferences and response to the funding requests for conferences
 - 11.4. Proposed Travel
- 12. Proposed PICES Publications / 1997-1998
 - 12.1. Bering Sea Review Volume
 - 12.2. BASS-97 Symposium
 - 12.3. REX-97 and MODEL-98 Workshops
 - 12.4. Working Group 9 Report
 - 12.5. Working Group 10 Report
 - 12.6. Working Group 11 Report
 - 12.7. Working Group 12 Report
 - 12.8. Communication Study Group Report
 - 12.9. Multilingual Nomenclature in the Okhotsk Sea Region
 - 12.10. Investigations on the Ecosystem of the Okhotsk Sea (translation from Russian)
 - 12.11. PICES Handbook and Handbook for Chairmen and Convenors
 - 12.12. PICES Press and PICES CCCC Newsletters
- 13. Proposed new Technical Committees and Working Groups
- 14. Data Management for CCCC Program
- 15. Preparation for Election of Science Board and Committees Chairmen
- 16. Summary of Science Board recommendations to Governing Council
- 17. Closing remarks

Endnote 3

Composite Agendas of Scientific and Technical Committee Meetings

Technical Committee on Data Exchange

October 18, 09:00-17:30; October 23, 13:30-17:30

- 1.1 Introduction of members
- 1.2 Review of PICES meeting plan/TCODE meeting objectives
Review TCODE meeting times
Meetings of other committees and Issues (assign individuals to report back); requirements for Science Board meeting
Annual Report
Recommendations for Science Board
Review relevant activities in other committees and Working Groups
- 1.3 Approval of Agenda and addition of New Items
- 1.4 Review of Progress on issues from last year
 - 1.4.1 Inventory of Long Time Series
 - 1.4.2 Other Internet Resources
 - 1.4.3 Communications Study Group
- 1.5 Bering Sea Metadatabase (Megrey)
- 1.6 MIRC - new agency in Japan
- 1.7 Data Management for CCCC Program
- 1.8 New business
- 1.9 Work Plan for 1997/1998
- 1.10 Recommendations to Science Board

Physical Oceanography and Climate Committee

October 22, 08:30-17:30

1. Welcome to new members
2. Approval of agenda
3. Minutes of last meeting
4. Business arising from last year's meetings: (pp 107-110 in last year's annual report)
 - a. WOCE Pacific Workshop publication
 - b. State of the Ocean
 - c. Bathymetry information
 - d. Other
5. Okhotsk Multilingual Nomenclature (Nagata and Lobanov)
6. WG 10 Report (Byun and Mooers)
7. Sea of Okhotsk Symposium in Nemuro (Nagata)

8. The future of WG 9 - disband or create a permanent committee?
9. Training courses on marine data and information management (Martynov)
10. Brochure with possible title "Application of Satellite Remote Sensing over the North Pacific" (Martynov)
11. Trans-Pacific Kuroshio-Oyashio influences - how to address? As WG? As part of CCCC- BASS?
12. 1998 Symposium Topic
 - POC/BIO session on CO₂ in the N. Pacific?? (Tsunogai)
 - The 97/98 El Niño in the North Pacific?? (Freeland)
13. New Working Group topics - WG on CO₂ (and other tracers?) in the N. Pacific?? (Tsunogai)
14. Organization of scientific presentations.
15. Other topics
16. Draft of report to Science Board.

Fishery Science Committee

October 22, 13:30-17:30

1. Discussion and approval of agenda of FIS Committee meeting
2. Review of the implementation of PICES V decisions
 - 2.1 Review and comment the WG 12 Report
 - 2.2 WG 3 Inventory
Russian member of FIS should provide the names of their scientists working on pelagic species to complete WG 3 inventory (95/S/6)
3. Scientific items of the interests
 - 3.1 Review the scientific activity in the CCCC Program and the reports of REX, BASS and MODEL
 - 3.2 FIS role in the CCCC Program and the international GLOBEC members should identify the main scientific activities which are related to the CCCC Program and the international GLOBEC
 - 3.3 SCOR WG 105 activity

- 3.4 Review the work of PICES WG 12, and discussion of the WG recommendation for the next year
- 3.5 Relationship with regional fisheries organizations or commissions
- 3.6 Possibility to establish another working group
- 4. Proposals for the session topic for PICES VII
- 5. Discussion of Best Presentation Award from FIS
- 6. Discussion of any other arising issues

**Marine Environmental Quality Committee
October 22, 13:30-17:30**

- 1. Welcome and introduction of members
- 2. Minutes of previous meeting (Nanaimo)
- 3. Report of WG 8 meeting (Pusan)
- 4. Discussion of Qingdao Practical Workshop
 - a. scientific aspects
 - b. funding implications
- 5. Report on MEQ Scientific Session (Pusan)
- 6. Report on Joint BIO/MEQ Scientific Session (Pusan)
- 7. Input of long time series data to TCODE
- 8. Any other business

**CCCC Program/Implementation Panel
October 21, 13:30-17:30**

- 1. Task Team Progress Reports
 - 1997 accomplishments
 - 1998 planned activities

- Progress towards meeting implementation plan goals
- 2. Status of cooperation with other programs
 - IPHC
 - ICES GLOBEC
 - IGBP GLOBEC
 - NPAFC
- 3. Proposals for CCCC Program changes/updates
 - Structure (Terms of reference, new Task Teams, executive committee & task team composition)
 - implementation plan revision (content, target dates for phases)
 - Use of CCCC time at Annual Meeting
 - more science content?
- 4. Communication
 - CCCC newsletter (proposed outline attached)
 - PICES CCCC web page content
 - history ,description, and terms of reference of CCCC Program
 - current composition of the group
 - task team reports
 - Science plan/implementation plan
 - updated regional program tables (update frequency?)
 - upcoming events
 - articles for other GLOBEC newsletters
- 5. Presentations
 - PICES CCCC Data Management and Exchange - Robin Brown (TCODE)

Endnote 4

Handbook of Guidelines

I. Introduction

The primary purpose of this Handbook is to describe the duties and responsibilities of Chairmen and Convenors of the various Scientific Committees, Groups, Symposia, Topic and Paper sessions and any other meetings established, organized, or sponsored by the North Pacific Marine Science Organization (PICES). Further, a secondary purpose is to briefly specify the function and composition of

these Committees and Groups. The Handbook is intended to identify necessary tasks and working procedures, assist in the efficient organization and completion of tasks (including the conduct of meetings) and, as a result, help facilitate, improve, and enhance the work of the Organization. These Committees and Groups include Science Board, Scientific and Technical Committees, Working and Study Groups, Task Teams and various other expert groups set up by the Governing Council.

Some of the responsibilities and functions of the Committees and Working Groups and their Chairmen are defined in the Council's Rules of Procedure. These Rules can only be changed with the agreement of Council by giving two months notice or agreement of Council (Rules of Procedure 20). Proposals must be submitted as a recommendation to Council at the Annual Meeting, which, if accepted, would take effect upon adoption, by the Council.

II. Science Board

The Board consists of the Chairmen of the permanent Scientific Committees together with a Chairman elected by the Board (Rules of Procedure 14(i), 16(iii)) for a three-year term from among the Delegates, Alternate Delegates, experts, and advisors (Rules of Procedure 14 (i)). Parties to the Convention not represented on the Committee can appoint a member. The Science Board has the responsibility to provide the Council with recommendations on various aspects of scientific interest and carrying out the Council's scientific work including giving guidance to the Scientific Committees and Groups. The Science Board shall:

1. Have general oversight over:
 - a. the scientific interest of Council and its scientific works;
 - b. the programs of research recommended by Council;
 - c. the arrangements for carrying out Council's scientific work and the programs of research recommendations or coordinated by it; and
 - d. the arrangements for discussing all the foregoing matters at the Council's meetings, including the organizing of special scientific meetings.
2. Be responsible for advising Council on all matters mentioned in sub-paragraph (1).
3. Give guidance as it may deem necessary to Scientific Committees and Groups as to the performance of their functions.

4. Review and make recommendations to Council concerning proposed transmittal of scientific advice to Parties to the Convention or an international body that requested such advice.
5. Consider at each Annual Meeting of Council the reports from all the scientific and *ad hoc* Committees and Groups and report thereon to the Council with special reference to any expenditures involved; and
6. Advise Council on publications subject to the availability of funds.

(See Rules of Procedure 14 (ii) a, b, c, d, e, and f for more details).

Annual Meeting

1. Chairmen of Scientific and Technical Committees, Working Groups that report to Science Board, and Scientific Programs such as the CCCC shall prepared the following information for the Science Board meeting:
 - a. a summary report that includes highlights of their meeting which have been reviewed by the members;
 - b. an annual report be prepared and circulated to members for final review and comment by the end of the Annual Meeting. The revised report should be provided to the Secretariat no later than one month after the Annual Meeting;
 - c. a draft of all proposed recommendations to Council that will be included in the Science Board report;
 - d. proposed Topic and Paper sessions and Symposia for the next Annual Meeting that includes a short paragraph of the goals of the sessions suitable to be put in the First Announcement;
 - e. a proposed list of future scientific and Working Group meetings that includes time and venue;
 - f. a proposed list of PICES publications for the next year;
 - g. a proposed list of any new special groups along with terms of reference;

- and
- h. draft text for any other items that would be expected to form part of the text of the Science Board report.
2. The Secretariat in conjunction with the Science Board Chairman will develop a draft outline for the Science Board Report based on the agenda, no later than one month before the Annual Meeting. The outline would be circulated to all SB Members for review and comment. A second draft of the report based on information provided to the Secretariat from the various meetings of all the Committees, Programs (CCCC) and Science Board Working Groups during the Annual Meeting will be circulated at the start of the SB meeting as a focus for discussion. Chairmen must give the Secretariat draft material as soon as possible (i.e. preferably 2 days before but no later than the morning before the SB meeting) to put into the draft outline of the SB Report.
 3. During its final meeting, Science Board will review, approve and submit the report to members of Council (i.e. 0830 the next morning) for their review in preparation for the Council meeting in the afternoon.

III. Scientific and Technical Committees

There are currently four Scientific Committees and one Technical Committee (see Appendix 1). Each Scientific Committee elects a Chairman from amongst its members for a period of three years. The Chairman takes office at the conclusion of the Annual Meeting at which elected. Each Party to the Convention appoints no more than three members to a Scientific Committee and two members to a Technical Committee.

The Committees are responsible for keeping under review and coordinating scientific investigations in the subject or area defined by the Committees responsibility. The Chairman's responsibility involves:

1. Chairing meetings.
2. Preparing agenda for meetings.
3. Communicating with Committee members and ensuring that work is carried out in accordance with the program and to obtain records thereon.
4. Compiling a general review of the work done and results achieved.
5. Annually furnishing Science Board with a summary report of the Committee's deliberations and recommendations together with an annotated estimated of their financial needs.

(See Rules of Procedure 16, 17 and 18 for more details).

The Secretariat maintains a current list of members of each Committee. The Chairman is informed whenever a Party to the Convention appoints or replaces members to a Committee

IV. Working Groups

A Working Group (WG) is a group of experts that is established with specific terms of reference, by Council, based on the recommendation of Science Board. Most WGs report to Scientific Committees, other directly to Science Board. Most WGs meet annually to undertake specific tasks within their terms of reference. Each Party to the Convention decides on the names and number of scientists that it wishes to appoint as members. Science Board selects the Chairman from among its members and he/she serves in the position for the duration of the WG. The Secretariat maintains a current list of members of each Working Group. The Chairman is informed whenever a Party to the Convention appoints or replaces members to a Working Group. The Working Group:

1. Normally functions for not more than three years.

2. Makes a progress report at the Annual Meeting.
3. Prepares a final report at the end of its task.
4. Maintains close contact with the parent committee to ensure the task is undertaken as envisioned.

The responsibility of the Chairman is to ensure that the specific task assigned to the WG by Council is carried out. This involves:

1. Making plans for meetings of the Group including preparation of an agenda and work schedule in consultation with the other members.
2. Chairing meetings.
3. Annually, overseeing the preparations of the Group's report to its parent Committee.

V. Scientific Programs

The guidelines for the CCCC Program are being developed over the next year.

VI. Membership and Elections

1. The Parties appoint members in Scientific Committees, Working Groups and Technical Committees. The official membership of each Scientific Committee is limited to three per Party and two for each Technical Committee. Working Group membership is not limited.
2. The members of Scientific Programs and other Groups are suggested by Science Board and appointed by the Parties.
3. The Chairman of Science Board is elected by the Board from amongst the Delegates, Alternate Delegates, experts, and advisors and shall not seek re-election for the immediate succeeding term.

4. Chairmen of Scientific Committees are elected from amongst their members. Chairmen shall not seek re-election for the immediate succeeding term.

5. Science Board in consultation with the Chairman of Council appoints the [first] Chairmen of Technical Committees, Working Groups, Scientific Programs and Other Groups from among the members of such Groups. [Succeeding Chairmen are elected from among the members.]

6. Chairmen of Science Board, Scientific Committees, Technical Committees and Scientific Programs and other Groups serve three years terms and take office immediately following the Annual Meeting in which they are [elected or appointed.]

7. The Chairmen of Working Groups serve for the life of the Group, which usually does not exceed three years.

8. The Executive Secretary is responsible for carrying out the election of all Chairmen at the Annual Meeting in which the term of the incumbent ends. Nominations will be called for election of Chairman and a secret ballot will be used when more than one candidate stands for the office. The Executive Secretary will count the votes and inform the members of the winning candidate.

9. Except in the case of Science Board elections, members from any Party have only one single vote among them for candidates in the election.

VII. Scientific Sessions

1. Scientific sessions are organized by Scientific Committees and by Science Board. In the case of the Scientific Committees, they consist of invited and/or contributed papers on topics selected by the Committee (Topic Sessions) or contributed papers (Paper Sessions) relevant to the interests of the Committee. Sessions of one

Committee are often scheduled in parallel with those of another. Scientific sessions organized by the Science Board are usually on selected topics deemed to be of interest to all committees and are usually scheduled without competition from other sessions.

2. Scientific Committees have the responsibility to organize sessions they sponsor, including designation of convenors for their Topic Session. Committee Chairmen normally convene their Paper Sessions or designate other Committee members to undertake this responsibility.
3. Convenors of Topic Sessions have the responsibility to select papers for oral or poster presentation and schedule papers for those sessions; contributed papers to the Paper Sessions assigned to the Committee are selected for oral or poster presentation and are scheduled by the Committee Chairman. Science Board has the responsibility to organize sessions it sponsors, including designating the Convenors who select and schedule papers for oral or poster presentation for those sessions.
4. Convenors should be identified and their names and method of contact given to the Secretariat as soon as possible preferably within one month after the end of the Annual Meeting.
5. Convenors in consultation with the parent Scientific Committee, provide the Secretariat with the names and method of contact for special invited speakers (currently one for SB and one each for each of the four Scientific Committees) who are to receive PICES financial support. These scientists should be selected based on the premise that they will present an important paper at a Symposium or Topic Session and make a major contribution to the meeting. They should not be scientists that would normally be expected to attend PICES meetings, as their interests are not in the northern North Pacific.
6. Copies of contributed abstracts are to be sent to the Secretariat preferably through the PICES Home Page, e-mail or by fax. Mail should only be used as a last resort. Speakers must provide the Secretariat with abstracts of their presentation before July 1.
7. Convenors must notify the Secretariat of invited speakers to their Topic Session by July 1. Invited speakers should submit an abstract to the Secretariat preferably through the PICES Home Page, e-mail or fax before the end of July.
8. Copies of the abstracts are sent by the Secretariat to the Convenors of Topic Sessions or to the Chairmen of Scientific Committees, as appropriate. The Chairman of Scientific Committees will also receive a list of the Topics Session papers, as appropriate. Science Board Chairman will receive copies of abstracts submitted for Science Board Sessions plus a list of all abstracts received for the Scientific Sessions, that indicates where copies have been sent.
9. All speakers are to provide a designated number of extended abstracts at the time of their talks.
10. The Secretariat will notify the lead author of the acceptance of the paper for oral or poster presentation, and the author is required to confirm (by a certain date) that he/she will attend the meeting to present the paper. Authors of posters will also be required to confirm (by a certain date) whether they or someone acting on their behalf will come to present their poster.
11. Upon receipt of those who will attend the meeting to present their papers orally or by poster, the Secretariat will notify Convenors of Topic Sessions and Committee Chairmen of the results and given a few days to make

any adjustments in their schedules prior to publication in the program.

VIII. Oral and Poster Presentations

1. Introduction

This set of guidelines is developed to promote effective international and interdisciplinary understanding among PICES members who come from different cultures and speak different native languages. Scientists who present papers at meetings have a responsibility to present their information in a way that is easy for the audience to understand.

The guide provides advice and observations on preparing and delivering a scientific presentation at PICES meetings. The focus is on both invited and contributed talks. Studies show that we retain much more of what we see than what we hear and we best retain what we see and hear together. A speaker brings his subject to life for the audience through personal involvement and familiarity with it. Thus, if a scientific talk presents a balance of visual and verbal stimuli, the audience is in the best position to absorb and retain the information presented.

2. Preparation

- a. It is very important to the success of the program that authors develop a talk that can be given in the allotted time. Once the presentation has been drafted, authors should rehearse and refine the talk to ensure the central theme is being clearly presented in the allotted time. The more you practise and adjust the talk to fit the time allowed, the better chance that the audience will understand the talk. Remember convenors are entitled to hold speakers to their assigned times.
- b. When preparing a talk, consider that you must speak slowly and clearly to be understood. Remember that even a native English speaking audience may

find it difficult to follow a fast delivery, and it is disastrous for those whose native tongue is not English. Keep the word choice simple and active, and sentences should be short and to the point.

- c. Narrow the focus rather than try to cover a large, complex topic with generalities in a short period. Even if the topic is an overview, pull out one or two of the most important points that support the generality.
- d. Before you begin drafting a talk you must define the purpose and topic, and the appropriate depth and scope of the information you will present. A successful scientific talk is based on how clear the subject is presented. In preparing your presentation, ask yourself a few questions (suggestions below), the answers to which you can incorporate in the talk to help bring the subject to life and make it memorable.
 - i. Why should other scientists be interested?
 - ii. How can I generate some excitement for the subject?
 - iii. How might scientists from other disciplines use this information?
 - iv. Can I spice up the talk by adding an emphasis, illustrative story or introduce a little humor to the subject.

The talk should stick to the topic of the submitted abstract. How well you present your material directly impacts on how well it is received.

- e. The talk should present your findings sequentially with simple words:
 - i. Outline the hypothesis that was tested,
 - ii. Ensure that the facts presented build a clear picture of the findings,

- iii. Always clearly differentiate between fact and opinion.
- f. Prepare a visual piece that can be shown any time to deliver a closing message or summary. One should be able to go through this in no more than a minute or two. A brief conclusion or summary is far better than leaving your audience without a clear message. This will be most helpful if for some reason the allotted time has expired.
- g. Mathematical equations and symbols do not necessarily strengthen the aim of the talk. They do slow the pace, make it hard to understand (even for experts) and create an opportunity for confusion. If equations, calculations and symbols are crucial to your talk, consider preparing an extended abstract for later study by those who request it. You can then concentrate on explaining the relevance of the mathematics and symbols. If you must use mathematics, slowly talk your audience through each equation step by step. Do not assume that the audience grasp their relevance.
- h. Presenting a talk is a chance to face criticism. If you are defensive of criticism, the presentation will not likely raise interest in discussion by the audience.

Slide and Overhead Preparation

Many public speaking experts contend that visual aids ruin more presentations than they improve. The answer lies in the fact that there is a right way and a wrong way to present visual material. Visual aids are vehicles for enhancing or facilitating the understanding of the spoken word.

1. Devote each slide/overhead to a single fact, idea, or finding. Illustrate major points or trends, not detailed data. Each visual aid shown must enhance, support, exemplify and/or facilitate understanding of the

material covered in the talk. Two or three facts or information points per image are best; six are considered the absolute maximum. Each slide/overhead should remain on the screen at least 20 seconds.

2. All information presented should be brief and concise. It should be presented in the most comprehensible format and edited to the minimum number of words possible. Use bold characters and the absolute minimum number of words in titles, subtitles, captions and key phrases.
3. Slides/overheads must be well designed, simple and legible to everyone in the audience. It is worthwhile to consider getting professional help to make slides and overheads. It is important to consider that if the visual aid is not visible and legible to all the audience, it isn't an aid.
 - i. In most circumstances do not make slides/overheads from illustrations or tables that were prepared for publication. They are rarely satisfactory.
 - ii. Use a uniform bold face type and combine upper and lower case letters. Do not use fancy fonts.
 - iii. Use large type for headings and smaller type for subheadings to show relative importance.
 - iv. Use contrasting colors where possible for emphasis, distinction and clarity.
 - v. Legible font size of letters and numbers for slides/overheads is 24 point on letter size paper.
 - vi. A good way to test your material is to stand 30 cm away for every 2.5 cm of original copy width (about 420 cm from a letter size sheet of paper). If you cannot read it at that distance, then your audience will not be able to read it either when it is projected.
 - vii. Guide to charts and tables;
 - Word charts (lists) of no more than 36 words per visual piece

- (maximum of six lines with six words each).
- Pie charts for percentages.
 - Bar graphs (horizontal) or column charts (vertical) for comparisons and rankings.
 - Column or line charts for changes over time and frequency.
 - Bar graphs and dot charts for correlation.
 - Generally, do not use more than one or two curves on a chart; three or four are maximum but only if well separated.
 - Only use tables when it is not possible to use charts.
 - Each slide/overhead table should not be more than three or four vertical columns or six to eight horizontal lines. Any more information will not be legible.
 - Do not use ruled vertical or horizontal lines in a table as they distract the eye and confuse the reader in understanding the information on the slide.
4. Do not load too much visual material into a talk. Use as few slides/overheads as are really needed and can be properly discussed in the time allotted. A general rule is one for each 1-2 minutes of presentation.

Poster Sessions

Poster presentations are as important as oral presentations. Care should be taken to present the material in a clear logical manner. Many of the points made above under "Preparation" and "Slide and Overhead Preparation" should be taken into account as you develop your poster. It is recommended that you read these before developing your poster.

1. Poster boards are set up near to where coffee is served in order to provide easy access during breaks. Authors are requested to be available during these times to explain their work.

2. Provide a list of times, other than during breaks, when you would be there to provide explanation.
3. Unless otherwise notified by the PICES Secretariat posters can remain in place throughout the meeting.
4. The Secretariat will notify each author of the size of the board available. This varies from venue to venue.

Extended Abstract

1. Short abstracts are required to judge papers for oral or poster presentation. In order to facilitate understanding by participants, speakers and poster presenters are required to also provide advance copies of their presentation in the form of extended abstracts. The number of copies to be provided will be in the letter of acceptance of papers for oral or poster presentation.
2. Extended abstracts should not exceed 2,500 words plus tables and graphs. The extended abstract should include:
 - a. Title,
 - b. Authors name, affiliation, e-mail and mailing address,
 - a. What you did,
 - b. How you did it,
 - c. What you found out, and
 - d. What your findings mean.
3. The extended abstracts should reinforce important information, provide summaries and reading lists, and supply-supporting data such as mathematical equations, tables, graphs and detailed relational or organizational information that would help better understand your paper.

Helpful Hints

1. Do not waste time by reading visual aids to the audience instead of giving the talk.
2. Practice makes perfect so practise, practise, practise.
3. Out of consideration for other speakers, stay within the time allotted.
4. Speak slowly and clearly. Keep the word choice simple, active and sentences short. Words should reinforce the visual material.
5. Speak into the microphone towards the audience at all times. If you need to see what is being shown on the screen, have copies with you at the speaker's rostrum. If available, use a hand held microphone to give you flexibility.
6. Do not stand in front of the projection and obstruct the view of the audience from seeing your visual material.
7. Be systematic in presenting overheads. Nothing confuses an audience more than a speaker who is continually searching for overheads.
8. Use a pointer to emphasize what you wish the audience to focus on.

Endnote 5

Working Group 9: Subarctic Pacific Monitoring Final Report

Previous Recommendations

At WG 9-1, 2 a number of proposals for monitoring projects were made. Some of these involved new efforts and others involved enhancements of continuing programs. A summary of the status of these projects follows.

1. Long-term measurement of exchange of water between the Bering Sea and the N.

References

This paper draws upon guidelines used by the Oceanographic Society and the American Geophysical Union. Some points are taken from the following references:

1. Morikawa Y., Ookura, I. and Takahashi, T (1990) Skilful Preparation for Scientific Papers Presentations, Kodansha-Scientific, Tokyo. (In Japanese)
2. JIRCAS (1995): For Attractive Science Presentations, to communicate what to be presented 120%, JIRCAS Workshop No. 24, December 12, 1995. (In Japanese)

Appendix 1.

Scientific Committees

Fishery Science Committee (**FIS**)

Physical Oceanography and Climate Committee
(**POC**)

Biological Oceanography Committee (**BIO**)

Marine Environmental Quality Committee
(**MEQ**)

Technical Committees

Technical Committee on Data Exchange
(**TCODE**)

Pacific by electromagnetic measurement (conducting cable) of the southward transport of the E. Kamchatka Current through the Kamchatka Strait.

Status: No progress.

2. Ecosystem moorings deployed in the western and eastern Subarctic Gyres to describe the dynamics of response of the

ocean and plankton populations to atmospheric forcing.

Status: JAMSTEC is designing a surface mooring to deploy in the Subarctic; the location under consideration is in the Subarctic Current in a region of high spatial variability.

3. There is a continuing XBT program to measure heat content in the Subarctic; recent decreases in sampling density (50%) threaten the usefulness of the data set. No measurements of salinity profile (XCTD) are made.

Status: No progress on either XBT sampling rate or inclusion of XCTDs.

4. A joint USA/Japan ship-of-opportunity flow-through program to measure surface physical and chemical variables is being run between Vancouver and Tokyo.

Status: No progress on recommendations to add a meridional track across the eastern Subtropical and Subarctic Gyres and measurement of upper-layer temperature and salinity profiles (XCTDs) along the ship tracks.

New recommendation

Gargett (1997) has presented an hypothesis relating changes in atmospheric forcing to survival of juvenile salmon during their migration after entering the ocean. It is based on the premise that there are changes in the stability of the coastal water column that mediate changes in primary productivity and higher trophic levels which govern the relative abundances of northern and southern salmon stocks. There is no data set that can be used to test this hypothesis. **Recommendation:** Occupy hydrographic sections to measure the stability distribution offshore to 150 km at a minimum of three locations along the eastern boundary (Alaska to California) with high resolution in the coastal zone.

New initiative

There is no systematic large-scale, low-frequency measurement of zooplankton abundance and species distribution in the Subarctic Pacific. A proposal has been made recently by Dr. P.C. Reid of the Sir Alistir Hardy Foundation for Ocean Science to initiate monthly tows with the Continuous Plankton Recorder in the PICES area. The Panel felt that this idea was attractive and should be evaluated by PICES. The usefulness of the data would be enhanced if the recorder could be engineered to change depth to integrate samples vertically. It would be imperative to collect ancillary environmental data, e.g. temperature, salinity, fluorescence.

Endnote 6

Report of the Study Group on Communications

1. Background

At the PICES Fifth Annual Meeting (October, 1996, Nanaimo, Canada) a Communications Perspectives report was submitted by Dr. Makoto Kashiwai to the Governing Council and Science Board (see complete text of the Communications Perspectives article in the 1996

Annual Report, p. 23-24). This report points out that “*effective communication is important to PICES because the work places of participants are widely scattered*” and “*it is important that PICES employ the developing technology in the most effective way to meet its goals and objectives*”. In response to the Communications Perspectives article, Science Board created a

Communications Study Group (ComSG) composed of Dr. Makoto Kashiwai (Science Board Chairman), Dr. Alexander Bychkov (Assistant Executive Secretary, PICES) and Mr. Robin Brown (TCODE Chairman) to review PICES communications needs and practices. The Study Group was requested to report to Science Board at the PICES Sixth Annual Meeting (October, 1997; Pusan, Korea).

2. Terms of Reference

The Communications Study Groups was not provided with detailed terms of reference. At the first meeting, the Group decided to adopt the terms of reference proposed in the Communications Perspectives document:

- a. Review existing electronic communication practices and procedures within PICES.
- b. Survey the electronic communication capabilities in member states.
- c. Determine the communication requirements of PICES participants and identify the present problems in meeting those requirements.
- d. Review technological developments of utility to PICES communications.
- e. Consider ways whereby participation in PICES activities might be enhanced through an expanded communications network.
- f. Develop a communication plan to meet the requirements of PICES participants and of the Organization, within the constraints of present and soon-to-be-available technology, together with estimates of anticipated costs.

3. Activities

The major activities carried out by the ComSG were:

- review of existing PICES communications policies and practices
- analysis of the PICES survey on electronic communication
- review of utilization of the PICES Web server.

The ComSG held two meetings at the PICES Secretariat and conducted the rest of the discussion by e-mail exchange. Discussion and analysis focused on the first three issues in the Terms of Reference.

4. Results

4.1 Review of existing communication practices of PICES Secretariat

4.1.1 Distribution of Reports, Newsletters and other printed information

Postage is used (i) to send non-urgent correspondence and (ii) to distribute bulky reports and printed matter (PICES Annual Reports, Scientific Reports, PICES Press, PICES Directory, Announcements & Posters for PICES Meetings, etc.).

Postage is the biggest portion of PICES communication expenditure. Postage expenses are directly correlated with activities of Committees, Working Groups and CCCC IP/EC. The percentage of postage cost relative to total communication expenditures sharply increased in 1993/94, when PICES began to publish the Scientific Report Series, and has remained reasonably constant during 1994-1997:

Table 1. Postage costs (percent of total Communication budget):

1993	1994	1995	1996	1997 (June)
33.8%	64.8%	63.2%	70.7%	~70%

Expenses are usually high in January - February and June-July due to the distribution of the Annual Report, Scientific Reports, PICES Press

and information for the upcoming Annual Meeting.

As mailing costs are significant, PICES maintains two levels of mail service. Official delegates and members of Committees, Working Groups and CCCC Implementation Panel (*about 180 people*) receive all PICES reports and printed material by air mail (relatively fast, but expensive); scientists, organizations and libraries from the General Mailing List (*about 600 members*) receive documents via surface mail (slower, but cheaper). Individual scientists on the General Mailing List do not receive PICES Scientific Reports and Annual Reports automatically, but requests are welcome at the PICES Secretariat.

4.1.2 Courier Services

Courier services are used only for time-sensitive and/or confidential correspondence

for the members of Governing Council, Finance and Administration Committee and Science

Board. In addition, courier service is used to deliver time-sensitive material to Annual Meeting Session Convenors when faxing would be more expensive. These constitute a very small percentage of the Communications budget.

4.1.3 Fax Communications

Fax is used (i) to send time-sensitive official documents for the members of the Governing Council, Finance and Administration Committee and Science Board, and (ii) to distribute specially formatted documents.

Expenses for fax communication have been declining as more PICES participants gained access to electronic mail. The decline in fax communication costs relative to total communication expenditure is shown below:

Table 2. Fax costs (percent of total Communication budget):

1993	1994	1995	1996	1997 (June)
12.9%	22.7%	17.0%	7.4%	~10%

The costs for fax communication vary significantly among PICES parties (fax rates for Canada and U.S.A. are approximately one-half the costs of faxes to China and Russia; rates for Japan and Korea are in between). Peak expenses are observed in June-August during preparation for the PICES Annual Meeting (sending of agenda and other documents for Governing Council and Finance and Administration Committee, abstracts for Convenors and Science Board members). Fax communications expenses are generally higher when PICES has meetings on the western side of the Pacific.

4.1.4 Electronic Mail and WWW

Electronic mail (E-mail) is used:

- to send all possible correspondence (including attached documents in Word, Excel, etc.)

- to distribute news related with PICES activities (including information on meetings, publications, etc.)
- for registration and abstract submission for PICES meetings.

World Wide Web (WWW) access through Web pages on the PICES WWW server is used for:

- archival information (reference materials, structure and rules of Organization, Annual and Scientific reports, etc.)
- data access information
- news distribution
- registration and abstract submission for PICES meetings
- ordering of PICES publications
- preparation and editing of documents (via ftp area)

Unlike fax and postal distribution, there are no incremental costs associated with e-mail and Internet usage by the Secretariat. The only expenses are for upgrades and maintenance of computer equipment and software. These expenses are part of the Equipment and Contractual Services budgets.

4.1.5 Conclusions and Recommendations

4.1.5.1 ComSG does not see any means of reducing postage costs without considerable effect on PICES goals, and recommends that the present policy of sending all PICES publications to all members of Council, Committees, Working Groups, and the CCCC Program be continued to foster interdisciplinary communication.

4.1.5.2 ComSG supports maintaining the higher cost air mail distribution of documents to members of the PICES Mailing List to ensure that this information is distributed in a reliable, timely and equitable manner to participants in all PICES Contacting Parties.

4.1.5.3 ComSG recommends that the Secretariat continue to "prune" the General Mailing List periodically by sending out response forms. This will help to contain the costs of mailing. Members from the PICES Mailing List should be automatically "enrolled" on the General Mailing List when appointments are ended or when Working Groups disbands.

4.1.5.4 ComSG suggests that Science Board and the Secretariat review the list of libraries that receives the complete set of PICES publications. The list should be noted on the PICES WWW server and in PICES Press. This will allow researchers to gain access to PICES publications through the closest or most appropriate sources within their country.

4.1.5.5 ComSG recommends that the Secretariat continue efforts to reduce expenditures on fax communication as participants gain access to e-mail and WWW, but there is likely little potential for further substantial cost savings. Savings in this area will come from reductions

in costs for fax service and from improvements in the exchange of binary files/attachments.

4.1.5.6 ComSG supports the Secretariat's initiative of "ordering" of PICES Reports and documents through the PICES web site and through order forms distributed with PICES Press (see also recommendation 4.2.2.4).

4.1.5.7 ComSG recommends that the PICES Secretariat assemble fully electronic versions of new reports and publications to allow for "print on demand" capability of reports when the initial print run is exhausted.

4.2 PICES Questionnaire on Electronic Communications

4.2.1 Summary of the Survey Results

The PICES Secretariat distributed a questionnaire on electronic communication to all participants at the PICES Fifth Annual Meeting. The results of the survey were analysed by the ComSG, circulated to Committee Chairmen and TCODE members for comment and published in the July, 1997 edition of PICES Press (Vol. 5; No. 2). The following is a short summary of the survey results:

Most PICES participants have access to e-mail and there has been rapid improvements in access to e-mail for Chinese and Russian participants during the last year. There is limited access to WWW in China and Russia (primarily due to high costs), but the situation is changing rapidly. Exchange of binary documents is a continuing problem and the results from the survey were confusing (and often contradictory) on which e-mail systems were capable (or incapable) of exchanging binary attachments. The difficulty (and confusion) over exchange of binary attachments is probably a combinations of problems with incompatible e-mail systems and the skills of the users. An ftp (file transfer protocol) site on the PICES server might provide a "work around" for the problems of binary attachments.

An electronic bulletin board would allow users to post (and read) files and messages relating to

selected topics or subject areas. Bulletin boards can be configured with areas that are accessible to selected users (e.g. members of a Working Group) or open to all participants to both contribute and read. There was limited support for an electronic “bulletin board” function. In particular, there were few respondents who would agree to contribute to such a bulletin board. There may be more support for a bulletin board focussed on specific issues. There was support for an ftp area on the PICES server to support exchange of binary documents. The main suggestion for improving PICES electronic communication was to remove barriers to e-mail and WWW access to colleagues in Russia and China to allow fuller participation. We received suggestions that it was important to keep the contents of the PICES web server up-to-date and provide interesting content, in addition to organizational reference information.

One important result from the survey was the rapid improvements in access to e-mail and WWW for scientists in Russia and China. One of our original conclusions was that PICES should help establish the infrastructure in those countries to improve communications, but this is no longer a valid approach. The infrastructure is now in place and working in these countries and the remaining barriers are primarily due to the high communication costs. These costs may also decline significantly over the next few years.

4.2.2 Recommendations

4.2.2.1 ComSG recommends that the PICES Secretariat establish ftp area(s) for exchange of binary documents.

4.2.2.2 ComSG recommends that PICES attempt to improve the content of the PICES WWW pages. Ideas and contributions should be solicited from Science Board, other Scientific and Technical Committees, the CCCC Program and Working Groups and these groups should be encouraged to take an active role in creating and maintaining (with the assistance of the Secretariat) material in their subject area.

4.2.2.3 ComSG recommends that PICES Committees consider the potential advantages provided by an electronic bulletin board in their activities and that a pilot bulletin board be established on the PICES web server if there is sufficient interest.

4.2.2.4 ComSG recommends that the PICES Secretariat provide a summary of WWW contents and “order form” to be distributed with PICES Press to allow users with limited WWW access to request printed versions of these documents from the Secretariat.

4.3 Analysis of recent activity on PICES webserver

4.3.1 General Usage

At the request of TCODE and the ComSG, the Secretariat started to record WWW access activity. Table 4 summarizes the activity on the PICES Web Server (by country) for the period April 4, 1997 to Aug. 22, 1997 and Table 5 lists some of the most frequently “visited” documents on the PICES Web server:

Table 4. Activity on the PICES Web Server for the period April 4, 1997 to Aug. 22, 1997:

Country	% of total "visits"	Comments
Canada	30.0	Excludes "ios.bc.ca" address
China	0.2	
Japan	11.0	
Korea	0.4	
Russia	0.8	Includes ".ru", ".su" addresses
U.S.A.	25.0	Includes ".com", ".edu", ".gov", ".mil", ".com", ".net" addresses
Other	32.6	Includes "unresolved" addresses

Table 5. The most frequently "visited" or "requested" documents on the PICES Web Server:

Document	Numbers of Requests
Annual Meeting Schedule	291
List of PICES publications(PicesPublications.htm)	228
WWW links (www.htm)	212
Announcement of Annual Meeting (announce.htm)	211
PICES list of Meetings (meetings.htm)	186
Description of Committees (comm.htm)	154
PICES Directory (names and addresses)	141
Structure and Rules of PICES (struct.htm)	139
CCCC Program description (cccc.htm)	135
TCODE Inventory of Long Time series (ltsintr.htm)	114
PICES Administration (admin.htm)	92

4.3.2 Ordering of printed publications

Ordering of PICES publications has been available through PICES web server since Jan.

Canada	6	Taiwan	3
China	4	Denmark	1
Japan	5	Netherlands	1
Korea	1	Germany	1
Russia	1	UK	1
USA	16		

5, 1997. Forty requests were received as of September 10, 1997, from the following countries:

The distribution of requests among different publications is as follows:

PICES Scientific Reports

No. 1 (WG 3 and WG 6)	9
No. 2 (WG 1: The Okhotsk Sea and Oyashio Region)	7
No. 3 (WS on Monitoring Subarctic North Pacific Variability)	18
No. 4 (CCCC: Science and Implementation Plan)	19
No. 5 (WG 7: Modelling on the Subarctic North Pacific Circulation)	14
No. 6 (WS on The Okhotsk Sea and Adjacent Areas)	14
No. 7 (WS on Model Development, MODEL, BASS, REX Reports)	3

The PICES Papers, 1992 7

PICES Scientific Workshop, 1992 7

Annual Reports and PICES Press

1992	7
1993	7
1994	8
1995	11
1996	15
PPress	50

4.3.3 Registration and abstract submission

The PICES Secretariat implemented on-line (WWW) and electronic (e-mail) registration and abstract submission for PICES-VI.

As of September 10, 160 people had registered with 90 registrations submitted via the PICES WWW registration page (56%). The summary of WWW registrations is as follows:

Canada	6/9 (66.7%)	Korea	33/33 (100%)
China	0/12 (0%)	Russia	4/29 (13.8%)
Japan	26/41 (63.4%)	U.S.A.	21/36 (58.3%)

A total of 39 abstracts (20.6%) were submitted by WWW. The methods preferred for abstract submission are shown below:

Country	by E-mail:		By Fax:		By WWW page	
Canada	11/14	(78.6%)	0/14	(0%)	3/14	(21.4%)
China	2/3	(66.7%)	1/3	(33.3%)	0/3	(0%)
Japan	27/41	(65.9%)	3/41	(7.3%)	11/41	(26.8%)
Korea	11/47	(23.1%)	20/47	(42.5%)	16/47	(34.4%)
Russia	57/61	(93.5%)	3/61	(4.9%)	1/61	(1.6%)
U.S.A.	12/20	(60.0%)	0/16	(0%)	8/20	(40.0%)

4.3.4 Ftp area for “group” preparation and exchange of documents

At the request of the Chairman of WG 10, the PICES Secretariat set up an ftp area on the PICES server to allow members of this Working Group to exchange binary documents.

4.3.5 Recommendations

4.3.5.1 ComSG recommends that the Secretariat encourage the use of the PICES WWW server by:

- advertising new subject areas (in PICES Press and/or via the General E-mail list)
- advising Committees and Working Groups of services and facilities that are available

4.3.5.2 ComSG recommends that the monitoring of WWW server usage be continued and that regular summary reports be prepared (every 6 months) by the Secretariat in consultation with TCODE. Additional software may be required to assist in the efficient analysis of the activity reports.

4.3.5.3 ComSG recommends that the Secretariat by monitoring WWW access and summarizing e-mail problems encountered by the Secretariat and Committees identify communication barriers and suggest, in consultation with TCODE solutions to overcome these problems.

5. Expansion of the PICES Communications Network

There are various “group-ware” products available that might (in principle) aid PICES communication and improve collaboration. The functions of “group-ware” include:

- i. electronic mail and messaging, including group calendaring and scheduling
- ii. conferencing, including shared document and message databases and bulletin boards
- iii. group decision support systems, including electronic meeting systems with audio and video conferencing
- iv. group document handling, including group editing, group document and image management and document databases

- v. workflow management, including workflow process diagramming and analysis and electronic forms processing and routing

Amongst the various components of “group-ware” listed above, items (ii) and (iv) have potential for improving PICES communication in the future. These items would allow for a wider “audience” for discussion on PICES issues. Our present communication structure is based on e-mail exchanges between the Secretariat and Committee Chairs (primarily) and the Committees/ Working Groups exchange e-mail messages amongst themselves. There is limited opportunity for other scientists to participate or contribute to these discussions, except at Annual Meetings and high travel costs limit this. An improved communication system that allowed broader participation in Committee and Working Group discussions via bulletin boards, message/document databases or related technologies could improve PICES operations. The ComSG notes that a large “demand” for this type of system has not yet been demonstrated. There is a stronger demand for group document editing facilities to allow Committees and Working Groups to assemble reports, but implementing specific ftp work areas on the PICES server may satisfy this demand.

The ComSG has not done a study of the detailed costs and implications of implementing these technologies (item 6 of the Terms of Reference) but these products are relatively immature and would be difficult to implement (probably impossible in some PICES Contracting Parties). The organizations that make up PICES will all have their own internal requirements, rules and standards that will be unaltered by any PICES recommendations or standards. Adoption of these advanced products could lead to isolation of PICES participants in countries or organizations that are unable or unwilling to implement such systems. PICES should be careful not to introduce technical barriers in communications in addition to language barriers. The ComSG recommends a much more modest approach, using the basic Internet components (e-mail, ftp and WWW) and developing short-

term, modest solutions to any specific PICES communications problems. These facilities are rapidly propagating to all PICES Contracting Parties. There may be temporary impediments (such as high communication costs) that PICES could reduce or subsidise, but the larger market forces will remove or reduce these barriers in a short period.

Recommendations

5.1 ComSG recommends that Committees and Science Board forward requirements and priorities for enhancements to the PICES electronic communication system to the Secretariat.

5.2 ComSG recommends that Secretariat explore options and costs for implementing the required enhancements to the PICES electronic communications system and report to Science Board.