

REPORT OF FISHERY SCIENCE COMMITTEE

The meeting of the Fishery Science Committee (hereafter FIS) was held from 16:00–19:40 hours on October 18, 2006. Dr. Gordon H. Kruse called the meeting to order and welcomed the participants. The meeting was attended by 12 FIS members and 22 observers representing all PICES member countries except China (*FIS Endnote 1*). Dr. Paul Spencer served as rapporteur.

The draft agenda was reviewed, and the only change was to move discussion of the FIS Action Plan after discussion of proposals for Topic Sessions and workshops (*FIS Endnote 2*).

Implementation of PICES XIV decisions (Agenda Item 3)

At PICES XV, FIS sponsored a 1-day BIO/FIS Topic Session on “*The human dimension of jellyfish blooms*” (S2), a 1-day FIS/CCCC Topic Session on “*Key recruitment processes and life history strategies: Bridging the temporal and spatial gap between models and data*” (S7), a 1-day FIS/MEQ Topic Session on “*Aquaculture and sustainable management of the marine ecosystem*” (S8), and a 2/3-day FIS Contributed Paper Session. Also, FIS sponsored a 2-day FIS workshop on “*Linking climate to trends in productivity of key commercial species in the subarctic Pacific*” (W2), and a 1-day MEQ/FIS workshop on “*Criteria relevant to the determination of unit eco-regions for ecosystem-based management in the PICES area*” (W3). Summaries of these sessions and workshops can be found in the *Session Summaries* chapter in this Annual Report.

2006 FIS Best Presentation and Poster Award (Agenda Item 4)

The FIS Best Presentation Award is available to early career scientists only. The FIS Best Poster Award is open to all scientists, but the recipient must be the senior author of the poster and must have attended the Annual Meeting.

This year’s winners were selected from the FIS Contributed Paper Session and the BIO/FIS Topic Session S2. The committee consisting of Drs. Kruse, Richard D. Brodeur (convenor of Topic Session S2) and Chang Ik-Zhang selected the paper by Min Ho Kang (co-authored by Jung Youn Park and Suam Kim) entitled “*Genetic variations and differences of chum salmon (Oncorhynchus keta) collected from the Bering Sea and along the North Pacific region*” and given at the Topic Session S2 as the best FIS presentation. The committee consisting of Drs. Masahide Kaeriyama and Hyoung Chul Shin selected the paper by Atsushi Kawabata entitled “*Distribution and biomass of the Japanese common squid, Todarodes pacificus, estimated by acoustic survey in the Pacific coastal waters off the northern Japan*” and presented at the FIS Contributed Paper Session as the best FIS poster.

New PICES integrative science program, FUTURE (Agenda Item 5)

The Committee reviewed the draft outline for the next PICES integrative science program (FUTURE). The U.S. delegation presented a draft set of potential science priorities for FUTURE, which formed the basis for further discussion. FIS identified the following science priorities:

1. global climate change (*e.g.*, shifts in species distributions, changes in productivity, shifts in predator-prey dynamics);
2. natural and human effects on marine ecosystems (*e.g.*, separate effects of climate *vs.* human effects such as trawling effects on seafloor, the study of local ecological mechanisms, the need for field experiments);
3. improved monitoring to detect change (*e.g.*, monitoring systems needed to detect changes in the environment of fishes, improved stock assessments, advancements in development of ecosystem indicators);

4. forecasting (*e.g.*, the need to predict changes in fish stocks with climate change at various scales of variability);
5. ecosystem-based fishery management (*e.g.*, development and validation of ecosystem models, development of operational objectives for conservation and socio-economics, advancement in the science of ecosystem-based management); and
6. more effective communication (*e.g.*, strengthen communication to managers, the general public and others outside of PICES, strengthen partnerships with organizations having shared interests).

Other discussion included the need to develop forecasts (priority area 4) at scales relevant to ecology and fisheries. This priority was distinguished from monitoring because it is model-based. Discussion also considered the need for hypothesis testing, for instance, within science priority area 2. An example could be experiments with control and treatment areas within the sea. There is a strong need to move beyond correlations and to take a more mechanistic approach. Finally, the need to consider feedback between monitoring and modeling was discussed.

A FIS Writing Team was formed to prepare a 3- to 5-page summary of the FIS science priorities. The team will consist of the FIS Chairman, plus one member from each country: Dr. Laura Richards (Canada), Dr. Yukimasa Ishida (Japan), Dr. Chang-Ik Zhang (Korea), Dr. Alexander Glubokov (Russia), Dr. Michael Schirripa (U.S.A.), and a Chinese representative to be named later. Dr. Kruse will prepare a first draft for review and revision by the Writing Team. Then he will incorporate contributions from the Writing Team in a second draft to be sent for review to the full FIS Committee.

Review of FIS Action Plan (Agenda Item 6)

Dr. Kruse suggested that he can update the FIS Action Plan using information provided by the FIS-sponsored Working Groups and FIS members, and circulate it for review to the full Committee prior to the 2007 PICES Annual Meeting in Victoria.

Report of WG 16 on *Climate change and fisheries management* (Agenda Item 7a)

Dr. Richard Beamish reported on progress in completing the report from FIS WG 16 on *Climate change, shift in fish production, and fisheries management*. Since last year, the document has been assessed by three reviewers. The reviewers' comments have been addressed by Dr. Beamish. Reports from the various countries sometimes speculated on the effects of global warming on fish populations. Different countries had different interpretations, and those differences are reflected in the document. Not all countries considered the same species. Some of the reviewers' comments regarded choice of species. Dr. Beamish respected the choices of the countries in these matters. There was an attempt to standardize styles of national reports to the extent possible. Dr. Steven J. Bograd has been asked to help prepare a synopsis of the results; otherwise, a synopsis written by Dr. Beamish will be used. The revised report has been submitted to FIS. FIS formed a committee consisting of the FIS Chairman and Drs. Yukimasa Ishida, Elizabeth A. Logerwell and Mikhail Stepanenko to review the revised report and to advise PICES on report publication.

Progress report of WG 18 on *Mariculture in the 21st century* (Agenda Item 7b)

Dr. Michael Rust reported on progress by MEQ/FIS Working Group 18 on *Mariculture in the 21st century – The intersection between ecology, socio-economics and production* (see WG 18 chapter in this Annual Report for details). The first two Terms of Reference were completed; the third is to propose a joint MEQ/FIS workshop for PICES XVI in Victoria. The duration of this workshop will be determined later. The workshop would produce an Action Plan on scientific issues for aquaculture. Dr. Richards indicated that the workshop will be important for completing the Terms of Reference of WG 18. The Working Group has suffered low attendance in the past two meetings due to lack of adequate financial support. Providing support for the attendance of Chinese scientists would help, as well as funding

for a professional facilitator. Dr. Glen Jamieson reported that MEQ proposed that WG 18 be disbanded and that a Study Group be formed to determine the next steps for PICES concerning aquaculture.

Progress report of WG 19 on *Ecosystem-based management science and its application to the North Pacific* (Agenda Item 7c)

Dr. Jamieson reviewed activities of MEQ/FIS WG 19 on *Ecosystem-based management science and its application to the North Pacific*, and the results of the PICES XV MEQ/FIS workshop (W3) on “*Criteria relevant to the determination of unit eco-regions for ecosystem-based management in the PICES area*”. The report of WG 19 is included elsewhere in this Annual Report, and the workshop summary can be found in the *Session Summaries* chapter. The Working Group proposed a joint FIS/MEQ workshop on “*Comparative analysis of frameworks to develop an ecosystem-based approach to management and research needed for implementation*” to be held at PICES XVI (WG 19 Endnote 3). The Committee noted that excellent progress has been made by this Working Group.

Proposals for new subsidiary bodies (Agenda Item 8)

One proposal for a new FIS Working Group on *Theoretical anadromy* was presented by Dr. Skip McKinnell. The proposal noted that there are competing mechanisms for the rapid increase in catches that occurred in the latter part of the 20th century. A significant reduction in the age of smolts was observed in several Bristol Bay sockeye salmon populations after 1976/77, causing greater numbers of juveniles to enter the sea. Smolt age and survival are linked because most of the mortality of sockeye salmon, for example, happens in fresh water. The main objective of the Working Group would be to build a high-resolution salmon model to examine the influence of inter-annual variation in important life-history characteristics. The model should be generally applicable to all salmonids and could potentially be linked to NEMURO. Dr. Beamish commented that ocean

mortality may still be a driving factor in population regulation. Dr. McKinnell clarified that the model would be an entire life-cycle model. It was suggested that this need could potentially be addressed by a NPAFC Working Group (as they are interested in the effect of climate), or it could be a cooperative effort between PICES and NPAFC. Drs. Ishida and Zhang indicated that this proposal is a low priority to Japan and Korea, respectively, and that it is most likely a low priority for China. It was also noted that starting this Working Group now may preclude other subsidiary bodies more aligned with FUTURE, which could be developed at PICES XVII. FIS decided to postpone formation of a new Working Group until a Science Plan for FUTURE is finalized.

Proposals for Topic Sessions and workshops at PICES XVI (Agenda Item 9)

Proposals for Topic Sessions included:

- a 1-day FIS Topic Session on “*Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks*” presented by Dr. Ishida (FIS Endnote 3);
- a 1-day joint FIS/CCCC/BIO Topic Session on “*Fisheries interactions and local ecology*” put forward by Dr. Logerwell (FIS Endnote 4);
- a 1-day joint MEQ/FIS Topic Session on “*Coldwater biogenic habitat in the North Pacific*” suggested by Dr. Jamieson (MEQ Endnote 5);
- a ½-day joint BIO/FIS/POC Topic Session on “*Phenology and climate change in the North Pacific: Implications of variability in the timing of zooplankton production to fish, seabirds, marine mammals and fisheries (humans)*” presented by Dr. Logerwell (BIO Endnote 3b);
- a 1-day joint CCCC/FIS Topic Session on “*Towards ecosystem-based management: Recent developments and successes in multi-species modeling*” presented by Dr. Jacob Schweigert (MODEL Endnote 3).

The proposed FIS Topic Session on “*ecosystem approach to fisheries*” would address questions, such as “How do we rebuild depleted stocks

under variable climate regimes?” The proposal was unanimously supported by FIS members and was given top priority for PICES XVI.

It was suggested that the MEQ/FIS session on “cold-water biogenic habitat” is a low priority one compared to the other proposed sessions. Concern was expressed that this topic may not be of interest to all PICES member countries.

FIS had much discussion about the remaining three proposals. All topics are of interest to FIS, but there was concern that the Committee may not be able to co-sponsor so many sessions. It was noted that BIO supports the “fisheries interactions and local ecology” session proposal, and consideration was given to deferring to BIO only.

Discussion noted some commonalities between the session on “multi-species modeling” and the session on “fisheries interactions”. FIS opted to combine these two proposals, allowing for a 1.5-day session. It was noted that CCCC selected the unmerged version of the “multi-species modeling” session as a high priority. The merged session was approved by FIS and given a second priority behind the FIS Topic Session on “ecosystem approach to fisheries”. The FIS convenors of both sessions (Drs. Aydin and Logerwell) noted their preference to keep the two sessions separate, unless there is insufficient time in the schedule to convene both sessions. The decision to merge may need to be resolved at the Science Board meeting, where CCCC is present to discuss it.

FIS also supported the proposal for a ½-day “phenology” session and ranked this as a third priority. FIS requests the use of “timing” instead of “phenology” in the title, so it is more widely understood.

FIS unanimously approved having a 1-day FIS Contributed Paper Session at PICES XVI.

Proposals for workshops included:

- a 1-day FIS workshop on “Methods for standardizing trawl surveys to ensure constant catchability” (FIS Endnote 5);

- a 1-day joint FIS/MEQ workshop on “Comparative analysis of frameworks to develop an ecosystem-based approach to management and research needed for implementation” (WG 19 Endnote 3).
- a 1-day MEQ/FIS workshop on “Scientific issues for sustainable aquaculture in the PICES region.”

Dr. Logerwell described the proposal for the “trawl survey” workshop. This topic has been addressed by ICES, with U.S. participation. The workshop could be expanded to include acoustic surveys and off-bottom trawls, as well. It was suggested that Dr. David Reid (UK) would be a good invited speaker from ICES. It was noted that there has also been some work in standardization for surface trawls used in the NPAFC BASIS program. There is a need to ensure that we do not simply reproduce the work of ICES, and there may be unique issues for PICES nations. Dr. Ishida voiced support for this topic, and it was noted that this is part of the FIS Action Plan. Russia advised that standardization is a complicated, long-term problem. FIS supported the proposal and requested that this workshop consider trawl standardization (not just bottom trawls).

The FIS/MEQ workshop on “ecosystem-based approaches to management” was introduced by Dr. Jamieson. The proposed workshop would address the status and progress of ecosystem-based management science efforts in the PICES region, and would complete the Terms of Reference of WG 19. FIS gave this workshop top priority.

The details were not available for the MEQ/FIS workshop on “sustainable aquaculture”. Dr. Richards recommended that FIS yield sole sponsorship for this workshop to MEQ, and all members agreed.

Relations with other international programs and organizations (Agenda Item 10)

Dr. Ichiro Nomura explained the operations of the Fishery Department of FAO (Food and Agriculture Organization) and suggested potential areas for collaboration between FAO

and PICES. Among others, these areas include: (1) efforts to make the ecosystem approach to fisheries operational, (2) development of collaborative information systems, and (3) “fish in food” model and food safety. FIS looks forward to potential future collaborations with FAO.

The Committee discussed plans and proposals for upcoming FIS-related international meetings with requested PICES co-sponsorship.

The NAFO/PICES/ICES symposium on “*Reproductive and recruitment processes of exploited marine fish stocks*” was approved at the 2006 inter-sessional Science Board meeting and is now planned for October 1–3, 2007, in Lisbon, Portugal. Previously, FIS nominated Dr. Richard Brodeur (U.S.A.) to serve as a symposium convenor, and Drs. Suam Kim (Korea) and Jie Zheng (U.S.A.) as members of the Scientific Steering Committee.

A proposal was received requesting PICES sponsorship for the 1st GLOBEC/CLIOTOP (Climatic Impacts on Oceanic Top Predators) symposium to be held December 3–7, 2007, in La Paz, Mexico. The symposium will highlight the state of the art in the field and try to identify emerging directions and future challenges. Concern was expressed that the symposium organizers are seeking only a financial donation, and not scientific contribution, from PICES, and a flyer has been distributed already without indicating PICES involvement. Given the lack of PICES involvement in the planning of this forum, FIS does not endorse PICES sponsorship of the symposium.

FIS received two proposals inviting PICES to (1) co-sponsor, with NASCO, NPAFC and ICES, a symposium on “*Marine mortality of salmon*” to be held in 2009/2010; and (2) co-organize, with ICES, a symposium on “*Biodiversity and ecosystem-based management*” to be held in 2009. Neither proposal was very comprehensive, and no one present could offer more information.

Regarding marine mortality of salmon, it was determined that this topic may not be of broad interest to PICES, as related symposia in the

past have attracted few PICES scientists who were not already participating in NPAFC activities. Therefore, FIS does not feel that this topic is a high priority for PICES. Although the proposal for the biodiversity symposium was vague on details, FIS agreed that this topic is of much interest to PICES-member countries. As this symposium appears to be in the very early stages of development, FIS recommends that PICES obtain more information about the symposium, including opportunities for PICES involvement to help set symposium objectives and overall planning, and to consider co-sponsorship.

An international conference on “*Linking herring biology, ecology, and status of populations in a changing environment*” (sponsored by ICES, GLOBEC and the Marine Institute of Ireland) is already scheduled for August 26–29, 2008, in Galway, Ireland. ICES representative, Dr. Adolf Kellermann, indicated that PICES will be invited to join as another co-sponsor. It was noted that the former FIS Chairman, Dr. Douglas Hay (Canada), serves as a member of the Scientific Steering Committee.

Dr. George L. Hunt reported on progress by GLOBEC/ESSAS, including the workshop held in June 2006, in St. Petersburg, Russia. ESSAS made a formal request for PICES to support their work on sub-Arctic seas through the series of workshops to be held in the next three years: Hakodate, Japan (2007), Gijón, Spain (2008), and probably Seattle, U.S.A. (2009). The 2007 workshop will focus on the role of sea ice, the 2008 workshop will discuss the role of advection, and the 2009 workshop will be looking at the role of temperature. FIS follows with interest the work by ESSAS.

Proposed inter-sessional meetings (Agenda Item 11)

Dr. Anne Hollowed reported that participants of the PICES XV FIS workshop on “*Linking climate to trends in productivity of key commercial species in the subarctic Pacific*” (W2) recommended that FIS look at 30 key species to develop forecasts of their stock trends. It was noted that FIS would work with CCCC

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(CFAME), POC (WG 20) and MONITOR to develop single-species forecasts. These forecasts could be developed in time to be included in the 2009 North Pacific Ecosystem Status Report. A 3-day inter-sessional FIS workshop on “*Forecasting climate impacts on fish production*” was proposed to bring together fishery scientists, oceanographers, and modelers. Two options were suggested: in May 2007, in Seattle (U.S.A.), or alternatively in association with the June 2007 ESSAS workshops in Hakodate (Japan). Travel funds from PICES are requested for two invited speakers. FIS supported this proposal for an inter-sessional workshop and travel request.

Proposed publications (Agenda Item 12)

- If accepted, the final report of WG 16 will be published as a PICES Scientific Report in 2007;
- Three FIS-sponsored Topic Sessions recommended for PICES XVI (“*Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks*”, “*Fisheries interactions and local ecology*”, and “*Phenology and climate change in the North Pacific: Implications of variability in the timing of zooplankton production to fish, seabirds, marine mammals and fisheries (humans)*”) include plans for publishing special issues in primary journals.

Requests for travel support (Agenda Item 13)

Travel support is requested for:

- 1 invited speaker for the FIS workshop at PICES XVI on “*Methods for standardizing*

trawl surveys to ensure constant catchability” (FIS Endnote 5);

- 1 invited speaker for the FIS Topic Session at PICES XVI on “*Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks*” (FIS Endnote 3);
- 1 invited speaker for the FIS/CCCC/BIO Topic Session at PICES XVI on “*Fisheries interactions and local ecology*” (FIS Endnote 4);
- 1 invited speaker, with costs to be shared with BIO and POC, for the BIO/FIS/POC Topic Session on “*Phenology and climate change in the North Pacific: Implications of variability in the timing of zooplankton production to fish, seabirds, marine mammals and fisheries (humans)*” (BIO Endnote 3b).

Dr. Beamish recommended that financial support for scientists attending the PICES Annual Meeting should be given higher priority than travel of PICES scientists to non-PICES meetings. The low participation in the PICES Annual Meeting by Chinese scientists was noted, and FIS discussed whether this was an issue of travel support.

Theme for PICES XVII (Agenda Item 14)

No information was available on the proposed theme for PICES XVII to be held in Dalian, China.

Other business (Agenda Item 15)

No other business was raised.

FIS Endnote 1**Participation List**Members

Richard J. Beamish (Canada)
 Elena P. Dulepova (Russia)
 Alexander Glubokov (Russia)
 Toyomitsu Horii (Japan)
 Yukimasa Ishida (Japan)
 Masahide Kaeriyama (Japan)
 Gordon H. Kruse (U.S.A., Chairman)
 Elizabeth A. Logerwell (U.S.A.)
 Laura Richards (Canada)
 Michael Schirripa (U.S.A.)
 Hyoung-Chul Shin (Korea)
 Chang-Ik Zhang (Korea)

Christopher Harvey (U.S.A.)
 Anne B. Hollowed (U.S.A.)
 Evan Howell (U.S.A.)
 Chih-Hao Hsieh (Japan)
 George L. Hunt (U.S.A.)
 Oleg Ivanov (Russia)
 Yeonghye Kim (Korea)
 Hidetada Kiyofuji (U.S.A.)
 Hideaki Kudo (Japan)
 Patricia Livingston (U.S.A.)
 Skip McKinnell (PICES Secretariat)
 Ichiro Nemura (FAO)
 Jonathan Phinney (U.S.A.)
 Jacob Schweigert (Canada)
 Paul Spencer (U.S.A.)
 Oleg Zolotov (Russia)
 Jie Zheng (U.S.A.)
 Mikhail Stepanenko (Russia)
 Andrew Trites (Canada)
 Inja Yeon (Korea)

Observers

Kerim Y. Aydin (U.S.A.)
 Galina Gavrilova (Russia)

FIS Endnote 2**FIS meeting agenda**

1. Welcome, introductions, and nomination of a rapporteur
2. Adoption of agenda
3. Implementation of PICES XIV decisions
4. 2006 FIS Best Presentation and Poster Award
5. New PICES integrative science program:
 - a. Review of FUTURE outline
 - b. National perspectives on the content of FUTURE
 - c. Defining FIS science priorities within FUTURE
 - d. Formation of FIS writing team
6. Review of FIS Action Plan
7. Progress reports of the existing Working Groups:
 - a. WG 16 (FIS) on *Climate change, shift in fish production, and fisheries management*
 - b. WG 18 (MEQ/FIS) on *Mariculture in the 21st century*
 - c. WG 19 (MEQ/FIS) on *Ecosystem-based management science and its application to the North Pacific*
8. Proposals for new subsidiary bodies
9. Proposals for Topic Sessions and workshops at PICES XVI
10. Relations with other international programs and organizations:
 - a. FAO
 - b. Proposed joint symposia
 - c. Other organizations
11. Proposed inter-sessional meetings
12. Proposed publications
13. Travel support requests
14. Theme for PICES XVII (Dalian, China)
15. Other business

FIS Endnote 3

Proposal for a 1-day FIS Topic Session at PICES XVI on “*Ecosystem approach to fisheries: Improvements on traditional management for declining and depleted stocks*”

An ecosystem approach to fisheries (EAF), which recognizes the complexity of ecosystems and the interconnections between its component parts, has been recently advocated by many fisheries management bodies. In PICES countries, some fisheries resources are in high abundance and healthy, but others are decreasing or already depleted. Most causes of stock declines can be ascribed to climate changes and overfishing. Stocks in declining or depleted conditions require prompt, appropriate management actions, perhaps including ecosystem approaches. This session invites papers that examine: (1) major factors responsible for the status of fish stocks, particularly those that are decreasing or depleted; (2) limits to traditional fishery

management measures to address causes of stock declines; (3) new perspectives on fishery management that promote sustainable fishery management from an ecosystem perspective; and (4) case studies of rebuilding plans for depleted stocks – their successes and failures. Manuscripts contributed to this session will be considered for publication in the journal *Fisheries Research* following peer-review. Submission deadline of manuscripts is November 30, 2007.

Recommended convenors: Yukimasa Ishida (Japan), Gordon H. Kruse (U.S.A.), Ted Perry (Canada), Vladimir I. Radchenko (Russia) and Chang-Ik Zhang (Korea).

FIS Endnote 4

Proposal for 1-day FIS/CCCC/BIO Topic Session at PICES XVI on “*Fisheries interactions and local ecology*”

Ecosystem models are often employed to evaluate the effects of fishing and to distinguish natural variability from human impacts. These models typically operate at large spatial and temporal scales, which are appropriate for their goals and objectives. However, these models would benefit from better information on local-scale processes as there are likely to be bottlenecks at short time scales and small spatial scales that are critical to understanding recruitment variability. Similarly, there may be critical foraging interactions that happen at local scales, particularly for central place foragers such as marine mammals and seabirds. Small-scale effects of fishing such as “localized depletion” may have ecosystem-level consequences. More information on local-scale survival, foraging, movement, reproduction and

pelagic habitat selection would allow food-web and population dynamics modelers to make better scenarios of the effects of natural variability and/or fishing on ecosystems. Papers are solicited on the following topics: (1) current ecosystem models and the assumptions that require further research; (2) techniques for assessing climate impacts on predator-prey interactions at top trophic levels; (3) techniques for assessing local-scale dynamics of survival, foraging, movement, reproduction and pelagic habitat selection; and (4) techniques for assessing prey field response to fishing.

Recommended convenors: Kerim Y. Aydin (U.S.A.), Jason Link (U.S.A.) Elizabeth A. Logerwell (U.S.A.) and an Asian scientist (TBD).

FIS Endnote 5**Proposal for 1-day FIS workshop at PICES XVI on
“Methods for standardizing trawl surveys to ensure constant catchability”**

Standardization in the gear and methodology used to conduct pelagic and bottom trawl surveys is essential for a correct interpretation of catch per unit effort as a measure of relative abundance. In the United States, standardization problems stemming from inaccurate measurement of the towing warps on a NOAA survey vessel resulted in a thorough review of standardization methodology and the development of the National Bottom Trawl Survey Protocols (<http://spo.nmfs.noaa.gov/tm/tm65.pdf>) governing the operation of all NOAA-sponsored surveys. Subsequently, ICES formed the Study Group on *Trawl Survey Standardization* to examine the same issue for ICES-sponsored multinational surveys, and to formulate a similar set of standardized operating protocols expected to be published in the fall of

2007. The proposed workshop will review the various pelagic and bottom trawl surveys conducted by PICES member countries, with a focus on the operational protocols used to ensure that survey catchability remains constant over time. Topics to be discussed likely would include a consideration of various instruments to monitor trawl performance, such as acoustic trawl measurement systems, bottom contact sensors and speed through water sensors, as well as trawl design and operation procedures that allow trawl catchability to be robust to environmental variation.

Recommended convenors: David A. Somerton (U.S.A.), Greg Workman (Canada) and Jin-Yeong Kim (Korea).

