FIS Committee Action Plan (2012-2015)

Mission

The FIS Committee's area mission is to promote and coordinate fisheries science and interdisciplinary research in the northern North Pacific. This includes biology and ecology of living resources, particularly those that are subject to harvest or have the potential to be harvested.

Specific topics of interest to the FIS committee include:

- Taxonomy;
- Genetics;
- Behaviour;
- Diet and trophic relationships;
- Habitat;
- Distribution;
- Abundance;
- Ecology;
- Population dynamics;
- Regimes and global warming;
- Ecosystem dynamics;
- Aquaculture and ocean ranching; and
- Methods for stock assessment.

In considering these topics, the FIS committee endeavors to develop new concepts relating to the regulation of fish populations. A common focus is the relationships between human factors, climate, ecosystems, and fishery resources.

Given the connections between humans, climate, and fishery resources, the FIS committee's areas of interest intersect those of the other PICES committees (POC, MEQ, BIO, TCODE, and MONITOR) and PICES FUTURE Advisory Panels (AICE, COVE, and SOFE). This Action Plan endeavors to reflect these connections, as well as the PICES Strategic Plan, as revised in 2011.

Strategy of the FIS Committee

To implement its mission, the FIS Committee will address each of the five central themes of the PICES Strategy: (A) Advancing scientific knowledge; (B) Applying scientific knowledge; (C) Fostering partnerships; (D) Developing capacity; and (E) Ensuring a progressive organization. Specific goals, actions and tasks within each of these themes are as follows.

Theme A *Advance scientific knowledge*

Goal 1. Understand the functioning, resilience, and vulnerability of marine ecosystems.

Action 1.1 Improve our understanding of North Pacific ecology.

- **Task 1.1.1** Convene a session on "Global (or North Pacific) synchrony in fish population variations" perhaps in cooperation with ICES.
- **Task 1.1.2** Convene a series of scientific sessions that examine the roles of bottom-up, top- down, and middle-out controls of marine ecosystems of the North Pacific.
- **Task 1.1.3** Convene a series of scientific sessions that examine the roles of various functional groups (e.g., sessile benthic invertebrates, small pelagic fishes, large predators).
- **Task 1.1.4** Convene a series of scientific sessions on the biology of fish and invertebrate species of mutual interest to PICES countries.
- **Task 1.1.5** Convene a scientific session or workshop on the mechanisms of recruitment variation in populations of commercially valuable organisms.
- **Task 1.1.6** Convene annual FIS Contributed Paper sessions to foster information exchange on a diversity of fisheries topics.

Action 1.2 Improve our understanding of ecosystem function and resilience.

- **Task 1.2.1** Convene a scientific session on comparative analyses of ecosystems using retrospective analyses and other methods.
- **Task 1.2.2** Convene workshops or scientific sessions on identifying those systems or species for which fishing is a major factor and those species for which climate is a major factor in the regulation of fish stocks.
- **Task 1.2.3** Convene a scientific session or workshop on potential threshold responses and trophic cascades of ecosystems due to the combination of anthropogenic forcing and natural variability.
- **Task 1.2.4** Convene a scientific session or workshop on methods to characterize ecosystem resilience and vulnerability to natural and anthropogenic forcing with the goal of understanding how to make these concepts operational for research.

Goal 2. Understand and quantify how marine ecosystems respond to human activities and natural forcing.

Action 2.1 Evaluate and increase the knowledge and forecasts of climate effects on marine ecosystems of the North Pacific.

- **Task 2.1.1** Form a working group to develop indices of fish productivity that help to interpret ocean and climate effects. Include common species to contrast basin-scale responses.
- **Task 2.1.2** Convene a scientific session or workshop on current understanding of fish ecology parameters necessary for ecosystem models built to understand climate impacts on ecosystems (such as Ecopath w/Ecosim; Fish IBM; coupled biophysical ecosystem models; spatially explicit stock projection models; bio-climatic envelope models and vulnerability assessments)
- **Task 2.1.3** Convene a scientific session on whether different species, and/or regional ecosystems, respond in phase or with time lags to changes in the ocean environment.
- **Task 2.1.4** Evaluate the impacts of climate change on species range expansions and/or contractions as they alter predator-prey relationships and habitat use patterns.
- **Task 2.1.5** Evaluate the resilience of species to fishing under climate variability and climate change.
- **Task 2.1.6** Evaluate the effects ocean acidification on species' reproduction, growth and mortality to gauge their resilience to increasing levels of carbon dioxide in the North Pacific Ocean.

Action 2.2 Evaluate potential impacts of humans on marine ecosystems of the North Pacific.

- **Task 2.2.1** Convene a scientific session on impacts of bottom trawling on benthic communities and ecosystems.
- **Task 2.2.2** Form a working group or conduct a workshop to document levels of fishery bycatch and discards in the North Pacific.
- **Task 2.2.3** Convene a series of scientific sessions that consider other direct and indirect effects of fishing (such as genetic selection and loss of genetic diversity, truncation of size/age distributions, alteration of predator-prey relationships, biological interactions between wild and hatchery fish,) and how marine ecosystems and dependent communities have been affected by these changes.
- **Task 2.2.4** Convene a working group to document cases of NIS introductions in PICES countries and to evaluate studies of their ecosystem effects.
- **Task 2.2.5** Convene a PICES-ICES symposium on approaches to assessing environmental risk in association with aquaculture activities.
- **Task 2.2.6** Convene a workshop that would produce a report on current aquaculture activities in PICES and the benefits of incorporating aquaculture science into PICES. Depending on the outcome of this workshop, convene a series of workshops on gaps, challenges and solutions to more effectively incorporate aquaculture science in PICES.
- **Task 2.2.7** Convene a session or workshop on the development and application of models for carrying capacity (including environmental impacts, disease transmission, etc.) to mariculture.
- **Task 2.2.8** Convene a scientific session or workshop on how impacts of energy development (e.g., oil and gas, wind and wave energy) might change future coastal marine ecosystems and societies.
- **Task 2.2.9** Convene a scientific session or workshop on the use of marine spatial planning to manage multiple human uses of coastal marine ecosystems (e.g., fishing, oil and gas development, wave energy, shipping, recreation).

Action 2.3 Develop and evaluate potential approaches toward mitigating effects of fishing on marine ecosystems.

- **Task 2.3.1** Convene a session on wild fish stock and habitat rehabilitation and enhancement methods, successes and failures.
- **Task 2.3.2** Form a working group or conduct a workshop to compare stock rebuilding program in each member countries and develop cooperative work among their programs.

Action 2.4 Assess the degree to which marine resources are robust to human uses and vice versa.

- **Task 2.4.1** Convene a topic session on the resilience and vulnerability of fish stocks and marine ecosystems to fishing and natural variability.
- **Task 2.4.2** Convene a topic session to compare how societies have adapted to ecosystem changes and changes in management procedures.
- **Task 2.4.3** Convene a series of sessions or a workshop/working group to develop risk-based ecological assessments for major fisheries that project future states, their implications, and uncertainties.
- **Task 2.4.4** Convene a theme session/ workshop to discuss how the results of ecological assessments can be communicated to policy makers, managers and society.

Theme B *Applying scientific knowledge*

Goal 3. Provide scientific advice pertinent to North Pacific ecosystems.

Action 3.1 In cooperation with the MEQ Committee, develop the scientific basis for an ecosystem approach to fisheries management, including assessments and the provision of scientific advice. Specifically, the following activities are needed:

- **Task 3.1.1** Convene a series of scientific sessions that consider ecosystem features, such as ecosystem carrying capacity and mechanisms for stability and disturbance.
- **Task 3.1.2** Continue and expand the development of ecosystem models, such as Atlantis, that incorporate bio-economics, industry, and monitoring as part of the system in a holistic manner**.**
- **Task 3.1.3** Convene a topic session on the utility of multispecies and ecosystem models to conduct management strategy evaluations.
- **Task 3.1.4** Hold a series of symposia on progress and new developments in the science of ecosystem-based fisheries management.

Action 3.2 Improve the understanding and application of alternative stock assessment techniques and harvest strategies and their utility for fishery management approaches.

- **Task 3.2.1** Conduct a workshop to review the fisheries management approaches and techniques, including ABC and TAC management, employed by each PICES country.
- **Task 3.2.2** Explore the incorporation of ecosystem approaches or considerations into explicit fishery management advice on reference points, catch levels, area closures, fishing seasons and gear use.

Goal 4. Ensure that PICES products are relevant, timely, and broadly accessible.

Action 4.1 Publish products related to implementation of FUTURE Science Plan and ongoing FIS activities.

- **Task 4.1.1** Routinely publish products of FIS activities, such as papers from FIS topic sessions in special issues of peer-reviewed journals, working group reports, and fishery status reports, outlooks and forecasts.

Action 4.2 Link published products to the PICES website.

- **Task 4.2.1** Provide web links with information on recent publications, such as journal articles published after presentation in PICES sessions.

Theme C. *Foster partnerships*

Goal 5. Collaborate with organizations and scientific programs relevant to PICES.

Action 5.1 Develop formal linkages with ICES, NPAFC, IPHC and other organizations on fishery areas of common interest.

- **Task 5.1.1** Periodically sponsor PICES scientists to join organizing committees and to give presentations in international symposia of mutual interest to PICES.
- **Task 5.1.2** Invite scientists from other international organizations to participate in PICES FIS-sponsored scientific sessions on topics of mutual interest for the North Pacific and North Atlantic.
- **Task 5.1.3** Formalize PICES participation on symposia held by other organizations, such as ICES, NPAFC, IPHC, and others.

Task 5.1.4 Post announcements about upcoming international fisheries symposia on the FIS website.

Goal 6. Strengthen communication and engagement with users of PICES scientific products.

Action 6.1 Develop outreach to local coastal communities.

Task 6.1.1 Convene a workshop to identify issues of interest to users and effective mechanisms for communicating FUTURE products to local communities.

Task 6.1.2 Convene a topic session or workshop on methods for incorporating local knowledge into ecosystem status reports and outlooks.

Task 6.1.3 Develop a proposal to implement outreach activities identified in Task 6.1.2 and seek funding.

Theme D. *Develop capacity*

Goal 7. Advance methods and tools to improve and enhance scientific activities.

Action 7.1 Develop new tools to expand historical records of variability in North Pacific climate and biota.

Task 7.1.1 Hold a scientific session or workshop to explore alternative methods to derive historical records of North Pacific climate conditions, including chemical analysis of calcified structures such as fish otoliths and corals.

Task 7.1.2 Convene scientific sessions that evaluate the utility of archaeological sites and paleo-proxies to reconstruct historical ecosystems.

Action 7.2 Improve the understanding of alternative stock assessment techniques and harvest strategies and their utility for fishery management approaches.

Task 7.2.1 Conduct a workshop or topic session to review scientific knowledge of fisheries management techniques including stock assessment methods, survey design and sampling methods, and ABC and TAC management.

Task 7.2.2 Convene a workshop or topic session on procedures for conducting management strategy evaluations.

Task 7.2.3 Conduct an instructional workshop or summer school to review methods for quantitative stock assessment of exploited fish stocks for application in Asian PICES member countries.

Action 7.3 Improve the methods and approaches available to study the biology and ecology of fishes and invertebrates in the North Pacific.

Task 7.3.1 Conduct workshops and scientific sessions on new methods and technologies to study fish population genetics, age, growth, feeding, mortality, reproduction (i.e., fecundity, maturity and maternal effects) and movement in the North Pacific.

Task 7.3.2 Convene topic sessions on new acoustic, optical, and other techniques to estimate fish abundance and species composition.

Task 7.3.3 Conduct workshops and scientific sessions on new methods and technologies to study ecosystems, including development of size-based models, applications of satellite-derived information to fisheries management approaches, and other novel approaches.

Goal 8. Foster collaboration among scientists within PICES.

Action 8.1 Improve opportunities for early career scientists.

Task 8.1.1 Add links to the FIS website announcing graduate student opportunities in PICES-member countries.

Task 8.1.2 Maintain FIS Contributed Paper sessions at all PICES Annual Meetings to foster early career scientist participation in PICES.

Task 8.1.3 Continue to sponsor and promote PICES/ICES early career scientists symposia.

Action 8.2 Improve participation of all member countries in FIS activities.

Task 8.2.1 Select topics for scientific sessions and working groups of broad interest among all PICES-member countries and maintain broad representation among co-conveners.

Action 8.3 Facilitate data synthesis and comparison among PICES-member country scientists.

Task 8.3.1 Convene a workshop on the status and governance of fisheries-related data in each member country.

Goal 9. Create education and training opportunities.

Theme E. *Ensure a progressive organization*

Goal 10. Provide an effective infrastructure to support PICES activities.

Action 10.1 Create and oversee expert groups to support FUTURE and other scientific activities.

Task 10.1.1 Make recommendations to the Science Board on the establishment of new expert groups to support FUTURE and other scientific activities.

Task 10.1.2 Delegate representatives as members of the FUTURE Advisory Panels to effectively communicate with the FUTURE Advisory Panels.

Task 10.1.3 Oversee and coordinate the activities of the daughter expert groups through communication with the FUTURE Advisory Panels.