

MSEAS 2016—Understanding marine socio-ecological systems: Including the human dimension in Integrated Ecosystem Assessments

by Keith Criddle

The MSEAS (Understanding Marine Socio-Ecological Systems: Including the Human Dimension in Integrated Ecosystem Assessments) symposium will be remembered for outstanding presentations, scintillating dialogue among physical, biological, and social scientists, great food, and beautiful weather. By every measure, it was a success—a meeting to be remembered by all those fortunate to attend. The meeting, held May 30–June 3, 2016 in Brest, France, was organized by convened under the able leadership of Jason Link (USA), David C. Smith (Australia), and Olivier Thébaud (France) who served as local host and chaired the steering committee. MSEAS 2016 was organized by ICES, and co-sponsored by PICES, IFREMER NOAA, CSIRO, Université de Bretagne Occidentale, Centre for Marine Socioecology, Fisheries Research and Development Corporation, LabexMER, Université Européenne de Bretagne, Belmont Forum, Région Bretagne, Le Conseil Départemental 29, and Brest Métropole. Key papers from this symposium will be featured in an upcoming issue of the *ICES Journal of Marine Science*.

The objectives of the symposium were to advance understanding of marine social-ecological systems, to foster interdisciplinary discussions and collaborations, to identify challenges ahead and key areas for future research, to support the uptake of human dimensions in integrated assessments, and to further the development and uptake of Ecosystem-Based Management. The symposium was structured around six themes:

- A. *Identifying needs for managing multiple ocean use sectors*: What information is needed to inform policy, management and industry developments?
- B. *Coupled ecological, economic and social process understanding*: Can we build scenarios integrating ecological, economic and social dimensions?

- C. *From data to indicators to reference points and performance evaluation*: How do we use available data to set reference points and assess policy performance?
- D. *Participatory assessment processes*: What are the opportunities and challenges associated with participatory research?
- E. *Governance and institutional frameworks*: Can governance systems promote greater integration of knowledge systems and ocean management?
- F. *Case studies*: What lessons have we learned from practical research experience?

Keynote talks were presented by: Serge Garcia, UN FAO (*Fisheries from biological clockworks to socio-ecological systems and ecosystems services*), Jake Rice, DFO Canada (*Fisheries governance in an SES system: All things for all people or all things for all creatures?*), Beth Fulton, CSIRO (*What's easy and hard about modelling socioecological systems?*), Linwood Pendleton, LabexMER (*Indicators, indices, and essential variables; Oh my! A decidedly non-statistical take*), Edward Hugh Allison (PICES Keynote Speaker), University of Washington (*Adventures in integration: Unexpected insights for coastal and marine governance from interdisciplinary assessments*), Simon Levin, Princeton University (*Dealing with public goods and common-pool resources in marine ecosystems*), and Anthony Charles, Saint Mary's University (*Assessing and managing a multi-sectoral multi-objective ocean: Challenges for integration and participation*).

The meeting attracted over 230 attendees and 125 oral presentations were delivered. The PICES region was represented by 20 attendees, including 5 members of the Section on *Human Dimensions of Marine Systems* (S-HD).



Hirota Masahito, Juri Hori, and Grant Murray, members of S-HD, during a coffee break.



Left: Aoi Sugimoto, Juri Hori, and Masahito Hirota socializing between sessions. Right: S-HD members Robert Stephenson, and Keith Criddle participating in the MSEAS Young Researchers Workshop.

Presentations from PICES member countries were included in all the theme sessions, and talks by S-HD members covered four of the sessions:

- Keith Criddle (University of Alaska Fairbanks, USA), *La Machine Infernale—How the interplay of social, ecological, and environmental factors influences the observability and controllability of fishery social ecological systems* (Theme Session B);
- Keith Criddle (University of Alaska Fairbanks, USA), *Human dimension indicator data for North Pacific ecosystems* (Theme Session C);
- Juri Hori (Rikkyo University, Japan), *International comparison of human well-being structures and factors: a study of the PICES 6 countries* (Theme Session C);
- Masahito Hirota (Fisheries Research Agency, Japan), *Marine ecosystem health and human well-being (PICES MarWeb)—A good relationship between local communities and seafood diversity* (Theme Session D);
- Grant Murray (Duke University Marine Lab, USA), *Overview of the Marine Ecosystem Health and Human Well-being (MarWeb) project* (Theme Session B);
- Grant Murray (Duke University Marine Lab, USA), *What are we managing for: values and the Management of Marine Social-Ecological Systems* (Theme Session C);
- Robert Stephenson (Department of Fisheries and Oceans, Canada), *A framework for practical integration of ecological, economic, social and institutional aspects in integrated management* (Theme Session C);
- Robert Stephenson (Department of Fisheries and Oceans, Canada), *Practical steps toward integrating economic, social and institutional objectives and indicators in fisheries management* (Theme Session E).

The symposium provided a thorough representation of where we are and where we need to be headed in the study and management of marine ecosystems. Challenges faced by marine socio-ecological systems, including human dimensions in Integrated Ecosystem Assessments, are the lack of a common conceptual framework for model structure, differences in scale and scope, over-reliance on a

quantitative approach and failure to develop models that mesh qualitative and quantitative methods. While reductionism is useful for exploring mechanisms and details, it is unlikely to be useful for identifying systemic solutions—there is a strong need to shift modeling effort towards a systems approach. To date, fisheries ecosystem models have often been conceptualized and developed by fisheries scientists who, after having developed their models, ask social scientists to apply a ‘human dimensions’ patina. To make more effective progress on IEA, scientists from a broader suite of disciplines need to be involved from the start rather than as an afterthought. While the theme of MSEAS 2016 was broad, most presentations focused on fisheries and aquaculture. Effective IEA will require better engagement with other sectors, such as transportation, energy, and tourism and the disciplines from whom they seek advice. Implementation of IEA and evaluation of alternative choices that balance competing uses of the marine system necessitate consideration of national and multinational governance mechanisms and will likely require innovative new mechanisms for addressing cross-jurisdictional uses.

Dr. Keith Criddle (keith.criddle@alaska.edu) is a bioeconomist at the Juneau Fisheries Center of the University of Alaska Fairbanks. His research explores the intersection between the natural sciences, economics, and public policy and is driven by an interest in the sustainable management of marine resources of the North Pacific. He directs graduate projects in bioeconomics, statistical inference, and policy analysis and teaches courses in resource and environmental economics, econometrics and time series analysis, operations research and decision theory, fisheries law, and policy analysis. In PICES, Keith co-chairs the Section on Human Dimensions of Marine Ecosystems and a member of the Study Group on Socio-Ecological-Environmental Systems. Keith was a member of the MSEAS Scientific Steering Committee, representing PICES.

