Social and Economic Indicators for Status and Change within North Pacific Ecosystems: A PICES Section on Human Dimensions of Marine Systems Workshop

by Keith Criddle and Mitsutaku Makino

PICES sponsored a 3-day workshop on the development of social and economic indicators for the upcoming North Pacific Ecosystem Status Report (NPESR) and the World Ocean Assessment (WOA). The workshop was held June 13–15, 2013, in Honolulu, USA. The convenors were Keith Criddle (USA), Mitsutaku Makino (Japan), Thomas Therriault (Canada) and Ian Perry (Canada). All six PICES member countries were represented by 21 participants (see group photo). In addition, Alan Simcock (UK, WOA Group of Experts) and Xiaodong Zhong (Northwest Pacific Action Plan (NOWPAP)) attended the meeting.

To date, the NPESR has highlighted climatic, oceanographic, and biological changes. The PICES Section on *Human Dimensions of Marine Systems* (S-HD) was formed, in part, to contribute social and economic – "human dimension" – indicators and changes to the upcoming NPESR. Separately, the United Nations has committed to the WOA, a regular process for global reporting and assessment of the state of the marine environment. The objectives of these two efforts are complementary, and the work of the WOA Group of Experts has benefited from information represented in the most recent NPESR, but this group is still in need of human dimensions indicators.

The purpose of this workshop was to share information on human dimension indicators for marine ecosystems in the North Pacific. After providing examples of the type of human dimension indicators regularly collected by their countries, workshop participants agreed on a common set of indicators to be compiled at the 2013 PICES Annual Meeting (PICES-2013) in Nanaimo. These indicators will serve as the base information for the S-HD contribution to the next NPESR. The workshop participants also identified aspects of the human dimensions of North Pacific ecosystems that are not yet well represented by indicators collected across the region. To begin to address an important gap, a 1-day joint Topic Session on "*Marine ecosystem services and the contribution from marine ecosystems to the economy and human well-being*", co-sponsored by PICES and IMBER (Integrated Marine Biogeochemisty and Ecosystems Research), will be convened at PICES-2013.

Representatives of each country filled Day 1 and the first half of Day 2 of the workshop with presentations of examples of regularly collected time series of human dimension indicators. The latter half of the second day and the beginning of Day 3 were devoted to a structured discussion that led to the identification of key human dimension indicators that can be compiled for all PICES member countries. Data series to be collated include time series of: (1) the quantity and value of catches and landings of seaweeds, fish, shellfish, and other invertebrates from inside and outside national Exclusive Economic Zones; (2) the quantity and value of mariculture of seaweeds, fish, shellfish, and other invertebrates; (3) the number and power of fishing vessels by gear type, length, and tonnage; (4) catch per unit effort by gear type and target fishery; (5) numbers of commercial fishers; (6) injury and mortality rates of commercial fishers (absolute and relative to

Fig. 1 The participants at the PICES North Pacific Ecosystem Status Report and World Ocean Assessment workshop, Honolulu, June 13-15, 2013. Left to right: Shang Chen, Ian Perry, Jung-Hee Cho, Ron Felthoven, Minling Pan, Sam Pooley, Rashid Sumaila, Ayeisha Brinson, Ningsheng Yang, Alan Simcock, Elena Anferova, Wenbo Yang, Yingren Li, Kyungjin Kim, Keith Criddle (co-author of this article), Kyoung Ju Cho, Xiaodong Zhong, Masahito Hirota, Juri Hori, Suam Kim, Thomas Therriault, Mitsutaku Makino (co-author of this article) and Jay Nam.

The overall objective, endorsed by the UN General Assembly in UNGA Resolution 64/71 (2009), paragraph 177, is that:

- "The regular process under the United Nations would be recognized as the global mechanism for reviewing the state of the marine environment, including socioeconomic aspects, on a continual and systematic basis by providing regular assessments at the global and supraregional levels and an integrated view of environmental, economic, and social aspects.
- Such assessments would support informed decision-making and thus contribute to managing in a sustainable manner human activities that affect the oceans and seas, in accordance with international law, including the United Nations Convention on the Law of the Sea and other applicable international instruments and initiatives.
- The regular process would facilitate the identification of trends and enable appropriate responses by States and competent regional and international organizations.
- The regular process would promote and facilitate the full participation of developing countries in all of its activities. Ecosystem approaches would be recognized as a useful framework for conducting fully integrated assessments.

national workforce averages); (7) income to fishers (absolute and relative to national workforce averages); (8) the number of fishing ports; (9) the number of fish processing plants; (10) the number of fishing villages or communities; (11) the number of fishing households; (12) per capita consumption of seaweeds, fish, shellfish, and other invertebrates; and (13) the amount and value of seafood (seaweeds, fish, shellfish, and other invertebrates) exports and imports. In addition, Rashid Sumaila (Fisheries Centre, University of British Columbia, Canada), has offered to query his database on global fisheries to derive North Pacific estimates of time series of: (1) the number of sport fishers and the quantity of their catches; (2) fishing costs as a percentage of revenues; (3) fishing subsidies; (4) fishing effort by gear type; (5) the number of commercial fisheries; and (6) value added multipliers for fishing and processing. One advantage of these data is that they are all collected using the same methods among countries, and so are directly comparable. Other time series of interest as indicators (*e.g.*, exvessel prices) can be derived from these data.

Having Alan Simcock as a representative of the WOA Group of Experts was extremely useful as it opened the dialogue between PICES and the UN Regular Process and allowed information to flow in both directions. The goals of the WOA (see box) were presented on Day 1. The selection of key indicators for the NPESR led naturally, on Day 3, to a focused discussion with Alan about WOA needs for human dimensions data that extend beyond the above listed key indicators. The timing of the first WOA (this assessment is to be completed in 2014) limits the extent to which PICES can offer specific scientific advice. Moreover, because the WOA is intended to provide a high-level overview, much of the detailed understanding we within PICES feel is important to capture will be lost to some extent in "global roll-ups". Nevertheless, through the NPESR as augmented by human dimensions indicators, PICES is well positioned to make valuable contributions to future iterations of the WOA. While PICES is not able to host formal UN meetings (that must be done by UN member states), other meetings such as this workshop provide critical information in support of UN processes (not only WOA but also the Convention on Biological Diversity Ecologically and Biologically Sensitive Areas process earlier this year; see the article by Thomas Therriault on this meeting elsewhere in this issue of PICES Press) and access to a network of scientific experts within PICES with unparalleled knowledge of North Pacific marine ecosystems. Nevertheless, some recognition of this by the UN might allow PICES to formally engage in these activities. For example, with sufficient lead-time, PICES could establish *ad-hoc* expert groups to review, compile, and synthesize key information/data. Due to the tight timelines and need to constrain its scope, our workshop focused primarily on fishing-related activities in the North Pacific. Clearly, however, within PICES we have considerable scientific understanding of other human activities that could be explored in future meetings.

The North Pacific region includes global leaders in the production and consumption of seafoods. While important strides have been made in assuring that North Pacific capture fisheries do not exceed sustainable levels and that growth in aquaculture is guided by principles of sustainability, by themselves, these accomplishments do not ensure the sustainability of the human side of the North Pacific marine social-ecological system. The indicators identified during this workshop will help provide a synopsis of the status and trends in human dimensions of the North Pacific ecosystem.

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Dr. Mitsutaku Makino (mmakino@affrc.go.jp; see group photo on p. 12) co-chairs the Section on Human Dimensions of Marine Systems (he was a former Chairman of the Study Group on Human Dimensions) and co-leads the new PICES project on "Marine ecosystem health and human well-being" (see p. 18 for details).