

REPORT OF FISHERY SCIENCE COMMITTEE

The meeting of the Fishery Science Committee (FIS) was held during 14:00–18:00 h on October 28, 2009. Chairman, Mikhail Stepanenko, and Vice-Chairman, Gordon Kruse, called the meeting to order and welcomed the participants. The agenda was reviewed and adopted with one addition to add a report on the North Pacific Anadromous Fisheries Commission by Dr. Yukimasa Ishida (*FIS Endnote 2*). The meeting was attended by 14 FIS members plus 18 observers (*FIS Endnote 1*). All PICES member countries were represented. Dr. Kruse served as rapporteur.

AGENDA ITEM 3

2009 FIS Best Oral Presentation and Poster awards

Volunteers were solicited to serve on the FIS awards sub-committee for PICES-2009. Drs. John Field and Sukgeun Jung agreed to select the Best FIS Oral Presentation by an early career scientist and Drs. Libby Logerwell and Laura Richards agreed to select the Best FIS Poster. Selections were chosen from Topic Sessions S2 and S3 and the FIS Paper Session. Best Oral Presentation award was given to Hyunjung Kang (NFRDI, Korea) for her talk on “Maturity and spawning of small yellow croaker, *Larimichthys polyactis*” (FIS Paper Session). Best Poster award was given to Tatiana Tunon (SOLV Consulting, Canada) for “*Using classification trees to capture a manager’s interpretation of Bayesian projections*” (FIS Paper Session).

AGENDA ITEM 4

FIS Chairman’s report: Implementation of PICES XVII decisions

PICES-2009 sessions

At PICES-2009, FIS sponsored:

- 1-day FIS Topic Session (Oct. 27) on “*Ecosystem based approaches for the assessment of fisheries under data-limited situations*” (S2),
- ½-day FIS/BIO Topic Session (Oct. 28) on “*Early life stages of marine resources as indicators of climate variability and ecosystem resilience*” (S3),
- 1 day MEQ/FIS Topic Session (Oct. 30) on “*Marine spatial planning in support of integrated management – tools, methods, and approaches*” (S6),
- 1-day FIS Contributed Paper Session (Oct. 29),
- 1-day FIS Workshop (Oct. 23) on “*Understanding the links between fishing technology, bycatch, marine ecosystems and ecosystem-based management*” (W5),
- 1-day MEQ/FIS Workshop (Oct. 24) on “*Interaction between aquaculture and marine ecosystems*” (W7).

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

International events

During 2009, FIS co-sponsored/will co-sponsor the following events:

- Theme session with ICES on “*Climate impact on marine fish: Discovering centennial patterns and disentangling current processes*” at the ICES 2009 Annual Science Conference in Berlin, Germany. The PICES Co-Convenor was Dr. Skip McKinnell.
- Symposium on the “*Rebuilding of depleted fish stocks – Biology, ecology, social science and management strategies*” (co-sponsored by ICES, PICES, UNCOVER) from November 3–6, 2009, in Warnemünde, Germany. The FIS vice-chairman Gordon Kruse (U.S.A.), Cornelius Hammer (Germany), Olav Kjesbu (Norway), Peter Shelton (Canada) were Co-Convenors. Dr. Toyomitsu Horii (Japan) is a member of the Scientific Steering Committee. The proceedings will be published in the *ICES Journal of Marine Science*.

FIS-2009

- The 26th International Lowell Wakefield Fisheries Symposium, titled “*Ecosystem 2010: Global progress on ecosystem-based fisheries management*” will be held in Anchorage, U.S.A. from November 8–11, 2010. Dr. Kruse is a Chair of the Steering Committee on behalf of the University of Alaska and FIS member Dr. Chang-Ik Zhang is the designated PICES member of the Steering Committee. Co-sponsors include PICES, ICES, FAO, and regional sponsors. The proceedings will be published as an Alaska Sea Grant publication. The symposium website is: <http://www.seagrant.uaf.edu/conferences/2010/wakefield-ecosystems/index.php>

Publications

The following FIS-related PICES publications were either under preparation or have been published:

- Draft report of WG 19 on *Ecosystem-based management science and its application to the North Pacific*, edited by G. Jamieson, P. Livingston, C.-I. Zhang. The final FIS chairman’s edits were provided;
- Selected papers from PICES/ICES/FAO Symposium on “*Effects of climate change on fish and fisheries*” ,convened by ICES/PICES Working Group (POC/FIS) on *Forecasting Climate Change Impacts on Fish and Shellfish* (WG-FCCIFC), edited by A. Hollowed, M. Barange, S.-I. Ito, S. Kim, H. Loeng, and M. Peck to be published in a special issue of ICES Journal of Marine Science;
- Special issue of Fisheries Research Vol. 100, Issue 1 on *Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks* edited by G. Kruse, Y. Ishida, R.I. Perry, V. Radchenko, and C.I. Zhang was published. This publication was a product of a FIS Topic Session at PICES XVI in Victoria, Canada. Electronic copies of the papers are available via a link on the PICES website: (http://www.pices.int/publications/primary_journals/default.aspx).

AGENDA ITEM 5

Reports of FIS-sponsored groups

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

WG-19 Co-Chairman, Chang-Ik Zhang, reported on the activities of this Working Group. The Group has completed its work and a draft report has been submitted. Co-Chairman, Glen Jamieson, previously provided a summary of the draft final WG 19 report to FIS members by email. This report provides an emerging consensus on indicators of marine ecosystems, and makes recommendations applicable to North Pacific waters of PICES interest. In addition, it attempts to take a broader view of indicators for ecosystem-based management of marine systems rather than the narrower application to fisheries management (even though most research to date has focussed on this narrower application). Specific recommendations relating to indicators include: 1) PICES should explore the use of a consensus suite of indicators in each of its regions to develop a common set of indicators to be included in each iteration of the PICES Ecosystem Status Report; 2) PICES should use the WG 19 Ocean Management Activity reports and FIS and MEQ committee inputs to help identify region-specific drivers of change and pressure measurements in order to interpret relevant status indicators; 3) PICES should establish collaborations with social scientists to develop indicators which describe the coupled marine social-ecological system and expand the understanding of human behavior and responses to environmental forcing from the marine sector; and 4) PICES should recommend a research activity to explore the use of additional indicators for marine ecosystem-based management in each of its regions, building from those outlined here and elsewhere.

WG 19 considered that the issues it has addressed might evolve into a component of the PICES FUTURE program. Depending on the organization of FUTURE, WG 19 could become a task team, a section, or continue as a working group. In function, WG 19 suggested that the new expert group’s emphasis be on developing an integrative, science-based, ecosystem-scale understanding of the human dimension (across a diversity of sectors) in FUTURE, and suggest it be called “*PICES Understanding, Linking and Synthesis of Ecosystems*” (PULSE). The Working Group submitted a proposal to FIS for a PULSE task team that included a background statement and Terms of Reference (*FIS Endnote 3*). The goal of PULSE would be to monitor

and synthesize regional and basin-wide ecosystem-based management (EBM) studies and initiatives (ecosystem health) and to provide a forum for the integration of FUTURE-related EBM practices and their implementation. FIS supported the proposal for PULSE as a task team.

Joint PICES/ICES Working Group (POC/FIS) on *Forecasting Climate Change Impacts on Fish and Shellfish* (WG-FCCIFC)

Co-Chairman, Dr. Suam Kim, provided a summary of the activities of WG-FCCIFC. The Working Group had met previously at the GLOBEC Open Science Meeting in Victoria, Canada (June 2009), and at the ICES Annual Science Conference in Berlin, Germany (September 2009). The third meeting of this Working Group took place in Jeju, Korea, during PICES-2009 and another will occur for 1½ days immediately after the International Symposium on “*Climate change effects on fish and fisheries*” in Sendai, Japan, April 26–29, 2010. The Working Group plans to develop web meetings.

WG-FCCIFC finalized the organization of the Sendai symposium, including scientific sessions, invited speakers list, expected results of the conference, finances, and other logistical issues. The Working Group noted that many of their Terms of Reference cannot be achieved until after the symposium. It will provide a forum for discussing frameworks and methodologies for forecasting impacts of climate change on the growth, distribution and abundance of marine life. Dr. Kim noted that the proceedings of the Sendai symposium will be published as a special issue of the ICES Journal of Marine Science. However, he noted the Working Group’s desire to produce a second publication, likely to be a synthesis of the Sendai workshops. FIS discussed and supported this proposal. Finally, WG-FCCIFC proposed a Topic Session for PICES-2010 on “*Impact of climate variability on marine ecosystems: Understanding functional responses to facilitate forecasting.*”

MEQ/FIS Working Group on *Environmental Interactions of Marine Aquaculture* (WG 24)

Dr. Stewart Johnson (Canada) provided WG 24’s report to FIS. This Working Group began in 2008 and held its first meeting during PICES-2009 where the Group reviewed its Terms of Reference (ToR). One Working Group member will lead each of the three ToR – Drs. Katsuyuki Abo (ToR 1), Edward Black (ToR 2), and Kevin Amos (ToR 3). During PICES-2009, WG 24 held a 1-day workshop that featured 12 oral and 7 poster presentations, at least one presentation from each PICES member country. The Working Group meeting followed the day after the workshop.

WG 24 made the following decisions. First, all parties agreed to the ToR. Second, the members decided that they would not try to standardize risk assessment methods, but rather would strive to understand and compare them. WG 24 requested a 1½-day meeting to be held before PICES-2010. WG 24 also indicated its strong support for the proposal of a Topic Session, titled “*Economic relation between marine aquaculture and wild capture fisheries*”. Primary issues raised by WG 24 are the need to standardize terminology, and concern about meeting the second ToR regarding risk assessment within 3-year timeframe. Finally, the WG 24 noted that, at present, there is no Japanese representative for aquatic animal health. FIS supported the Working Group’s request for a 1½-day meeting at PICES-2010, as well as its request for one more Japanese scientist with expertise in animal health.

AGENDA ITEM 6

Relations with other programs and organizations

Dr. John Stein, Science Board Chairman, summarized the first meetings of the Advisory Panels of FUTURE, AICE (Anthropogenic Influences on Coastal Ecosystems), COVE (Climate, Oceanographic Variability and Ecosystems) and SOFE (Status, Outlooks, Forecasts, and Engagement). They met for first time at PICES-2009, first individually, then jointly. Each Advisory Panel was asked to nominate two potential candidates to serve as their chairman. Science Board is the Scientific Steering Committee for FUTURE. All Topic Sessions for PICES Annual Meetings proposed by the Advisory Panels will be vetted by the Committees, so the Panels

must meet before the Committees. The plan is to meet on the Sunday before the Opening Session; 3½ h individually, 1½ h together. It was also noted that, as some Working Groups end, it is important to keep track of them, as they may be doing activities important to FUTURE. Advisory Panel ToR are expected to be adopted at inter-sessional Science Board meeting in Sendai, Japan in April. There is a need to define how Science Board will function as an SSC of FUTURE.

Ms. Judith Amesbury (representing the Western Pacific Fishery Management Council, WPFMC) presented a report on the Pelagic Fish Research Program at the University of Hawaii and activities of the WPFMC. She summarized the fisheries of the region, which are largely focused on pelagic fishes. The Pelagic Fisheries Research Program funds research on pelagics to support WPFMC. She indicated that PICES members are welcome to attend the annual meeting of principal investigators to hear results and to propose new research. She offered the following ideas for collaboration with PICES: attend their meeting to help set priorities, co-sponsor meetings – current topics include catch shares, ecosystem-based approach, *etc.* Additional information is available at: www.soest.hawaii.edu/PFRP/ and www.wpcouncil.org/.

Dr. Juan Valero (representing the International Pacific Halibut Commission, IPHC) presented a report on IPHC research programs, and discussed opportunities to collaborate with PICES. IPHC has a long history of collaboration and welcomes opportunities to conduct joint research. IPHC's survey began in 1925. By 1980, many key areas were sampled, and by the late 1990s surveys covered distributions in the Gulf of Alaska and eastern Bering Sea. Current collaborations address the following topics: accurate catch accounting, collection of sablefish logbook information, halibut monitoring on NMFS surveys, electronic pop-up tags, rockfish monitoring off the U.S. west coast, oceanographic monitoring off Oregon, incidentally caught species on IPHC surveys, electronic monitoring instead of observers, pollutant contamination monitoring, and genetics research.

Dr. Yukimasa Ishida reported on the North Pacific Anadromous Fisheries Commission activities for 2008–2009. The BASIS Symposium was held from November 23–25, 2008 in Seattle, U.S.A. and a publication of papers presented is expected in December 2009. A long-term research and monitoring plan was developed to describe their vision for future research and monitoring. NPAFC contributed information on the status of salmon to the PICES North Pacific Ecosystem Status Report. NPAFC will organize a workshop on climate change and salmon during the Sendai Symposium in 2010. FIS discussed whether there were new areas for collaboration or any new requests of NPAFC by PICES. FIS agreed that NPAFC participation in the salmon workshop at the Sendai Symposium and preparation of the North Pacific Ecosystem Status Report remain top priorities for PICES–NPAFC collaborations for the next year. No new collaborations were identified.

Dr. George Hunt (representing ESSAS) presented a report on program activities. ESSAS started as a GLOBEC regional program, and it has now become an IMBER regional program. This past spring, ESSAS held its annual meeting in Seattle, U.S.A. The meeting included a gadid working group on gadoid-crustacean interactions. Also, the meeting examined the roles of advection on marine ecosystems.

Past and present ESSAS activities with PICES include: (1) co-sponsoring a modeling workshop at PICES XVII in Dalian, China, (2) supporting a modeling group to meet with Dr. Enrique Curchitser at Rutgers University, (3) co-sponsoring a workshop on model comparisons at PICES-2009, (4) hoping to co-sponsor at PICES 2010, and (5) making a big contribution for the North Pacific Ecosystem Status Report. ESSAS led the development of the Bering Sea chapter (~70 pages). George Hunt proposed an ESSAS Open Science Meeting in May/June of 2011 in Seattle, U.S.A. The meeting will have 9 or 10 sessions, including regional comparisons over more than one region, new observations on Bering Sea ecosystems (and Chukchi), modeling of marine ecosystem dynamics, contributions of endogenous remineralization of nutrient supplies, IPY studies, a gadoid-crustacean session, Arctic and Antarctic issues, ocean acidification, and hopefully, a session on socio-economics. ESSAS requests PICES funding for early career scientists to travel to the meeting from Asian countries. ESSAS is seeking \$20 K, which may cover 2 early career scientists from each of the four PICES countries in the western north Pacific. FIS supported this proposal.

Reports by the North Pacific Research Board and FAO, by Drs. Clarence Pautzke and Yimin Ye, respectively, were scheduled but not provided.

AGENDA ITEM 7

Proposals for FIS Topic Sessions and workshops at PICES XIX

The following Topic Sessions were proposed for PICES-2010:

- *Ecosystem models: Are they useful for management or forecasting biological response to climate change* (½ day, FIS/BIO). (FIS Endnote 4)
- *Observations of ecosystem mixing under climate change (1-day FIS/BIO)*. (FIS Endnote 5)
- *Economic relation between marine aquaculture and wild capture fisheries* (1 day, FIS/MEQ). (FIS Endnote 6)
- *Impact of climate variability on marine ecosystems: Understanding functional responses to facilitate forecasting* (1-day, FIS/POC/BIO). (FIS Endnote 7)
- *Oceanographic and demographic processes affecting the reproductive biology of exploited marine stocks* (½ or 1 day, FIS). (FIS Endnote 8)
- *Identifying vulnerable marine ecosystems in the North Pacific. (1/2-1 day, FIS/MEQ (possibly BIO)). Co-convenors: four potential convenors from Canada were discussed.* (FIS Endnote 9)
- *New and emerging technologies: Applications of genomics and related technologies for marine ecosystem studies* (½ day, FIS/MEQ/others?). (FIS Endnote 10)
- FIS contributed Paper Session (1 day)

After discussion, FIS members agreed to the following topic session priorities from highest to lowest:

1. *Observations of ecosystem mixing under climate change* (see FIS Endnote 5).
2. *Oceanographic and demographic processes affecting the reproductive biology of exploited marine stocks* (see FIS Endnote 8).
3. FIS Paper contributed Paper Session
4. Merger of two proposals: *Ecosystem models: Are they useful for management or forecasting biological response to climate change* (see FIS Endnote 4) and *Impact of climate variability on marine ecosystems: understanding functional responses to facilitate forecasting* (FIS Endnote 7). In recommending this merger, FIS noted that both have some focus on prediction. Also, FIS noted that papers in the ecosystem modeling session would be suitable to the *Ecosystems 2010* symposium to be held in November 2010, which PICES is co-sponsoring.
5. *Economic relation between marine aquaculture and wild capture fisheries*. FIS feels that this is a high priority activity. It is supportive of FUTURE and the activities of WG 24 (see FIS Endnote 6). Also, the proponents are providing substantial travel funds to bring Asian scientists to the meeting. If there is inadequate space for this session as a Topic Session, then FIS recommends this as a workshop.

FIS also discussed two informal proposals. Dr. Field indicated a desire to develop a cephalopod Topic Session for PICES-2011 which FIS encouraged. An informal proposal was received from a Norwegian scientist about a rockfish/redfish Topic Session. However, no additional information was provided, so FIS took no action.

The following workshop was proposed:

- *Beyond Lagrangian: Modeling migratory fish behavior in GCMs* (½ day, FIS).

FIS members agreed to the following workshop priorities from highest to lowest:

1. *New and emerging technologies: Applications of genomics and related technologies for marine ecosystem studies* (moved from Topic Session to workshop).
2. *Beyond Lagrangian: Modeling migratory fish behavior in GCMs* (see FIS Endnote 11)

AGENDA ITEM 8

Proposals for new FIS-sponsored working groups and study groups

- MEQ/FIS Study Group on *Human Dimensions for FUTURE (Ecosystem-based Fisheries Management – EBFM)* presented by Dr. David Fluharty. Co-Chairmen: Mitsutaki Makino (Japan), David Fluharty (U.S.A.),

FIS-2009

- MEQ/FIS Task Team on *PICES Understanding, Linking, and Synthesis of Ecosystems* (PULSE; *FIS Endnote 3*).

FIS endorsed the formation of the Study Group, but commented that the ToR were vague and suggested that they be refined to make them achievable in one year. FIS also endorsed the proposed PULSE Task Team.

AGENDA ITEM 9

Proposals for new meetings with PICES as co-sponsor

FIS considered ICES offers for PICES to co-sponsor some sessions and symposia:

- ICES Symposium on “*Carrying capacity: What does it mean in a changing ocean?*” will be held in Lisbon, Portugal in 2010. PICES was invited to be a co-convenor. FIS recommended that PICES support this symposium by providing a co-convenor.
- FIS supported the funding request of \$20 K for travel by early career Asian scientists to the ESSAS Open Science Meeting in Seattle, U.S.A. in 2011.
- FIS approved the inter-sessional meeting of the joint PICES/ICES WG-FCIFC during the International Symposium on “*Climate change effects on fish and fisheries*” in 2010 in Sendai, Japan. Publication of the results will occur in 2011. A workshop for this working group at the GLOBEC Open Science Meeting, was also supported.

AGENDA ITEM 10

High priority projects: FUTURE

The key features of PICES’ Future Integrative Science Plan (FISP, FUTURE) were reviewed very briefly to provide guidance for FIS priority setting concerning topic sessions, workshop, working groups and symposia. The FUTURE Science Plan includes key questions on system resilience and vulnerability to natural and anthropogenic forcing, on ecosystem responses and on evaluating how human activities affect coastal ecosystems and how societies are affected by ecosystem changes. FIS discussed how its decisions on working groups, topic sessions, and workshops could consider how well they match with FUTURE goals. It was pointed out that FIS activities are not entirely constrained by FUTURE. Other bottom-up activities that are not totally related to FUTURE could be approved. However, FIS agreed that high-priority, long-term activities such as working groups should be relevant to FUTURE.

At the recent inter-sessional Science Board meeting in Qingdao, China (April 28, 2009), the FUTURE Implementation Plan was approved. The FUTURE Science Plan and Implementation Plan are posted on the PICES main web page: <http://www.pices.int/>. FUTURE includes three Advisory Panels:

1. AICE (Anthropogenic Influences on Coastal Ecosystems) is focused primarily on human influences on coastal ecosystems, such as runoff, pollution, effects of fishing, existence of invasive species, and loss of habitat.
2. COVE (Climate, Oceanographic Variability and Ecosystems) is focused on regional (shelf) to basin scale ecosystem processes and Pacific teleconnections.
3. SOFE (Status Reports, Outreach, Forecast and Engagement) will identify major sources of uncertainty and impediments to improving the skill of assessments and forecasts, and suggest research areas for priority development.

PICES FUTURE Advisory Panel Chairman nominations from FIS:

AICE

- Masahide Kaeriyama, FIS, CFAME, IP-WT (Japan)
- Jae Bong Lee, WG 19 (Korea)
- Anne Hollowed, WG-FCCIFS, IP-WT, WG-25 Co-Chairman (U.S.A.)

COVE

- Jacquelynne King, CFAME, WG-FCCIFS (Canada)
- Akihiko Yatsu, FIS, CFAME, WG-FCCIFS (Japan)
- Sukyung Kang (Korea)

SOFE

- Sukgeun Jung, FIS (Korea)
- Oleg N. Katugin, CCCC, IP-WT (Russia)
- John Field, FIS (U.S.A.)

Science Board recommended, and Governing Council approved, the following FIS-nominated Advisory Panel memberships: Jackie King (COVE), Masahide Kaeriyama (AICE), and Oleg Katugin (SOFE).

AGENDA ITEM 11

Other priority items with funding implications

The Study Group on *Restructuring the Annual Meeting* (SG-RAM) reported its first draft to the 2009 inter-sessional Governing Council meeting in Qingdao (April 29, 2009) and made the following recommendations.

Options:

1. Increase of the number of concurrent scientific sessions and shorten the duration of Annual Meeting;
2. Reduce the number of meetings and workshops immediately prior to the Annual Meeting;
3. Use the Science Board inter-sessional meeting as an opportunity to decide on the scientific sessions of the Annual Meeting for the following year. This would be lighten the burden on Science Board during the Annual Meeting;
4. Science Board and Scientific/Technical Committees should explore the possibility of holding an inter-sessional conference using video and web systems among PICES member countries.

AGENDA ITEM 12

Proposed publications

The proceedings of the PICES/ICES Symposium on “*Climate change effects on fish and fisheries*” in Sendai, Japan, April 2010 is proposed for publication in 2011.

AGENDA ITEM 13

Inter-sessional activities, meetings and requests for travel support

No additional requests other than those already noted.

AGENDA ITEM 14

Review of FIS Action Plan

The FIS Action Plan has not been reviewed since 2007 and needs to be reviewed and updated to be more consistent with the FUTURE Science Program. However, FIS discussed the fact that the FIS Action Plan is based on the overall PICES Strategic Plan, which also needs to be revised. It was resolved that FIS should wait for the PICES Strategic Plan to be revised. In any case, time was much too limited to discuss the FIS Action Plan in detail during PICES 2009. Therefore, FIS will develop and consider revisions to its Action Plan by email during the year after the PICES Strategic Plan is revised.

AGENDA ITEM 15

Other business

None.

FIS Endnote 1

FIS participation list

Members

Elena Dulepova (Russia)
John Field (U.S.A.)
Gordon Kruse (U.S.A., Vice-Chairman)
Toyomitsu Horii (Japan)
Xianshi Jin (China)
Sukgeun Jung (Korea)
Masahide Kaeriyama (Japan)
Jin Yeong Kim (Korea)
Libby Logerwell (U.S.A.)
Laura Richards (Canada)
Mikhail Stepanenko (Russia, Chairman)
Akihiko Yatsu (Japan)
Chang-Ik Zhang (Korea)

Observers

Katsuyuki Abo (Japan)
Judith Amesbury (WPFMC)
Heui Chun An (Korea)
David Fluharty (U.S.A.)
Caihong Fu (Canada)
Graham Gillespie (Canada)
George Hunt (ESSAS)
Yukimasa Ishida (NPAFC)
Oleg Katugin (Russia)
Suam Kim (Korea)
Patricia Livingston (U.S.A.)
Skip McKinnell (PICES)
Minling Pan (U.S.A.)
Craig Rose (U.S.A.)
Hiroaki Saito (Japan)
Chang Seung (U.S.A.)
John Stein (PICES)
Tokio Wada (PICES)
Juan Valero (IPHC)

FIS Endnote 1

FIS meeting agenda

1. Welcome, attendance, rapporteur
2. Adoption of agenda
3. 2009 FIS Best Oral Presentation and Poster awards
4. FIS Chairman's Report: Implementation of PICES XVII decisions
5. Reports of FIS-sponsored groups
6. Relations with other programs and organizations
7. Proposals for FIS Topic Sessions and workshops at PICES XIX
8. Proposals for new FIS-sponsored working groups and study groups
9. Proposals for new meetings with PICES as co-sponsor
10. High priority projects: FUTURE
11. Other priority items with funding implications
12. Proposed publications
13. Inter-sessional activities, meetings and requests for travel support
14. Review of FIS Action Plan
15. Other business

FIS Endnote 3**Proposal for an MEQ/FIS Task Team on “PICES Understanding, Linking and Synthesis of Ecosystems” (PULSE)**

Objective: To monitor and synthesize regional and basin-wide ecosystem-based management (EBM) studies and initiatives (ecosystem health) and to provide a forum for the integration of FUTURE-related EBM practices and their implementation.

Proposed Terms of Reference:

1. PULSE (PICES Understanding, Linking and Synthesis of Ecosystems) is the scientific body responsible for the promotion, coordination, integration and synthesis of research activities related to the implementation of EBM among PICES member nations. This goal would be accomplished by convening meetings, periodic scientific symposia or workshops, and by distributing information designed to foster cooperation and integration among existing or developing PICES programs, and possibly between and/or within member nations;
2. PULSE will provide the scientific body to identify and improve indicators to measure progress in the achievement of EBM. It will provide the forum to discuss the needs, impacts and responses of coastal communities in a changing marine environment, and to enhance the use of this information by governments and society at large. It will provide a forum for the connection of ecosystem monitoring and status reporting of both environmental and social indicators (through linkage with Monitor), and the subsequent implementation and adaptation of EBM;
3. Scientific collaboration and coordination with other international agencies, bodies and societies that are engaged in either EBM or human activities that are relevant to the achievement of EBM will be undertaken. This will engage expertise not previously active in PICES, such as social-scientists and policy makers;
4. PULSE will encourage establishment of other component activities, such as developing the basis for coupled human science-natural science models, and emerging approaches as needed to facilitate synthesis of the FUTURE Program.

Suggested members: We recommend a structure that will ensure core connection with the PICES committees, key expertise from the various disciplines involved in studying ecosystem approaches to management, and national representation. We advocate a nomination process that will closely connect PULSE to PICES Scientific Committees, such as ensuring that a member or designate from each of the Committees and perhaps from the current Communication Study Group is in PULSE. There is also merit in having member participation from different sectors besides fishing (*e.g.* mariculture, *etc.*) and ecoregions.

FIS Endnote 4**Proposal for a ½-day FIS/BIO/ESSAS Topic Session at PICES-2010 on “Ecosystem models: Are they useful for management or forecasting biological response to climate change”**

Recommendations to pursue ecosystem perspectives in marine resource management and research have been common for several years. In the beginning, there seemed to be a consensus that ecosystem approaches were a reasonable next step in managing our living marine resources and alleviating problems of fragmented sector-based management. However, marine science organizations around the world struggled to operationally define and implement ecosystem-based fishery management. Consequently, most case studies that claim to be implementing an ecosystem approach to management have done so by adopting tactical measures that address one or a few species. While the combination of many tactical measures may result in an ecosystem approach to management, scientists and managers seldom examine the efficacy of the strategy to achieve the goals of ecosystem management. We believe this trend is changing in response to a demand for a public deliberation of the costs and benefits of different approaches. Ecosystem models are beginning to be useful for management or forecasting biological response to climate change and fishing. In this session, we seek papers that demonstrate the utility of ecosystem models and ecosystem assessments as techniques to inform decision makers as to the impacts different management approaches under a changing climate. Specifically we seek

examples of techniques for assessment of the impacts of different strategies on the structure, function and variability of marine ecosystems. We anticipate that some case studies will demonstrate the utility of these models to assist decision makers to address a variety of issues including: defining and setting limited access privilege, establishing quota programs and catch shares, assisting with the regulatory process, and helping to settle stakeholder disputes for marine spatial planning.

Convenors: Bernard A. Megrey (U.S.A.), Anne Hollowed (U.S.A.), Jae-Bong Lee (Republic of Korea)

Potential invited speakers: Steve Mackinson (Ecosystem Applications Team Leader, CEFAS, UK), Villy Christensen (Associate Professor, UBC, Canada), and Beth Fulton (CSIRO, Tasmania, Australia)

FIS Endnote 5

A 1-day FIS/BIO Topic Session at PICES-2010 on “*Observations of ecosystem mixing under climate change*”

As the ocean environment changes, we expect species to respond by changing their distribution. Species could expand into habitats newly made available to them and avoid or shrink their abundance in habitats that are no longer viable. Because species respond to these environmental changes at different rates, formally isolated species now interact. We coin the term “ecosystem mixing” to describe the pulling apart and re-mixing of ecosystems and species interactions in a changing environment. For example, Humboldt squid, for example, expanded their range northward along the west coast of North America in 2009, encountering new prey species, potentially including important stocks of juvenile salmon. In this topic session, we consider the consequences of ecosystem mixing. We invite papers which describe case studies of ecosystem mixing from a physical, biological and/or socio-economic perspective, especially as they impact the predators and/or prey of key species (such as those important for fishery harvests). Selected oral and poster presentations will be considered for publication in a peer-reviewed journal.

Suggested Convenors: Laura Richards (Canada), Franz Mueter (U.S.A.), Sanae Chiba (Japan), Jin-Yeong Kim (Korea)

FIS Endnote 6

Proposal for a 1-day FIS/MEQ Topic Session at PICES-2010 on “*Economic relation between marine aquaculture and wild capture fisheries*”

Past activities of PICES have mainly focused on physical and biological sciences, such as ecology, ecosystems, fisheries, oceanography, and biogeochemistry, *etc.* Recognizing the importance of impacts from human activities/uses upon marine living resources, we are proposing a topic session on the fisheries economics at the 2010 PICES meeting. While humans are essential parts of marine ecosystems, it is important to consider economic and social science research within PICES. Indeed, the new FUTURE science program endeavors to provide a greater role for social and economic scientists in PICES. This proposed economics session is a direct response to this objective and is intended to be a step toward enhancing research and management of marine living resources from a socio-economic perspective.

We propose the first ever PICES topic session on marine aquaculture economics, because of the growing role of marine aquaculture in both seafood production and consumption, as well as the close relationship between marine aquaculture and wild ocean capture fisheries. The proposed topic session will focus on the relationships of marine aquaculture with capture fisheries with respect to economics, such as (1) marine aquaculture products as a substitute and/or complement for wild caught products owing to consumer preference, price, and availability; (2) the synergies between aquaculture and fishing (use of fish processing trimmings, resilient coastal communities and maintaining working waterfronts, and (3) economic considerations regarding potential environmental effects (positive and negative) interactions between captured fisheries and marine

aquaculture (e.g. feed inputs in marine aquaculture derived from captured fisheries, aquaculture stock enhancement, aquaculture structures as fish aggregating devices, etc.).

We believe that the PICES 2010 annual meeting in Portland is particularly well suited for this proposed topic session for multiple reasons. First, this topic is timely owing to the ongoing activities of WG-24 and the joint interests of FIS and MEQ, particularly in light of FUTURE. Second, we have secured funding from NOAA NMFS to support travel of key Asian experts to this topic session. This funding, coupled to easy access to Portland by economic and social scientists from the U.S. and Canada, should assure a very well attended and highly successful topic session. We seek to publish accepted papers or a special issue from this session in a peer-reviewed journal such as *Aquaculture Economics and Management*, *Aquaculture*, *Reviews in Aquaculture*, or *Fishery Research*.

Suggested Convenors: Minling Pan (U.S.A., committed); Ingrid Burgetz (Canada, tentative); Qingyin Wang (China, committed); Dohoon Kim (Korea, in contact)

Proposed invited speakers: Michael Rubino (Manager, Aquaculture Program, NOAA), James Anderson (Professor, The Department of Environmental and Natural Resource Economics University of Rhode Island, tentative), Ping Sun Leung (Professor, Natural Resources and Environmental Management, University of Hawaii at Manoa, tentative)

FIS Endnote 7

Proposal for a 1-day POC/FIS/BIO Topic Session at PICES-2010 on “*Impact of climate variability on marine ecosystems: Understanding functional responses to facilitate forecasting*”

Understanding the role of natural variability, occurring over a variety of temporal and spatial scales is essential for effective management of marine ecosystems in the wake of predicted global change. Evidence suggests that climate variability can trigger regime shifts in marine ecosystems. Regime shifts are characterized by a re-organization of marine communities, species dominance, and tropho-dynamic relationships. Often, synchronous shifts occur in aquatic ecosystems that are separated by thousands of kilometers. This finding suggests that atmospheric teleconnections are mediating regional system changes. We postulate that comparative studies of ecosystems that have experienced regime shifts will provide insights into the expected responses of marine organisms to climate change. We seek papers that go beyond simple pattern matching. Contributions to this Theme Session should provide statistical evidence of the functional responses and relationships that underlie regime shifts and statistical or modeling studies that successfully simulate observed shifts. The primary focus of this session will be on understanding shifts in the pelagic realm including phytoplankton, zooplankton and pelagic fishes such as herring, capelin, sardines anchovies, sprat, saury and gadids.

Co-sponsored by ICES

Co-convenors: Suam Kim, Jurgen Alheit, Harald Loeng, James Overland

FIS Endnote 8

A ½ (or full) day Topic Session at PICES-2010 on “*Oceanographic and demographic processes affecting the reproductive biology of exploited marine stocks*” [later changed to a ½-day Topic Session]

Recent research has demonstrated several complexities in the reproductive processes of marine fish. First, for some cod and rockfish stocks there is evidence of a maternal effect upon larval quality such that larval viability increases with spawner age. Second, some iteroparous stocks show evidence of skipped spawning (*i.e.*, not all mature fish spawn in each year) that is related to environmental conditions and the life-history of the stock. Third, temporal changes in age at reproduction have occurred for some exploited stocks, and researchers are attempting to attribute this pattern to some combination of 1) demographic changes in age and size structure; 2) plastic responses to a changing environment; or 3) evolutionary responses to selective pressures. These

FIS-2009

complexities indicate that the production of reproductive output of marine stocks may be more complex than typically assumed in population models, and researchers are beginning to more fully incorporate reproductive biology in assessment procedures. The purpose of this symposium is to review field, laboratory, and modeling studies that may reveal how oceanographic variability, life-history pattern, and fishing pressure may affect the reproductive biology for North Pacific fish stocks, and consider how reproductive biology can best be incorporated into fishery assessment and management.

Suggested Convenors: Paul Spencer (U.S.A.), Chang Ik Zhang (Korea), Jin-Yeong Kim (Republic of Korea)

Proposed Keynote Speaker: Edward Trippel (Department of Fisheries and Oceans, New Brunswick, Canada). Dr. Trippel is an internationally recognized expert on the reproductive biology of commercially fished marine stocks, and in particular how environmental and anthropogenic factors can affect reproductive biology.

FIS Endnote 9

Proposal for a ½-day MEQ/FIS Topic Session at PICES-2010 on “Identifying vulnerable marine ecosystems in the North Pacific”

The FAO and the Convention on Biological Diversity (CBD) have been encouraging the sustainable use of marine living resources by the identification of vulnerable marine ecosystems (VMEs) and ecologically and biological significant areas (EBSAs), in particular but not exclusively in international waters. The broad purpose for identifying such areas is to prevent significant adverse impacts and to protect the marine biodiversity that these ecosystems provide.

To achieve these objectives, researchers and managers must be able to identify areas where VMEs are known, or are likely, to occur. Outstanding questions related to VME identification include what characteristics should be used to classify these systems, how can current information on VMEs and EBSAs be consolidated, and how can predictive models be developed and tested. PICES member countries are beginning to identify VMEs that meet a variety of biological and socio-economic objectives. However, no comprehensive comparison the different methods or assessment of their performance against established ecological, social and economic objectives exists to provide guidance on the appropriate tools to be used. The proposed session will bring together researchers and managers engaged in ecosystem-based management to address three objectives: (1) to compare current approaches and datasets used to identify Vulnerable Marine Ecosystems/Ecologically and Biological Sensitive Areas by different member countries in order to develop a list of appropriate tools, (2) to attempt to reach consensus on broadly acceptable criteria for the identification of VME/EBSA-type areas or potential areas in the high-seas of the Northeast Pacific Ocean, and (3) to propose the locations of such areas and ecosystems. Both benthic/demersal and pelagic systems will be considered, as they may have different criteria. Presentations and methods developed for shelf and coastal waters are welcome to the extent that they provide guidance and case studies for open ocean situations. This review of international experiences with applying criteria to identify VMEs and EBSAs will contribute to the international discussion and evaluation of these issues, and to the application of measures to protect these significant regions.

Convenors: Canada, U.S.A., Korea, others?

Invited speaker: TBD. Approximate cost: ?

FIS Endnote 10

Proposal for a ½-day FIS/MEQ/others? Topic Session at PICES-2010 on “New and Emerging Technologies: Applications of Genomics and Related Technologies for Marine Ecosystem Studies”

The use of genomics, proteomics and metabolomics, either alone or in combination with each other and/or with more traditional methods, is rapidly transforming many areas of biological and biomedical research. Genomics is the study of all genes within an organism, and can be applied at the sequence (DNA) level, or the

transcribed (RNA) level. Proteomics and metabolomics are studies of all proteins or metabolites, respectively, within an organism, organ, cell, or system, at any given time, under selected conditions. These technologies have enabled the transition from sequential studies of single genes, proteins or metabolites by enabling the simultaneous study of many components and their interactions with the environment (from pathways, through cell tissues to whole organisms and communities). These technologies are now being used to address fundamental questions in areas such as ecology, biodiversity and evolution primarily in the terrestrial setting. With the exception of genomic and proteomic studies designed to address questions about the diversity and ecology of marine microbial and phytoplankton and fish communities to date, these technologies have not been broadly applied in marine ecosystems or fisheries research. The goal of this session will be to provide an introduction to these technologies, including information on how they have been applied, or could be applied to address questions of importance to marine and fisheries scientists and policy makers. Contributors will be invited to explore topics such as: the scientific value of these technologies to ecological and fisheries research; the factors that have limited their application; the importance of these technologies to our understanding of complex issues such as monitoring, managing and setting policy for marine biodiversity; and what is needed for marine and fisheries scientists to take advantage of these technologies? This session will stimulate discussion within the PICES and broader research community: encourage interactions between marine and fisheries scientists with research groups that routinely use these technologies in their fields of research; and start the process of development of multidisciplinary research teams that are so crucial for obtaining funding for large-scale marine-base research programs that utilize and, more importantly, integrate these fields.

Convenors: Laura Brown (Canada) and (TBD)

Suggested invited speakers: Salvatore Aricò (Program Specialist Biodiversity, Environmental Governance and Policy Responses, UNESCO, Paris) or Brian Bowen (University of Hawaii – research area: phylogeography and conservation genetics of marine vertebrates)

FIS Endnote 11

Proposal for a ½-day FIS Workshop at PICES-2010 on “Beyond Lagrangian: Modeling migratory fish behavior in Global Circulation Models”

The advent of high resolution coupled atmosphere–ocean circulation models and the creation of repositories of high resolution 4-D ocean hindcasts and future scenarios has made it possible to contemplate adding virtual fish to an increasingly virtual ocean. The ability to study virtual fish in a virtual ocean has a potential to understand past phenomena and potentially, to predict future behavior. Recent developments in satellite data availability, in data assimilating physical models, and in tagging technologies for fishes, all increase the chance to improve our understanding of fish migration mechanism. However, fish behavior is complex. It is a consequence of genes, the physical, chemical and biological environment and their interaction, and perhaps even from learned behavior. This makes the modeling of fish behaviors potentially very complex, and this complexity suggests that a team approach to model building might be desirable. The purpose of this workshop is to understand the current state of development in modeling fish behaviour. Presentations are anticipated that discuss successes (and failures) in modeling migratory fish behavior. Presentations related to data availability to evaluate fish behavior models and laboratory experimental approaches to investigate fish behavior are also welcomed. Based on the results and opinions expressed at the workshop, the convenors would like to discuss the desirability of establishing a group that will focus its attention on developing and advancing the state of fish behavioral modeling.

Co-Convenors: Enrique Curchitser (U.S.A.), Shin-ichi Ito (Japan), Michio Kishi (Japan), Skip McKinnell (PICES)

Invited speaker: Geir Huse (Institute of Marine Research, Norway)