

Report of the Fishery Science Committee

The Fishery Science Committee met on Sunday, October 19, 18:00–20:00 and Wednesday, October 22, 14:00–18:00. Chairman, Dr. Elizabeth Logerwell (USA), led the meetings, welcomed the participants. Vice-Chairman, Dr. Xianshi Jin (China), was not able to attend. Dr. John Field (USA) agreed to serve as rapporteur. The meeting was attended by 12 members, representing all member countries except China, and 13 observers (*FIS Endnote 1*).

AGENDA ITEM 2

Adoption of agenda

The agenda was adopted with no modifications (*FIS Endnote 2*).

AGENDA ITEM 3

Volunteers for Award Committees for PICES-2014

Volunteers were sought to serve on subcommittees to select the FIS awards for Best Oral Presentation by an early career scientist and Best Poster Presentation in FIS-sponsored sessions during PICES-2014. Drs. Gordon Kruse (USA) and Motomitsu Takahashi (Japan) agreed to judge oral presentations. Drs. Jacquelynne King (Canada) and John Field (USA) agreed to judge the posters. The FIS Committee appreciates the work of these subcommittee members. The Best Oral Presentation Award was given to Zhe Li for his presentation on “*Effects of temperature and ontogeny on vertical movement ability of newly hatched larvae of the Pacific cod Gadus microcephalus*”. The Best Poster Presentation Award was given to Yang Liu for his presentation on “*The impacts of marine environment change on sustainable aquaculture model for Japanese scallop in southern Hokkaido and Aomori prefecture, Japan using RS/GIS and OGCM*”. This year’s selections were made from Topic Sessions S5 and S6; FIS-P; and W1 (posters only).

AGENDA ITEM 4

Nomination and election of FIS Chairman and Vice-Chairman

The 3-year terms of Chairman, Dr. Libby Logerwell, and Vice-Chairman, Dr. Xianshi Jin, are due to expire at the end of PICES-2014. Dr. Gordon Kruse (USA) nominated both Logerwell and Jin for re-election. Dr. King seconded the nomination and there were no other nominations brought forwards. The two were unanimously re-elected and congratulations for a second term were given.

AGENDA ITEM 5

FIS Chairman’s report: Implementation of PICES-2013 decisions

PICES-2014 topic sessions and workshops FIS sponsored by FIS

- S5: FIS Topic Session “*Ecosystem considerations in fishery management of cod and other important demersal species*” (1-day). Co-sponsored by International Council for the Exploration of the Sea (ICES). Co-Convenors: Gordon H. Kruse (USA), Sukgeun Jung (Korea), Alexei Orlov (Russia), Xianshi Jin (China), Jacquelynne King (Canada), Kenneth Drinkwater (Norway/ICES);
- S6: FIS/FUTURE Topic Session “*Climate change impacts on spatial distributions of marine fish and shellfish*” (½-day). Co-Convenors: Anne Hollowed (USA), Sukyung Kang (Korea);
- S7: FIS/TCODE/FUTURE Topic Session “*Recent assessments of climate change impacts on marine ecosystems*” (1-day). Co-Convenors: Anne Hollowed (USA), Sukgeun Jung (Korea), Hans-O. Pörtner (Germany), Jake Rice (Canada/ICES);

FIS-2014

- FIS Paper Session (1-day). Co-Convenors: Xianshi Jin (China), Elizabeth Logerwell (USA);
- W1: FIS Workshop “*Dynamics of pelagic fish in the North Pacific under climate change*” (2-day). Co-sponsored by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). Co-Convenors: Gerard DiNardo (USA), Suam Kim (Korea), Sei-Ichi Saitoh (Japan), Cisco Werner (USA);
- W2: FIS Workshop “*Linkages between the winter distribution of Pacific salmon and their marine ecosystems and how this might be altered with climate change*” (1-day). Co-sponsored by the North Pacific Anadromous Fish Commission (NPAFC). Co-Convenors: James Irvine (Canada/NPAFC), Elizabeth Logerwell (USA/PICES).

Summaries of these sessions can be found in the Session Summaries section of the [2014 Annual Report](#).

PICES co-sponsorship at the ICES Annual Science Conference 2014

- Theme Session A on “*Gelatinous zooplankton on a global perspective: interactions with fisheries and consequences for socio-economics*” (co-convended by Richard Brodeur, PICES, USA);
- Theme Session I on “*The increasing importance of biofouling for marine invasions: an ecosystem altering mechanism*” (co-convended by Thomas Therriault, PICES, Canada);
- Theme Session Q on “*Physical and biological consequences of North Atlantic circulation patterns*” (co-convended by Seth Danielson, PICES, USA).

International symposia, meetings, summer schools

- FUTURE Open Science Meeting, April 13–18, 2014, Kohala Coast, Big Island, HI, USA;
- 29th Lowell Wakefield Fisheries Symposium: Fisheries Bycatch: Global Issues and Creative Solutions, May 13–16, 2014 in Anchorage, Alaska, USA. (Gordon Kruse, Scientific Steering Committee);
- ICES/PICES “*Ecological basis of risk analysis for marine ecosystems*” (co-convended by Dr. Alexi Orlov, representing PICES), June 2–4, 2014, in Porvoo, Finland;
- IMBER Open Science Meeting, June 23–27, 2014, Bergen, Norway. PICES co-sponsored a session “*Responses of society to marine and global changes as a core mandate for IMBER: Ways forward*” (Drs. Ian Perry and Thomas Therriault as two of four co-convenors);
- IMBER ClimECO4 Summer School on “*Delineating the issues of climate change and impacts to marine ecosystems: Bridging the gap between research, assessment, policy and management*”, August 4–9, 2014, Shanghai, China, co-sponsored by PICES by providing travel support for 1 lecturer and travel grants for 5 early career scientists from PICES member countries (1 from Canada, 3 from China, and 1 from USA).

PICES was represented at the NPAFC Annual Meeting (May 12–16, 2014, Portland, USA) by FIS Chairman, Dr. Elizabeth Logerwell.

FIS-related PICES publications

S-CCME papers from the Workshop on “*Global assessment of the implications of Climate Change on the Spatial distribution of fish and fisheries*” was held May 22–24, 2013, in St. Petersburg, Russia, and is expected to be published in the *ICES Journal of Marine Science*:

- Bell *et al.* – *Disentangling the effects of climate, abundance and size on the distribution of marine fish: an example based on four stocks from the Northeast U.S. Shelf*
- Jones *et al.* – *Multi-model ensemble projections of climate change effects on global marine biodiversity*
- Lynch *et al.* – *Projected ocean warming poses a challenge to anadromous river herring populations*
- Gislason *et al.* – *Long-term changes in abundance of *Calanus finmarchicus* south and north of Iceland in relation to environmental conditions and regional diversity in spring 1990–2013.*

AGENDA ITEM 6

Update on FUTURE activities

Dr. Logerwell provided a briefing to Committee members on the joint FUTURE Advisory Panel meeting held Sunday, October 19. She reported that the AP meeting was concluded with a discussion of the future of FUTURE, with regard to research topics, strategies, *etc.* Committee members shared insights from other integrative research programs with which they were familiar, in Russia and the USA.

FIS members on the FUTURE APs, Dr. King (AP-COVE) and Dr. Chang-Ik Zhang (AP-SOFE), had nothing to report because the APs did not meet separately. Dr. Anya Dunham (AP-AICE) was not present at the FIS meeting, although her AP, likewise, did not meet at PICES-2014.

Committee members then discussed Dr. Phillip Mundy's (AP-SOFE) request for feedback regarding the North Pacific Ecosystem Status Report. There was overall support for continuing the NPESR, which is a key PICES contribution, and consequently for a study group to address the comments and concerns that have been raised by SOFE, although there was some concern with respect to a FIS nomination/participant, given a lack of clarity with respect to the overarching objectives of the study group. It may be a responsibility of the respective delegations to determine appropriate participants. The Committee agreed that the Chairman would act as a liaison with the study group until the appropriate level and source of participants was decided.

FIS committee members had discussed the proposal for a new SSC for FUTURE online before the PICES 2014 meeting. The committee supports the proposal.

AGENDA ITEM 7

Status reports of FIS expert groups

Dr. King gave a report on the activities of S-CCME. The Section was quite active over the past year, particularly at the FUTURE Open Science Meeting, where several members were co-conveners. She highlighted the Workshop (W4) on "*Ecosystem projection model inter-comparison and assessment of climate change impacts on global fish and fisheries*" for which many early career scientists were encouraged to attend. S-CCME plans for 2015 include trying to engage the ISI-MIP Marine Ecosystems and Fisheries Sector. Members are considering a "gathering" during the upcoming Symposium on the "*Effects of climate change on the world's oceans*" (March 23–27, 2015, Santos, Brazil), where they are very involved in a number of the Symposium sessions and workshops.

S-CCME is planning an inter-sessional workshop on "*Ecosystem projection model inter-comparison and assessment of climate change impacts on global fish and fisheries*", likely to be held in Princeton, USA, in August 2015. Dr. Suam Kim (Korea) stepped down as Co-Chairman of S-CCME, and Dr. Shin-ichi Ito (Japan) has agreed to take over the position. On the ICES side, Dr. Manuel Barrange will step down, and Dr. Brian MacKenzie will co-chair.

Dr. King gave a presentation on behalf of the Study Group on *Socio-Ecological-Environmental Systems* (SG-SEES) Chairman, Dr. Emanuele Di Lorenzo. She discussed the challenges and recommendations from the SG. SG-SEES envisions a model of a system that includes socio-economic and ecological components and the group picked coastal hypoxia as a model system. Recommendations from SG-SEES, when looking at modeling framework, are that PICES should develop the science capacity to support this model framework. Members would like to extend the SG for an additional year. They have produced a final report, but would like to develop an example (in a workshop) of how PICES could create conditions for interdisciplinary dialogue. The Draft Final Report of SG-SEES can be found at <http://goo.gl/QCJDvy>. FIS committee members asked when and where a workshop would take place, and how would travel be covered? It was agreed that although the details are yet to be confirmed, there is general support by FIS to extend SG-SEES.

AGENDA ITEM 8

Relations with other programs and organizations

Dr. Franz Mueter gave a presentation on ESSAS (Ecosystem Studies of Subarctic Seas, <http://www.imr.no/essas>). He described the overall goals of ESSAS and showed the list of working groups currently active: WG on Modeling Ecosystem Responses, WG on Arctic-Subarctic Interactions, WG on Bioenergetics of Subarctic Fishes, WG on Human Dimensions and WG on Paleo-Ecology of Sub-Arctic Seas. He then gave an overview of the 2014 ESSAS Annual Science Meeting held in Copenhagen, Denmark, April 7–9, 2014. There were 72 participants, from 10 nations, who gave 46 presentations and 10 posters. There were 3 sessions: Danish Research in Sub-Arctic Seas, Paleo-ecology of Sub-Arctic Seas and Biology and Ecology of Arctic Cods (+ contributed papers and WG meetings). ESSAS supported two theme sessions in 2014: ESSAS/ICES/PICES Theme Session Q on “*Physical and biological consequences of North Atlantic circulation patterns*” at the 2014 ICES Annual Science Conference (A Coruña, Spain), and POC/MONITOR Topic Session (S9) on “*Variability in advection and its biological consequences for Subarctic and Arctic ecosystems*” at PICES-2014 (Co-Convenor: Franz Mueter; Yeosu, Korea). Dr. Mueter reported that the next ESSAS Annual Science Meeting will be held Seattle, Washington, June 15–17, 2015. The 2½-day symposium on “*The role of sea ice*” will be co-sponsored by new University of Washington program entitled *The Future of Ice*. Dr. Mueter requested FIS to support at least one PICES scientist to attend the Annual Science Meeting. Committee members concluded that it was worth consideration, particularly if there is an appropriate candidate from the Western Pacific who works on ice edge communities (or otherwise appropriate topic).

Dr. Matthew Baker presented on NPRB (North Pacific Research Board), giving an overview of how the Board was formed and what types of research is funded on both fish and invertebrates. He described the large-scale multidisciplinary Integrated Ecosystem Research Programs for the Bering Sea (completed), Gulf of Alaska (nearly completed) and Aleutian Islands (future). He also told the Committee that NPRB is developing a highly-collaborative Arctic ecosystem research program and is actively seeking partners. NPRB would like to collaborate with Russian researchers with respect to Chukchi Sea research, in particular. FIS Committee members noted there is good exchange with Russian/AFSC scientists, and there is currently considerable effort by Russian workers in Chukchi, allowing good opportunities for collaboration.

Dr. Vladimir Radchenko, representing the NPAFC (North Pacific Anadromous Fish Commission), reported on the success of the joint NPAFC/PICES Study Group on *Scientific Cooperation in the North Pacific Ocean* (SG-SC-NP) in which the two organizations agreed on the need for a formal framework to guide, develop, implement, and monitor activities between PICES and NPAFC in the area of science cooperation. The Co-Chairs of the SG, Drs. Logerwell and James Irvine (Canada) co-convened a Workshop (W2) on “*Linkages between the winter distribution of Pacific salmon and their marine ecosystems and how this might be altered with climate change*” at PICES-2014, the result of which was the formation of a group from Canada, Russia, Japan and USA that will explore new data and hypotheses on Pacific salmon distribution changes at sea in a changing climate and oceanographic conditions. They will present their results at the NPAFC International Symposium on “*Pacific salmon and steelhead production in a changing climate: Past, present, and future*” (May 17–19, 2015, Kobe, Japan). Dr. Radchenko closed his presentation by describing the development of the International Year of the Salmon (IYS). The IYS Study Group will hold a scoping meeting in Vancouver Canada in February 2015 and invites enthusiastic professionals in Pacific salmon, North Pacific Ocean climate and oceanography, fisheries management, and public affairs to participate at the Scoping Meeting (contact secretariat@npafc.org for details).

Dr. Kenneth Drinkwater presented on ICES and IMBER (Integrated Marine Biogeochemistry and Ecosystems Research). ICES has developed a new Strategic Plan which focuses on Integrated Ecosystem Understanding and is aimed at providing Integrated Advice on Ecosystems. The strategic action areas will be aquaculture and the Arctic. In 2015 ICES will sponsor the Third International ICES/PICES/IOC Symposium on the “*Effects of climate change on the world’s oceans*” (March 23–27, 2015, Santos, Brazil); “*Oceans Past V*” (May 18–20, 2015, Tallin, Estonia); “*Marine ecosystem acoustics – observing the ocean interior across scales in support of integrated management*” (May 24–28, 2015, Nantes, France); and Symposium on “*Targets and limits for long*

term fisheries management” (October 27–30, 2015, Athens, Greece; EU project “MYFISH”). Regarding ICES/PICES strategic cooperation, Dr. Drinkwater reminded the Committee that in 2011, PICES and ICES agreed on commonalities and priorities for cooperation, resulting in a Report of the P/ICES Study Group on *Developing a Framework for Scientific Cooperation in Northern Hemisphere Marine Science*. A review of the document was agreed upon and, furthermore, PICES FUTURE and the ICES Strategic Plan now call for a review. A first meeting of a “new” group took place at the ICES ASC 2014 in A Coruña, Spain. This work will be continued in 2015.

Committee members discussed the ICES ASC 2015 list of theme sessions for potential PICES co-sponsorship. The consensus was:

- fairly strong support for #2 “*Operationalizing ecosystem-based fisheries management*”, #6 “*Small-scale fisheries under data poor scenarios*” and #7 “*Responding to change: Adapting to new management strategies and environmental shifts in fisheries*” merged with “*Managing marine ecosystem services in a changing climate*”;
- modest support for #1 “*Advancement of stock assessment methods for sustainable fisheries*”, #5 “*Beyond the connectivity in the ocean: Bridging forefront advances on early life stages and adults connectivity to assessment and management challenges*” and #11 “*Social and ecological dimensions of aquaculture*”.

AGENDA ITEM 9

PICES-2015

The Committee discussed the online rankings by FIS on PICES-2015 topic session and workshop proposals. The consensus was that the following three were of interest and appropriate for FIS Committee sponsorship:

- ps-12 – *Marine ecosystem services and economics of marine living resources (FIS)*;
- ps-2 – *Change and sustainability of fisheries: Lessons from eastern-western cultures for global food security (FIS, S-HD, ICES)* [later renamed “*Eastern-western approaches to fisheries: Resource utilization and ecosystem impacts*”];
- ps-13 – *Experiences and lessons learned in managing shared/transboundary stock fisheries*.

No workshops were of interest for FIS sponsorship.

S-CCME requests a ½-day business meeting at PICES-2015.

The Committee agreed to support the inter-sessional S-CCME workshop on “*Ecosystem projection model inter-comparison and assessment of climate change impacts on global fish and fisheries*” but recognized that this proposal has done an inadequate job in engaging Western Pacific PICES participants.

AGENDA ITEM 10

Proposals for new FIS expert groups and special projects

Dr. Elliot Hazen (USA) presented a proposal on behalf of potential Co-Chairmen, Drs. Jameal Samhour (USA) and Jaebong Lee (Korea), for the formation of a new Study Group on “Ecosystem reference points as a common currency across PICES social-ecological systems for use in assessing ecosystem resilience” (see *FIS Endnote 3*).

FIS recommendation: Committee members discussed whether this study group should wait until WG 28 is closer to completion. In addition, uncertainty about the future of FUTURE was discussed. FIS supports the establishment of the SG but defers to Science Board on the timing of SG.

Dr. Janelle Curtis (Canada) presented a proposal for the formation of a new Working Group “Working Group on Biodiversity and Deep-water Biogenic Habitats (BIO/FIS/MEQ)”.

FIS-2014

FIS recommendation: There were some concerns that the SG meeting was not well attended by all PICES members which may indicate poor future participation in the WG. In addition, uncertainties in the direction of FUTURE could impact whether this WG proposal should go forward. FIS supports the concept of the WG, but seeks SB input about whether the WG is appropriate given the changes to FUTURE.

Dr. Gerard DiNardo (USA) presented a proposal for a joint ISC-PICES Study Group on Scientific Cooperation in the North Pacific” (see *SB Endnote 6* elsewhere in the [2014 Annual Report](#)).

FIS recommendation: FIS recommends that this SG be formed.

AGENDA ITEM 11

Proposals for new meetings/workshops/conferences with PICES as co-sponsor

- NPAFC Symposium on “*Pacific salmon and steelhead production in a changing climate: Past, present, and future*” (May 17–19, 2015, Kobe, Japan). This was discussed and agreed to by FIS members by email inter-sessionally.
- Ninth International Conference on Marine Bioinvasions (ICMB-IX) will be held January 26–29, 2016 in Sydney, Australia. FIS supports PICES co-sponsorship of this conference.
- ICES Symposium on “*Understanding marine socio-ecological systems: Including the human dimension in Integrated Ecosystem Assessments*” will be held during February/March 2016, in Paris, France. FIS supports the concept of the symposium, but recognizes that it is a very “North-Atlantic” led effort, and question whether it is necessary for PICES to support it. If Science Board recommends PICES co-sponsorship, FIS suggests it should be for PICES participants already engaged in socio-ecological related activities (e.g., from WG 28 and/or SG-SEES). However, FIS members also recognized the need to balance financial support for other groups with the need to support inter-sessional efforts and activities; this may not be an important symposium to provide explicit financial support for at this time.

AGENDA ITEM 12

High priority projects and activities with financial/policy implications

Nothing to discuss.

AGENDA ITEM 13

High priority items with funding implications

FIS is willing to co-sponsor, in order of priority:

1. Joint ICES/PICES (S-CCME) Session on “*Impacts of climate change on marine ecosystems and their services*” at the International Scientific Conference on “*Our common future under climate change*” (July 7–10, 2015, Paris, France);
2. NPAFC Symposium on “*Pacific salmon and steelhead production in a changing climate: Past, present, and future*”, May 17–19, 2015, Kobe, Japan;
3. One FIS member to attend the ESSAS Annual Science Meeting, June 15–17, 2015, Seattle, USA;

AGENDA ITEM 14

Proposed publications

Nothing to discuss

AGENDA ITEM 15

Inter-sessional activities and meetings, travel support requests

Nothing to discuss

AGENDA ITEM 16

Other business

Nothing to discuss

FIS Endnote 1**FIS participation list**Members

Elena P. Dulepova (Russia)
 John C. Field (USA)
 Sukgeun Jung (Korea)
 Jacquelynne R. King (Canada)
 Gordon H. Kruse (USA)
 Jaebong Lee (Korea)
 Elizabeth A. Logerwell (USA, Chairman)
 Kazushi Miyashita (Japan)
 Mikhail Stepanenko (Russia)
 Motomitsu Takahashi (Japan)
 Akihiko Yatsu (Japan)
 Chang-Ik Zhang (Korea)

Observers

Matthew Baker (NPRB)
 Gerard DiNardo (ISC)
 Kenneth Drinkwater (ESSAS, ICES, IMBER)
 Robyn Forrest (Canada)
 Yukiko Inoue (Japan)
 Sukyung Kang (Korea, S-CCME)
 Franz J. Mueter (USA, S-CCME, ESSAS)
 Yoshioki Oozeki (Japan)
 Vladimir Radchenko (NPAFC)
 Chi-Lu Sun (ISC)
 Emmanuel A. Sweke (Japan)
 Phoebe Woodworth-Jefeouts (USA)
 Su-Zan Yeh (Taiwan)

FIS Endnote 2**FIS meeting agenda**

1. Welcome of new members, introductions, and nomination of a rapporteur
2. Adoption of agenda
3. Volunteers for Award Committees for PICES-2014
4. Nomination and election of FIS Chairman and Vice-Chairman
5. FIS Chairman's Report
6. Update on FUTURE activities
7. Status reports of FIS expert groups
8. Relations with other programs and organizations
9. PICES-2015
10. Proposals for new FIS expert groups and special projects
11. Proposals for new meetings/workshops/conferences with PICES as co-sponsor
12. High priority projects and activities with financial/policy implications
13. High priority items with funding implications (meetings/workshops/conferences)
14. Proposed publications (PICES Scientific Report series and primary journals)
15. Inter-sessional activities and meetings, travel support requests
16. Other business

FIS Endnote 3

**Proposal to establish a Study Group on
“Ecosystem reference points as a common currency across PICES social-ecological systems”**

Recommended parent committees: FIS/BIO/POC

Description: We propose a Study Group of one-year duration, which would be parented by FIS with support from BIO and POC and would contribute to Objective 1.1 of the FUTURE Science Plan to understand what determines “an ecosystem’s intrinsic resilience and vulnerability to natural and anthropogenic forcing.” Managing ecosystems under a changing climate requires flexibility in order to facilitate resilient ecosystems for ecological and societal goals. For example, high fishing rates under poor climatic conditions and high predation pressures are less likely to produce favorable management outcomes than the same fishing rates under good climatic conditions. This kind of observation motivates the need for dynamic reference points that reflect a dynamic marine environment and a coupled social-ecological system. The overall goal of this Study Group will be to determine if PICES member countries have the data and capacity to address this need effectively. If successful, we would propose the development of a Working Group in following years to advance this work in support of the FUTURE program.

Terms of Reference:

1. Describe the societal needs and goals that underlie the establishment of ecosystem reference points across PICES member nations, including notions of safe operating space, and determine those that are comparable.
2. Examine data availability for geographic areas and time periods of particularly strong climate influence & fisheries dependence within specific N. Pacific ecosystems, fish stocks, and fishing communities.
3. Develop a heuristic model to examine climate forcing, ecosystem, and fishery response to selected ecosystem reference points and tradeoffs among social and ecological components of North Pacific ecosystems (*e.g.*, Figure 1).
4. Assess the efficacy of and refine the terms of reference for the implementation of a future working group supporting FUTURE goals on “Reference points as a common currency across social-ecological systems.”

Membership:

Suggested Co-Chairmen: Jameal Samhouri (USA), Jaebong Lee (Korea)

Suggested Members:

Canada – Jennifer Boldt, Ian Perry,

China – Wei Xu, TBD

Japan – Motomitsu Takahashi, Kazumi Wakita

Korea – Chang-Ik Zhang

Russia – TBD

USA – Elliott Hazen, Steven Bograd, Keith Criddle, Manuele Di Lorenzo

Proposal to establish a Working Group on “Biodiversity and Deep-water Biogenic Habitats”

Recommended parent committees: BIO/FIS/MEQ

Description: The PICES Study Group on Biodiversity Conservation (SG-BC) recommends establishment of a Working Group on Biodiversity and Deep-water Biogenic Habitats. The proposed 3-year Working Group will advance understanding of the distribution of deep sea coral and sponge taxa in the North Pacific and their contribution to biogenic habitats and biodiversity. This effort represents a new emphasis on habitat research for PICES, and the initial focus on biogenic species/habitat could provide a proof of concept on how to undertake biodiversity research related to other taxa/ecosystems. A major application of the science products

developed by the Working Group would be advancing capabilities to identify vulnerable marine ecosystems, a priority for the new North Pacific Fishery Commission.

Terms of Reference:

1. Gather data on the distribution of deep-sea coral and sponge taxa, and associated fish and invertebrate assemblages in the North Pacific and facilitate their submission to appropriate biodiversity databases, *e.g.*, Ocean Biogeographic Information System (OBIS);
2. Review modeling approaches to predict the distributions of species and habitat suitability for deep-sea corals (*e.g.*, MaxEnt, Boosted Regression Trees, or high resolution bathymetry-based models).
3. Identify environmental and ecological predictors of patterns in the distribution and biodiversity of coral, sponge and associated taxa, and propose indicators for assessing and monitoring diversity in biogenic habitats.
4. Review and document associations between commercially important fish and invertebrate species and biogenic habitats
5. Catalogue sources of multibeam/swathe bathymetry data for deep-water areas in the North Pacific so that such data can be more readily accessed and used for modeling.
6. Liaise with other PICES expert groups to incorporate biodiversity measures or considerations.

Membership (draft):

Suggested Co-Chairmen: Dr. Janelle Curtis (Fisheries and Oceans, Canada): NPFC SWG, Dr. Masashi Kiyota (Fisheries Agency, Japan): NPFC Scientific Working Group

Canada:

Ellen Kenchington (Fisheries and Oceans Canada): NAFO
 Jake Rice (Fisheries and Oceans Canada): (telepresence only)
 Anders Knudby (Simon Fraser University)
 Cherrisse Du Preez (University of Victoria)

China:

Pending suggestions from SG-BC members.

Japan:

Tom Nishida (National Research Institute of Far Seas Fisheries) SEAFO SC Representative

Korea:

Ki-Seong Hyeong (KIOST: Deep-sea and Seabed resources).
 Seok-Gwan Choi (Fisheries Resources Management Division) FAO
 Inja Yeon (Fisheries Resources Management Division) NPFC Scientific Working Group

Russia:

Tatyana Dautova (Institute of Marine Biology, Far East Division of the Russian Academy of Sciences, Vladivostok)

USA:

Chris Rooper (NOAA, US)
 Curt Whitmire (NOAA, US)
 Robert Stone (NOAA, US)
 Timothy Shank (Woods Hole Oceanographic Institution, US)
 Christopher Kelley (Hawaii Undersea Research Laboratory, University of Hawaii, US)
 Tom Hourigan (NOAA, US): telepresence only