REPORT OF OPENING SESSION

AGENDA ITEM 1
Opening by the Chairman of PICES

The Opening Session started at 09:00 hours on October 17, 2011. Dr. Lev Bocharov, Chairman of PICES, welcomed delegates, observers and researchers to Khabarovsk and formally declared that the PICES Twentieth Annual Meeting (PICES-2011) was open. The session agenda is appended as *OP Endnote 1*.

AGENDA ITEM 2
Welcome addresses on behalf of the host country

Prof. Vyacheslav Shport (Governor, Khabarovsk Region, Russian Federation) addressed the session on behalf of the local government, and Dr. Vasily Sokolov (Deputy Head, Federal Agency for Fisheries, Russian Federation) welcomed participants on behalf of the host country (*OP Endnotes 2* and *3*).

AGENDA ITEM 3
Remarks by the Chairman of PICES

Dr. Bocharov thanked Prof. Shport and Dr. Sokolov for their remarks, and addressed the participants on behalf of PICES (*OP Endnote 4*).

AGENDA ITEM 4
Wooster Award presentation ceremony

Dr. Bocharov and Dr. Sinjae Yoo, PICES Science Board Chairman, conducted the Wooster Award presentation ceremony. Dr. Yoo introduced the award and announced that the 2011 award was being given to the late Dr. Bernard A. Megrey, a world-renowned oceanographer with NOAA's Alaska Fisheries Science Center (*OP Endnote 5*). Reading of the Science Board citation was accompanied by a slide show dedicated to Dr. Megrey. A commemorative plaque was presented to Dr. Megrey's wife, Mrs. Ronnette Megrey, and his daughter Sarah (a permanent plaque identifying all Wooster Award recipients resides at the PICES Secretariat). After the Annual Meeting, Mrs. Megrey sent the following note to the PICES Secretariat:

"*Our children, Sarah, Nick and Chris, and I would like to thank PICES for honoring Bern with this posthumous award. It is with great appreciation and gratitude that Bern's many friends and colleagues keep his memory alive and honor the work that he performed over his 30+ year career. We are so very happy, and Bern would be touched, that several early career scientists were able to travel to Khabarovsk for this meeting using the Dr. Bernard A. Megrey Fund established by Dr. Megrey's family and friends, to support participation of graduate students and early career scientists in PICES Annual Meetings and conferences co-sponsored by the Organization.*"

AGENDA ITEM 5
PICES Ocean Monitoring Service Award presentation ceremony

Drs. Bocharov and Yoo also conducted the presentation ceremony of the PICES Ocean Monitoring Service Award (POMA). Dr. Yoo introduced the award and announced that the 2011 award was being given to the NFRDI (National Fisheries Research and Development Institute of Korea) **N**etwork of **S**erial Oceanographic **O**bservations (NSO; *OP Endnote 6*). Reading of the Science Board citation was accompanied by a slide show

dedicated to NSO and the various people who contributed to the program for the past nine decades. A commemorative plaque (a permanent plaque identifying all POMA recipients resides at the PICES Secretariat) and a certificate were presented to Dr. Yangho Choi, NFRDI senior researcher, who accepted the award with the following remarks of appreciation:

"*It is great honor for me to have a chance to accept this award on behalf of Korean **N**etwork of **S**erial Oceanographic **O**bservations (NSO). First of all, I would like to thank PICES and its MONITOR Committee and Technical Committee on Data Exchange for selecting our Network for this year's PICES Ocean Monitoring Service Award. As you know, our Network has a very long history, more than 90 years. I am not sure that this could be achieved without any contributions and sacrifices. On behalf of the NSO Monitoring Group, I would like to thank the hundreds of people, past and present, who contributed to this monitoring program over the past 90 years. I am confident that every member of the NSO Monitoring Group will work hard to serve the best data to you all. Thank you very much.*"

AGENDA ITEM 6
PICES "Year-in-Review" 2011

Dr. Yoo reviewed PICES' scientific accomplishments since the Nineteenth Annual Meeting (PICES-2010) in Portland, U.S.A. An article on the state of PICES science for 2011 will be published in the 2012 winter issue of PICES Press (Vol. 20, No. 1).

The 2011 keynote lecture entitled "*Recent changes in the North Pacific marine ecosystems related to climate change: Global or regional forcing*" (by Drs. Vyacheslav Shuntov and Olga Temnykh, Pacific Research Fisheries Centre, Russia) was given by Dr. Temnykh as part of the Science Board Symposium on "*Mechanisms of marine ecosystem reorganization in the North Pacific Ocean*". The abstract of this talk is appended to the report as *OP Endnote 7*.

AGENDA ITEM 7
Closing remarks and announcements

After the closing remarks by Dr. Bocharov, Dr. Stewart (Skip) McKinnell, PICES Deputy Executive Secretary, made announcements related to the logistics of the Annual Meeting. The session was adjourned at 10:15 a.m.

OP Endnote 1

Opening Session agenda

1. Opening by the Chairman of PICES, Dr. Lev Bocharov
2. Welcome addresses on behalf of the host country
   - Prof. Vyacheslav Shport (Governor, Khabarovsk Region, Russian Federation)
   - Dr. Vasily Sokolov (Deputy Head, Federal Agency for Fisheries, Russian Federation)
3. Remarks by the Chairman of PICES, Dr. Lev Bocharov
4. 2011 PICES Wooster Award presentation ceremony
5. 2011 PICES Ocean Monitoring Service Award presentation ceremony
6. PICES "Year-in-Review" *2011* by the Chairman of Science Board, Dr. Sinjae Yoo
7. Closing remarks/announcements

OP Endnote 2

Welcome address on behalf of the local government of the host country by Prof. Vyacheslav Shport (Governor, Khabarovsk Region, Russian Federation)

Dear meeting participants, ladies and gentlemen,

We are very happy to welcome you to Khabarovsk, the administrative and cultural capital of the Russian Far East. This is the third meeting in the history of the North Pacific Marine Science Organization (PICES) to be held in Russia, and we are very excited and proud that Khabarovsk has been chosen as the host for the Twentieth Annual Meeting of PICES.

The Khabarovsk Region has been known for its vast marine and freshwater biological resources. The more than 2,500 km coast line, washed by two seas, is an area of intensive fishery activities and the development of shelf resources. The Amur River, one of the world's longest rivers, flows through the Khabarovsk Region, and has a rich diversity of freshwater species (over 100 native species).

Fisheries, with major commercial species such as pollack, herring, crab, shrimp, squid, salmon, *etc*., is a very important sector of our economy. The preservation and rational use of marine biological resources in the region has a high priority nowadays. Therefore, many issues to be discussed at the PICES Annual Meeting, especially the effect of regional and global climate change on marine ecosystems and biological resources, are of practical importance. Major international conferences, such as PICES Annual Meetings, contribute to a broad international integration of scientific knowledge. No doubt these conferences are also critical for the training of early career scientists.

I wish all meeting participants successful work and productive discussions. I also expect that you will be able to find time to explore and enjoy Khabarovsk: to get pleasure from the walks through its historical center, from the visits to the museums, theaters and other attractions offered by our hospitable city. I hope that you will fall in love with our region and will come back to visit us again.

OP Endnote 3

Welcome address on behalf of the federal government of the host country by Dr. Vasily Sokolov (Deputy Head, Federal Agency for Fisheries, Russian Federation)

Dear delegates, colleagues, ladies and gentlemen,

On behalf of the Government of the Russian Federation, I would like to welcome you to the capital of the Far Eastern Federal District, the city of Khabarovsk, at the Opening Session of the Twentieth Annual Meeting of the North Pacific Marine Science Organization (PICES). This international forum is dedicated to a wide range

of oceanic issues, which are vital for communities worldwide. Your meeting is very important for all countries around the North Pacific rim, and is undoubtedly of high value not only for the Russian Far East, but for the entire country of Russia.

The Russian Federation is a member of a number of international science organizations dealing with the exploration of the seas, and regional fishery management organizations, whose activities are associated with various aspects of fishing, studies of fishery resources, and conservation and sustainable use of biological resources of the world's oceans. The Russian Federation ratified the PICES Convention in 1994. Since that time, our country has been actively participating in a wide range of PICES activities, contributing in many ways to the fulfillment of the aims and objectives of this scientific organization.

Many scientists from the Russian Federation and our closest North Pacific neighbors: Canada, Japan, People's Republic of China, Republic of Korea, and the United States of America, as well as researchers from non-member countries, take part in PICES Annual Meetings. These forums are critical for facilitating fruitful communication and mutual understanding of scientific problems, and for providing increasing opportunities for collaboration and joint research. Exchange of knowledge and methodologies and synthesis of results at PICES-2011 will certainly strengthen the international relationships among scientists from our member countries. This will enable all of us to receive new fundamental and practical knowledge about the North Pacific Ocean and its marginal seas, where ecosystem and resource studies are hard to achieve using efforts of only one particular country.

I hope that the participants of this meeting will discuss results of their studies and outline the most promising research directions where scientists should concentrate their efforts in the near future. In the long run, this will help PICES member countries and their fishery industries to accurately assess and successfully manage fishery stocks in the North Pacific Ocean.

I wish all the participants of this Annual Meeting effective work, useful contacts and fruitful discussions. Thank you very much for your attention!

OP Endnote 4

Welcome address by Dr. Lev Bocharov (Chairman of PICES)

Dear delegates, respectful guests, ladies and gentlemen, welcome to PICES-2011.

First and foremost, on behalf of PICES, I would like to express my deep gratitude to the Government of Russia, Governor and Government of the Khabarovsk Region for hosting our Annual Meeting. I would also like to thank the Russian Federal Agency for Fisheries and the Local Organizing Committee for their help in the preparation of the Annual Meeting.

One of the main objectives of PICES is the study of regional and global climate change and its impact on marine ecosystems of the North Pacific Ocean. Thanks to research activities of the PICES Scientific and Technical Committees and expert groups, we are expanding our knowledge on how the Pacific Ocean responds to various natural and anthropogenic stressors. Our investigations today are aimed at forecasting how climate will affect socio-economic activities of PICES member countries, and at offering scientific advice on how to utilize natural resources, such as biological resources of the ocean. These are major objectives of our second integrative science program, FUTURE, which started in 2009. Studies of relationships between human society and ecosystems of the North Pacific Ocean are an important part of the FUTURE Program. This activity is new to PICES, and the main goal in this field is to analyze the role of social sciences and practices in decision making with respect to marine ecosystems.

The role of international organizations in the conservation of living resources of the world's oceans and the regulation of their commercial use has been growing in the last decade. In the North Pacific Ocean, such a

coordinating role belongs to PICES, which brings together multiple efforts of numerous scientists from our member countries as well as scientists from other states. PICES is constantly expanding its cooperation with other international organizations and programs, such as the International Council for the Exploration of the Sea (ICES), the North Pacific Anadromous Fish Commission (NPAFC) and others. Recently, for example, interesting results were obtained by the joint PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish*.

Many scientists in PICES use the unique opportunity, provided by our Organization, to broadly exchange their metadata and collaborate in building models. The North Pacific Ocean is the habitat for thousands of species playing various roles in ecosystem functioning. Therefore, to create marine ecosystem simulation models aimed at predicting such parameters as abundance and distribution of ecosystem components, we need a reliable database for planktonic, nektonic, benthic and other communities. To achieve a higher level of information for research we need to merge the efforts of all PICES Standing Committees, and their subsidiary bodies within the framework of the FUTURE Program.

As I see it, in the near future, we need to pay more attention to the unification of methods for data collection, first of all, by research vessels. We also need to organize coordinated international marine investigations.

Our Twentieth Annual Meeting provides a good chance for all of us to look back at what has already been achieved, define more exactly the prospects for future development of PICES and, through multi-national efforts, continue to move forward for the benefit of all people living on the coasts of the great Pacific Ocean.

Thank you for your attention.

OP Endnote 5

Science Board citation for the 2011 Wooster Award

It is with both great sadness and pleasure I announce that the late Dr. Bernard Megrey is the recipient of the 2011 Wooster Award.

As many of you know, Bern passed away suddenly at the age of 60, almost one year ago (October 1, 2010). The Wooster Award is given annually to an individual who has made significant scientific contributions to North Pacific marine science. In particular, the Award recognizes sustained excellence in research, teaching, administration or a combination of the three in the area of North Pacific marine science. Special consideration is given to individuals who have worked to integrate knowledge from the disparate disciplines of marine science.

Bern was born in July 1950, in Latrobe, Pennsylvania. Along his educational pathway, he earned an Associate of Science degree (1971) and a Bachelor of Arts degree from Cleveland State University in Ohio (1974). Bern began his scientific career in 1978, with a Masters in Environmental Science from Miami University in Ohio, and carried out his doctoral research at the University of Washington.

During his doctoral research, Bern found a position with the United States National Oceanic and Atmospheric Administration, working for the National Marine Fisheries Services at the Northwest Fisheries Science Center and Alaska Fisheries Science Center. In 1987, he became a permanent employee of NOAA. There, he worked on recruitment prediction, and his focus broadened from single species to ecosystems. During his time with the Alaska Fisheries Science Center, Bern's career spanned a broad spectrum of activities within his chosen disciplines, including fish population dynamics, stock assessment, fish reproductive biology, ecosystem simulation and climate impacts on marine ecosystem production.

Bern also worked tirelessly for several professional organizations, most notably the American Fisheries Society (AFS), International Council for the Exploration of the Sea (ICES), Global Ocean Ecosystem Dynamics (GLOBEC) and Ecosystem Studies of Sub-Arctic Seas (ESSAS) projects, and PICES.

Held in the highest regard by his colleagues, he never missed a chance to collaborate, share research, or help others break into or advance their careers in fisheries science. During the course of his career, Bern either wrote or contributed to over 80 articles in primary scientific literature.

In PICES, Bern chaired the Technical Committee on Data Exchange (TCODE) and co-led the MODEL Task Team under the Climate Change and Carrying Capacity (CCCC) Program. The greatest achievement of this Task Team was the development of the NEMURO (**N**orth Pacific **E**cosystem **M**odel for **U**nderstanding **R**egional **O**ceanography) model. Bern made significant contributions to North Pacific marine science, including understanding of how fluctuations in climate may impact marine ecosystem production.

The American Fisheries Society recognized Bern's lifetime achievement in 2009 with the Oscar Elton Sette Award for sustained excellence in marine fishery biology. PICES honored Bern's leadership in building an inventory of biophysical data for the North Pacific and creating the PICES Marine Metadata Federation with the 2009 PICES Ocean Monitoring Service Award. In 2011, NOAA awarded him the NOAA Distinguished Career Award for lifetime contributions to NOAA's fishery management.

Bern was highly regarded regionally, nationally and internationally in the field of marine fishery science professionals. His wife Ronnette and daughter Sarah are here today to accept the award, and we welcome them to the Russian Federation, to Khabarovsk, to PICES, and to this meeting where we can honor Bern's memory.

OP Endnote 6

Science Board citation for the 2011 PICES Ocean Monitoring Service Award

Long-term monitoring observations are particularly critical to detecting and understanding ecosystem changes. The PICES Ocean Monitoring Service Award (POMA) was established to acknowledge monitoring and data management activities that contribute to the progress of marine science in the North Pacific. It is my great pleasure to announce that the 2011 POMA award goes to the NFRDI (National Fisheries Research and Development Institute of Korea) **N**etwork of **S**erial Oceanographic **O**bservations (NSO).

Since the foundation of the Fisheries Experimental Station in 1921, the predecessor of NFRDI, NSO has been carried out for the purpose of monitoring climate variability and oceanographic conditions, and also for collecting information on fishing grounds and anthropogenic effects in Korean waters. The unique data and information collected by the observations provide the basis for assessing the status of the ecosystem and managing fisheries in the seas around the Korean Peninsula. Accumulated data also have enabled studies of long-term changes in the region. NSO has been one of the key monitoring systems in the marginal seas of the Northwest Pacific and is a good example of long-term oceanographic monitoring in the world.

In the beginning of NSO, 6 observation lines were surveyed occasionally from 2 to 6 times a year. In 1935, 14 observation lines covered the entire seas adjacent to Korea and expanded up to 100 miles from the coast. Among the lines at that time, 4 lines were located in North Korean waters. Oceanographic data collected in North Korean waters, which are hardly obtainable nowadays, were published in the book form of oceanographic charts. The Korea Oceanographic Data Center (KODC) operated by NFRDI keeps these precious old books. In 1961, NSO was reorganized for the Cooperative Study of the Kuroshio project to a bimonthly surveyed grid, with 175 stations from 22 observation lines. The present-day grid includes 196 stations from 25 lines around the Korean Peninsula and in the northern East China Sea surveyed from 4 to 6 times per year.

NSO has guided the Korean oceanographic community to modernization of oceanographic equipment and standardization of seawater analysis methods. NFRDI has been provided a huge amount of oceanographic data and information obtained by NSO for domestic and international users in many ways. For example, the "annual reports of NSO" have been published every year since 1952. They include the data on water temperature, salinity, dissolved oxygen, nutrients, zooplankton, and meteorological variables. Statistical analysis of the NSO data has been provided intermittently by the "Oceanographic handbook of the neighboring seas of Korea".

NFRDI has sent the NSO data to up to 200 institutes in the world, and those data have been used for various research. The vertical temperature and salinity profiles from ship observations are prepared and released within 2 days of observation time. The NSO data are also released at the KODC website. Near real-time ocean bulletins for several serial lines have been released at the NFRDI website. The data could also be used for monthly ocean forecasts, providing simple statistical information. NFRDI is now planning a real-time/near-real time automated transmission system for oceanographic data to be used for ocean forecast modeling.

The accomplishments of NSO are so numerous that we cannot mention all of them here. Many students and researchers have used the NSO data for academic purposes, and the research results are utilized for marine and fisheries policy issues by policy makers. Furthermore, the long-term NSO data have expedited climate research, providing data with clear signals of regime shifts and warming in the Northwest Pacific. In addition, NSO has supported domestic and international researchers to share NSO data and gives an opportunity of boarding its research vessels.

Please join me in congratulating Dr. Yangho Choi, NFRDI senior researcher, who is receiving the 2011 POMA Award on behalf of the hundreds of people, past and present, who contributed to the Korean Network of Serial Oceanographic Observations over the past nine decades.

OP Endnote 7

"*Recent changes in the North Pacific marine ecosystems related to climate change: Global or regional forcing*"

(Abstract of the keynote lecture by Drs. Vyacheslav Shuntov and Olga Temnykh, TINRO-Centre, Russia)

The idea that anthropogenic greenhouse gases are among the major drivers of climate change became widespread at the end of the 20th century. Some researchers suggest that global warming caused by the greenhouse effect will continue at least until the end of the 21st century. We do not argue that increasing human activity will have an increasing effect on regional and global climate. However, there is a real need to outline the magnitude of natural climate oscillations, with periods from hundreds to thousands of years, that were occurring long before humans started to have any noticeable impacts on the biosphere. All physical processes on the Earth evolve under the guidance of cosmogenic and global geophysical factors influencing the atmosphere and hydrosphere. This may be the reason for the approximately synchronous cycles in physical (climate) and biological processes. The simultaneous overlaying of cycles having a time-span from years and decades to centuries produce numerous combinations in the observed patterns of climatic, and especially, biological events. Existing trends in the dynamics of populations, biotic communities, and ecosystems depend on temporal and spatial factors. When global factors produce major effects, changes in biota occur in phase over wide areas and on a long time scale. When regional (provincial) factors are in play, local and short-term trends are more evident. Therefore, even large, occasionally local, anomalies should not be interpreted as responses to global causes, either natural or anthropogenic. Global changes may occur differently in different regions. Patterns in population and community dynamics may differ significantly even during analogous cycles due to multivariate impacts on biota. Biotic processes are influenced not only by fundamental environmental factors, but by population and community factors as well. Thus, widely used climatic indices are not always reliable for unraveling mechanisms and cause-and-effect relationships. Such a conclusion is supported by newly revised datasets on variations in productivity of pelagic and bottom fish, squids, zooplankton and jellyfish acquired by TINRO-Centre in the northwestern Pacific Ocean during the last 3 decades. Observed sharp changes in fluctuating fish stocks are still poorly predictable on the basis of existing stock assessment approaches. It is, therefore, important to support stock assessment models with real observational data obtained in ecosystem surveys when abundance and biomass of each species are evaluated. Macroecosystems of the North Pacific function normally, keeping biological (in particular, fish) productivity at a high level today, though it is somewhat lower than in the 1980s. Traditional methods of assessing further changes in populations and ecosystems do not have the power for producing long-term forecasts. To improve our understanding of marine ecosystem function, we need in-depth studies on how climate and oceanographic factors impact energy transfer (especially during the earliest ontogenetic stages of marine organisms) in the biosphere.