REPORT OF THE FISHERY SCIENCE COMMITTEE

The meeting of the Fishery Science Committee (FIS) was held from 16:00–19:30 on October 29, 2008. Chairman, Dr. Gordon Kruse, called the meeting to order and welcomed the participants. The meeting was attended by 11 FIS members plus 19 observers (*FIS Endnote 1*). All PICES member countries were represented, except for China. Ms. Pat Livingston served as rapporteur.

The Chairman reviewed the original agenda (*FIS Endnote 2*) and no changes were made although it was recognized that the discussion on FUTURE should take place before making recommendations on new working groups to ensure that FIS Committee contributions to the new PICES scientific program are complementary.

AGENDA ITEM 3
Proposal to establish FIS Vice-Chairman

Members discussed a proposal for a FIS Vice-Chairman. It was noted that virtually all other PICES committees have vice-chairmen and that the FIS workload has increased in recent years. It was pointed out that a native English-speaking vice-chairman is particularly important if the chairman is a non-native English speaker. All parties present supported the idea of a vice-chairman.

AGENDA ITEM 4
Election of officers

The PICES Executive Secretary, Dr. Alexander Bychkov, reminded members of the rules for election for Committee Chairmen and Vice-Chairmen. Chairman, Gordon Kruse, announced that he was not seeking a second 3-year term. A letter was received from the Russian delegation, which nominated Dr. Mikhail Stepanenko as FIS Chairman. No other nominations were proposed. Dr. Stepanenko accepted the nomination and was unanimously elected to be the next FIS Chairman. Dr. Stepanenko nominated Dr. Kruse as Vice-Chairman. No other nominations were presented. Dr. Kruse was elected to be the FIS vice-chairman. The 3-year terms of both officers begin immediately following the PICES Annual Meeting in Dalian, China.

AGENDA ITEM 5
2008 FIS Best Oral Presentation and Poster awards

Volunteers were sought for judging FIS awards to be given during PICES XVII. Dr. Kruse acted as the awards committee for FIS Best Oral Presentation and Drs. Anne Hollowed and Laura Richards were responsible for judging the FIS Best Poster. Selections were chosen from topic sessions S4 and S11 and the FIS Contributed Paper session. Anastasia Khrustaleva (Russian Federal Research Institute of Fisheries and Oceanography (VNIRO), Moscow) received the FIS Best Presentation award for her paper on "*Integrated method for sockeye salmon stock differentiation in the West Pacific and the Sea of Okhotsk*" (FIS Paper Session). The FIS Best Poster award was given to Chiyuki Sassa (Seikai National Fisheries Research Institute, FRA, Japan) for the poster (co-authored with Keisuke Yamamoto, Youichi Tsukamoto and Muneharu Tokimura) on "Distribution and biomass of *Benthosema pterotum* (Pisces: Myctophidae) in the shelf region of the East China Sea: Mechanisms of population maintenance" (FIS Paper Session).

AGENDA ITEM 6

FIS Chairman's report: Implementation of PICES XVI decisions

PICES XVII sessions

At PICES XVII, FIS sponsored:

- 1-day FIS Topic Session on "*Institutions and ecosystem-based approaches for sustainable fisheries under fluctuating marine resources*" (S4),
- 1-day MEQ/FIS Topic Session on "*Mariculture technology and husbandry for alternate and developing culture species*" (S5),
- ½-day FIS Topic Session on "*Effects of fisheries bycatch and discards on marine ecosystems and methods to mitigate effects*" (S11),
- 1-day FIS Contributed Paper Session,
- 1½-day CCCC/POC/FIS Workshop on "*Climate scenarios for ecosystem modeling* (II)" (W4).

Summaries of these sessions and workshops can be found in the Session Summaries chapter in this Annual Report.

International symposia

During the past year, FIS was very active in international symposia.

- Symposium on "*Effects of climate change on the world's oceans*" (co-sponsored by ICES, PICES, IOC, GLOBEC, SCOR and WCRP) from May 19–23, 2008, in Gijón, Spain. The PICES co-convenor was Dr. William Peterson (PICES), and Scientific Steering Committee members included Drs. Akihiko Yatsu (Japan) and Michael Foreman (Canada). Invited talks by PICES members included FIS Chairman, Dr. Gordon Kruse.
- Symposium on "*Linking herring biology, ecology, and status of populations in a changing environment*" (co-sponsored by ICES, PICES and GLOBEC), from August 26–29, 2008 in Galway, Ireland. PICES members, Drs. Brenda Norcross (U.S.A.) and Yoshiro Watanabe (Japan), were members of the Scientific Steering Committee.
- ICES/PICES Workshop on "*Environmental interactions of mariculture*", from April 14–18, 2008 in Victoria, Canada. An ICES publication of this workshop is available at: http://www.ices.dk/reports/MCC/2008/WGEIM08.pdf.

Upcoming meetings of interest to FIS members include:

- an ICES/PICES/GLOBEC Workshop on "*Changes in distribution and abundance of clupeiform small pelagic fish in relation to climate variability and global change*" to be held during November 3–7, 2008 in Hamburg, Germany. The co-convenors are: Drs. Jürgen Alheit, Jin Yeong Kim, and Gerd Kraus.
- An International Symposium on "*Rebuilding depleted fish stocks: Biology, ecology, social science and management strategies*" (co-sponsored by ICES, PICES, and UNCOVER), will take place November 3–6, 2009 in Warnemünde, Germany. Co-conveners are Drs. Cornelius Hammer (Germany), Olav Kjesbu (Norway), Peter Shelton (Canada), Gordon Kruse (U.S.A.). Information is available at: www.uncover.edu.
- An International Symposium on "*Biology and management of exploited crab populations under climate change*" will be held in Anchorage, Alaska, from March 10–13, 2009. The Steering Committee Chairman is Dr. Kruse, and further information is available at: http://seagrant.uaf.edu/conferences/2009/wakefield-crab/index.html.

Publication

- PICES Scientific Report No. 34 on *Forecasting Climate Impacts on Future Production of Commercially Exploited Fish and Shellfish* edited by Anne B. Hollowed, Richard J. Beamish, Thomas A. Okey and Michael J. Schirripa. This report provides a summary of workshops held in Seattle, U.S.A. in July 2007, in Victoria, Canada in October 2007, and in Gijón, Spain in May 2008.

AGENDA ITEM 7
Status reports of FIS-sponsored groups

Working Group on *Ecosystem-based Management Science and its Application to the North Pacific* (WG 19)

WG 19 Co-Chair, Ms. Patricia Livingston, provided a report of the Working Group meeting, final report and follow-on recommendations. WG 19's final report and brochure are both targeted for completion by the end of 2008. The Working Group proposed: (1) a task team (PICES Understanding, Linking and Synthesis of Ecosystems, PULSE) to FUTURE that will carry on ecosystem-based management activities; (2) a study group on "Indicators of Human Well-Being: Benefits and Health" to advise development of future North Pacific Ecosystem Status Reports, and (3) a 1-day MEQ/FIS Topic Session for PICES-2009, titled "*Marine spatial planning in support of integrated management – tools, methods, and approaches*". FIS action on proposal (1) is described under Agenda Items 9 and 10, and on (3) under Agenda Item 9.

Within this portion of the agenda, Dr. Jake Rice presented information on the need to identify vulnerable marine ecosystems of the North Pacific by 2010. FAO expert consultation and Convention on Biological Diversity (CBD) expert workshops were held independently to develop criteria. The results were similar but not identical. It was proposed that PICES could be the scientific credible body to evaluate how well the criteria would work. Dr. Stepanenko mentioned that there will be a new Northwestern Pacific bottom fisheries management organization and the relationship between this organization and PICES would be similar to ICES and NPAFC. A working group could be formed next year. However, Dr. Rice mentioned that CBD will make its recommendations by 2010 so waiting until next year will not be helpful. Japanese FIS members said that they are not prepared to take action or make decisions this year, owing to the short notice of this issue. Therefore, FIS declined to take action regarding potential PICES involvement in this issue.

Dr. Hollowed provided a report of workshop W4 on "*Climate scenarios for ecosystem modeling*" sponsored by CCCC/POC/FIS. A written summary was provided and can be found in the Session Summaries chapter of the PICES 2008 Annual Report. The workshop discussion revolved around how to provide the climate scenarios for modeling of ecosystem effects. The proposal for a PICES/ICES working group on "Forecasting Climate Change Impacts on Fish and Shellfish" was introduced. As this is a global issue, the proposed co-chairs would include both ICES and PICES members. The issues are well defined and several working group meetings are proposed; some would be virtual meetings. The proposal included a symposium to be held in early 2010 with the proceedings to be published in peer-reviewed literature by 2011. This time-critical deadline was chosen in light of the timetable for developing the 2013 IPCC report. In addition to a 2010 symposium, the proposal also included a request for a working group meeting at the GLOBEC Open Science Meeting in June 22–26, 2009 in Victoria, Canada. It was noted that the proposed working group was already approved by ICES. FIS actions on the proposed new working group are reported under Agenda Item 10.

Workshop on "*Environmental interactions of mariculture*"

Drs. Kevin Amos, Katsuyuki Abo, and Ingrid Burgetz summarized the activities of the workshop on "*Environmental interactions of mariculture*" held April 14–18, 2008 in Victoria, Canada. With respect to marine aquaculture sustainability, North America and Asia perspectives are quite different. The balance between the needs to sustain an important established industry (western North Pacific emphasis), while sustaining marine ecosystems (eastern North Pacific emphasis) is a key consideration to PICES activities in the area of mariculture. Examples of potential beneficial or adverse interactions were presented. It is anticipated that with the growth in global seafood consumption, aquaculture is projected to increase. A working group proposal on "Environmental Interactions of Marine Aquaculture" (WG-EIMA) was presented at an *ad hoc* meeting of proposed Chairs and other interested parties at PICES XVII (*FIS Endnote 3*). Suggested working group members are looking for opportunities to collaborate and share knowledge with other working groups, including WG 19, and HAB-S and others in PICES' next integrated science program, FUTURE. Expected outcomes of the working group were presented. Consistent with the FUTURE Science Plan, there was some emphasis to provide information and results of WG-EIMA available to a wide variety of audiences, including policy makers. Also, a workshop on marine aquaculture was proposed to be held in Korea (perhaps in Busan)

just prior to PICES-2009. Convenors would be Dr. Lim (Korea) and others to be named. The workshop would include a tour of aquaculture facilities along with presentation of scientific papers. The ability of the working group to complete the proposed Terms of Reference in 3 years was discussed. Proponents have tried to narrow their themes and mentioned that they could narrow further, if necessary. Lack of participation of Chinese members in the aquaculture session at the present PICES Annual Meeting, and whether Chinese participation in the proposed working group would occur, was questioned. The first working group meeting is proposed to be held at PICES-2009 in Jeju, Korea, if approved.

AGENDA ITEM 8
Relations with other international programs and organizations

Dr. Adolf Kellermann, Head of the ICES Science Program, presented an overview of the new (2008) ICES Science Plan and restructuring of the science and advisory systems of ICES. The process started in 2006 with a bottom-up approach from the working groups and top-down perspective from the delegates, clients and member countries. An ICES Strategic Plan was developed in 2007. Its focus is medium-term strategic issues in a 5- to 10-year period. It has 16 research topics in three thematic areas. It draws upon a shared pool of expert groups that report both to the advisory process and to the science program. The 8 existing Science Committees will be disbanded at the end of the year. The new Science Committee will have representatives from each of the member countries and thus will be quite large. The Science Committee will have the power to establish intermediate bodies between expert groups and the Science Committee. Thematic areas include: (1) understanding ecosystem functioning, (2) understanding interactions of human activities with ecosystems, and (3) development of options for sustainable use of ecosystems. Some of the proposed activities are new to ICES so there will be a need to engage the academic community to assist in those. There will be a need for strategic partnering. Climate change is an issue that will require partnering and PICES would be a likely partner.

Dr. Kellermann invited PICES to co-convene joint ICES/PICES theme session on "*Climate impact on marine ecosystems and fish populations on centennial and millennial scales*" during the ICES Annual Science Conference in Berlin in 2009. A PICES co-convenor is requested. Several other co-sponsored symposia in 2009/2010 were mentioned and PICES was offered the opportunity to become a co-convenor for some of them.

Dr. George Hunt presented a report on ESSAS. There is a working group on climate interactions and gadoid–crustacean interactions. Two PICES workshops had ESSAS collaborations this year. Two upcoming ESSAS activities will occur in Seattle, U.S.A. and PICES participation is welcomed. Two activities at the GLOBEC Open Science Meeting in June 2009 in Victoria, Canada, were mentioned that would be of interest to PICES. An ESSAS Open Science meeting in 2011 has been proposed. The PICES Secretariat was requested to provide administrative support for the 2011 meeting *(i.e.*, host a website for the symposium, handle abstract submission and registration). ESSAS also seeks funding in the form of travel support. The linkages between ESSAS and FUTURE were discussed.

FIS actions on proposals for PICES co-sponsorship of upcoming symposia with international organizations are provided under Agenda Item 11.

AGENDA ITEM 9
Proposals for FIS Topic Sessions and Workshops for PICES-2009

The following Topic Sessions were proposed and discussed:
1. *Ecosystem-based approaches for the assessment of fisheries under data-limited situations* (1-day, FIS). (*FIS Endnote 4*)
2. *Early life stages of marine resources as indicators of climate variability and ecosystem resilience* (1 day, FIS/BIO/FUTURE). (*FIS Endnote 5*)

3. *Marine spatial planning in support of integrated management – tools, methods and approaches* (1 day, MEQ/FIS). (*FIS Endnote 6*)
4. *Oceanographic and demographic processes affecting reproductive biology of exploited marine stocks* (½ or 1 day, FIS)
5. *Future marine ecosystem predictions from an earth system science perspective* (1 day, POC/FIS/FUTURE). (see *POC Endnote 4*)

After discussion, FIS members agreed to the following Topic Session priorities. Top priority was given to the Topic Session on ecosystem-based approaches (1). The Committee recommended that proposed Topic Sessions on early life history (2) and reproductive biology (4) could be merged into a 1-day session, with ½-day devoted to each topic. Third priority was given to a full-day MEQ/FIS Topic Session on marine spatial planning (3). Finally, lowest priority was given to the POC/FIS/FUTURE Topic Session on future marine ecosystem predictions (5). There was some discussion that a related ICES project on ecosystem-based approaches was recently completed, and someone could be requested as an invited speaker from that project.

FIS considered two workshops:
1. *Marine aquaculture* [later renamed as "*Interactions between aquaculture and marine eco-systems*"] (1 day, MEQ/FIS), with a request for an invited speaker);
2. *Understanding fisheries bycatch, fishing technology, marine ecosystems and new technology for ecosystem based management* [later renamed to *Understanding the links between fishing technology, bycatch, marine ecosystems and ecosystem-based management*] (1 day, FIS).

After discussion, FIS members agreed to support both workshops, with mariculture as the top priority and bycatch as second priority.

AGENDA ITEM 10
Proposals for new FIS Working Groups and Study Groups

FIS received proposals for the following three Working Groups:
1. WG-FCCIFS: *Forecasting Climate Change Impacts on Fish and Shellfish* (co-sponsored by PICES/ICES);
2. WG-EIMA: *Environmental Interactions of Marine Aquaculture*;
3. WG-PCRFM: *Pacific Cod Research and Fisheries Management*.

The proposals for WG-FCCIFS and WG-EIMA were introduced earlier in the agenda during reports from FIS-sanctioned groups (Agenda Item 7).

Dr. Alexei Orlov presented a proposal for a Working Group on "Pacific Cod Research and Fisheries Management" (*FIS Endnote 8*). This Working Group would look at stock structure and management of cod in different regions of the North Pacific. The question was asked about a potential conflict between the proposed AFS publication and the requirement for a PICES scientific report. Because one is peer reviewed and the other is not, it was thought not to be a problem. Suggestions were to hold a workshop first, before a working group is formed. Also, some FIS members suggested that, whereas cod was important, the proposed Working Group is too specific and other cod-like fish should be included. Questions were also raised about the lack of Chinese membership on the proposed Working Group, but it was explained that cod do not extend into Chinese waters. However, subsequent discussion outside the FIS meeting indicated that Pacific cod do extend into Chinese waters. In any case, FIS did not endorse this proposed Working Group at this time. Instead, FIS recommends developing a proposal for a workshop at PICES-2010 to be considered at next year's FIS business meeting. This workshop proposal could include other gadoids.

FIS recommended approval of the PICES/ICES Working Group on "Forecasting Climate Change Impacts on Fish and Shellfish" (WG-FCCIFS). It was approved last year by FIS, but the proposal was deferred by Science Board until 2008 in order to involve PICES Working Group on *Evaluations of Climate Change Projections*.

FIS noted that this proposed Working Group is in line with FUTURE goals. A question was raised about the relationship between this Working Group and a possible task team of FUTURE. It was premature for a definitive answer, but the Working Group could possibly evolve into a task team. However, FIS urges that this work needs to proceed and cannot wait for FUTURE to be finalized. Dr. Hollowed recommended a meeting of the proposed Working Group to take place immediately prior to PICES-2009 in Korea.

FIS also recommends approval of the Working Group on "Environmental Interactions of Marine Aquaculture" (WG-EIMA). Previously, FIS was supportive of efforts in this area. The group that developed this proposal was very responsive to previous comments and suggestions by FIS and other PICES committees (see *MEQ Endnote 3* for the meeting report of the proposed Working Group).

Finally, WG-19 has proposed a Task Team called PULSE (PICES Understanding, Linking and Synthesis of Ecosystems). FIS briefly discussed this proposal and was very supportive of PULSE, feeling that efforts in this area should be part of FUTURE. However, until the FUTURE Implementation Plan is further developed, FIS felt it may be premature to adopt a new task team.

AGENDA ITEM 11
Proposals for new meetings with PICES as co-sponsor

PICES was approached to co-sponsor (with NASCO, ICES and NPAFC) a symposium on the marine mortality of salmon in spring 2011. Previously, a proposed date of spring 2010 precluded PICES involvement. It was noted that the NPAFC has not yet agreed to co-sponsor this symposium. Thus, FIS felt that it was premature for FIS to discuss possible PICES co-sponsorship at this time.

FIS discussed a proposal to co-sponsor an international symposium, titled "*Ecosystems 2010: Global progress on ecosystem-based fisheries management*". PICES and ICES are invited to co-sponsor this symposium, which is part of the Lowell Wakefield Symposium series. Typical sponsors include Alaska Sea Grant, NMFS, Alaska Department of Fish and Game, and the North Pacific Fishery Management Council. Questions were asked about the international nature of the attendees and how the funding support would be used. Could the financial support go to support travel for PICES members from Asian countries? It was explained that Lowell Wakefield Symposia are international symposia with a range of international participation depending on the meeting topic. Two representative examples may be a 2003 symposium on fisheries management on data-limited situations, which included 39 foreign participants from 13 countries and a 1998 symposium on ecosystem considerations in fisheries management, held in conjunction with the American Fisheries Society Annual Meeting, which had 32 foreign participants from 12 countries. Questions were asked about whether funds could be provided with specific earmarks for PICES foreign travel support only. It was explained that 100% of unrestricted funding could be put to work to the symposium, whereas funding with specific spending constraints would need to go through a different process from which overhead would be collected. However, it was suggested that details could be worked out with Alaska Sea Grant, should PICES wish to support this symposium and steering committee members could help prioritize foreign travel by PICES member scientists. Finally, it was pointed out that FAO may about to provide a similar progress report, and it was agreed that inclusion of FAO as a co-sponsor is preferred. There was some concern expressed that this event appeared to be a regionally generated event as opposed to an international one. So, FIS did not endorse support for this symposium.

FIS considered ICES' offers for PICES to co-sponsor several sessions and symposia. An ICES/PICES theme session on "*Climate impact on marine ecosystems and fish populations on centennial and millennial scales*" was proposed to be held during the ICES Annual Science Conference in Berlin in 2009. FIS recommends PICES co-sponsorship of this session, and will nominate a PICES scientist to be a co-convenor if approved.

An ICES Symposium on "*Carrying capacity: What does it mean in a changing ocean?*" will be held in 2010 in Lisbon, Portugal and PICES is invited to be a co-convenor. FIS recommends PICES support for this symposium by providing a co-convenor.

A Cephalopod International Advisory Council (CIAC) symposium will be held on "*The effects of environmental variability on cephalopod populations*" from September 3–11, 2009, in Vigo, Spain. FIS rates this as a lower priority, and recommends naming a PICES co-convenor only if funding is available.

Concerning the ESSAS Open Science Meeting, The PICES Secretariat did not find any problem with the administrative support requested but financial support could not be committed so far in advance of the 2011 meeting, because its budget is unknown. The question is whether PICES can co-sponsor this event by supporting one or two scientists. Therefore, FIS deferred decision until next year.

A 2010 inter-sessional meeting of the proposed joint PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish* was approved by FIS. Publication of the meeting proceedings would occur in 2011.

Finally, a workshop, as part of the GLOBEC Open Science Meeting to be held in Victoria, Canada, in June 2009, for the PICES/ICES working group on *Forecasting Climate Change Impacts on Fish and Shellfish* climate, was also supported.

AGENDA ITEM 12
High priority projects and activities with financial/policy implications

This item was moved forward in the agenda. The key features of the Future Integrative Science Plan (FISP, FUTURE) were reviewed very briefly so as to provide guidance for FIS priority setting concerning topic sessions, workshop, working groups and symposia. Dr. Kruse reminded FIS that FUTURE asks three key questions for setting priorities for research activities: system resilience to natural and anthropogenic forcing, ecosystem response to those, and evaluating how human activities affect coastal ecosystems and how societies are affected by ecosystem changes.

FIS discussed how well the decisions that FIS makes on working groups, topic sessions, and workshops should match with FUTURE goals. It was pointed out that FIS activities are not constrained totally by FUTURE, and other bottom-up activities not totally related to FUTURE could be approved. However, FIS agreed that, in particular, high-priority, long-term activities, such as working groups, should be relevant to FUTURE. Aside from this discussion about priority setting, no time was available for a FIS discussion of the draft FUTURE Implementation Plan or the North Pacific Ecosystem Status Report.

AGENDA ITEM 13
Other priority items with funding implications

None.

AGENDA ITEM 14
Proposed publications

The proceedings of the PICES/ICES Symposium on "*Climate change effects on fish and fisheries*" (to be held in Sendai, Japan in 2010) is proposed for publication in 2011.

AGENDA ITEM 15
Inter-sessional activities, meetings and requests for travel support

No additional requests other than already noted.

AGENDA ITEM 16
Review of FIS Action Plan

Discussion on this agenda item was cancelled owing to lack of time.

AGENDA ITEM 17
Other business

Japan provided a proposal concerning a change in timing of various activities occurring during the PICES Annual Meeting. The FIS Committee supported a proposal for ½-day Committee meetings instead of the 3½-hour session, at present. FIS discussed ways to conduct its annual business meeting in shorter time. One suggestion was to conduct more business by email. It was pointed out that most FIS decisions concern proposals that arrive immediately prior to, or during, the Annual Meeting. Two options include: (1) the Chairman could summarize implementation of last year's decisions in advance by email and the FIS Committee could simply receive any last minute updates at the annual meeting, and (2) a pre-meeting deadline for all proposals could be established. Item 5 of the proposal from Japan, concerning criteria to convene workshops, was also supported by FIS.

The FIS Committee thanked Dr. Kruse for his service as Committee Chairman for the past 3 years.

FIS Endnote 1

FIS participation list

Members

Richard Beamish (Canada)
Alexander Glubokov (Russia)
Anne Hollowed (U.S.A., alternate for Libby Logerwell)
Toyomitsu Horii (Japan)
Masahide Kaeriyama (Japan)
Jin Yeong Kim (Korea)
Gordon Kruse (U.S.A., Chairman)
Laura Richards (Canada)
Mikhail Stepanenko (Russia)
Akihiko Yatsu (Japan)
Chang-Ik Zhang (Korea)

Observers

Katsuyuki Abo (Japan)
Kevin Amos (U.S.A.)
Heui Chun An (Korea)
George Boehlert (U.S.A.)
Ingrid Burgetz (Canada)
Alexander Bychkov (PICES)
Jung Hwa Choi (Korea)
Caihong Fu (Canada)
George Hunt (ESSAS)
Yukimasa Ishida (Japan)
Adolf Kellerman (ICES)
Hyun Jeong Lim (Korea)
Tom Okey (Canada)
Samuel Pooley (U.S.A.)
Jake Rice (Canada)
Jake Schweigert (Canada)
Hiroaki Saito (Japan)
John Stein (PICES)
Tokio Wada (PICES)
Inja Yeon (Korea)

FIS Endnote 2

FIS meeting agenda

1. Welcome of new members, introductions, and nomination of a rapporteur
2. Adoption of agenda
3. Discussion about need for a FIS Vice Chairman
4. Election of new FIS chairman (and vice chairman, if approved)
5. Volunteers for Award Committees for 2008
   a. FIS Best Presentation Award
   b. FIS Best Poster
6. FIS Chairman's Report: Implementation of PICES XVI decisions
7. Status reports of FIS-sanctioned groups
8. Relations with other international programs/organizations
9. Proposals for FIS topic sessions and workshops for PICES XVIII
10. Proposals for new FIS Working Groups, Study Groups and Special Projects
    a. PICES/ICES Working Group on "Forecasting Climate Change Impacts on Fish and Shellfish" (WG-FCCIFS)
    b. Proposed Working Group on "Environmental Interactions of Marine Aquaculture" (WG-EIMA)
    c. Proposed Working Group on "Pacific Cod Research and Fisheries Management"
    d. Others
11. Proposals for new meetings/workshops/conferences with PICES as co-sponsor
12. High priority projects and activities with financial/policy implications
    a. FUTURE
    b. North Pacific Ecosystem Status Report
13. 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. Review of FIS Action Plan
17. Other business

FIS Endnote 3

Proposal for a Working Group on
***Environmental Interactions of Marine Aquaculture* (WG-EIMA)**
Final Draft – 9/23/08

Recommended Co-Chairs: Katsuyuki Abo (Japan), Kevin Amos (U.S.A.), Edward Black (Canada), Ingrid Burgetz (Canada)

Mission Statement
Develop standard methods and tools to assess and compare the environmental interactions and characteristics of existing and planned marine aquaculture activities.

Strategy Statement
The working group should contain expertise corresponding to the three terms of reference (TORs) outlined below. Working sessions on environmental interaction models of marine aquaculture, risk assessment case studies and infectious diseases will be held at PICES annual general meetings (AGMs) and when possible, at other times as needed. A symposium (likely in the third year) will highlight models and information generated by all three TORs to evaluate environmental interactions associated with aquaculture. Final results will be reported as a PICES publication and, hopefully, also in the peer-reviewed literature. The working group will maintain contacts and linkages with PICES WG 21 on *Non-Indigenous Aquatic Species* and two ICES groups (Working Group on *Environmental Interactions of Marine Aquaculture* and Working Group on *Pathology and Diseases of Marine Organisms*).

Goals and Actions (Terms of Reference)

1. Evaluate approaches currently being used in the different PICES countries to assess and model the interactions of aquaculture operations with surrounding environments. This will involve conducting a comparative assessment of the methodologies, applications, and outputs of different approaches to assess finfish, shellfish, seaweed, and/or integrated multi-tropic aquaculture. Assessments of the approaches will include case studies of their application. As the possibilities for different types of aquaculture and their interactions to be assessed are so vast, it is suggested that a process be developed that prioritizes and limits the options. A possible process would:
   a) List types of aquaculture and identify major culture technologies and related species of highest interest to member states. Select three or four important culture technologies and associated species and assess their environmental effects and associated interactions.
   c) Review the scientific literature to ascertain if these possible interactions have been determined to be significant.
   d) Identify methodologies used to predict the effects of these interactions and the history/uncertainty associated with these predictions.
   e) Examine a variety of institutional decision-making models that are used to limit the effects and associated monitoring and mitigation protocols. (Katsuyuki Abo to lead)
2. Standardize, if considered appropriate, risk assessment methods used to assess environmental interactions of aquaculture and use case studies to compare results among countries in the PICES region. This will be achieved by holding a workshop in the second year to compare and discuss possible standardization of methodologies and the selection of potential case studies for assessment with a standardized approach. Much of the information for this exercise can be derived from "d)" in TOR 1 above. Case studies may then be developed. Responsibilities and functions will be similar to the ICES Working Group on *Environmental Interactions of Mariculture* (WGEIM), so holding a joint meeting with this group will be explored. (Edward Black to lead)
3. Assess methods to detect, identify, evaluate and report on infectious disease events and potential interactions between wild and farmed marine animals. If appropriate, develop a recommended standardized approach for detection/evaluation/reporting from wild and cultured populations. The focus of this activity will be on OIE-notifiable diseases and other infectious diseases of regional/economic importance. Discuss and document new and emerging infectious diseases in the PICES region, methods for their detection, and develop models to conduct risk assessments of their potential impacts on both endemic wild and farmed species. If resources are available it would be advisable to test these models by conducting risk assessments on a few (2–3) emerging pathogens. Responsibilities and functions will be similar to the ICES Working Group on *Pathology and Diseases of Marine Organisms* (WGPDMO), so a joint meeting will be explored. (Kevin Amos to lead)
4) As a conclusion to all the above, we propose to hold a PICES session or separate symposium in the third year to present case studies and results, and submit for publication as a PICES document, in appropriate scientific journals, and as a summary paper that examines development and application of aquaculture-environment interaction models.

Additional potential Working Group members (beyond Co-Chairs)

Canada: Simon Jones (3), Mark Higgins (3), Susan Bower (3), Jon Chamberlain (1), Nick Mandrak (2) Graham Gillespie (2), Dario Stucchi (1)
Japan: Toyomitsu Horii (2), Tamiji Yamamoto (1), Michio Kishi (1)
Korea: Hyun Jeong Lim (2), Oh Hyun Taik (1) Myung Ae Park (3)
Russia: Valery Terekhova (3), Galina Gavrilova (2), (Modeler?)
China: TBD – one for Risk, one modeler, one Pathologist
U.S.A.: Kevin Amos (3), Jim Winton (3), Lori Gustafson, (3), Mike Kent (3), Jill Rolland (3), Jack Rensel (2), Dale Kiefer (2), Mac Rawson (2), C.S. Chen (2), Wendy Hall (3), Bill Fairgrieve (1), Michael Rust (1)

Note: Numbers in ( ) represent term of reference most germane to this persons scientific expertise.

The draft was developed by: Michael Rust, Toyomitsu Hori, Jon Chamberlain, Graham Gillespie, Hyun Jeong Lim, Katsuyuki Abo, with edits by Glen Jamieson, Gordon Kruse, Kevin Amos, Katsuyuki Abo, and Edward Black.

FIS Endnote 4

Proposal for a 1-day FIS Topic Session at PICES-2009 on "*Ecosystem-based approaches for the assessment of fisheries under data-limited situations*"

The World Summit on the Sustainable Development recommended implementation of the ecosystem-based management by 2010. Achievement of this goal will require holistic assessment and management of fisheries resources and their associated habitat and ecosystems. Therefore, consideration must be given to ecological interactions of target species with predators, competitors, and prey species, bycatch species, interactions between fishes and their habitat, and the effects of fishing on fish stocks and their ecosystems. The challenge associated with implementation of ecosystem-based management is the design of an approach that is capable of capturing the complexity of the system, while at the same time dealing with the varying quality and quantity of available information. The Ecological Risk Assessment for the Effects of Fishing (ERAEF) approach developed by Australia and the Marine Stewardship Council's Fisheries Assessment Methodology provide two examples of pragmatic approaches. This session encourages contributions that: (1) describe the data and/or information requirements for the application of ecosystem-based assessments, (2) review existing and emerging ecosystem-based assessment methodologies, (3) describe indicators and reference points for these assessments, (4) identify research activities needed for developing an integrated framework for assessments, and (5) discuss indices for evaluating and assessing the ecosystem status and management.
Convenors: Chang-Ik Zhang (Korea), Pat Livingston (U.S.A.), Gordon Kruse (U.S.A.), Yukimasa Ishida (Japan), Laura Richards (Canada) and Mikhail Stepanenko (Russia)

Proposed potential keynote speaker: Keith Sainsbury or David Agnew

Selected oral and poster presentations will be considered to be published in peer-reviewed journal.

FIS Endnote 5

Proposal for a ½-day FIS/BIO/FUTURE Topic Session at PICES-2009 on
"Early life stages of marine resources as indicators of climate variability and ecosystem resilience"

As management strategies become more ecosystem-based and climate-driven, there is a need for more information on the role of species interactions and oceanographic variability in regulating fisheries resources. The early life stage of fish and invertebrates has been shown to be critical in determining year class success and subsequent recruitment to the fisheries. This session will examine changes in the abundance, distribution, and ecological relationships of early life stages (eggs to juveniles) of important fish and invertebrate species in relation to climate fluctuations. Studies examining these stages in relation to adult recruitment and their use as indicators of ecosystem stress or variability are encouraged. Examples of the uses of ichthyoplankton or juvenile surveys in the assessment or management of stocks and in forecasting future trends in fisheries are highly encouraged. The convenors especially invite papers that examine the role of early life stage work relative to ecosystem structure and vulnerability of ecosystems to climate change, with particular reference to the processes of recruitment.

Conveners: Suam Kim (Korea), Richard Brodeur (U.S.A.), Douglas Hay (Canada), Yoshiro Watanabe (Japan), Gordon Kruse (U.S.A.), and Vladimir Radchenko (Russia)

Potential invited speakers: Brian McKenzie (Denmark), Ian Perry (Canada), Samuel McClatchie (U.S.A.), Carl van der Lingen (South Africa), others?

FIS Endnote 6

Proposal for a 1-day MEQ/FIS Topic Session at PICES-2009 on
"Marine spatial planning in support of integrated management – tools, methods, and approaches"

Marine spatial planning is receiving support from a growing number of PICES member countries as a means to develop a strategic approach to offshore ocean usage and resolve spatial conflict issues. While the concepts of integrated management (IM) and supporting marine spatial planning (MSP) are now often referred to at the policy level, there is generally only a vague and patchy understanding of how they might be practically implemented. The most obvious elements of MSP include marine protected or spatially regulated areas designed to meet one or more objectives of IM. This requires identifying and mapping marine features and processes, along with human activities and associated pressures and impacts. The session aims to explore the latest thinking and developments in MSP. Contributions are therefore invited on practical examples of MSP approaches or on any of its sub-components, including:

1. Role of MSP in achieving IM objectives - success stories and problem areas to avoid in practical implementation of MSP;
2. Criteria for identifying, mapping and assessing (based on observations and/or predictions) cumulative impacts of multiple human activities, including theoretical developments on community sensitivity, resilience and other features of ecological significance eg. Mapping of human activities / impacts using spatially-resolved data or model predictions;
3. Criteria and guidelines used to design and locate MPAs to meet cross-sectoral IM objectives, i.e. not just fisheries or nature conservation objectives; included in this are theoretical considerations on interconnectivity amongst these areas; and
4. We are particularly interested in practical examples of marine planning or management systems or processes that bring together any combination of the above.

Convenors: Glen Jamieson (Canada), Chang-Ik Zhang (Korea) and Stuart Rogers (UK)

Proposed invited speaker: Fanny Douvere (IOC, UNESCO, France)

FIS Endnote 7

Proposal for a 1-day FIS Workshop at PICES-2009 on "*Understanding the links between fishing technology, bycatch, marine ecosystems and ecosystem based management*"

Bycatch and discards pose significant problems for sustainable use of living marine resources that are targeted in commercial fisheries. To minimize unintended impacts on the environment, commercial fisheries should strive to increase selectivity by reducing the bycatch and discards of non-target species, as well as undersized commercial species. Research is exploring the effects of fishing gears on ecosystems and developing new technology to minimize unintended impacts. This topic session will focus on bycatch, fishing technology, and gear effects on ecosystems and on recent methodologies to reduce these effects. Particular emphasis will be placed on studies that have changed commercial fishing practices.

Convenors – Heui Chun An (Korea), Patricia Livingston (U.S.A.) and one other.

FIS Endnote 8

Draft PICES proposal to form a Working Group on
***Pacific Cod Research and Fisheries Management* (PCRFM)**

Proposed Parent Committee: FIS
Acronym: WG-PCRFM
Suggested Co-Chairmen: Woo-Seok Gwak (Korea), Alexei Orlov (Russia), Grant Thompson (U.S.A.)

Background/Rationale

The Pacific cod is one of the most important commercial fish species caught in the North Pacific. Its geographic range spans the Yellow Sea and the northwest Pacific Ocean to the northern Bering Sea and along the northeast Pacific Ocean as far south as California. Within this region, Pacific cod primarily occupy coastal waters of most of PICES member states (Canada, USA, Russia, Japan, and Republic of Korea). In spite of its great commercial importance, the population structure of Pacific cod is not entirely clear. Moreover, present stock status, fluctuations in abundance, and causes of these fluctuations have been poorly studied across its range. In some regions cod stocks are at a low levels, prompting the need for stock recovery measures. Meanwhile, most countries fishing for cod are applying different assessment techniques and different methods to explore population structure. By bringing together experts from various fields of genetics, stock assessment, and fishery management, the overall goal of this working group is to develop the scientific basis for the development of rational harvest strategies of Pacific cod stocks throughout their entire range.

Proposed Terms of Reference

1. Assess the current methods applied by PICES member states to the study of the population structure of Pacific cod. Develop a uniform technique for genetic studies of the Pacific cod and recommend it for application by all PICES member states with a view of attaining comparable results.
2. Compare Pacific cod stock assessment techniques currently in use in PICES member states and evaluate comparability of the results obtained through the use of different methods. Generate advice, if needed, for Pacific cod stock assessments so that they could be further applied to improve the quality of research.
3. Estimate the interannual dynamics of Pacific cod abundance in various parts of the North Pacific and examine contrasting patterns in an attempt to identify potential causative factors.
4. Analyze the present status of Pacific cod stocks in various parts of its range; identify areas where poor stock condition warrant rehabilitation efforts.
5. Review the Pacific cod culturing techniques currently applied in Japan and Republic of Korea, and assess their efficiency for stock enhancement. Evaluate their applicability to Pacific cod stock recovery programs in the other parts of the range.
6. Identify research needs on Pacific cod in the PICES region. Review ongoing and define new research initiatives on Pacific cod. Identify potential high priority Pacific cod research projects that could be done cooperatively by PICES member countries.

Suggested outputs

1. A symposium (most likely after termination of working group activity) summarizing the results of studies on the population structure, stock condition and fishery management of Pacific cod in PICES member countries.
2. Either a PICES Scientific Report or a collection of peer-reviewed papers describing the major outcome of the Pacific cod research conducted by the working group
3. Working group members, in addition to some other fishery scientists, will contribute to a book with a working title “Pacific cod: population structure, stock assessment and fisheries management” to be published by the American Fisheries Society involving scientists from PICES member states harvesting Pacific cod stocks.

Potential Working Group members

Canada: (TBD)
Japan: Yoji Narimatsu, Tetsuya Takatsu, Masaki Ito, Nobuhiro Tezuka, Tetsuhiro Funamoto
Korea: Woo-Seok Gwak, Yeong Hye Kim, Sukgeun Jung
Russia: Andrei Stroganov, Andrei Savin, Kim Sen Tok, Andrei Vinnikov, Pavel Kalchugin, Yuri Poltev, Alexei Orlov
U.S.A. Michael Canino, Brenda Norcross, Lorenz Hauser, Olav Ormseth, Stew Grant, Dan Nichol