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SCICOM STEERING GROUP ON HUMAN INTERACTIONS ON ECOSYSTEMS

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Report of the Joint PICES/ICES Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (WGFCCIFS)

Portland, Oregon, USA, 24 October 2010

Seattle, Washington, USA, 22 May 2011



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1) Summary of WGFCIFS Activities 2011

This report summarizes key activities of the North Pacific Marine Science Organization (PICES) and the International Council for the Exploration of the Sea (ICES) joint working group on Forecasting Climate Change Impacts on Fish and Shellfish, WGFCIFS in 2010/11.

2) ICES Special Issue of ICES JMS

ICES-PICES WG FCCIFS met a major milestone in 2011 through the publication of the special issue volume on “Climate Change Effects on Fish and Fisheries: Forecasting Impacts, Assessing Ecosystem Responses, and Evaluating Management Strategies” in the July issue of ICES Journal of Marine Science. This special issue provides a valuable assessment of our current knowledge of the effects of climate change on fish and fisheries. The papers illustrate the complexity and multifaceted issues facing the scientific community as they strive to understand and project the future implications of climate change effects on marine ecosystems. The volume provides a comprehensive understanding of the topics discussed during the symposium and the range of analytical approaches being explored to assess the effects of climate change on fish and fisheries. Several papers address the implications of climate change and ocean acidification on the distribution and productivity of marine species under a changing climate. Studies of adaptation and changes in phenology illustrated the importance of monitoring seasonal changes in temperature, acidification, and daylength on the physiology and timing of key life-history events. Other papers used ecosystem models to assess the direct and indirect impacts of climate change that would emerge through species interactions. Different methods for modelling the effects of climate change on fish and fisheries were presented and discussed. In the final papers, authors consider the human dimensions of climate change. These papers emphasized that analytical teams attempting to project the future of fisheries should include social scientists, stakeholders, and economists to project societal and market changes.

The symposium volume provides tangible products that address several of the remaining reference for the WGFCIFS:

- Identify frameworks and methodologies for forecasting the impacts of climate change on the growth, distribution and abundance of marine life with particular emphasis on commercial fish and shellfish;
- Assess the results of designated case studies to test methods;
- Establish techniques for estimating and communicating uncertainty in forecasts;
- Evaluate strategies for research and management under climate change scenarios, given the limitations of our forecasts.

3) WGFCCIFS – Working Group Meetings

Members of the WGFCCIFS met 24 October 2010 in Portland, Oregon, and 22 May 2011 in Seattle, Washington, to discuss ongoing activities of the group.

Lists of participants are found in Annex 1 and 2. The main objectives of these meetings were to review the activities of the working group in 2010/2011 and to discuss plans for future collaborative research. During these meetings the WG discussed the need to develop a long-term strategic initiative on Climate Change effects on Marine Ecosystems (SICCME). The life time of WGFCCIFS will end December 2011. Both PICES and ICES recognized that great strides in new science have emerged from collaborative work between their two organizations. Therefore, they requested the formation of a science plan that outlines a structure for continued collaborations focused on climate change. A Science Plan for SICCME was delivered to ICES and PICES in spring. ICES and PICES agreed to the formation of SICCME in principle and asked working group members to develop an implementation plan over summer. These documents are submitted separately from this WG report.

Anne Hollowed reported that the Special Issue of ICES JMS has been published, and now authors can proceed to develop a synthesis article. The target date for draft text for the manuscript is December 2011.

Jürgen Alheit reported that his ICES/PICES workshop on “Reaction of northern hemisphere ecosystems to climate events: A comparison” was a success. The participants expect to develop several manuscripts from the meeting. Details of this meeting can be found in the separate ICES workshop report.

Suam Kim serves as a Symposium Convener for the upcoming Effects of Climate Change on the World’s Oceans Symposium in Yeosu, Korea, 15–19 May 2012. He reported that planning for the symposium is proceeding as expected. Anne Hollowed noted that the WGFCCIFS proposal for a 1 day theme session during the Symposium was approved. The title of the theme session will be “Climate change effects on living marine resources: From physics to fish, marine mammals, and seabirds, to fishers and fishery dependent communities.

Working group members discussed plans for upcoming Theme/Topic sessions for PICES and ICES in 2011 Annual Science Meetings that are relevant to the WGFCCIFS.

- Jürgen Alheit will serve as a convener of ICES/PICES Theme Session Q: *Atmospheric forcing of the northern hemisphere ocean gyres, and subsequent impact on adjacent marine ecosystems* that will be held on 21 September in Gdańsk, Poland.
- Myron Peck will serve as a convener of ICES Theme Session L: *Biophysical modelling tools and their potential use in marine spatial management: a strategic dialogue* that will be held on 23 September, Gdańsk, Poland.
- Jürgen Alheit will serve as a convener of the PICES BIO/POC Topic Session S2: *Mechanisms of physical-biological coupling forcing biological “hot spots”* that will be held on 18 October in Khabarovsk, Russia.
- Sukyung Kang, James Overland and Akihiko Yatsu will as serve as conveners of the PICES FIS/POC Topic Session S4: *Recent changes of North Pacific climate and marine ecosystems: Implications for dynamics of the dominant species* that will be held on 20 October in Khabarovsk, Russia. Jürgen Alheit is the invited speaker for this session.

- Michael Foreman will serve as a convener of the PICES Monitor/POC/FUTURE Topic Session S9: *How well do our models really work and what data do we need to check and improve them?* This session will be held on 19 and 20 October in Khabarovsk, Russia.

4) WGFCCIFS – Workshops

Members of the WGFCCIFS co-convoked three workshops in 2011. Jürgen Alheit and Christian Möllmann co-chaired an ICES/PICES workshop on the Reaction of northern hemisphere Ecosystems to Climate Events: a Comparison (WKNORCLIM), in Hamburg, Germany on 6 May, 2011. Anne Hollowed and Harald Loeng co-chaired a workshop on Biological Consequences of a Decrease in Sea Ice in Arctic and Sub-Arctic Seas (WKBCASAS) on 22 May, 2011 in Seattle, WA. Jürgen Alheit and Ken Drinkwater co-chaired a workshop on Basin-wide impact of Atlantic Multidecadal Oscillation (WKAMO) on 10 June, 2011 in Woods Hole, Massachusetts, USA. Reports on these workshops are submitted in separate reports.

5) WGFCCIFS – Other meetings

Manuel Barange attended the PICES Science Board meeting in Honolulu, Hawaii, USA, 29–30 April 2011 to present the draft Science Plan for SICCME. Presentations were made to the PICES FUTURE Advisory Panel and Science Board. Anne participated in the meeting with the FUTURE Advisory Panel by Skype.

Annex 1: WGFCCIFS Agenda, 24 October 2010

DRAFT Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (WG-FCCIFS)

Co-Chairs: Manuel Barange (UK), Anne Hollowed (USA.),
Suam Kim (Republic of South Korea) and Harald Loeng (Norway)
Oregon Convention Center, Portland, Oregon, USA

Agenda and Order of the Day

Sunday, 24 October 2010, 09:00–12:00

- 1) Opening 09:00
- 2) Review of the Working Group Activities in 2010
- 3) Status of Symposium Volume
 - 3.1) Discussion of options for a second volume.
 - 3.2) Discussion of synthesis paper for Nature Climate.
- 4) Discussion of working group report
- 5) Review of proposal for workshop in conjunction with the ESSAS open science meeting in May 2011 in Seattle, WA.
http://www.pices.int/meetings/international_symposia/2011/ESSAS/default.aspx
- 6) Review of proposal for 1 ½ day theme session in conjunction with the Effects of climate change on the world's oceans meeting in conjunction with the 2012 Ocean Expo in Yeosu, Korea.
- 7) Discussion of a proposal for an International Research Program for the South Pacific that will be proposed at the upcoming Conference on the Environment and Resources in the South Pacific.
- 8) Discussion of opportunities to enhance our contributions to IPCC AR5 reports.
- 9) Theme session proposals for ICES and PICES 2011.
- 10) Coordination with related ICES research
- 11) Proposal for a global effort to compare the performance of model forecasts of the effects of climate on fish and fisheries.

Closing

Annex 2: List of WGFCIFS participants, 24 October 2010

Portland, Oregon, USA

LAST	FIRST	INSTITUTE	LOCATION
Alheit	Jürgen	Leibniz Institute for Baltic Sea Research	Warnemuende, Germany
Foreman	Michael	Fisheries and Oceans Canada, Institute of Ocean Sciences	Sidney, British Columbia, Canada
Hare	Jon	Northeast Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration	Woods Hole, MA
Hollowed	Anne	Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration	Seattle, WA, USA.
Kim	Suam	Department of Marine Biology, Pukyong National University	Busan, Republic of Korea
King	Jacqueline	Department of Fisheries and Oceans	Nanaimo, Canada
Okey	Thomas	Ecosystem Sciences, Westcoast Aquatic and University of Victoria	Port Alberni, British Columbia, Canada
Stein	John	Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration	Seattle, Washington, USA.
Takahashi	Motomitsu	East China Sea Fisheries Research Division, Seikai National Fisheries Research Institute	Nagasaki, Japan
Yoo	Sinja	Korea Ocean Research and Development Institute	Ansan, Korea
Zuenko	Yury	Japan Sea and North-West Pacific Oceanography, Pacific Research Institute of Fisheries and Oceanography (TINRO-Center)	Vladivostok, Russia

Annex 3: WGFCCIFS Agenda, 22 May 2011

Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (WG- FCCIFS)

Co-Chairs: Manuel Barange (UK absent), Anne Hollowed (USA),
Suam Kim (Republic of South Korea), and Harald Loeng (Norway)
Marriott Waterfront Hotel, located at 2100 Alaskan Way, Seattle, USA
Sunday, 22 May 2011, 18:00–20:00

18:00 Opening

18:00-18:20 Overview of Working Group Activities in 2011

18:20 – 19:00 Status of Scientific Initiative on Climate Change Effects on Marine Ecosystems and schedule for development of implementation plan

19:00-19:15 Break

19:15-19:25 Status of Symposium Volume

19:25-19:35 Synthesis paper for Nature Climate.

19:35-19:45 Outcomes of ICES/PICES workshop on [*“Reaction of northern hemisphere ecosystems to climate events: A comparison”*](#)

19:45- 19:55 Update on 2nd International Symposium Effects of Climate Change on the World’s Oceans, Yeosu, Korea May 2012.

19:55-20:00 Schedule for proposals for workshops and theme sessions in 2012 in Seattle, WA.

Closing (Dinner across the street at Anthony’s)

Annex 4: WGFCCIFS List of Participants, 22 May 2011

Seattle, USA

LAST	FIRST	ORGANIZATION	E-MAIL
Alheit	Juergen	Institut für Ostseeforschung Warnemünde Biologie, Germany	juergen.alheit@io- warnemuende.de
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Kim	Suam	Department of Marine Biology, Pukyong University, Republic of Korea	Suamkim@pknu.ac.kr
Loeng	Harald	Institute of Marine Research, Norway	Harald.Loeng@imr.no
Mueter	Franz	University of Alaska Fairbanks, USA	Fmueter@alaska.edu
Overland	James	NOAA, OAR, Pacific Marine Environmental Laboratory, USA	James.e.overland@noaa.gov
Sundby	Svein	Institute of Marine Research, Norway	Svein.Sundby@imr.no