

REPORT OF OPENING SESSION

AGENDA ITEM 1

Opening by the Chairman of PICES

The Opening Session started at 09:00 hours on October 25, 2010. Dr. Tokio Wada, Chairman of PICES, welcomed delegates, observers and researchers to Portland and formally declared that the PICES Nineteenth Annual Meeting (PICES-2010) was open. The session agenda is appended as *OP Endnote 1*.

AGENDA ITEM 2

Welcome addresses on behalf of the host country

Dr. Larry Robinson (Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator for the National Oceanic and Atmospheric Administration, U.S.A.) welcomed participants on behalf of the host country (*OP Endnote 2*).

AGENDA ITEM 3

Remarks by the Chairman of PICES

Dr. Wada thanked Dr. Robinson for his remarks, and addressed the participants on behalf of PICES. His comments are appended as *OP Endnote 3*.

AGENDA ITEM 4

Wooster Award presentation ceremony

Dr. Wada and Dr. John Stein, PICES Science Board Chairman, conducted the 2010 Wooster Award presentation ceremony. Dr. Wada introduced the award, and Dr. Stein announced the 2010 award is being given to Dr. Jeffrey J. Polovina, a world-renowned oceanographer with NOAA's Pacific Islands Fisheries Science Center (*OP Endnote 4*). Reading of the Science Board citation was accompanied by a slide show dedicated to Dr. Polovina. A commemorative plaque was presented to Dr. Polovina (a permanent plaque identifying all Wooster Award recipients resides at the PICES Secretariat), who accepted the award with the following remarks of thanks:

Thank you, Drs. Wada and Stein. What a surprising and amazing honour! I am especially humbled given the outstanding scientific talent in the PICES community and that represented by the previous awardees. This award is especially significant to me for several reasons. In the late 1980s, we observed ecosystem changes in the Hawaiian Archipelago and invited Dr. Wooster to Hawaii to help us develop a research program to understand those changes. Thus, Dr. Wooster's guidance helped shape the direction of much of my subsequent research on decadal variation. Secondly, while much of my research focuses on the subtropical ecosystem south of the PICES geographic area of interest, the PICES community represents my intellectual home. Its approach of addressing large spatial-scale dynamics, physical-biological linkages, and complete ecosystems has always had great appeal to me. Lastly, I would like to acknowledge that my achievements are the result of contributions from many wonderful colleagues, mentors, and co-authors, and I am truly grateful to the collaborations over many years with the talented staff of the Ecosystems and Oceanography Division of the Pacific Islands Fisheries Science Center.

AGENDA ITEM 5

PICES Ocean Monitoring Service Award presentation ceremony

Drs. Wada and Stein also conducted the presentation ceremony of the 2010 PICES Ocean Monitoring Service Award (POMA). Dr. Wada introduced the award, and Dr. Stein announced that the 2010 award be given to the Station Papa/Line-P monitoring program (*OP Endnote 5*). Reading of the Science Board citation was accompanied by a slide show dedicated to the various people who contributed to the program for the past six

decades. A commemorative plaque (a permanent plaque identifying all POMA recipients resides at the PICES Secretariat) and a certificate were presented to Dr. William Crawford (Head of the State of the Ocean section at the Institute of Ocean Sciences, Fisheries and Oceans Canada), who accepted the award with the following remarks of appreciation:

I was honoured when asked to accept this award on behalf of Marie Robert and the Station Papa/Line-P Program. My role is mainly administrative, as many of the Line-P scientists are in my section of Fisheries and Oceans Canada.

This morning I compiled a list of 36 scientists who stand out among the thousands of persons who contributed to this program over the past years. I admit it is biased to recent years because my knowledge of the start of the program is limited. In mostly chronological order: John Tully, Sus Tabata, Tim Parsons, Robin Lebrasseur, John Strickland, Cary McAllister, John Garrett, Bob Stewart, Cedric Mann, John Davis, C.S. Wong, Paul Harrison, Ken Denman, Peter Niiler, John Love, Reg Bigham, Bernard Minkley, Laura Richards, Frank Whitney, Tim Soutar, Howard Freeland, Robin Brown, Wendy Richardson, Mike Arychuk, Marie Robert, Ron Bellegay, Janet Barwell-Clarke, Lisa Miller, Keith Johnson, Sophie Johannessen, Angelica Peña, Jim Christian, Hugh MacLean, Doug Anderson, David Mackas, and our data quality queen: Germaine Gatien.

On behalf of Fisheries and Oceans Canada, Marie Robert (godmother), the three godfathers (John Tully, Sus Tabata and Frank Whitney), the list of 36, and the cast of thousands, thank you PICES for this great honour.

AGENDA ITEM 6

PICES “Year-in-Review” 2010

Dr. Stein reviewed PICES’ scientific accomplishments since the Eighteenth Annual Meeting (PICES-2009) in Jeju, Republic of Korea. An article on the state of PICES science for 2010 will be published in the 2011 winter issue of PICES Press (Vol. 19, No. 1).

The 2010 keynote lecture entitled “*Observing change in the Northeast Pacific: Past, present and FUTURE*” was given by Dr. John (Jack) A. Barth (Oregon State University) as a part of the Science Board Symposium on “*North Pacific ecosystems today, and challenges in understanding and forecasting change*”. The abstract of his presentation is appended to the report as *OP Endnote 6*.

AGENDA ITEM 7

Remarks by Dr. Luis Valdés (Intergovernmental Oceanographic Commission of UNESCO)

Dr. Luis Valdés, Head of the Ocean Science Section of the UNESCO Intergovernmental Oceanographic Commission (IOC), addressed the participants in connection with the 50th anniversary of IOC. His remarks are appended as *OP Endnote 7*.

AGENDA ITEM 8

Closing remarks and announcements

After the closing remarks by Dr. Wada, 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. Tokio Wada
2. Welcome address on behalf of the host country by Dr. Larry Robinson, Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator for the National Oceanic and Atmospheric Administration
3. Remarks by the Chairman of PICES, Dr. Tokio Wada
4. 2010 PICES Wooster Award presentation ceremony
5. 2010 PICES Ocean Monitoring Service Award presentation ceremony
6. *PICES "Year-in-Review" 2010* by Dr. John Stein, PICES Science Board Chairman
7. Remarks by Dr. Luis Valdés, Head of the Ocean Science Section of the UNESCO Intergovernmental Oceanographic Commission (IOC), in connection with the 50th anniversary of IOC
8. Closing remarks/announcements

OP Endnote 2

**Welcome address on behalf of the federal government of the host country
by Dr. Larry Robinson (Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy
Administrator for the National Oceanic and Atmospheric Administration, U.S.A.)**

Good morning, Chairman Wada and all PICES members!

It is a pleasure to welcome you to the United States of America, to the beautiful, if occasionally rainy, city of Portland, and to the 2010 Annual Meeting of the North Pacific Marine Science Organization (PICES). The Pacific Northwest region is home to several important marine science activities – including major research universities in Oregon and Washington, and British Columbia; development of ocean renewable energy based on waves and tides; and some of the most innovative ocean observing systems. It is therefore quite appropriate to have a meeting of PICES in this region.

The theme of this year's meeting, "*North Pacific ecosystems today, and challenges in understanding and forecasting change*", represents an important theme in ocean science and management today. This theme is central to increasing our understanding of the impact of climate change on both marine and terrestrial ecosystems. As you know, advancing scientific knowledge of climate change is a major priority for the United States, and NOAA has recently created the NOAA Climate Service dedicated to bringing together the agency's strong climate science and service delivery capabilities. Clearly, this meeting is a showcase for such science around the North Pacific.

The United States has just adopted a broad-ranging National Policy for the Stewardship of the Ocean, Coasts, and Great Lakes. The new National Oceans Policy strengthens ocean governance and coordination, establishes guiding principles for ocean management, and adopts a flexible framework for effective coastal and marine spatial planning to address conservation, economic activity, user conflict, and sustainable use of the ocean, our coasts and the Great Lakes. Key to this National Oceans Policy is enhanced scientific understanding of marine ecosystem dynamics, and we appreciate the role that PICES is playing in advancing that understanding for the North Pacific.

Critical to ocean management is collaboration with our ocean neighbors, including the members of PICES in the North Pacific: Canada, China, Japan, Korea and Russia. As the oceans science agency for the United States, NOAA – the National Oceanic and Atmospheric Administration -- provides a broad range of scientific information for ecosystem-based fisheries management, understanding how the ocean and atmosphere affect weather and climate; how weather and climate affect marine ecosystems; and to inform the sustainable use of the marine ecosystem goods and services that we all depend on in our daily lives. This science is central to supporting both national and international ocean governance initiatives.

The United States recognizes and supports PICES as a major contributor to understanding the marine ecosystems that underlie important international and national fisheries, as well as to understanding the environmental conditions related to seafood safety, harmful algal blooms and invasive species, aquaculture, and related topics.

As PICES moves forward with the implementation of your new integrative science program, *FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems)*, we hope to see PICES and its member countries broadening the partnerships that are the foundation to fruitful and effective international collaboration.

I also want to thank PICES for addressing our future, literally, from another perspective. Support of young scientists through the PICES Intern Program is an important priority for the United States and is an initiative we have annually contributed funds to in recent years. We cannot afford to assume that the scientific talent needed to sustain our efforts through this international partnership will develop on its own. I want to commend PICES' leadership for your efforts to nurture and cultivate young scientists who embody this talent.

I also want to encourage scientists at all stages of your careers to consider the value of communicating the outcomes of your work to all segments of society. As individual scientists and as organizations, your involvement will help ensure that more effective and accurate accounts of our work are told when we engage with students of all levels, public officials, the media and the broader public. Publishing your work in the scientific literature, and discussing our work with fellow scientists at scientific conferences are time honored traditions that will continue but we should also explore opportunities to allow the rest of society to witness your ingenuity, integrity and passion for your work and your commitment to solving the complex issues that confront us today. The new communication and outreach priority of PICES is well conceived, and the United States supports this initiative.

With that, let me turn the platform back to the Chairman, and wish you well for this week's meetings.

OP Endnote 3

Welcome address by Dr. Tokio Wada (Chairman of PICES)

Assistant Secretary Robinson, distinguished delegates, guests, ladies and gentlemen, welcome to the 2010 Annual Meeting of our Organization!

First of all, on behalf of PICES and all the participants, I would like to express our sincere thanks to the government of the United States of America for hosting our Annual Meeting and, in particular, I would like to acknowledge NOAA Fisheries and the U.S. State Department for their support of the meeting, and the Pacific States Marine Fisheries Commission for their warm-hearted hospitality and hard work in organizing this Annual Meeting in the beautiful city of Portland.

PICES has collaborated with many organizations that share common interests in ocean science with us. Since the establishment of PICES, the Intergovernmental Oceanographic Commission of UNESCO, IOC, has been our strong partner. IOC is celebrating its 50th anniversary this year. On behalf of PICES, I would like to congratulate IOC on this anniversary and thank them for their collaboration with PICES over the past years.

This year, many parts of the world suffered under abnormal weather conditions such as high temperatures, heavy snowfall, and heavy rain. According to WMO's (World Meteorological Organization) prediction, the mean temperature of 2010 will be the highest since the middle of the 19th century. It cannot be said that all conditions of such abnormal weather are caused by global warming, however, it seems that the intensification of climate change is having a big influence on the marine ecosystems and living resources of the North Pacific.

One of the basic goals of PICES is to elucidate the marine ecosystem response of the North Pacific to climate change, including global warming. Through the PICES/GLOBEC Climate Change and Carrying Capacity

(CCCC) Program, the first integrated science program of PICES, we learned a lot about the behaviour of the North Pacific ecosystems. Scientific knowledge accumulated through the program has been returned to the member countries in various ways. This September, we published a book titled “*Marine Ecosystems of the North Pacific Ocean 2003 – 2008*”. This is the second issue of our North Pacific Ecosystem Status Report. I would expect that this report will be very useful for policy makers and stakeholders in PICES member countries.

In addition to interpreting ecological phenomena, from now on, we are expected to predict how climate change will affect our socioeconomic activities, including fisheries, and to offer scientific advice to national agencies on how to mitigate the influence. We will also be responsible for evaluating the effects of human activity on ecosystem structures and functions, and to develop countermeasures to keep these influences, to the minimum. This will be the task of our second integrative science program called FUTURE, *Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems*, which will focus on the relationship between human society and the North Pacific ecosystems or, how we co-exist with the North Pacific ecosystems. This Annual Meeting marks the first annual meeting where FUTURE is now fully in effect, and I expect that PICES will start a new era for the sustainable use of the North Pacific ecosystems here.

Before I close my remarks, I must announce to you some sad news. To our deep regret, Dr. Bernard Megrey, the Chairman of our Technical Committee on Data Exchange and the recipient of the 2009 PICES Ocean Monitoring Service Award, passed away on October 1 in Seattle. Dr. Megrey participated in PICES since its beginning phase and played a leading part to federate PICES member countries’ meta-databases for the North Pacific. He was also one of the Co-Chairmen of the MODEL Task Team of the PICES/GLOBEC CCCC Program, and contributed to the development of the NEMURO model, one of the standard ecosystem models in the world. When I met him for the first time, he talked earnestly about a plan to develop meta-databases for the Bering Sea and the North Pacific, and the importance of the international collaboration in ocean monitoring and database construction. It may be said that his tireless activity in PICES was intended to realize his dream. His untimely death is a big loss for us. I would like to ask everyone to observe a minute of silence in memory of Dr. Megrey. Thank you very much.

OP Endnote 4

2010 Wooster Award

Introduction of the Wooster Award (Dr. Tokio Wada)

In 2000, PICES established an annual award for scientists who have made significant contributions to North Pacific marine science; have achieved sustained excellence in research, teaching, administration, or a combination of these in the area of the North Pacific; have worked to integrate the various disciplines of the marine sciences; and preferably, all of these in association with PICES. The award was named in honor of Professor Warren S. Wooster, a principal founder and the first Chairman of PICES, a world-renowned researcher of climate variability and fisheries production. Prior recipients of the Wooster Award were Michael Mullin (2001), Yutaka Nagata (2002), William Pearcy (2003), Paul LeBlond (2004), Daniel Ware (2005), Makoto Kashiwai (2006), Kenneth Denman (2007), Charles Miller (2008) and Kuh Kim (2009).

To our deep regret, Professor Wooster passed away in October 2009. He was not only a distinguished scientist, but also an ambassador of international scientific cooperation. We will no longer be able to see him among the participants at the Annual Meetings, however, his spirit will be living in our minds through this Award.

Science Board citation for the 2010 Wooster Award (Dr. John Stein)

It gives me great pleasure to announce that the Wooster Award for 2010 is being given to Dr. Jeffrey J. Polovina, world-renowned oceanographer with NOAA’s Pacific Islands Fisheries Science Center. Dr. Polovina’s groundbreaking contributions to climate and marine ecosystem research epitomize the PICES approach of

integrating oceanographic factors and biological modeling to significantly advance ecosystem management.

During an exemplary career that spans 30 years, one would never guess that Dr. Polovina did not start out in fisheries. Regardless, his insights as a trained mathematician and statistician may have formed the basis of a landmark scientific achievement in the 1980s—the development of an innovative marine ecosystem model, ECOPATH, to describe energy flow through a coral reef food web. ECOPATH was the first model to apply a type of statistics called “path analysis” to the field of marine ecology, and Dr. Polovina’s role in its development was recognized as one of NOAA’s Top Ten scientific breakthroughs in the agency’s first 200 years. The model’s elegant simplicity and ability to accurately identify ecological relationships has since revolutionized scientists’ ability to understand complex marine ecosystems around the world.

Much like the ocean itself, the scope of Dr. Polovina’s innovative scientific research is wide and deep. With over 115 publications to his name, Dr. Polovina has demonstrated incredible breadth in his theoretical, analytical, and direct approaches to tackle some of the most challenging questions about marine ecosystems and the species that inhabit them. For over a decade, he and his team have made extensive use of satellite remotely-sensed oceanographic data to better understand ecosystem dynamics in the central North Pacific. By combining remotely-sensed data with electronic tracking data from large pelagic animals, Dr. Polovina provided remarkable new insights into the migration and forage habitats of loggerhead sea turtles, bigeye tuna, whale sharks, and whales. His research interests also include the applications of remote sensing and ocean circulation models to fisheries issues and, particularly, protected species of the Hawaiian Islands. Moreover, his distinguished career is anchored by early studies on the impact of climate change on marine fisheries as well as more recent discoveries of how global warming may be contributing to the world’s expanding biological ocean deserts.

Dr. Polovina has worn many hats in his service to the PICES community. His significant roles have included: co-convening a major session on Pacific climate variability for the 2000 PICES “*Beyond El-Niño*” Conference, co-guest-editing a PICES special issue on the marine ecosystem impacts of climate variability in 2001, and helping organize the 2002 PICES symposium on “*Transitional Areas in the North Pacific*”. More recently, he served as a member of the Study Group on *Fisheries and Ecosystem Responses to Recent Regime Shifts* and was honored to deliver the keynote lecture at PICES-2004 on the applications of electronic tags as oceanographic sensors.

Dr. Polovina’s contributions to the international scientific community and award recognition may have thrust him into the limelight, but behind the scenes he is equally engaged in mentoring and training the next generation of scientists. He has served as a strong advocate of his staff scientists’ participation in PICES activities, as evident in the contributions of Drs. Michael Seki, Reka Domokos, Evan Howell and Donald Kobayashi at past PICES meetings and, hopefully, for years to come.

Please join me in congratulating Dr. Jeffrey Polovina as the recipient of the 2010 Wooster Award.

OP Endnote 5

2010 PICES Ocean Monitoring Service Award

Introduction of the PICES Ocean Monitoring Service Award (Dr. Tokio Wada)

Progress in many aspects of marine science is based on ocean observations, monitoring, and management and dissemination of data provided by these activities. However, these activities are often behind the scenes and so inconspicuous that they are seldom evaluated appropriately. To remedy this, a PICES Ocean Monitoring Service Award (POMA) was established in 2007 to recognize the sustained accomplishments of those engaged in monitoring, data management, and communication. This award aims to acknowledge organizations, groups and outstanding individuals who have contributed significantly to the advancement of marine science in the North Pacific through long-term ocean monitoring and data management. The first award was presented in

2008 to the training ship T/S *Oshoro-maru* of Hokkaido University, Japan, for her long-term ecological monitoring activities in the northern North Pacific, and the 2009 award was given to Dr. Bernard A. Megrey of NOAA-Fisheries' Alaska Fisheries Science Center and Mr. S. Allen Macklin of NOAA's Pacific Marine Environmental Laboratory for their sustained efforts, vision, and leadership in building an inventory of biophysical data for the North Pacific, and creating the PICES Marine Metadata Federation.

Science Board citation for the 2010 PICES Ocean Monitoring Service Award (Dr. John Stein)

The PICES Ocean Monitoring Service Award (POMA) was established to recognize organizations, groups and outstanding individuals that have contributed significantly to the advancement of marine science in the North Pacific through long-term ocean monitoring, data management and communication. And it is with great pleasure for me to announce that the 2010 POMA award goes to the Station Papa/Line-P monitoring program.

The seeds that grew into Line-P were sown during the Second World War. With the increase in the number of trans-Pacific flights, there was a need to monitor marine weather systems in the North Pacific. In 1943, the first vessel to occupy Station Peter, as it was then known, was the U.S. Coast Guard cutter *Haida*, and since then many ships have occupied Line-P and Station Papa. The first hydrographic casts at the station began in 1959, and this was the start of Line-P observations. And for the past 60 years, Ocean Station Papa and Line-P have contributed to the region's only multi-decadal time series of oceanographic conditions for the Northeast Pacific Ocean. Today, the Line-P oceanographic sampling program is comprised of 27 hydrographic stations leading to Station Papa, and forms the backbone for cutting-edge, multi-disciplinary research on ocean dynamics, biology and chemistry.

Throughout its history, the rich data provided by this unique monitoring program have given scientists around the world opportunities to revolutionize the field of ocean science and participate in international projects that probe today's most pressing challenges in the physics, biology and chemistry of the ocean—including studies of El Niño, ocean storms, and iron enrichment. The long-term surveys along Line-P have also served as an integral component of global reports on the dynamics and status of our oceans, as well as a training ground for the next generation of oceanographers who have completed (or someday imagine completing) graduate research degrees on Line-P.

The Line-P archive provides a unique picture of the mean state in one part of our global oceans, and has proven critical in developing our ideas of how the ocean evolves. There are far too many people involved in this monitoring program to list. But there are managers who have ensured excellence in ocean sampling along Line-P. In chronological order, they are John P. Tully to whom we owe the original concept, Sus Tabata who years ago showed the power of a long time series, Frank Whitney who managed the program as it expanded to become a training ground for students and PhD theses, and finally, Marie Robert, who is presently juggling the myriad of demands from many universities and other research laboratories.

Please join me in congratulating Dr. Bill Crawford, Head of the State of the Ocean section at the Institute of Ocean Sciences at Fisheries and Oceans Canada, who is receiving the 2010 POMA Award on behalf of the thousands of people, past and present, who contributed to the Station Papa/Line-P monitoring program for the past six decades. Their sustained efforts, extraordinary vision, and dedicated leadership have built an invaluable resource that captures the changing biophysical conditions of the North Pacific and have had a profound impact on the development of ocean science.

OP Endnote 6

“Observing change in the Northeast Pacific: Past, present and FUTURE”

Abstract of the keynote lecture by John (Jack) A. Barth (Oregon State University, U.S.A.)

Observing the fundamental physical and chemical properties of the coastal and adjacent deep ocean is critical to assessing the impacts of changing ocean conditions on marine ecosystems. One important quantity is the

amount of dissolved oxygen available for coastal marine ecosystems. Through a combination of moorings, autonomous underwater gliders and ship-based sampling, we have been measuring dissolved oxygen with increasing temporal and spatial coverage in the Northeast Pacific off the coast of Oregon and Washington, U.S.A. Near-bottom waters over the inner shelf (< 50 m water depth) off central Oregon have been increasingly hypoxic (dissolved oxygen < 1.4 ml/l) over the last 9 years, including the appearance of anoxia in summer 2006. Near-bottom, inner-shelf hypoxia is driven by upwelling of low-oxygen, nutrient-rich source water onto the continental shelf, followed by the decay of organic matter raining down from surface phytoplankton blooms. Data returned in near real-time from moorings and gliders have helped guide additional sampling to assess the impact of low-oxygen on marine organisms, for example on larval and adult fish and invertebrates. Data from the expanding observatory are used in a regression model to link observed inner-shelf, near-bottom oxygen levels with offshore source water dissolved oxygen content and wind forcing. The decreasing oxygen content of the offshore source waters for upwelling is documented from a 50-year time series off central Oregon and is in agreement with observations to the north (Vancouver Island) and south (Southern California Bight) in the California Current. Indeed, decreasing oxygen levels in the oxygen minimum zone (OMZ) appears to be a global phenomenon with a hypothesized connection to global warming.

We are collaborating with other Pacific Northwest measurement programs, in particular the National Oceanic and Atmospheric Administration (NOAA) groundfish and hake surveys, to make maps of the extent of hypoxia over the Oregon and Washington shelves (~43–48°N) from September 2006 to the present. Minimum near-bottom oxygen values are often found over the mid- to inner shelf (50–100 m water depth), with oxygen levels increasing closer to shore and farther offshore toward the permanent OMZ. This reflects the shelf respiration contribution to lowering dissolved oxygen. The size of the near-bottom hypoxia zone increases with time during the upwelling season, reaching its maximum extent in mid- to late summer. In July 2007, the area of hypoxic water inshore of the 200-m isobath covered nearly 18,000 square kilometers, slightly less than the size of New Jersey and on par with the size of the Mississippi River plume hypoxia region. The percent of shelf waters inshore of the 200-m isobath occupied by hypoxic waters varies from 30% early in the season (May) to nearly 80% in the late summer–early fall (Sep), and tracks the cumulative amount of seasonal upwelling-favorable wind stress.

Given the connection of coastal marine ecosystems to basin-scale oceanographic processes, it is imperative to maintain ocean observing systems on both coastal and basin scales. Measurements of physical and an increasing number of chemical and bio-optical properties are being accomplished on both the Argo float array and underwater gliders. In the next few years, the Ocean Observatories Initiative in the United States will construct a multi-element ocean observing array off Oregon and Washington, joining its partner NEPTUNE Canada in laying the long-term foundation for observing change in the Northeast Pacific. Maintaining and expanding these observing systems, in particular to increase the number of biological measurements, will be key for the FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Marine Ecosystems).

OP Endnote 7

Remarks by Dr. Luis Valdés a (Intergovernmental Oceanographic Commission of UNESCO)

It is a great pleasure and honor for IOC-UNESCO to take part in this PICES 2010 Annual Meeting. On behalf of our organization and its Executive Secretary, Dr. Wendy Watson-Wright, I would like to express my gratitude for the kind invitation and the opportunity to make these opening remarks following our long involvement and cooperation in different research activities.

As you know, IOC is celebrating its 50th anniversary and we would like to share with you this commemoration. UNESCO formed IOC in 1960, and our headquarters are based in Paris. The IOC Secretariat is made up of only 62 people, but I assure you that we do our best to satisfy the needs of the oceanographic community and, of course, we do it in line with the demands and necessities of our 138 Member States.

We have done a long walk since the creation of IOC. From its first session, it became obvious that Member States were looking to the new organization to be more than a meeting place to discuss ocean research and to plan cooperative oceanographic experiments. Throughout its lifetime, IOC has continued to move towards the exploitation of ocean knowledge and information for the use and benefit of national governments and for collectively addressing regional and global problems.

The thrust of discussions at IOC's governing body meetings has evolved over the years beyond ocean research *per se*, to the extension of the knowledge gained in tackling problems in areas such as coastal management, ocean health, climate change, ocean services and capacity-building. Today, IOC has a key role to play as a global knowledge broker to gather, transfer, disseminate and share information, data and knowledge, and to promote best practices related to oceanography. Let me say that this process is done in an inclusive and participatory way, including views of the scientific community, academia, Member States, and considering cultural diversity principles.

The UN Convention on the Law of the Sea considers IOC to be the competent international organization for marine science. In recognition of its mandate as the UN focal point for marine scientific research, IOC also provides a direct link between Member States and those UN agreements and conventions dealing with ocean and coastal issues. These activities are carried out in collaboration with international organizations concerned with the work of the Commission, like PICES, and especially with other sister organizations of the United Nations system.

For achieving the above mandate, IOC has developed a Medium Term Strategy with Four High Level Objectives (HLO) which corresponds to the main challenges facing the world:

1. Prevention and reduction of the impacts of natural hazards;
2. Mitigation of the impacts and adaptation to climate change and variability;
3. Safeguarding the health of ocean ecosystems;
4. Management procedures and policies leading to the sustainability of coastal and ocean environment and resources.

The IOC horizontal functional activities fulfill our mission and guide IOC within the four HLO, and successfully deliver outcomes and results which include: (i) science innovation and management by promotion and coordination of scientific programmes; (ii) science synergy by stimulating co-operation between researchers and organizations to explore new directions; (iii) scientific services by providing guidelines and scientific criteria for ecosystem management; (iv) outreach by publishing results, educating the general public and giving visibility to OSS activities; and (v) capacity building by transferring knowledge to developing countries and scientific communities.

Given our multilateral constituency, it is substantial to our existence and functions to promote international cooperation and coordinate programmes to generate knowledge, and to apply that knowledge for the improvement of Member States. In this regard, IOC has established partnerships with international organizations like PICES.

At this stage it is appropriate to recall that IOC and PICES have an interwoven history. For example, Dr. Warren Wooster, the first Chairman of PICES, was also the first Executive Secretary of IOC, taking that position in 1961 and guiding IOC during its formative years. It is also important to bear in mind that all PICES Contracting Parties are members of IOC and currently all of them are elected members of the IOC Executive Council.

Of course, IOC and PICES have, since the beginning of PICES, been complementary in supporting each other and doing global oceanography. To cite a few examples of cooperation, I could mention our programmes on HAB, GOOS, IOCCP, *etc.* In outreach activities I could mention an extensive list of joint symposia supported by both institutions during the last years, like the 2010 symposium on "*Climate change effects on fish and fisheries: Forecasting impacts, assessing ecosystem responses, and evaluating management strategies*", or the one that we are currently preparing together (with ICES as another major international sponsor), the second

international symposium on “*Effects of climate change on the world’s oceans*” to be held in May 2012, in conjunction with the Ocean Expo-2012 in Yeosu, Korea.

I am sure you are aware that IOC is providing coordination and expertise on climate change and variability of the oceans, on consequences of ocean warming and ocean acidification, on monitoring marine biodiversity, on management and demarcation of Marine Protected Areas, Marine Spatial Planning, and other management tools, among other issues. At this stage I would like to offer IOC’s cooperation in helping to provide scientific and political coordination to strength our collaboration with the scientific stakeholders, like PICES, to create synergies, explore emerging issues and create capacities for the entire scientific community.

For example, there is an urgent necessity for an international framework of cooperation for both ocean research and environmental governance in the Arctic. Climate change, preservation of biodiversity and exploitation of resources in the Arctic are global problems, and their management cannot depend solely in the sovereignty of single States. It is obvious that scientific research and protection of the Arctic need a stewardship and governance that can be provided only by authorized international and transparent agencies.

Better science linked to improved risk management and adaptive management strategies will help scientists and policy makers cope with the high levels of uncertainty related to mitigation alternatives and with the range of impacts associated with climate change and variability. IOC and UNESCO are convening an international expert meeting on Geoengineering at the Paris Headquarters. The meeting is the first to use UNESCO’s ‘honest broker’ role to create a forum for international discussion and create awareness of the science and governance of this rapidly evolving field. PICES has supported a working group on iron fertilization, and the lessons learned by this group will be very positive for the IOC-UNESCO workshop. So, we have formally invited PICES to attend this meeting in Paris.

Credible and timely scientific information is a necessary asset as nations engage in the process of responding to new challenges of global dimensions. Special attention should be given to new marine pollutants, like plastics and microplastics, and their impact on habitats and ecosystems. For instance, during the past 40 years, world production of plastic resins has increased some 25-fold, while the proportion of material recovered has remained quite constant at the level of only 5%, so that plastics account for a growing segment of urban waste. Once discarded, plastics are weathered and eroded into very small fragments known as micro-plastics. These, together with plastic pellets, are already found in most beaches around the world and we still do not know the impacts they will have on the marine environment and on the marine food web. IOC would like to encourage PICES to support IOC and GESAMP in their joint activities to elucidate the importance of these new pollutants in the marine environment.

I will conclude by saying that partnerships are crucial for IOC. IOC cooperation with UN and non-UN organizations is essential, expected by our Member States, and by the scientific community. In this regard, PICES is an IOC core partner in the North Pacific Ocean, and we have common interests in scientific activities that need our mutual cooperation to protect our oceans together.

Thank you very much for your attention. On behalf of IOC, I wish you all a most productive Annual Meeting.