

participants recommended that all PICES Standing Committees utilize the following common framework when identifying and calculating indicators for the common descriptors and attributes for North Pacific ecosystems:

1. identify the objective of selecting indicators;
2. identify the end user;
3. identify ecosystem attributes to be measured;
4. apply the following criteria to select the indicator for each attribute (each criterion should be weighted for relevance to the end user identified):
 - available regularly and in a timely manner applicable to the issue,
 - available as a time series,
 - statistical properties are understood and provided,
 - related to the attribute either empirically or theoretically,
 - specific to the attribute (*i.e.*, how specific is the indicator to the processes being indexed?),
 - spatial and temporal scales of the indicator are appropriate to the attribute,
 - responsive (sensitive to perturbation),
 - relevant to the objective,
 - understandable by the target audience,
 - provides a basis for comparison between ecosystems;

5. identify indicator reference levels; otherwise report on the time series' statistics (*e.g.*, current value relative to mean; trend; standard deviation);
6. test the performance of each indicator;
7. identify a suitable method of communication that is based on end user and report indicator uncertainty.

In addition to identifying a framework for selecting ecosystem indicators for use by PICES within FUTURE, workshop participants pointed out the need to create additional working groups to start tackling the difficult topics of: (1) ecosystem resilience, including metrics to measure and thresholds for comparisons, and (2) ecosystem vulnerability, especially the human dimension aspects of this topic. Lastly, at the request of Governing Council, workshop participants reviewed and revised the terms of reference for a proposed PICES Working Group on multiple stressors. Overall, the convenors were extremely happy with the workshop and its accomplishments and feel that strong guidance has been provided to PICES FUTURE science.

The convenors would like to thank all of the participants for their contributions, and the PICES Secretariat for arranging the logistics and for hosting a reception on the first day for all of us to enjoy.

PICES Calendar

- PICES/MAFF–IOC/WESTPAC Workshop on “*Rapid assessment survey methodologies for detecting marine non-indigenous species*”, July 19–21, 2011, Phuket, Thailand (http://www.pices.int/meetings/summer_schools/2011_training/RAS-Workshop-description.pdf);
- 7th International Conference on “*Marine bioinvasions*” (co-sponsored by PICES), August 23–25, 2011, Barcelona, Spain (www.icmb.info/);
- 5th SOLAS Summer School (co-sponsored by PICES), August 29–September 10, 2011, Cargèse, Corsica, France (<http://solas-int.org/summerschool/welcome.html>);
- Joint Theme Sessions at the 2011 ICES Annual Science Conference, September 19–23, 2011, Gdansk, Poland:
 - *Atmospheric forcing of Northern hemisphere ocean gyres and their subsequent impact on the adjacent marine climate and ecosystems*;
 - *Atlantic redfish and Pacific rockfish: Comparing biology, ecology, assessment and management strategies for *Sebastes* spp.*;
 - *Recruitment processes: Early life history dynamics – from eggs to juveniles*;
 - *Surplus production models: Quantitative tools to manage exploited fisheries and compare the productivity of marine ecosystems*;
- International Workshop on “*Development and application of Regional Climate Models*”, October 11–12, 2011, Incheon, Korea (www.pices.int/meetings/descriptions.aspx#description8);
- PICES Annual Meeting, October 14–23, 2011, Khabarovsk, Russia (www.pices.int/pices2011.aspx);
- International NPAFC-led Workshop on “*Explanations for the high abundance of pink and chum salmon and future trends*” (co-sponsored by PICES), October 30–31, 2011, Nanaimo, Canada (<http://www.npafc.org/new/events/workshops/2011Workshop1stAnnouncement.pdf>);
- 2nd ICES/PICES Early Career Scientist Conference on “*Oceans of change*”, April 24–27, 2012, Palma de Majorca, Spain (<http://www.ices.dk/marineworld/oceans/index.asp>);
- 2nd PICES/ICES/IOC Symposium on “*Effects of climate change on the world's oceans*” in conjunction with Ocean Expo-2012, May 14–18, 2012, Yeosu, Korea (<http://www.pices.int/climatechange2012.aspx>).