

PICES Vision for OceanObs'09

The North Pacific Marine Science Organization, PICES (www.pices.int), is pleased to provide a message of support for the vision of OceanObs'09, and to add our vision of how PICES will enable routine and sustained collection and dissemination of the marine environmental information that is so critical to the future of all cultures and economies, and the global ecosystems on which they depend. We believe that effective and continuing communication among all concerned in the nations in the North Pacific is the way forward to the systems of observation and knowledge necessary to achieve sustainable management of marine resources in the face of the uncertainties imposed by global climate change. To achieve enduring communication, PICES was established as a treaty among nations dedicated to improved scientific understanding of the North Pacific Ocean and its processes, living resources, and oceanographic features. PICES members include Canada, Japan, People's Republic of China, Republic of Korea, Russian Federation and the United States of America. PICES interests in marine living resources and ecosystems are well aligned with the OceanObs'09 goals to continue to expand observations beyond just physical variables, including species level information.

PICES enables scientific communication through internationally-populated and openly-shared databases. Effective and ready sharing of data and technology are fostered within the PICES Technical Committee on Data Exchange. This committee has sponsored the PICES Metadata Federation, a one-stop internet utility for public search, access and delivery of international marine ecosystem data from throughout the North Pacific. In another effort, the PICES Section on Carbon and Climate is creating a synthesized database of water-column CO₂-related parameters for the Pacific that includes high-quality discrete hydrographic and chemical data from post-WOCE cruises and historical datasets documented with complete metadata records. A workshop on "Carbon data synthesis" to be held at the 2009 PICES Annual Meeting will be a major step forward in the implementation of this project. Since 2005, PICES and ICES have partnered with the Intergovernmental Oceanographic Commission (IOC) of UNESCO to systematically compile, store and present on-line, records on harmful algal events. The IOC-PICES-ICES Harmful Algal Event Database (HAE-DAT) serves the overall objective of hemispheric coverage for data on harmful algal bloom events. Lastly, a communications tool available to any community in the North Pacific for tracking non-native species, the PICES Non-indigenous Species Information System (PICES NISIS), is scheduled for completion in October of this year.

To complement the data communication efforts, increasingly effective networks of observations are being built through the PICES Technical Committee on Monitoring, for example by fostering international cooperation in the North Pacific Continuous Plankton Recorder (CPR) Program. Through an international consortium approach, this program has provided observations on plankton communities at times and places never before observed, expanding our knowledge of the structure of marine communities. However, existing CPR transects must be sustained and many more transects are needed in the future.

PICES communication strategies include publications that compare and synthesize data across wide geographic regions, such as the North Pacific Ecosystem Status Report, or unify methodologies for observations, such as "Guide to best practices for ocean CO₂ measurements", as well as many other scientific publications.

A number of PICES communication approaches draw public attention to the international cooperation in development of observing systems, both *in situ* and remote, that is absolutely essential to sustained progress. The newest of these is the annual PICES Ocean Monitoring Service Award (POMA) to be given to organizations, groups and outstanding individuals that have contributed significantly to the advancement of observation and data management in marine science in the North Pacific. The first POMA recipient (2008) is the Training Ship *Oshoro-maru* of Hokkaido University, Japan. The unparalleled record of annual ecosystem observations compiled by the *Oshoro maru* dating to 1955 is the

window through which many scientific disciplines are able to view and understand global change in the North Pacific.

Finally, PICES latest venture in international scientific collaboration is a new long-term, integrative science program, **F**orecasting and **U**nderstanding **T**rends, **U**ncertainty and **R**esponses of North Pacific **E**cosystems, **FUTURE** (www.pices.int/members/scientific_programs/FUTURE/FUTURE_default.aspx). **FUTURE** seeks to understand how marine ecosystems in the North Pacific respond to climate change and human activities, to forecast ecosystem status based on a contemporary understanding of how nature functions, and to communicate new insights to its members, governments, stakeholders and the public. Sustained and expanded ocean observations, including those important for informing fisheries management, will be absolutely critical to the success of this PICES integrative science program.

PICES endorses and pledges participation in a working group to carry forward the vision and momentum generated by the OceanObs'09 conference. We would like to point out the importance of including expertise on fisheries in the working group, especially in the spirit of expanding observations beyond just physical and chemical parameters. Long-term ecosystem monitoring is a crucial element of sustainable fisheries and an ecosystem approach to management. Fishery-independent time series of abundance, biomass, the maturity schedule, length and age composition of the population in conjunction with fishery-dependent time series of catch, catch-per-unit-effort (CPUE), and the length and age composition of the catch form the basis for statistical age structured assessments throughout the world. Time series of environmental data are needed to more accurately simulate the past and present population dynamics and to project future stock dynamics. An understanding of the influence of environmental change on the functional relationships governing the population and the fishery are needed to manage fisheries in a sustainable manner. A coordinated effort to collect and maintain a database of physical and biological conditions is needed to achieve this level of understanding. This will require communication between managers, stock assessment scientists and oceanographers to design an economical monitoring program that will provide the critical data needed for the maintenance of stock assessments that adjust to fluctuations in ecosystem conditions.

Time series of mixed-layer temperature, mixed-layer depth, and bottom temperature are needed to predict the growth and maturity rate of fish and shellfish, as well as, the availability and catchability of fish and shellfish. These time series should be collected on a spatial grid to allow analysts to assess shifts in distribution in response to changing ocean conditions. This can be achieved if fish and shellfish surveys collect underway oceanographic data and water column profile data at sampling stations. Survey sampling can be supplemented by the collection of underway acoustic and oceanographic data, and water column profile data from fishing vessels. While the surveys and fishing vessels provide some information, tagging data are needed to fully understand the migratory pathways used by fish and shellfish, and the timing of seasonal shifts in distribution. Fisheries scientists now recognize the need for time series of the distribution and abundance of key prey during the summer feeding period. To assess the role of prey availability on growth and distribution of fish and shellfish, scientists need to monitor the diets of fish and shellfish relative to the prey fields available. Time series of diet and prey availability will allow analysts to assess the functional response of fish and shellfish to the species composition of prey and the abundance of prey. Time series of the location and intensity of major currents is needed to predict larval dispersal, nutrient exchange, and boundaries of essential fish habitats. These time series can be used to verify drift trajectories derived from coupled bio-physical models of ecosystems (e.g., the ecosystem box model Atlantis and PICES' "North Pacific Ecosystem Model for Understanding Regional Oceanography", NEMURO) and individual based models. There is growing recognition of the importance of seasonal factors such as the duration of the growing season, timing of the spring bloom (match, mis-match), the timing of the onset of upwelling, and fall transitions as key factors influencing the ability of animals to survive to the first feeding stage and to reach a critical size for overwintering or

predator avoidance. A coordinated series of moorings could be used to collect information on the seasonal events.

Predicting the impact of climate change on the distribution, growth, and productivity of fish and shellfish is necessary to alert managers and the public of the potential changes likely to occur. Time series of climate conditions are needed to distinguish the interannual and decadal signals from the longer term impact of climate change.

In summary, we share the vision of this conference and PICES looks forward to playing an enduring role in finding the way forward.

North Pacific
Marine Science
Organization

September 15, 2009



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Thank you for your letters of inquiry regarding the North Pacific Marine Science Organization's (PICES) interest in a limited-lifetime Working Group (WG) to build on the results of the OceanObs'09 Conference. PICES agrees with the idea to form a Post-OceanObs'09 WG to carry forward the plans made at the conference and we think the draft Terms of Reference is reasonable.

In order to officially endorse the WG and its Terms of Reference, and thereby pledge our participation including supporting PICES WG members' expenses, PICES will seek approval at its Eighteenth Annual Meeting to be held October 23 to November 1, 2009. At the Annual Meeting, we will also finalize our choice of participants in the WG, but suggest that we might like two PICES members to participate. One would have expertise in physical-chemical oceanography and the other expertise in biological oceanography and fisheries. We would also strive to have one participant from a PICES member country on the east side of the North Pacific and one from the west side.

Dr. Jack Barth and I will be available for discussions about the WG at lunchtime on Tuesday, September 24th, at the OceanObs'09 conference.

Secretariat

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On behalf of PICES Chairman Dr. Tokio Wada, we wish you the best of luck with the upcoming OceanObs'09 Conference. PICES is ready to work with you in fulfilling the vision of the OceanObs'09 Conference, a sustained ocean observing system for the world's oceans.

Sincerely,

Chairman

Tokio Wada

Vice-Chairman

Lev Bocharov

Executive Secretary

Alexander S. Bychkov

Dr. Alexander S. Bychkov
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