

REPORT OF OPENING SESSION



The Opening Session was called to order on October 21, 2002, at 8:30 a.m. The Chairman, Dr. Hyung-Tack Huh, welcomed delegates, observers and researchers to the PICES Eleventh Annual Meeting.

Welcome address on behalf of the hosting city

Dr. Huh introduced the Assistant to the Mayor of Qingdao, Mr. Bao-Zhan Xu, who greeted participants on behalf of the host city (*OP Appendix 1*).

Welcome address on behalf of the Government of the People's Republic of China

Dr. Huh asked Prof. Qi-Sheng Tang, Academician of the Chinese Academy of Engineering and Director of the Yellow Sea Fisheries Research Institute, to welcome participants on behalf of the host country (*OP Appendix 2*).

Remarks by representatives of Contracting Parties and the Chairman of PICES

Dr. Huh called upon Dr. Laura Richards to make a statement on behalf of the Canadian Government. Dr. Richards addressed the session and her remarks are appended to the report in *OP Appendix 3*.

Dr. Huh invited Dr. Tokimasa Kobayashi to speak on behalf of the Japanese Government. Dr. Kobayashi addressed the session and his remarks are appended to the report in *OP Appendix 4*.

Dr. Huh then asked Dr. Yeong Chull Park to speak on behalf of the Korean Government. Dr. Park addressed the session and his remarks are appended to the report in *OP Appendix 5*.

Dr. Huh called upon Dr. Lev N. Bocharov to

speak on behalf of the Russian Government. Dr. Bocharov addressed the session and his remarks are appended to the report in *OP Appendix 6*.

Dr. Huh invited Dr. Vera Alexander to make a statement on behalf of the U.S. Government. Dr. Alexander addressed the session and her remarks are appended to the report in *OP Appendix 7*.

Dr. Huh called upon Mr. Hai-Qing Li to make a statement on behalf of the Chinese Government. Mr. Li addressed the session and his remarks are appended to the report in *OP Appendix 8*.

Dr. Huh thanked Mr. Bao-Zhan Xu, Prof. Qi-Sheng Tang, and all the delegates for their remarks and spoke on behalf of PICES. The text of his address is appended to the report in *OP Appendix 9*.

Wooster Award presentation ceremony

Dr. Huh invited Dr. Ian Perry, the Science Board Chairman, to conduct the Wooster Award presentation ceremony.

Dr. Perry reminded the audience that in October 2000, PICES announced a new award that will be given annually to an individual who has made significant scientific contributions to North Pacific marine science, such as understanding and predicting the role of human and climate interactions on marine ecosystem production. The award was named in honour of Dr. Warren S. Wooster, the principal founder and first Chairman of PICES, and world-renowned researcher and statesman in the area of climate variability and fisheries production. The award consists of a commemorative plaque and travel support to attend the following PICES Annual Meeting in order to receive the award.

Dr. Perry quoted the following citation from Science Board for the 2002 Wooster Award:

Two nominations were received for the 2002 PICES Wooster Award. The unanimous choice by the Science Board is Dr. Yutaka Nagata of Japan.

The Wooster Award is to be given annually to an individual who:

- has made significant contributions to North Pacific marine science;
- has achieved sustained excellence in research, teaching, administration or a combination of these in the area of North Pacific;
- has worked to integrate the various disciplines of the marine sciences; and
- preferably someone who is, or has been, actively involved in PICES activities.

Dr. Nagata exemplifies all of these criteria. He has demonstrated sustained excellence in science, teaching and administration of marine science in the North Pacific region. After retiring from being a Professor at two Japanese Universities, he established for himself a "second career" as a manager of oceanographic data, products, and their quality control (he is the first Director of the Marine Information Research Center in Japan). He has over 70 publications in English, with further publications in Japanese, including 10 books. He has served a leadership role in oceanography in Japan, and on several international oceanographic committees in addition to those of PICES. Dr. Nagata has a broad inter-disciplinary range, with publications from core physical oceanography to lobster biology. He has been a central figure in the successful establishment of PICES, including serving as the first Chairman of the Physical Oceanography and Climate Committee, Co-Chairman of the Climate Change and Carrying Capacity Program, and member of Working Group 1 on Okhotsk Sea, along with an important role in the formation of the Technical Committee on Data Exchange. Science Board is very pleased to name him as the recipient of the PICES Wooster Award for 2002.

Then Dr. Perry read a note from Dr. Warren Wooster:

In PICES, we have emphasized international and interdisciplinary approaches to marine science, and as the Science Board citation makes clear, all of these have characterized Professor Nagata's professional life. There is another, interpersonal, dimension that is vital for the success of any collaborative effort, and the friendships that have developed within the PICES family have accounted for much of its effectiveness.

The day will come when winners of this award will not have been personal friends of mine, but I am happy that this is not the case with this year's winner. My friendship with Yutaka Nagata goes back to our first encounter, in the late 1960's when he came to La Jolla for a stay at Scripps. As described in Bruce Taft's encomium in PICES Press, it was then and is now, Yutaka's warm personality, sense of humor, and frankness that make friendship with him so rewarding. Even though absent from this occasion, I send from afar my sincerest congratulations to Nagata-san whom we all recognize as one of the jewels in the PICES crown.

Dr. Huh presented a commemorative plaque to Dr. Nagata. A permanent plaque identifying Wooster Award winners resides at the PICES Secretariat in Sidney, British Columbia, Canada.

PICES scientific accomplishments in 2001

Dr. Perry reviewed PICES' scientific accomplishments in 2001 (*OP Appendix 10*).

Keynote lecture

The Science Board Chairman introduced the keynote speaker, Prof. Dun-Xin Hu (Institute of Oceanology, Chinese Academy of Sciences). Prof. Hu gave a keynote lecture titled "The ocean's role in global change: Global oceanography has come". The abstract of his presentation is appended to the report in *OP Appendix 11*.

The Opening Session closed at 10:30 a.m.

OP Appendix 1

Welcome address on behalf of the Qingdao Municipal Government by Mr. Bao-Zhan Xu

Mr. Chairman, distinguished participants, ladies and gentlemen:

On behalf of the Qingdao Municipal Government, I would like to forward my sincere congratulations to the PICES Eleventh Annual Meeting, and my warm welcome to all the scientists attending this Meeting.

Qingdao is a famous seaside city. It has solid research strength in marine science and technology. Several national level oceanography research institutes and universities are situated in this city, which have attracted more than half of all the marine science researchers in China, including 16 academicians who major in this field. Marine science and technology has, as a result, become one of the key industries in Qingdao.

Opening widely to the outside world, Qingdao is quickening its pace towards the future as an international cosmopolitan. As the host of various significant international conferences, and the aquatic sports events of the 2008 Olympic Games, Qingdao has many attractions.

We will follow the progress of the PICES Eleventh Annual Meeting with great interest. Hosting this meeting is a further indication that Qingdao has become a center for research and education in marine sciences, and it will also enhance Qingdao's internationalization.

I hope this meeting will be a great success and that you will have an enjoyable stay in our beautiful city.

Thank you!

OP Appendix 2

Welcome address on behalf of the Government of the People's Republic of China by Prof. Qi-Sheng Tang

Mr. Chairman, distinguished delegates, ladies and gentlemen:

On behalf of the Chinese Government, it is my pleasure to welcome you to the Eleventh Annual Meeting of the North Pacific Marine Science Organization (PICES). Personally, I would also like to express my warm greetings to the participants from all over the North Pacific region, who have come to our country and the city of Qingdao.

The 21st century is the century of the ocean. The fast growth of the world population has put higher and higher demands on the ocean for food and energy. We need novel technologies and scientific methods for the development and management of the marine environment. We also need to further our understanding into the Ocean. Last month, at the World Summit on Sustainable Development held in South Africa, the Johannesburg Declaration on Sustainable Development and the Plan of Implementation

were publicized. The plan for the development of the global society in the oncoming decades has been set by these two important documents. Chinese Premier Zhu Rongji made an announcement on behalf of the Chinese Government during this meeting, declaring that China is determined to go along the way of sustainable development. At the same time, the Chinese Government has also proclaimed its Compendium on Sustainable Development of Science and Technology. Three of the twelve major established fields are related to the ocean, including ocean monitoring and resource development, control of environmental pollution and integrated ecological management, and the problems of global environment. What will be the aim for PICES' future development as a regional scientific organization, under this situation? Personally, I think that the development of marine sustainable science needs the contribution of us all. The objectives of sustainability cannot be achieved nationally, or even regionally; sustainability is an issue of

the entire world. I hope that PICES' activities will be pushed toward a global perspective in the future.

Ever since its creation, PICES has been an active player on the global platform of marine science research. It has become the crux of information exchange, the network of excellence and the nurturing bed for cooperation. You are a remarkable group of scientists! Your experiments and joint programs have significantly enlarged our knowledge of the Pacific Ocean as well as the global environment. I believe that PICES will do better and better.

OP Appendix 3

Remarks at the Opening Session by Dr. Laura Richards (Canada)

Mr. Chairman, distinguished guests and colleagues:

On behalf of Canada and the Canadian delegation, I would like to thank the People's Republic of China and the Yellow Sea Fisheries Research Institute for inviting us here to Qingdao, a city with such a strong connection to marine science.

In July 2002, Canada released an "Ocean Strategy" that announces Canada's intent to improve our scientific knowledge base for estuarine, coastal and marine ecosystems. The strategy acknowledges the need for better understanding of ecosystem dynamics including climate, variability and the impact of change on living marine resources, as well as a new orientation towards operational oceanography. The strategy also promotes the development of a "State of the Oceans Reporting system". These goals fit well with the purpose and current activities of PICES.

In September, I had the honour of attending the 30th anniversary celebration of the Japan Marine Science and Technology Center (JAMSTEC), together with other Directors of oceanographic institutes. There, we signed the "Yokosuka Statement", where we committed to work together on issues such as establishing global

This is the second time that Qingdao has hosted the PICES Annual Meeting, and it is a further indication that this city is one of the major marine science centers around the North Pacific. I believe the Chinese Government will give its full support to this center, so that it will play a more vibrant part in PICES' joint programs.

Finally, I would like to wish the meeting great success in its discussions, and all the participants an enjoyable stay in Qingdao city and China.

Thank you for your attention!

observation networks and developing technologies for more effective observations and better predictions.

PICES has already anticipated these scientific and policy developments, as demonstrated by this year's theme of "Technological advancements in marine scientific research".

Last year at PICES' Tenth Anniversary, we took the opportunity to look back and reflect on our achievements over the past ten years. We also committed to a review of PICES that should help us prepare for an organization well placed for the future. I look forward to these discussions over the next week.

International collaboration is essential for addressing global problems like climate change and the sustainability of marine resources. Canada is pleased with the success of various international projects that will be reported at this meeting, including SOLAS, CLIVAR and GLOBEC. These types of interactions will ensure that all components of the North Pacific ecosystem become integrated into our knowledge base to improve understanding of the changes in the North Pacific.

Let's build on our successes to ensure a vibrant PICES organization!

OP Appendix 4

Remarks at the Opening Session by Dr. Tokimasa Kobayashi (Japan)

Distinguished delegates, ladies and gentlemen, on behalf of Japanese participants, I am honored to have the opportunity to make these remarks.

First of all, I would like to express my sincere thanks to the delegates of the People's Republic of China, the Government of People's Republic of China, the Qingdao Municipal Government and the Yellow Sea Fisheries Research Institute for their arrangements for the Eleventh Annual Meeting in this beautiful city of Qingdao.

The Fourth PICES Annual Meeting was held here in Qingdao, in 1995. Since that time PICES has established a structure and steadily expanded its activities. With the contribution of not only the Contracting Parties, but also the Chairman and the Secretariat, PICES has entered into the second developmental stage and has been fostering collaboration with international scientific organizations such as ICES, IOC, SCOR, GLOBEC, GOOS, etc., and of course including NPAFC. Japanese scientists are very proud of being a part of this major effort from the beginning.

Well, it is said that the conservation of the environment will be a big issue in the 21st century, due to the anxiety about global environmental degradation, such as global warming and the loss of biodiversity. On the other hand, in accordance with the increase of population, the establishment of a stable supply of food is becoming one of the serious subjects. Therefore the role of fisheries production is

getting bigger and bigger, and more suitable and sustainable utilization of fisheries resources is required. PICES is expected to lead the scientific investigation on the preservation and sustainable utilization of marine resources based on the ecosystem in the North Pacific more than before. Japan expects that PICES will examine and adopt a long-term plan to advance the scientific knowledge and shape up the strategies of research and investigation. And PICES set up the Review Committee at the last Anniversary Annual Meeting, which has begun to examine the role and structure of the Organization. We hope this review will bring prosperous development and efficient activities to PICES. Of course, there is no doubt that Japan will continue her positive support towards PICES to contribute in its activities in the second era as always.

By the way, I have to tell you an unfortunate story. Sad to say, Dr. Takashi Sasaki, who gave remarks on this stage seven years ago as a Japanese delegate, passed away in March. He contributed as one of the organizers of PICES in Japan from the beginning of its establishment. He always said that fisheries management based on the ecosystem is important and indispensable, which is also the approach of PICES. We would like to express our sympathy.

Finally, I am sure the Eleventh Annual Meeting will become a great success.

Thank you for your attention.

OP Appendix 5

Remarks at the Opening Session by Dr. Yeong Chull Park (Republic of Korea)

Mr. Chairman, distinguished delegates, local organizing committee members, ladies and gentlemen:

It is a great pleasure for me to attend the PICES Eleventh Annual Meeting and to meet fellow scientists and national delegations from member countries here in Qingdao. On behalf of the

Korean delegation and scientists, I would like to express my heartfelt appreciation to the PICES Secretariat and the Government of the People's Republic of China for organizing this excellent Annual Meeting, and also extend my thanks to the PICES Chairman, Dr. Hyung-Tack Huh, for giving me a chance to speak.

Since PICES I in Victoria, Canada, in 1992, PICES has made steady progress in the sharing and exchange of information and knowledge among scientists on marine and fisheries science of the North Pacific region. I would like to comment on the progress that has been made through PICES symposia, workshops and joint conferences to ensure the sustainable use of renewable resources of the North Pacific.

Bearing in mind our PICES spirits, Korean scientists have studied long-term variation in the marine ecosystem and conservation strategies for fisheries resources, through hard activities in oceanographic observation and living marine resources research. In addition, the Korean GLOBEC program has been adopted as a model

for our study of climate change and carrying capacity in the Northwest Pacific.

Korean scientists are highly supportive of cooperative studies with the view to promoting and coordinating marine and fisheries science in the North Pacific. I hope those studies will be highlighted at PICES XII, to be held in Korea in 2003. I am sure that these activities are promising in the development of PICES for sustaining marine living resources in this century.

The Korean delegation wishes all participants at PICES XI success in their scientific undertaking. And see you all again in Korea next year. Thank you for your attention.

OP Appendix 6

Remarks at the Opening Session by Dr. Lev N. Bocharov (Russian Federation)

Mr. Chairman, distinguished delegates, ladies and gentlemen:

First of all, let me thank you on behalf of the Russian delegation for the opportunity to take part in the Eleventh Annual Meeting, for the chance to visit Qingdao, China's east coast treasure, once again. I would like to specially note the excellent work of the Local Organizing Committee, and appreciate their tremendous efforts to successfully host this meeting.

PICES is now in its second decade. Over the time past, the scope of PICES' activities has multiplied. Extensive and elaborative work is being done now even between the Annual Meetings. The relations and cooperation with other international forums have significantly strengthened. PICES is being more and more attentively regarded by the international scientific community. The proof is the presence of many observers from international scientific and public organizations concerned with the exploration and exploitation of the Oceans, who are here today.

It is a special pleasure for me to see here again many of those who recently visited Vladivostok and attended the NPAFC Tenth Anniversary

Meeting. NPAFC is another body, whose activities are being closer and closer coordinated with PICES, and it is the only other marine commission that brings together specialists from Russia and other North Pacific nations. It is very important for PICES to use every possibility to increase the number of PICES member nations.

Exploration and rational exploitation of the oceans is the essential priority for Russia. In September 2002, there was the All-Russian Conference on assessing the results of the first five years of the Federal Program "World Ocean". This Program involves all the Ministries and organizations that are concerned with appropriating the ocean resources. These activities are extensive and long-term-oriented. It was emphasized that many problems, because of their diversity and complicatedness, require stronger international cooperation. PICES is a perfect forum to address them.

We have lots of tasks to accomplish during this Annual Meeting. I believe we shall make every effort for the Meeting to become a new landmark for the development and progress of PICES. Good luck to the Meeting and thank you.

OS Appendix 7

Remarks at the Opening Session by Dr. Vera Alexander (U.S.A.)

Mr. Bao-Zhan Xu, Prof. Qi-Sheng Tang, Mr. Chairman, distinguished delegates, ladies and gentlemen:

I am deeply honored to speak on behalf of the United States delegation. It is indeed a pleasure to be back in the beautiful seaside city of Qingdao. I was here for the PICES Annual Meeting several years ago, and I have noticed many changes, but the warm welcome has remained the same. The United States delegation thanks our hosts for the excellent arrangements and hospitality.

As PICES matures, its programs and activities are growing and expanding, and becoming very ambitious. The word “billowing” comes to mind. For example, the commitment to produce a report on the status of the ecosystem is certainly ambitious, but it follows logically after the Climate Change and Carrying Capacity Program. I think that PICES can be successful in producing this report, and that it will be a very useful product.

I particularly value PICES for the extensive involvement, or rather, control, of the activities by scientists. It is an organization for the international North Pacific scientific community. Each year, the number of participating scientists grows. As Working Groups conclude their tasks, and new ones are appointed, new scientists are brought into the PICES family. Scientific concerns and scientists lead the Organization’s agenda. PICES does not dictate

or regulate, it forms and provides a forum for synthesis and the development of ideas. This meeting is notable for the number of other organizations that are present. 16 organizations have sent representatives, and yesterday, the Governing Council heard from 5 of them. The next decade of PICES will, I believe, witness increasing collaboration. This, too, is a part of PICES’ evolution as the Organization matures.

This year, two organizations have met in conjunction with the PICES Annual Meeting. The GLOBEC International, and the Scientific Steering Committee of the Census of Marine Life. GLOBEC is, of course, the major marine ecosystem program, now in mid-life; its goals mesh with PICES very well. The Census of Marine Life is a visionary international program, very ambitious. It already has ties with PICES in supporting, or rather, adopting, some of PICES’ high priority projects. We look forward to continuing these relationships.

Finally, all this would not be possible without the excellent PICES Secretariat. I have never before witnessed such high quality, high quantity of work produced by so few. It is amazing!

Thank you again, to our hosts, the Yellow Seas Fisheries Research Institute and the City of Qingdao, to the Local Organizing Committee, and especially, to the Government of China for inviting PICES to hold its Meeting here.

OP Appendix 8

Remarks at the Opening Session by Mr. Hai-Qing Li (People’s Republic of China)

Dr. Huh, Chairman of PICES, distinguished guests, ladies and gentlemen:

I am very pleased today to address the Eleventh Annual Meeting of the North Pacific Marine Science Organization (PICES) in Qingdao, a beautiful coastal city in north China. First of all, please allow me to extend, in my personal

capacity as the Chinese Delegate to PICES, as well as on behalf of the Chinese Government, our hearty congratulations to the opening of the meeting, and warmest welcome to all participants.

As everybody knows, the ocean is the cradle of life and an essential component of the global

life-support system. With the depletion of the world's terrestrial resources, the ocean provides a valuable source of food, energy, mineral resources, and perhaps a vast reservoir of fresh water. The coastal areas provides an ideal home for some 60% of the world's population, the fastest locomotive of the world's economy, as well as a valuable asset for sustainable development of the world. In the 21st century, the ocean's strategic importance is increasing in political, economic and social development of the world. In 2001, the United Nations declared that "the 21st century is the century for the Ocean", and the last frontier for human development.

However, to ensure long-term sustainable development, we need to better understand the ocean. There are still various scientific uncertainties of which the ocean is an important component. For instance, the ocean is not only a sink, but also a source of CO₂. The El Niño phenomenon, La Niña, the southern oscillation, etc., all play an important role in global climate change, and yet we have not a grasp of the mechanism of their incidence. This is where marine science comes in to help, and this is where PICES comes in to help.

I first physically got to know PICES in 1999, when PICES had its Eighth Annual Meeting in Vladivostok. As an inter-governmental scientific organization, PICES concentrates its research efforts on the North Pacific. Through more than 10 years' effort, PICES has become a major forum for international cooperation in marine science around the world, by displaying its important role in the promotion and coordination of marine research; advancing scientific knowledge about the ocean environment, global weather and climate change, living resources and their ecosystems, and the impacts of human activities; and promoting the collection and rapid exchange of scientific information on these issues. Especially in recent years, PICES has taken the lead in joining forces with other international organizations and programmes such as

GLOBEC, ARGO, GOOS, etc., and great achievements have been made. I should like to congratulate PICES for all its remarkable achievements.

As a country with important marine science capabilities, China attaches great importance to marine scientific research and to PICES. Despite various difficulties, China is becoming more and more involved in PICES through encouraging the participation of Chinese scientists in PICES activities. In order to encourage more young Chinese scientists to be involved in PICES activities, drastic changes of Chinese membership in some Standing Committees and *ad hoc* groups have been made. I believe, with their participation, the Chinese scientists will greatly benefit from PICES programmes on the one hand, and will also become an important linkage between China and PICES, as well as between China and the international marine science community on the other.

Today, I am very happy to see this grand gathering of so many marine scientists, which I believe, is a very important occasion for promoting and enhancing cooperation and exchange in marine science in the area of the northern North Pacific. Besides the meeting, scientists from outside China could have interactions with Chinese marine scientists. In this connection, I would like to inform you that Qingdao is not only famous for its beauty as a coastal city, it is the cradle of China's marine sciences, and the most important base for China's marine scientific research. I hope, through the meeting and visits outside the meeting, scientists from outside China could have interactions with the Chinese marine scientists, so that everybody could benefit from each other, and more and more Chinese marine scientists can get to know PICES and participate actively in PICES activities.

Finally, I wish this meeting great success, and everybody a happy stay in Qingdao. Thank you!

OP Appendix 9

Welcome Address by Dr. Hyung-Tack Huh, Chairman of PICES

Mr. Bao-Zhan Xu, Prof. Qi-Sheng Tang, distinguished participants, ladies and gentlemen:

It gives me great pleasure to welcome you all to the opening of the Eleventh Annual Meeting of PICES.

First of all, I would like to begin my remarks by thanking our host, the Government of the People's Republic of China, for hosting this meeting, and the Yellow Sea Fisheries Research Institute and City of Qingdao for their hard work in arranging the meeting. I am particularly grateful to the Qingdao Municipal Government for hosting PICES Annual Meeting for the second time in this beautiful ocean city.

This is the first meeting in the second decade of PICES. At the Tenth Anniversary Meeting held last year in Victoria, Canada, we looked back with satisfaction at what was done by PICES during the first decade of its existence. Now we can look forward with confidence at what should be done in the next 10 years.

I am proud of the fact that in ten years PICES has grown into a major international forum in marine science representing the North Pacific Ocean. I am sure that the second decade will be a period of scientific take-off for PICES to be a strong and leading international marine science organization.

As this meeting is the last Annual Meeting for me as Chairman, it is worth recalling the changes I have seen during the last few years. PICES has made significant advancements in marine science research in the North Pacific by promoting and coordinating regional and international research programs, integrating knowledge across the marine science disciplines, and disseminating research results and data through conferences, workshops, symposia and publications.

Considerable progress has been made in strengthening its interactions with other international organizations and programs,

notably IOC, ICES, SCOR, GOOS, CLIVAR, GODAE, IGBP, GLOBEC, ARGO, GEOHAB, etc. It is very encouraging to see a steadily increasing number of attendees at the Annual Meetings of PICES, as these meetings become the choice and attractive forum for the ocean science in the North Pacific. I feel that I was very fortunate in having been the Chairman, witnessed the pioneering activities and growth of PICES during its early stage of development.

The last inter-sessional period has also been a very productive year for the Organization. PICES convened or co-sponsored 17 international meetings, produced 14 publications including special issues of *Journal of Oceanography* and *Progress in Oceanography*, and participated in 13 international programs jointly with other international scientific organizations and programs. A new PICES database has been established, through which information of all contacts, organizational activities and programs will be efficiently produced and managed.

As we move forward from the September 2002 World Summit on Sustainable Development (WSSD) toward the future, "a new imperative is emerging that calls for a radical shift in thinking about how marine ecosystems are to be managed". At the WSSD, the importance of the oceans has been reaffirmed, as the oceans has sustained living resources and their habitats for millennia and represent a vital life support system for humanity in the 21st century. It is known to be the most bountiful and yet the most threatened natural resource of the planet. Therefore, wise management of the oceans based on scientific knowledge is becoming the central issue in the 21st century, "the Century of the Oceans". The collective efforts, wisdom and commitments of all states are required to maintain the sustainability of the oceans.

As we all know, PICES was established ten years ago to promote international cooperative research efforts to solve key scientific problems in the North Pacific, and has been developing to

strengthen such a function. PICES will be a full partner in the continuing quest to examine scientific uncertainties of oceanic processes, in the provision of forecasting marine environments, in the understanding of productivity, ecology and health of the oceans, and in the exploration of its resources.

The Eleventh Annual Meeting of PICES is designed to provide many insightful agendas with topic sessions, symposium and workshops

OP Appendix 10

PICES “Year-in-Review” 2002 by Dr. Ian Perry, Chairman of Science Board

PICES continued to be a very busy and productive organization throughout 2002. Several important publications were produced, and significant meetings and workshops were held during the past year. Most impressive was publication in the primary scientific literature of two volumes of papers presented during sessions at PICES X, in October 2001. These volumes (“Physics and biology of eddies, meanders and rings in the PICES region”, *Journal of Oceanography* 58(5), edited by W. Crawford, A. Bychkov, S. McKinnell, and T. Sugimoto; “Variability of Bering Sea ecosystems”, *Progress in Oceanography* 55(1-3), edited by A. Macklin, J. Napp, V. Radchenko, S. Saitoh, P. Stabeno and S. McKinnell) went through submission, review, revision and publication in well under 12 months! Primary papers from two other sessions at PICES X, on “Migration of key ecological species in the North Pacific Ocean” and “Plankton size classes, functional groups and ecosystem dynamics” are expected to be published soon. Four reports were published in the PICES Scientific Report Series, including two from the CCCC Program (PICES Scientific Reports Nos. 20 and 21), one from Working Group 15 on Ecology of harmful algal blooms (PICES Scientific Report No. 23), and the series of invited papers from the Science Board Symposium at PICES X titled: “PICES Science: The first ten years and a look to the future” (PICES Scientific Report No. 22).

In addition to the Eleventh Annual Meeting held in China this year, PICES also co-sponsored 5

for scientists from the region as well as from other areas of the world. I am confident that PICES XI will be another fruitful occasion for all of us in enriching our knowledge and renewing friendships with colleagues from other countries. I wish that all of you will find everything to your satisfaction and have an enjoyable stay in Qingdao.

Thank you very much for your attention.

symposia: “The causes of marine mortality of salmon in the North Pacific and North Atlantic and in the Baltic” (with NPAFC, NASCO, ICES and IBSFC, March, in Vancouver); “North Pacific transitional areas” (with CIBNOR and CICIMAR, April, in La Paz, Mexico); “Recent progress in studies of physical processes and their impact to the Japan/East Sea ecosystem” (with CREAMS; August, in Seoul); “Synthesis of JGOFS North Pacific process study” (with JGOFS, October, in Sapporo), and “GLOBEC 2nd Open Science Meeting” (with GLOBEC, October, in Qingdao). These all dealt with organizations and scientific aspects of the North Pacific which PICES hopes to encourage and enhance. I wish to draw particular attention to the joint “Transitional areas” symposium, which was highly successful and represented the first formal event held by PICES in Mexico. The year was also busy with meetings and workshops of specific groups within PICES. These included meetings of the various Working Groups and CCCC Task Teams (notably two workshops dealing with lower and upper trophic level models in the North Pacific, and monitoring systems).

PICES has in place two field projects, both of which were very active in 2002. The Continuous Plankton Recorder (CPR) Program conducted surveys from merchant marine vessels along meridional transects in the eastern North Pacific (Alaska to California) and zonal transects from Canada/U.S. to Japan. Results from these and earlier surveys are now *in press*

in the scientific literature, and further publications are being prepared. In addition, this program was awarded further funding from the *Exxon Valdes* Oil Spill Trustee Council in Alaska to continue sampling through 2003. The Iron Fertilization Experiment Panel (IFEP), an Advisory Panel under the CCCC-BASS Task Team, conducted a collaborative (Canada-Japan) iron enrichment experiment in the Northeast Pacific during summer 2002. This experiment was so successful that the resulting phytoplankton bloom was visible from the SeaWiFS satellite, and was observed and puzzled over by remote sensing laboratories in North America.

Two major projects were also begun during 2002. One was the CCCC Integration Workshop, which was held just prior to PICES XI to review the accomplishments of the CCCC program and to consolidate its next steps. The initial results of this workshop are published elsewhere in this Annual Report; the detailed results will be presented in the PICES Scientific Report Series.

The other project was the North Pacific Ecosystem Status Report. This is a major effort to integrate and assess the ecosystems of the North Pacific, identify critical factors causing changes, and to try and forecast the consequences of these changes. Funding support was awarded by the National Marine Fisheries Service and the *Exxon Valdes* Oil Spill Trustee Council. A “draft for discussion” of a sample Ecosystem Status Report was prepared prior to PICES XI, and received considerable comment. A proposal was submitted and funding was subsequently awarded by the Census of Marine Life (through the Alfred P. Sloan Foundation) for a parallel collaborative effort with PICES on “Marine life in the North

Pacific: The known, unknown, and unknowable”. These will be major initiatives for PICES during 2003.

As with every growing organization, PICES faces several challenges. Since PICES is now 10 years old, both the Science Board and the Governing Council conducted reviews of what has worked well for PICES over the past 10 years, and what the weaknesses were. In addition, the Science Board examined issues that appear to be emerging as important topics in global science and that are likely to be significant drivers of research activities over the next five to ten years. The Science Board review contributed to the Governing Council Review Committee Report, which is published elsewhere in this Annual Report. Two significant conclusions of this latter report were a need for a stronger sense of direction for the Scientific Committees of PICES, and therefore for PICES as a whole, and following this, the need for stronger interaction among the Scientific Committees and the CCCC Program. Significant emerging scientific issues included biodiversity, ocean observing systems, ocean-climate interactions, and understanding the combined impacts of climate and direct human forcing on marine systems. A central theme was proposed that may help to integrate these new and existing scientific issues, and help to provide a stronger sense of direction for PICES: What are the problems in the North Pacific in the next 5-10 years, and how can PICES position itself to understand and be prepared to offer advice on these problems? The approval at PICES XI of an inter-sessional Science Board meeting will provide an opportunity to discuss these issues in much more detail, and to continue the high level of action that PICES has demonstrated in the past few years.

OP Appendix 11

The Ocean’s role in global change: Global oceanography has come Abstract of the keynote lecture by Prof. Dun-Xin Hu (People’s Republic of China)

The ocean occupies 71% of the earth surface, so it plays a very important role in many aspects of global change.

The ocean is not only the main source, but also the purifier of global fresh water. The ocean receives human-polluted water from land, and

provides the atmosphere with purified fresh water through evaporation, making the global water cycle complete. What would happen to the global water cycle with a continuous decrease of riverine water discharge by dam construction, irrigation and so forth?

The ocean is not only a component, but also the main regulator of the global climate system. Because of its huge heat capacity, thermal inertia and circulation characteristics, the importance of the ocean in global climate change has been recognized through TOGA, WOCE and CLIVAR. What should man do to further understand the ocean's role in global climate change, even beyond CLIVAR?

The ocean carbon cycle is an important integral part of the global carbon cycle, which is one of the main issues of global change, associated with global warming. How much have we

known about the ocean carbon cycle? What should we do after JGOFS? And can we foresee how the ocean carbon cycle changes with global warming?

The ocean will be the main protein source for humans. With global change, especially anthropogenic impact, can living marine resources be sustainably preserved in the future? What could and how should we do beyond GLOBEC for living marine resources?

In this lecture, a review and a prospective are made on issues of the ocean, such as climate, fresh water, carbon cycle and living resources, *etc.*

In sum, global change is a big challenge and at the same time it provides a good opportunity for oceanography, because it made global oceanography come into being.