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North Pacific Climate, Fish and Things

Understanding the relationship among oceans, climate and the different trophic levels of ecosystems is now becoming more recognized as an important area of research among marine scientists. The vastness of the North Pacific creates difficulties in developing an understanding of the principles that govern the system. Some of the more noteworthy events that recently occurred are as follows:

There is an El Nino occurring in the North Pacific this year (see H. Freeland page 2). The charts show the mixed-layer temperature anomaly (i.e. deviation from normal temperature) for the North East Pacific, for the first 4 months of 1993. The data are from IGOSS XBT observations.

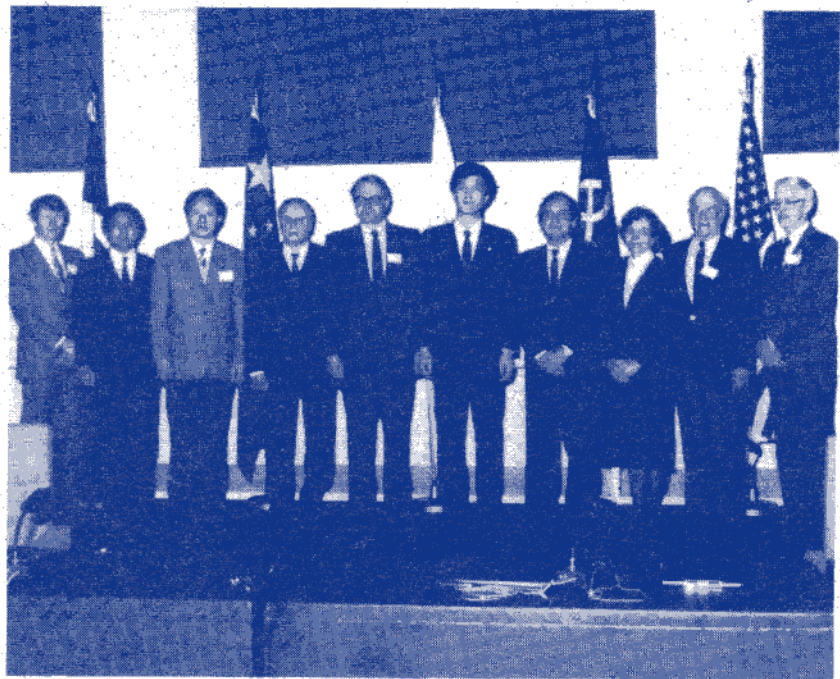
In January sea-surface temperatures were extremely close to the climatic normal throughout the entire region, though the January map does show a suggestion of anomalous warmth at the edge of the map, west of Baja, California. At the same time it was known that the southern oscillation index had moved substantially negative and equatorial Kelvin waves had been



PICES WORLD

observed by the Topex-Poseidon satellite. These are the normal precursors of an El Nino. The next three maps, for February, March and April, 1993 are all remarkably similar and show a warming throughout most of the North East Pacific.

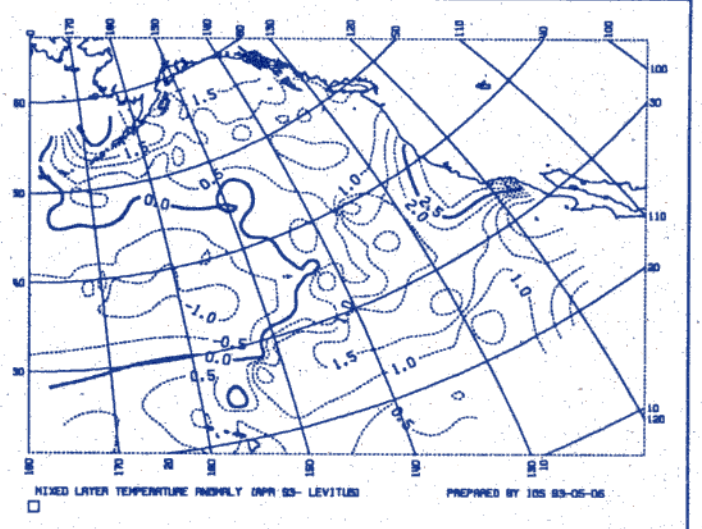
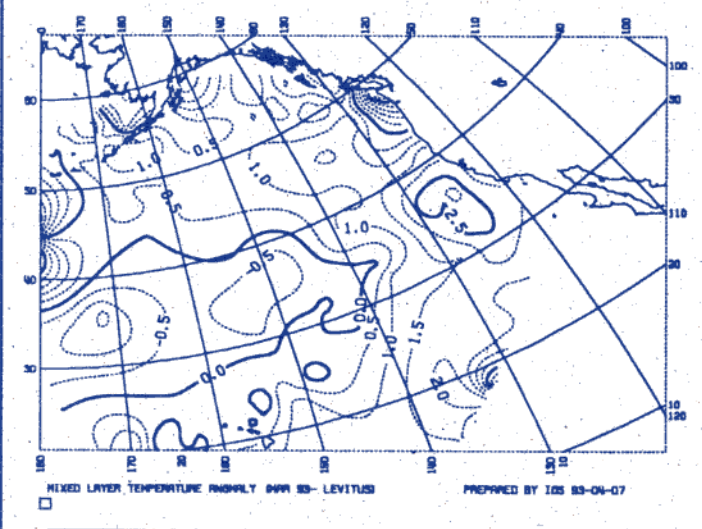
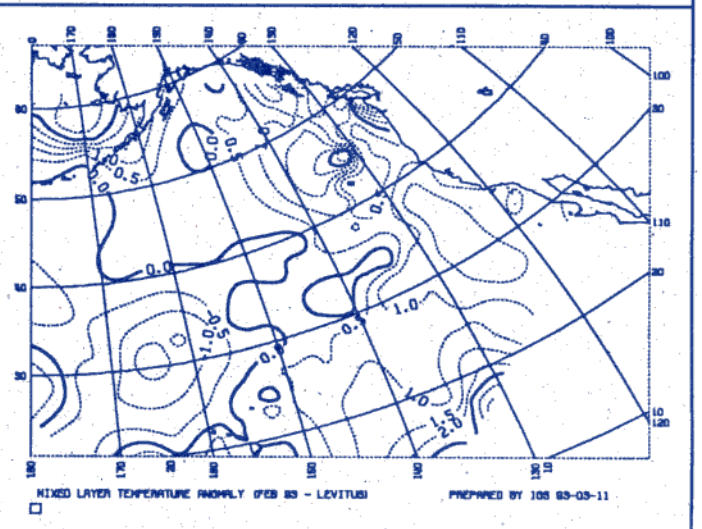
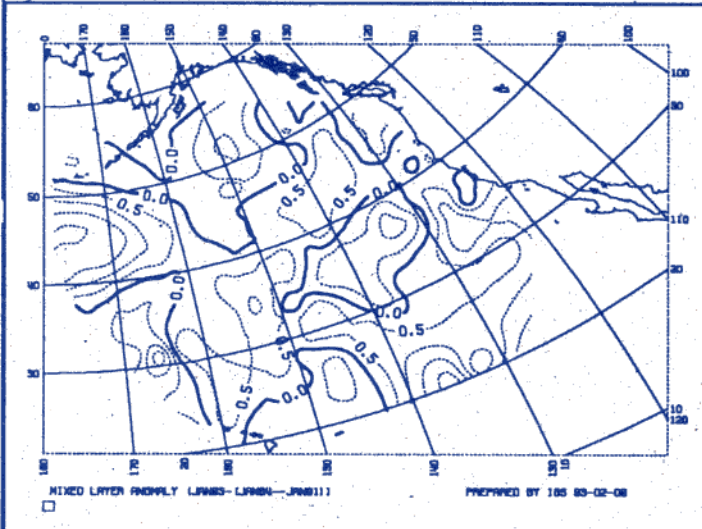
In the February map the warming appears to have travelled around the coast of the Americas reaching to the Aleutians. In the two later maps the warming clearly occupies the entire North East Pacific except for a pool of cold



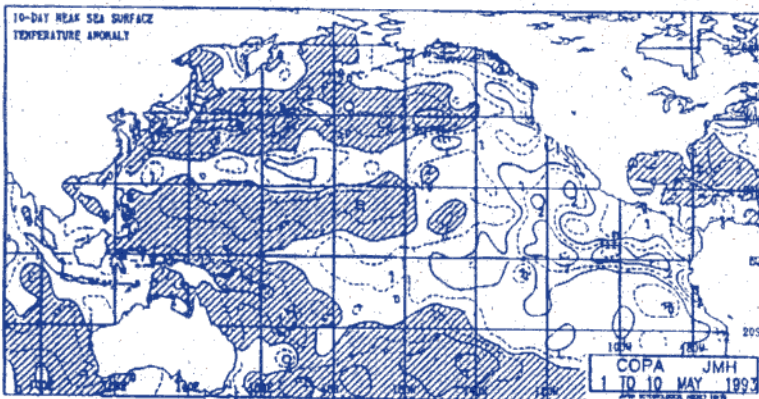
MEMBER COUNTRIES INITIAL CONVENTION IN OTTAWA ON DECEMBER 12, 1990

From left to right:

Dr. J.B. Morrissey(Can.) Mr. S. Takahashi(Japan) Prof. Y.K. Xu(China)
Mr. V.L. Minin(Russia) Mr. A.A. Elizarov(Russia) Mr. J.S. Jia(China)
Mr. B. Valcourt(Minister of Fisheries and Oceans, Can.) Dr. S. Earle(USA)
Dr. W.S. Wooster(USA) Dr. B.S. Muir(Can.)



SST anomalies in May compared to mean from 1961 to 1990.
Open areas above normal and shaded areas below normal.



the El Nino Monitoring Center of JMA (Japan Meteorological Agency), sea surface temperature anomaly of the eastern tropical Pacific in April are highest since last summer.

The tendency of warming in the eastern part and cooling in the western part continues in May compared to the normal year. This, in addition to weakening of trade winds during the same period, can be a precursor of El Nino.

-According to "Pacific Fishing" magazine the world supply of wild salmon was at a record level of 871,000 tonnes in 1991 up 13% from 1990.

water North West of Hawaii. The North East Pacific appears to be in the grip of an 1993

Pacific warm event. In the figure above produced by



We made it! The very first edition.

-Nine Japanese-Canadian high seas salmon research cruises in 1992 found very sharp thermal limits to the southern distribution of all salmon species.

-Research on early life history of walleye pollock in the Bering Sea is being conducted by NMFS through the Bering Sea FOCI (Fisheries Oceanography Coordinated Investigation) project. From 13 - 20 April the research vessel MILLER FREEMAN was engaged in a detailed study of larvae over deep water of the Aleutian Basin, around Bogoslof Island.

-The expected large spawning run by the 1988 herring year class failed to materialize in Prince William Sound this spring, resulting in the cancellation of the 16,000 ton purse seine harvest. Herring that did spawn were unusually small for their age and up to 50% were covered with lesions.

-Because herring spawned early in Bristol Bay, catching fishers unprepared, and Prince William Sound harvests were minimal, Alaska's herring sac roe harvest will be near average this year. With the recruitment of the strong 1988 year class in both the Gulf of Alaska and Bering Sea, a much greater harvest had been anticipated.

-Japanese sardine catch in 1992 was 2.0 million tonnes. This is about 50% of the catches in the later half of 1980's when the sardine stock reached a maximum level.

-Sardine spawning off southern Japan was very bad this year, suggesting the stock may still be decreasing.

-Pacific sardine spawning off California has been good this spring, suggesting that the stock may still be recovering.

-A joint Mexico/US sardine meeting was held in May. The consensus is that the Mexico-Canada stock has continued to grow; the various indices suggest that the spawning biomass has shown little, if any, increase south of Point Conception since 1991. The quota for the Southern California bight (11,600 tons) was caught and this fishery was closed on April 22. The Ensenada sardine fishery will probably catch in excess of 30,000 tons this year and may reach 40,000 tons. Mexico has no plans to institute a quota. The US view is that the decline in the rapid rate of increase, that was observed until 1991, is undoubtedly due to the rapid increase in total catches. The 1992 Mexican catch was over 25,000 tons. This was the first year since the 1950s that young-of-the-year sardines have been commonly observed in Monterey Bay; they have been present there since the summer of 1992. Old (age 6-8) sardines were reported in the Canadian hake fishery, and sardines were reported also off of Oregon and Washington.

On the other hand the Gulf of California stock is still in decline with expected catches of

about 20,000 tons this year; down from over 300,000 tons a couple of years ago.

-Researchers conducting trawl surveys reported the first confirmed catches of Pacific sardine in B.C. since the 1950s.

-The Japanese research vessel KAIYO MARU found anchovies distributed out to 180 degrees in the NW Pacific in December 1992.

-Anchovy (*Engraulis japonicus*) biomass in the Yellow Sea is over 4 million tonnes, which is the highest estimation since 1984.

-Analysis of data from the November and December, 1992, combined acoustic and trawl survey conducted by scientists from the Yellow Sea Fisheries Research Institute estimated anchovy biomass is 4.28 million tonnes, 50 percent higher than the January, 1992 estimation.

-Jack and Pacific mackerel were unusually abundant off the British Columbia coast last summer coincident with the 1991/92 El Nino.

Should you consider this article interesting, please help us to provide a more comprehensive and balanced report by sending your input.

Future Outlook

As the only multidisciplinary marine science organization in the North Pacific, PICES is in a unique position to be at the fore front of marine science in these times when human demands on the ocean and its responses are ever-changing. The pressures on the environment are increasing as the world population increases. The effects of stressing the ocean and its biological resources are compelling. There is a need to change our way of thinking and an urgent requirement for bold and imaginative innovation by marine scientists in the way we do research.

The ideas brought forward in the different committees of the First Annual Meeting have set the stage for a very young PICES to participate in the vigorous marine scientific activities as we move into the third millennium. The contributions from scientists who come together under the PICES umbrella will no doubt prove to be of major importance to Pacific Rim countries in future years.

A note from the Chairman

I am often asked questions such as "Why is PICES intergovernmental?" and "How will it be useful to marine scientists?" The following, prepared for the recent Japan East China Sea Study (JECSS) meeting, contains some views on these questions.

PICES was developed as an intergovernmental organization because of the nature of marine science and the need for governmental support and com-

mitments. But scientists tend to regard such organizations as slow-moving, bureaucratic, and dominated by political rather than scientific concerns. To combat this, the design of PICES drew on the experience of the International Council for the Exploration of the Sea, ICES, which has successfully functioned in the North Atlantic in a somewhat analogous role for more than 90 years. In PICES, as in ICES, scientists have been assigned a central responsibility in the governance of the organization, through the Science Board (in ICES, the Consultative Committee) consisting of the chairmen of the standing scientific committees and whose chairman bring the recommendations of scientists to the Council Delegates (representatives of governments).

In what ways can PICES be useful to scientists? Possible functions include the following:

Exchange of information and data.

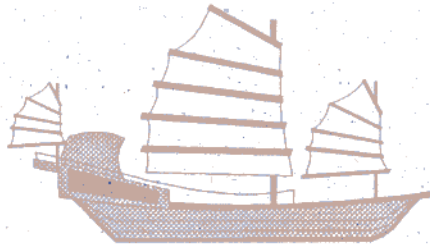
In most countries, there are ample opportunities for scientists to present their findings to national colleagues, especially those in the same scientific discipline. Interdisciplinary forums are less common, both on the national, and especially on the international level. But this sort of exchange offered by PICES is essential to resolving the broad, ecosystem-type problems seen today as so important. Whether PICES should provide publication sup-

port for information exchange remains to be determined.

Investigation of these problems also requires data from several disciplines, and reconstruction of the past depends in some instances on finding and making available data that are buried in laboratory archives. PICES can help to identify and locate such data, and can make them available to scientists who need them. The quality of data exchanged relates closely to developing agreements on methods used in data collection and analysis, a task to which PICES should be an important contributor.

Development of cooperative programs.

The PICES Working Groups are devoted to reviewing present scientific knowledge and activities with a view to identifying gaps in present knowledge that might be filled by cooperative scientific activities. Of course, in some cases such activities are already underway in bilateral projects and as part of global programs (e.g., WOCE, GOOS, JGOFS, GLOBEC). PICES should be able to help strengthen and broaden participation in these activities as well as to identify other areas where cooperative scientific action could be helpful, for example, in seeking understanding of decadal and longer period environmental change and its effect on ecosystems, or in evaluating the carrying capacity of the subarctic gyre ecosystem for salmonids. I hope that scien-



tists working through PICES will make it an instrument for achieving their scientific objectives.

Mobilization of scientific opinion.

On the national level, marine scientists are often called upon for advice on problems of ocean use. Such problems arise on the international level, for example pertaining to exploitation and conservation of living and non-living resources and to the protection of marine environmental quality. The management of these uses, especially when it concerns allocation, is constrained by scientific knowledge but is dominated by economics, social, and political considerations. While PICES is explicitly excluded from management authority or responsibility, there may be questions of concern to governments where scientists could be mobilized through the efforts of PICES to produce objective scientific assessments for consideration by management bodies. Such an effort could insure the availability of the best scientific advice decoupled from the political pressure faced by the managers.

A Note from the Science Board Chairman

The Global Ocean Ecosystem Dynamics Program (GLOBEC) concluded during a workshop in

1991, that "concerns for global climate change emphasize the need to understand how changes in the global environment will affect the abundance, diversity, and production of animal populations comprising ocean ecosystems". ICES is sponsoring a multinational GLOBEC working group to examine the effect of climate change on cod production in the North Atlantic. There is a growing opinion that PICES should also develop and sponsor a multinational GLOBEC program that addresses the importance of interannual and decadal-scale climate change on the fisheries resources of the North Pacific. This is unarguably a problem that PICES should be concerned with in view of the changes we have witnessed in the North Pacific climate in the last two decades, and the concurrent striking increases in the productivity of Pacific salmon (and other species).

As scientists we have obviously thought: How long will this increase continue? We know there has to be a limit, so: Have the salmon stocks already passed their state of maximum productivity? If they haven't then: How will the productivity of this important resource respond to climate change in the next decade? These are some of the questions that PICES has the collective oceanographic and fisheries expertise to address, and will be considered at some of the working group meetings this year.

Electronic Bulletin Board

In order to facilitate the exchange of news and information on marine sciences in the North Pacific, PICES Secretariat has set up an electronic bulletin board on Omnet. The name of the board is PICES.OCEAN.

The board is open to all who wish to put in information on the following topics:

- research developments,
- research progress,
- research ideas that need to be pursued,
- ship schedules,
- access, quality control and other information on data bases,
- announcements of meetings,
- calls for research proposals,
- research job opportunities,
- recent publications and
- any other items that would be of interest to the North Pacific marine science community.

Messages will remain on the board for sixty days. Additionally, information on the activities of PICES will be put on the bulletin board by the Secretariat.

If you are not on Omnet but want to read the articles on the board, we will send them to you through Internet. Please make a request by providing us with your Internet address. If Internet is also not available to you, we can send them to you

*And I have loved thee, Ocean! and my joy.
Byron (1788-1824)*

by FAX or by post.

We are also looking into the possibility of having a bulletin board system in Internet. If you have any suggestions or comments on the electronic communication system, please send them to:

PICES.SEC(Omnet)
pices@ios.bc.ca (Internet)

Who's Who in the Secretariat

Dr. W. Doug McKone was selected as the first Executive Secretary, by Council, at the First Annual Meeting. He assumed the position in early January, 1993.

Doug started his work career as a mechanic in the British Columbia forest industry but decided after 14 years that a change in career was needed. In 1975, he graduated from the University of British Columbia in Zoology, specializing in aquatic ecology. He immediately joined the Canadian Department of Fisheries and Oceans in St. Johns, Newfoundland as a herring scientist working on juvenile biology. After a short period he moved to manage the Redfish (*Sebastes sp.*) Section and became involved in problems related to providing advice to managers on the status of redfish stocks. Because of his mechanical experience he was also heavily involved with the con-

struction of two new fisheries research vessels for use on the east coast of Canada. He moved to Headquarters in Ottawa in 1981 as a Senior Advisor on Fisheries Ecology. This position involved providing advice to senior managers on fisheries ecology issues, climate impact on fisheries, stock assessment on invertebrates on both the east and west coast and on groundfish and herring on the west coast. Finally he was involved in providing support to the Canadian Delegation during all negotiations leading up to the formation of PICES.

On January the 17th, candidates who applied for the position of Assistant Executive Secretary were short listed to four. Two from Japan and two from the People's Republic of China. Dr. Motoyasu Miyata, from the University of Tokyo, was selected as best meeting the criteria required by Council - "Preference will be given to candidates with skills and experience complementary to those of the Executive Secretary (a fisheries scientist)". Dr. Miyata joined the Secretariat on April 22, 1993.

Moto graduated from the University of Tokyo in 1963, specializing in geophysics. He accepted a two-year fellowship towards a MSc. in Oceanography from the East-West Center, a USA State Department supported organization at the University of Hawaii. During this time he was exposed to six-hundred students from thirty

Asian-Pacific countries which fostered an interest in multicultural affairs. In 1965 he started a career as an assistant physical oceanographer at the Hawaii Institute of Geophysics, University of Hawaii. His work involved research on sea-level changes in tropical oceans and long-period waves. After four years he joined the Geophysical Institute in the Faculty of Science, University of Tokyo. Over the next twenty years, he was a visiting fellow at several institutions for periods of six months to two years: researching waves and tides at the Institute of Ocean Sciences, Wormely, UK; researching equatorial waves and shoaling effects of tsunami at the Joint Institute of Marine and Atmospheric Research, Honolulu; teaching geophysical fluid dynamics at the Department of Earth Sciences, Seoul National University and working on non-linear internal waves at the Jet Propulsion Laboratory, Caltech, Pasadena, California, USA. Most recently he was a member of the Earth Observing Committee for NASDA, Japan, and was involved in a NASA Working Group to use the scatterometer on the Japanese satellite ADEOS.

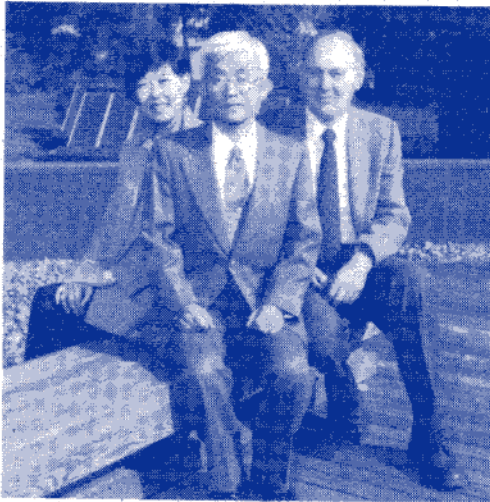
Moto's main function will be to provide support to the Executive Secretary. Currently, he is pursuing the following three projects:

-Solicit the cooperation of member countries to supply, for exchange, schedules of major research vessels.



PICES! What is this new Organization?

-Locate and identify physical, chemical, biological and fishery data that are not widely available and develop a mechanism for exchange and distribution of



Dr. Motoyasu Miyata
Ms. Christina Chiu Dr. W. Doug McKone

in Economics and Japanese Language and Literature. After graduation she went to Japan for a year to teach English. She then returned to the

University of Toronto to pursue a Masters degree specializing in Japanese Theatre. In 1991 she returned to Hong Kong to work on a contract for an academic conference and an international film festival.

Christina has published articles in Hong Kong on travel in Japan and traditional performing arts of Japan and China.

Before joining PICES, she worked part time in the Conference Services Department of the University of Victoria. Christina wants to emphasize that she is a very "unscientific" person who failed scientific subjects in school and is interested in almost all things "unscientific" such as handicrafts literature and theater. She says she is willing to learn and finds it a challenge to work for PICES.

such data.

-Develop an electronic PICES bulletin board system using the Internet and/or Omnet systems.

These latter tasks will be done in cooperation with Working Group 4 on Data Collection and Quality Control.

The Administrative Assistant position was won by Ms. Christina Chiu who joined the staff on February 8, 1993.

Christina is originally from Hong Kong and immigrated with her parents to Toronto, Canada in 1984 after she graduated from high school. She graduated from the University of Toronto with a double major

A Bit About PICES

The Convention for establishment of the organization came into force on March 24, 1992. Contracting Parties are Canada, Japan, the Peoples Republic of China, and the United States of America. Russia has been a party to the negotiations and is expected to join soon. The Convention is open to accession of other countries.

The scope of the organization is concerned with marine scientific research in the North Pacific Ocean and adjacent seas, especially north of 30 degrees North.

The purpose of the organization is to promote and coordinate marine scientific research in order to advance scientific knowledge of the area concerned and of its living resources, including but not necessarily limited to research with respect to the ocean environment and its interactions with land and atmosphere, its role in a response to global weather and climate change, its flora, fauna, and ecosystems, its uses and resources, and impacts upon it from human activities; and to promote the collection and exchange of information and data related to marine science research in the area concerned.

*If you wish to avoid foreign collision, you had better abandon the ocean.
Henry Clay (1777-1852)*

Who's Who in the Organization

On page 11 there is a tree of the current structure and chairmen of the different groups in the organization. This is also available in Chinese and Japanese.

Annual Meetings

The First Annual Meeting of the Organization took place in Victoria, British Columbia, Canada on October 12-17, 1992. The meeting was a great success. The Science Board and the four scientific committees were formed and chairmen elected. Topics for the six Working Groups were approved by Council along with terms of reference. The venue (below) for the Second Annual Meeting was selected and topics for the program were determined. The Annual Report was published and was circulated in early March to members of the Council, Committees, Working Groups, Libraries, International Organizations and others who have requested it.

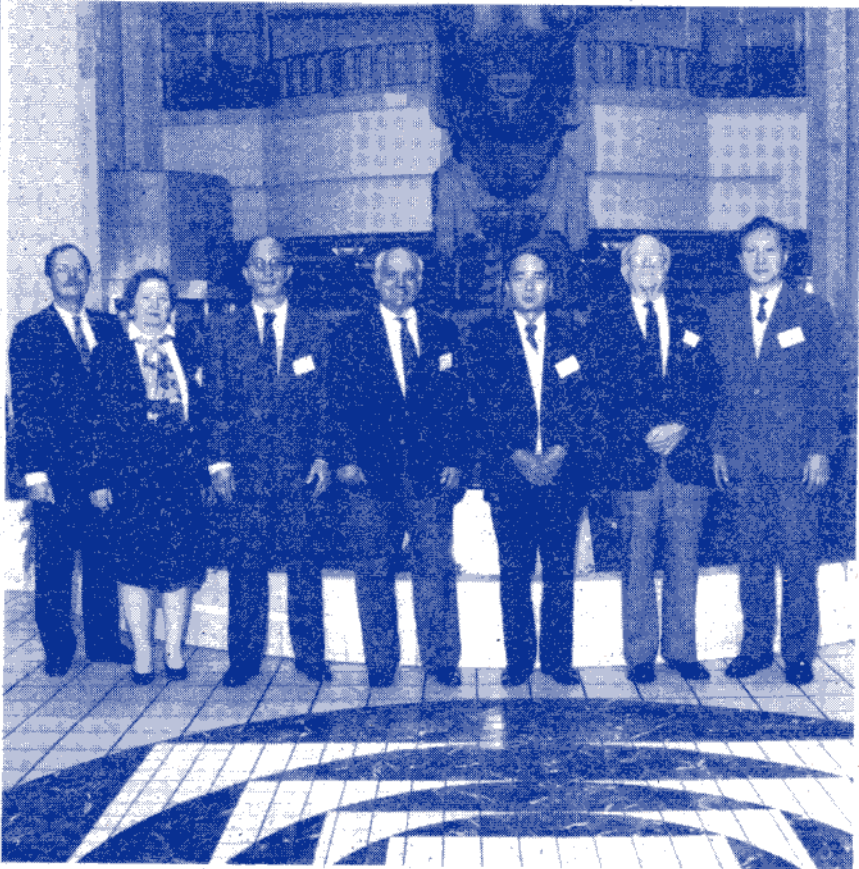
The International Symposium on Climate Change and Northern Fish Populations organized by the Canadian Department of Fisheries and Oceans, partly supported by PICES, which was held at the same time as the

First Annual Meeting provided an excellent opportunity for scientists from many disciplines to get acquainted with our new organization.

The Second Annual Meeting will be in Seattle, Washington, USA on October 25-30, 1993. All interested persons are in-

vited to provide summaries of their papers, not exceeding 250 words, to the PICES Secretariat by July 15, 1993.

A poster on the Second Annual Meeting was circulated in mid April. The final announcement was distributed in June. For information contact the PICES Secretariat (address last page).



DELEGATES TO THE FIRST ANNUAL MEETING IN VICTORIA OCTOBER 12-18, 1992

From left of right:

Dr. J.C. Davis(Can.) Dr. V. Alexander(USA) Dr. L.S. Parsons(Can.)
Dr. W. Aron(USA) Dr. H. Hatanaka(Japan) Dr. W.S. Wooster(USA)
Prof. Y.K. Xu(China)

*little drops of water, little grains of sand,
Make the mighty ocean, and the pleasant land...
Julia Carney 1823-1908*

PROGRAM SECOND ANNUAL MEETING

Ocean circulation and climate variability in the subarctic Pacific.

Conveners: P. LeBlond, S.C. Riser and J.E. Overland

High resolution paleoecological studies in the subarctic Pacific.

Convener: M. Mullin

Priority chemical and biological contaminants in the North Pacific ecosystem.

Convener: Usha Varanasi

Shifts in fish abundance and species dominance in coastal seas.

Conveners: Q. Tang and A. MacCall

Long-term monitoring from platforms of opportunity.

Convener: C. Miller

Scientific sessions will include invited and contributed papers on these topics as well as contributed papers on other subjects of interest. Contributed papers will be selected for oral or poster presentation.

In addition to the scientific sessions, there will be meetings of the Governing Council, Science Board and business meetings of the scientific committees. The scientific and committee sessions will be run

from Monday, 25th through Thursday, 28th of October. The Science Board and Governing Council will meet on the 29th and 30th of October.

Committee's Activities

Committees have selected conveners for the program of the Second Annual Meeting. In consultation with committee chairmen the conveners are developing a program and inviting speakers.

Working Groups' Activities

Working Group chairmen have been busy developing a work plan leading up to providing a report of their activities to the committees and Science Board at the Second Annual Meeting. Working Group chairmen have been using electronic mail or facsimile for the initial planning. Working Groups 1, 3, 4, and 6 are meeting in Nemuro, Japan on September 19-23, 1993. Chairmen of these groups will have to work quickly after the meeting to provide the Secretariat with their reports for circulation prior to the Second Annual Meeting. Working Group 2 is tentatively set to meet in Victoria in mid September. Working Group 5 will meet in

Anchorage on August 24-25.

Comings and Goings

Dr. Barry Muir, one of the prominent members of the Canadian delegation during negotiations leading up to the formation of PICES, retired from the Department of Fisheries and Oceans on April 29th, 1993. He played a formative role during the negotiations as Canada, at the request of the other countries, provided the lead. We wish him well in his new career.

On February 27-28, 1993, Dr. Tokio Wada, Prof. Takashige Sugimoto, Dr. Makoto Kashiwai, Dr. Dan Ware, Dr. Brent Hargreaves and Dr. W. Doug McKone met in Vancouver to discuss the Nemouro Workshop and issues concerning Working Groups 3 and 6.

In early March Dr. Warren Wooster attended the IOC meeting on behalf of PICES. He also acted as a goodwill ambassador for PICES at the Japan-East China Sea Studies Meeting in Qingdao on May 9-15, 1993.

During a March trip to Japan on other business, Dr. Dan Ware took the opportunity to have discussions on the planning for the four Working Group meetings to be held in Nemuro in late September.

*The greatest joy of nature is the absence of man.
Bliss Carman 1904*

Dr. Brent Hargreaves also traveled to Japan in March on business. He met with Dr. Sugimoto (co-chairman) to plan the tasks of Working Group 6 leading up to the Second Annual Meeting.

The Executive Secretary Dr. Doug McKone will represent PICES at the September Nemouro Workshop.

What's in a Name ?

Although many names for the new organization were advanced, none of them could be easily formed into a pronounceable acronym. From the beginning, the analogy with the International Council for the Exploration of the Sea, ICES, was recognized, and it became commonplace to refer to a Pacific ICES, or PICES. Unfortunately, no appropriate name could be found whose initials come out as PICES. Agreement was finally reached only at the December 12, 1990 meeting for initialing the Convention, when the suggestion was made to use a diagnostic name North Pacific Marine Science Organization, along with an official nickname, PICES. With a sigh of relief, consensus was finally reached and this controversial issue was at last put aside.

Meetings of Interest

The following is a sample of future meetings that might be of interest. Your help in making a more comprehensive list would be greatly appreciated.

5th International Congress on the History of Oceanography, La Jolla, California, USA, 7-14 July 1993.

ICES 81st Statutory Meeting, Dublin, Ireland, September 23 - October 1, 1993.

Second International Ocean Pollution Symposium, Qinghua University, Beijing, China, 4-8 October, 1993.

Oceans "93", Victoria, B.C. Canada, 19-22 October, 1993.

Workshop on the importance of prerecruit walleye pollock to the Bering Sea and North Pacific ecosystem, NMFS Sand Point Lab., Seattle, Washington, USA, 28-30 October, 1993.

North Pacific Anadromous Fish Commission, Vancouver British Columbia, Canada, 1-6 November, 1993.

Third Western Pacific Geophysics Meeting, Hong Kong, 25-29 July 1994.

Symposium on "Impact of Anomalous Oceanographic Conditions at the Beginning of the 1990s in the Northwest

Atlantic on the distribution and Behavior of Marine Life, Host NAFO, 14-16 September, 1994.

Symposium on "North Pacific Flatfish". Anchorage, Alaska, USA, 26-28 October 1994.

Publications

1. PICES Scientific Workshop, December 1991 (parts A & B).

2. PICES Annual Report AM92-01.

3. PICES Directory 1993.

PICES participants have expressed a number of ideas concerning the possibility of regularly publishing scientific papers as other international organizations do. The gambit of ideas range from no publications to establishment of more than one publication. For example, develop one which has a review process and one that does not. Another suggestion has been expressed, that PICES should contract with one of the existing established journals to publish scientific papers.

Your comments and ideas concerning the development of a publication policy for the organization would be greatly appreciated. All responses will be forwarded to the Science Board Chairman for consideration by the committee.

Representative responses will be published in the next issue of PICES PRESS.

Governing Council
Chairman: Dr. Warren S. Wooster
Delegation: 2 each from Canada, China, Japan & U.S.A.

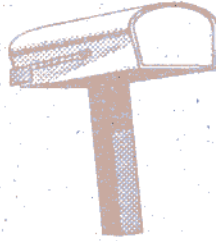
Science Board
Chairman: Dr. Dan Ware
Members: Chairmen of the 4 Scientific Committees

Secretariat
Executive Secretary: Dr. W. Doug McKone
Asst. Executive Secretary: Dr. Motoyasu Miyata
Administrative Assistant: Ms. Christina Chiu

Finance & Admin. Committee
Chairman: Dr. John C. Davis
Members: from Canada, China, Japan & U.S.A.

- Biological Oceanography Committee**
Chairman: Prof. Michael M. Mullin
- Physical Oceanography Committee**
Chairman: Prof. Yutaka Nagata
- Marine Environmental Quality Committee**
Chairman: Prof. Jia-Yi Zhou
- Fishery Science Committee**
Chairman: Prof. Qi-Sheng Tang

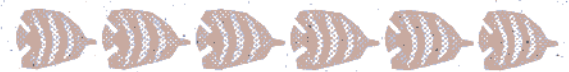
- Working Group 4: Data Collection and Quality Control**
Chairmen: Mr. Skip McKinnell & Dr. De-Quan Yang
- Working Group 5: Bering Sea**
Chairman: Prof. Albert Tyler
- Working Group 6: Subarctic Gyre**
Chairmen: Dr. Brent Hargreaves & Prof. Takashige Sugimoto
- Working Group 1: Okhotsk Sea and Oyashio Region**
Chairman: Dr. Lynne D. Talley
- Working Group 2: Development of Common Assessment Methodology for Marine Pollution**
Chairmen: Dr. Richard Addison & Dr. Ming-Jiang Zhou
- Working Group 3: Dynamics of Small Pelagics in Coastal Ecosystems**
Chairmen: Dr. John Hunter & Dr. Tokio Wada



*Your mail is important to us.
Send your comments and
ideas for future editions.*

Comment Corner

This section of the newsletter is reserved for comments of our readers. The editor would be pleased to receive any comments on this newsletter or any other contributions that you may wish to make. Letters received will be published in the next edition of PICES PRESS. Please send to the address below.



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