The FUTURE Advisory Panel on *Climate, Oceanographic Variability and Ecosystems*

The FUTURE Advisory Panel on *Climate, Oceanographic Variability and Ecosystems* (AP-COVE) held its fourth meeting from 14:00–17:15 on October 14, 2012, in Hiroshima, Japan. AP-COVE chairman, Dr. Hiroaki Saito, welcomed the 5 members (*AP-COVE Endnote 1*) and guests to the meeting. The draft agenda (*AP-COVE Endnote 2*) was reviewed and agreed upon.

AGENDA ITEM 2
Changes to, adoption of, agenda

The agenda was adopted without changes.

AGENDA ITEM 3
Expert group activities relevant to COVE

a. WG 29 on *Regional Climate Modeling*

Comments/suggestions: COVE would like to see a roadmap of activities that will allow WG 29 to being able to downscale biogeochemistry. COVE requested guidance on whether downscaling biogeochemistry is appropriate or if regional data should be used in specific relationships, and when the downscaled biogeochemistry will be available for zooplankton output. COVE suggested that collaboration with S-CC on their O_2 database may be useful in developing an O_2 model in WG 29.

b. WG 27 on *North Pacific Climate Variability and Change*

Emerging questions and activities: What are the forcing dynamics that modulate the eddy fields? What are the changes in forcing dynamics predicted by IPCC climate models? What are the controls and mechanics of oxygen variability?

Future activities include: combining observations and ocean models; identifying the different-scale dependent regional climate controls on ecosystem variability; developing process models to hindcast and forecast regional oxygen and time series of marine population variability.

Comments/suggestion: WG 27 is well organized and is following the Terms of Reference well. COVE can expect ToR output.

c. S-CCME, Section on *Climate Change Effects on Marine* Ecosystems

Comments/suggestions: Since S-CCME is dependent on the activities of many expert groups, there needs to be face-to-face dialogue for progress or for defining requirements. This might be useful to avoid unnecessary overlap between activities of S-CCME and other expert groups. It would be helpful to have S-CCME meetings when other expert groups are not meeting because many of S-CCME's members are also the members of these expert groups and the face-face dialogue or personal connections cannot be maintained if they have to be present at these other meetings. It would be useful to the communication between S-CCME and other expert groups to prepare a table of understanding, forecasting, and application with linkages of PICES expert groups.

d. S-CC, Section on *Carbon and Climate*

Analysis and synthesis of historical data; analysis of climate model projections and evaluation against observations. Observations and projections of changes in open ocean O_2 and CO_2 are needed to help separate local from larger-scale influences.

Comments/suggestions: Since transport dynamics is a topic that recurs in different expert groups, it would be

worthwhile to have a cross-cutting meeting at the next PICES Annual Meeting to have informal discussions on these recurrent topics.

e. WG 28 on *Ecosystem Responses to Multiple Stressors*

Comments/suggestions: The web-based survey of experts on habitats vulnerable to important multiple stressors was carried out by WG 28 in a successfully. It collected data for understanding the priorities of each PICES member country.

AGENDA ITEM 4
COVE related national/regional projects

AP-COVE compiled a list of relevant national projects (*AP-COVE Endnote 3*) which will be posted on the COVE or FUTURE website to make it easy for PICES and non-PICES scientists to get information on what COVE-related activities are occurring in each PICES member country.

AGENDA ITEM 5
Identify potential for new expert groups to address COVE-AP priorities

Continuous climate research activity is important for PICES and FUTURE after the termination of WG 27. Resilience is an important remaining issue of FUTURE.

Comments/suggestions: COVE suggests inviting Dr. Buzz Holling (Canada), a specialist on ecosystem resilience, to the next joint FUTURE AP meeting at PICES-2013 in Nanaimo, Canada, to have dialogue about moving forward with ecosystem resilience as it relates to FUTURE's Science Plan.

AGENDA ITEM 6
Discussion of FUTURE roadmap from Busan inter-sessional meeting

The FUTURE roadmap, developed at the inter-sessional FUTURE Workshop in Busan, Korea (May 24–25, 2012) was discussed in the joint AP meeting. There was no additional input from members.

AGENDA ITEM 7
FUTURE-related sessions at PICES-2013

Topic Sessions and workshops were proposed through a new web-based submission system prior to the Annual Meeting. Having all the workshop and Topic Session proposals ahead of The Annual Meeting enables FUTURE to have input. COVE will not consider proposals that are submitted after the deadline unless it is of high importance to COVE activities. High priority proposals of COVE were selected for the discussion between FUTURE AP Chairs in which they would select appropriate proposals to move FUTURE forward.

AGENDA ITEM 8
FUTURE OSM in 2014

COVE Recommendations:

- Have a social event for early career scientists so they can begin to network.
- Ensure that there is at least one (if not two) early career scientists as an invited speaker.
- PICES should establish a practice that each session has one early career scientist as a co-covenor.
- PICES could try to use the special funds of APN (Asia Pacific Network) that have been set aside for early career scientists' travel.

AGENDA ITEM 9
Develop/review COVE Workplan

All the AP-COVE members agreed on the proposed Workplan (*AP-COVE Endnote 4*).

AGENDA ITEM 10
Linkages to other FUTURE-APs, Committees and PICES scientists

AP-COVE was pleased with Joint FUTURE AP meeting attendance from PICES Standing Committees and scientists. COVE found it helpful to have it scheduled ahead of the separate AP meetings. COVE appreciated having an invitation from the Committees to provide FUTURE AP feedback at their meetings.

AGENDA ITEM 11
Membership

Attendance of COVE members to AP meeting has been high consistently, and e-mail discussions prior to, or between, meetings are active. The Chair did not have any issues with a membership, and all members agreed to continue their voluntary support of COVE activities.

AGENDA ITEM 12
Other issues

None.

AP-COVE Endnote 1

AP-COVE participation list

Members

Liqi Chen (China)
Emanuele Di Lorenzo (USA)
Jung-Hoon Kang (Korea)
Jacquelynne King (Canada)
Hiroaki Saito (Japan, Chairman)
Toru Suzuki (Japan)

AP-COVE Endnote 2

AP-COVE meeting agenda

1. Welcome, introductions, opening remarks
2. Changes to, adoption of, agenda
3. Review and discussion of COVE related ExGs activity
   a. New WG 29 on *Regional Climate Modeling*
   b. WG 27 on *North Pacific Climate Variability and Change*
   c. S-CCME Section on *Climate Change Effects on Marine Ecosystems*
   d. S-CC Section on *Carbon and Climate*

   e. WG 28 on *Ecosystem Responses to Multiple Stressors* (AICE)
4. Review and discussion of COVE related national/regional projects
5. Identify potential for new expert groups to address COVE-AP priorities
6. Discussion of FUTURE Road Map from Busan ISB Meeting
7. FUTURE-related sessions at PICES-2013 (Nanaimo)
8. FUTURE OSM in 2014
9. Develop/Review COVE Workplan
10. Linkages to AICE and SOFE, committees and PICES scientists
11. Membership
12. Other issues

AP-COVE Endnote 3

List of Relevant National Projects

Project	Funding agency/country	Duration	Contact	Purpose	web
ACCASP (Aquatic Climate Change and Adaptation Services Program)	DFO, Canada		R. Brown	Annually funded projects that investigate climate change impacts to maritime sectors and fisheries, sustainable ecosystems, and safe and secure waters	http://www.dfo-mpo.gc.ca/science/oceanography-oceanographie/accasp/index-eng.html
NEPTUNE Canada	UVic, Canada		K. Juniper K. Moran	Continental shelf and offshore cabled observatory system	http://www.neptunecanada.com/
Nereus	Nippon Foundation Japan/UBC, Canada	2010-2019	V. Christensen	Simulating the future ocean - develop scientifically credible simulations of future fish populations and policy options for the world oceans; developing research capacity and international cooperation, raising public awareness of the state of the oceans.	http://www.nereusprogram.org/content/about-nf-ubc-nereus-%E2%80%93-predicting-future-ocean
Assessment of the climate impact on the South Sea ecosystem	China	2008-2013	(J. Zhang, J.G. Fang, T. Xiao, D.J. Huang, S.M. Liu)	Understanding the effects of climate/marine environment changes (global warming, acidification) and predicting the future changes on ecosystem structure and function	
Sustainability of Marine Ecosystem Production under Multi-stressors and Adaptive Management	Korea	2011-2015		Impact of external forcings (Multi-stressors) from climate change and anthropogenic perturbations on the marine ecosystems. Responses of marine ecosystem and change in function and services	

POSEIDON (Northwestern Pacific Ocean Study on Environment & Interactions bw Deep Ocean & marginal seas)	Korea	2006-2015		To suggest the best scenario for 2030 in association with the climatic impacts by examining and configuring the correlation between the Northwestern Pacific and the marginal seas	http://east-1.snu.ac.kr/intro/index.php
YES Cold Water (The study on the impact of the Yellow Sea Bottom Cold Water Mass to the ecosystem)	KORDI, Korea	2012-2014	Woong-Seo Kim, Seok Lee, Se-Jong Ju, Jung-Hoon Kang	To better understand effects of cold water mass on the ecosystem by investigating temporal and spatial variation in structure and dynamics of planktonic trophic components in the Yellow Sea Bottom Cold Waters in the Yellow Sea	
KOREA EAST-1 (East Asian Seas Time Series)	Korea	2006-2015	K.-I. Chang, T. Lee, C. K. Kang, K.-R. Kim	Identify, quantify, and model the dynamic processes governing the climate variability and their linkage to changes in marine ecosystems	
SKED (The study of Kuroshio Ecosystem Dynamics for Sustainabel Fisheries)	MEXT, Japan	2011-2021	H. Saito (FRA)	Understanding the mechanisms of high fisheries productivity from oligotrophic Kuroshio ecosystem	http://tnfri.fra.affrc.go.jp/kaiyo/sked/english/index.html
NEOPS (New Ocean Paradigm on its Biogeochemistry, Ecosystem and Sustainable Use)	MEXT, Japan	2012-2017	K. Furuya (U. of Tokyo)	Developing new ocean provinces based on BGC and ecosystem studies for sustainable use of marine ecosystem services. Half natural sciences, half social sciences.	http://ocean.fs.a.u-tokyo.ac.jp/
"Hot spot" in the climate system	MEXT, Japan	2010-2015	H. Nakamjura (U. Tokyo)	Extra-tropical air-sea interaction under the East Asian monsoon system	
Tohoku Ecosystem-Associated Marine Science	Mext, Japan	2011-2020	A. Kijma, K. Kogure, H. Kitazato	Understanding the perturbation damage by 3.11 Tsunami in the coastal ecosystems in Tohoku, Japan	http://www.i-teams.jp/
IMBER Hakuho-Maru cruise	various funding	2012	H. Ogawa H. Saito	Meridional transect cruise of N. Pacific (E160) on BGC and Ecosystem	

Evaluation, Adaptation and Mitigation of Global Warming in Agriculture, Forestry and Fisheries	MAFF, Japan	2010-2015	H. Kidokoro (FRA)	Forecasting and mitigation of the impact of global warming on marine ecosystems.	
Comprehensive Study of the Far Eastern Seas of Russia and Northern Pacific	Ministry of Economic Development and Russian Academy of Sciences, Russia	2011-2013	V. Lobanov (POI FEB RAS)	Comprehensive study of properties and dynamics of water, atmosphere and lithosphere, their interactions, including process in coastal zone, to understand their influence on climate and formation of biological, mineral and energetic resources and encrease effectiveness of marine activity and protect environment of the Far Eastern Seas and Northwestern Pacific	
Integrated investigations of ecosystems and biological resources of the Far Eastern Seas of Russia	Committee on Fisheries, Russia	2012-2016	O. Katugin (TINRO)	To understand status and variability of fisheries resources of the northwestern Pacific and its marginal seas and make assessment for sustainable fishery	
POBEX (Pacific Ocean Boundary Ecosystems)	NSF, USA		E. Di Lorenzo	investigating the mechanisms of climate-related variability in three Pacific boundary ecosystems: Gulf of Alaska, California Current System, the Humboldt or Peru-Chile Current System, the Kuroshio-Oyashio Extension (KOE) region	http://www.pacific-ecosystems-climate.org/index.html
CIMEC (The Cooperative Institute for Marine Ecosystems and Climate)	NOAA, USA		D. Checkeley	To better serve the Nation's needs through observing and understanding the marine ecosystems and climate in the California Current System, Eastern Tropical Pacific, Southern Ocean, and globally.	http://cimec.ucsd.edu/index.html

POBEX (Pacific Ocean Boundary Ecosystems)	NSF/NOAA, USA		E. Di Lorenzo	Investigating the mechanisms of climate-related variability in three Pacific boundary ecosystems: Gulf of Alaska, California Current System, the Humboldt or Peru-Chile Current System, the Kuroshio-Oyashio Extension (KOE) region	http://www.pobex.org
Understanding the spatial and temporal variability of dissolved oxygen through a hierarchy of models	NSF, USA	2009-2013	C. Deutsch, T. Ito	Developing a hierarchy of models to understand observed variability of oxygen in the North Pacific and its relation to physical and biogeochemical processes	
The history and future of coastal upwelling in the California Current	NSF, USA	2012-2012	W. Sydeman, S. Bograd	Using historical time series and climate models to evaluate changes in the intensity and timing of upwelling in the California Current System	
Multi-Scale Modeling	NSF, USA		E. Curchitser	Assessing the role of eastern boundary upwelling regions and their ecosystems on climate variability using a fully coupled model	
BEST Synthesis	NSF, USA		E. Curchitser	The variable transport of pollock eggs and larvae over the Bering shelf: A marriage of physics and biology	

AP-COVE Endnote 4

AP-COVE Workplan

Mission of FUTURE AP-COVE

The Advisory Panel on *Climate, Oceanographic Variability and Ecosystems* (AP-COVE) is focused on regional (shelf) to basin-scale ecosystem processes and Pacific basin teleconnections. Even though COVE will keep all FUTURE key questions in mind while pursuing its activities, the purview of COVE is mainly the key questions (2) How do ecosystems respond to natural and anthropogenic forcing, and how might they change in the future? and (1) What determines an ecosystem's intrinsic resilience and vulnerability to natural and anthropogenic forcing?

COVE associated expert groups (2012):

On-going expert groups

- WG 27: WG on *North Pacific Climate Variability and Change* (2011–2014)
- WG 29: WG on *Regional Climate Modeling* (2011– 2014)
- S-CC: Section on *Carbon and Climate* (2005–2013)
- S-CCME: Section on *Climate Change Effects on Marine Ecosystems* (2011–2020)
- WG 28: *Ecosystem Indicators to Characterize Ecosystem Responses to Multiple Stressors* (June 2011–2014; Mainly associated with AP-AICE)
- AP-MBM: Advisory Panel on *Marine Birds and Mammals* (1999-2014)

Relevant expert groups (now disbanded)

- WG 20: WG on *Evaluation of Climate Change Projections*
- WG 22: WG on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific*
- WG 23: WG on *Comparative Ecology of Krill in Coastal and Oceanic Waters around the Pacific Rim*

Workplan 2012–2013

1. Review the activities of on-going COVE related expert groups at PICES-2012;
2. Provide advice on revising the ToRs for COVE-related expert groups with terms that extend beyond 2012, as needed from PICES-2012 – ISB-2013;
3. Work with Committee Chairs to develop new working groups during PICES-2012/PICES-2013;
4. Develop a plan for the FUTURE workshop in St. Petersburg 2013 with AICE, SOFE and Committees. PICES-2012 – Feb.-Mar. 2013
5. Develop a plan for the FUTURE OSM in 2014 with AICE, SOFE and Committees. PICES-2012/PICES-2013;
6. Review progress toward COVE workplans and update as needed. PICES-2012/ISB-2013;
7. Confirm the membership of AP-COVE. PICES-2012;
8. Initiate reviews and synthesis of information to address FUTURE goals. PICES-2012/PICES-2013.