

REPORT OF MARINE ENVIRONMENTAL QUALITY COMMITTEE

The meeting of the Marine Environmental Quality Committee (MEQ) was held from 16:00–19:50 hours on October 29, 2008 in Dalian, China. The Chairman, Dr. Glen S. Jamieson, called the meeting to order and welcomed the participants and observers (*MEQ Endnote 1*). Representation was present from all member countries, with eight of 16 Committee members present. The Committee reviewed the draft agenda (*MEQ Endnote 2*), and it was adopted. Dr. Steve Rumrill served as rapporteur.

AGENDA ITEM 3

Implementation of PICES XVI decisions

There were no pressing issues pending for the Committee from last year's Annual Meeting (PICES XVI) in Victoria, Canada. The Chairman briefly summarized the report of the inter-sessional Science Board meeting (April 2008, Seattle, U.S.A.).

AGENDA ITEM 3

Membership and chairmanship of MEQ

There continues to be an overall issue of having full participation in MEQ by all PICES member countries. At this meeting, only 50% of MEQ members were in attendance.

AGENDA ITEMS 3, 4 AND 5

Progress reports of MEQ subsidiary bodies

Section on *Ecology of Harmful Algal Blooms in the North Pacific* (HAB-S)

Dr. Vera Trainer, HAB-S Co-Chairman, reported on the results of their workshop and laboratory demonstrations (W1) on “*Review of selected harmful algae in the PICES Region: IV. Karenia and Prorocentrum*”; MEQ Topic Session (S3) on “*Species succession and long-term data set analysis pertaining to harmful algal blooms*”, and the HAB-S business meeting convened at PICES XVII. Summaries of the workshop and session can be found in the *Session Summaries* chapter of the PICES 2008 Annual Report.

Several new focus people have been suggested as primary contacts for HAE-DAT entry for their countries. This is necessary due to changes in key people responsible for HAB data in these countries: Akira Ishikawa (Japan) and Weol-Ae Lin (Korea). It was requested that the respective PICES member countries consider appointing these new people to become HAB-S members (or at least be added to the HAB-S e-mail list).

Dr. Trainer indicated that the goal to combine the summaries of Reviews of Important Harmful Algae in a PICES special report is withdrawn, and plans now are to publish them on the web (possibly jointly with IOC), to be completed in approximately 2010–2011. See the full HAB-S report elsewhere in the Annual Report.

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

Dr. Glen Jamieson, WG 19 Co-Chairman, reported on the activities of the Working Group, both at this meeting and at the inter-sessional meeting held February 21–22, 2008 in Seattle, U.S.A. WG 19 held its final meeting on October 26, 2008, in Dalian, China, under the co-chairmanship of Drs. Jamieson, Chang-Ik Zhang, and Ms. Patricia Livingston. The list of participants and the meeting agenda can be found in the complete report of the WG 19 (*WG 19 Endnotes 1 and 2*) elsewhere in the PICES 2008 Annual Report.

Discussion primarily involved of the completeness of the final report and the recommendations of the Working Group. Status of the brochure was also discussed. The Working Group went over the different sections of the report and developed a work plan to complete the report by the end of 2008.

WG 19 debated on the format and wording of a brochure. A figure depicting the differences between single sector management, ecosystem-based fishery management and multisector integrated management was suggested, and the Working Group agreed that the term EBM was to be consistently used throughout the brochure, although some mention could be made of the other terms that are in use. There was support for translating the brochure into each of the languages of PICES member countries and making those available on the PICES website. The Working Group also suggested obtaining the perspectives and recommendations of the Study Group on *Communication* about this brochure. Members were tasked with looking at the various brochure sections and providing edited text.

WG 19 discussed the relationship of a new expert group, PULSE (see *WG 19 Endnote 3*), to other potential expert groups of FUTURE and nominated more members. The proposed Study Group on *Indicators of Human Well-being: Benefits and Health* was also discussed (see WG 19 report, Agenda Item 4). The Working Group recommended that the convenors of the S12 Topic Session on “*Connecting the human and natural dimensions of marine ecosystems and methods to mitigate the effects*” bring up this proposed group in the discussion part of their session.

WG 19 received information of the development of a Regional Fisheries Management Organization (RFMO) devoted to international waters in the North Pacific, and a joint Convention on Biological Diversity-International Union for Conservation of Nature (CBD-IUCN) effort that are both considering looking at the application of criteria for designating vulnerable marine ecosystems (VMEs) in North Pacific international waters (see WG 19 report, Agenda Item 5 for further details). The Working Group did not have any comment about a possible PICES role but did agree that species do not recognize national borders and that effective EBM must ultimately extend to international waters. The proposed designation of VMEs in international waters would be a necessary step in the long-term achievement of EBM in the entire North Pacific.

MEQ believes that PICES has the scientific expertise and capacity to evaluate the appropriateness of criteria relevant to determination of VMEs in the North Pacific and to evaluate the adequacy of the information available to apply the criteria. The Committee recommended that this background and observation be presented to Science Board for their consideration of PICES holding a proposed meeting to address the criteria in spring 2009.

Working Group on *Non-indigenous Aquatic Species* (WG 21)

Ms. Darlene Smith, WG 21 Chairman, reported on the third meeting of the Working Group. As part of the initiative funded by Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan, through the Fisheries Agency of Japan, WG 21 held a 4-day Rapid Assessment Survey (RAS) in Dalian on September 20–23, 2008 immediately prior to their Working Group meeting to assess the presence of non-indigenous species. This RAS was led by Dr. Thomas Therriault, with Dr. Lijun Wang (National Marine Environmental Monitoring Center, SOA) as the local organizer. Results of the survey were presented at the Working Group meeting by Dr. Toshio Furota (*WG 21 Endnote 3*).

WG 21 then met on October 24–25, 2008, with 14 WG participants and 9 observers. Given the refocusing of WG 21's work on the two MAFF-funded projects (see WG 21 report elsewhere in the PICES 2008 Annual Report), WG 21 reviewed its current terms of reference and proposed revisions to them to reflect content and duration of the activities under these projects. Progress and details of the MAFF-funded Non-indigenous Species Data Base being developed by Drs. Henry Lee II and Deborah Reusser was described and discussed. It involves the development and population of a database of marine/estuarine species that can be queried for distributional, ecological, and physiological data at different taxonomic levels and spatial distributions.

Judith Pederson presented information on the 6th International Conference on “Marine bioinvasions” to be held August 24-29, 2009 in Portland, Oregon, U.S.A. The conference is entitled “*Marine bioinvaders: Agents of change in a changing world*”. The conference organizers are seeking financial support from PICES, and PICES support was recommended by the MEQ if an active WG 21 member would be appointed to the conference’s science committee. Dr. Thomas Therriault volunteered to serve as this member. Dr. Yoon Lee (Korea) is already a member of the conference’s science committee.

AGENDA ITEM 6

New PICES integrative science program, FUTURE

The Committee, again, had a good discussion of the next integrative science program of PICES and, overall, endorsed the direction as outlined in the latest draft of FUTURE. Members also found that the direction of FUTURE is well aligned with the objectives of MEQ. MEQ, however, stressed the importance of having existing Committees better linked to FUTURE than they were to CCCC, and that members of every Committee should be on FUTURE’s guiding committee; and expressed some concerns about the impact such a large ambitious program might have on PICES’ capacity to do other activities, stressing the need for integration and the need for a clear initial focus.

AGENDA ITEM 8

2008 MEQ Best Presentation and Poster awards

The MEQ Best Presentation award was given to Shang Chen (First Institute of Oceanography, Qingdao, China) for the paper (co-authored by Jian Liu, Tao Xia and Qixiang Wang) entitled “*Change of ecosystem services of the Yellow River Delta Wetland, China*” presented at the MEQ Topic Session (S12) on “*Connecting the human and natural dimensions of marine ecosystems and marine management in the PICES context*”.

The MEQ Best Poster award was given to Yubo Liang (National Marine Environmental Monitoring Center, SOA, Dalian, China for the paper (co-authored by Dongmei Li, Sa Sliu, Xingbo Wang, Tao Song, Xing Miao, Guanhua Chen and Guize Liu) entitled “*Spatial distribution of *Perkinsus olseni* in the Manila clam *Ruditapes philippinarum* along Chinese coast*” from the MEQ/FIS Topic Session (S5) on “*Mariculture technology and husbandry for alternate and developing culture species*”.

AGENDA ITEM 7

Proposals for new subsidiary bodies

a. Proposal for a Working Group on *Environmental Interactions of Marine Aquaculture (EIMA)*

Proposed Working Group chairs and other interested parties met on October 28 and 29, 2008 in Dalian, China. This meeting was attended by members from Canada, Japan, Korea, Russia and the United States of America. As these were *ad hoc* meetings, there was no formal agenda. Discussions are summarised in *MEQ Endnote 3*, which includes the proposed Terms of Reference. The report was also given to FIS. MEQ supported the proposal presented for the Working Group and recommended its establishment. The Committee noted that the issue of marine aquaculture continues to be of great interest to all PICES member countries.

The summary of MEQ/FIS Topic Session (S5) on “*Mariculture technology and husbandry for alternate and developing culture species*” can be found in the Session Summaries chapter of the PICES 2008 Annual Report.

b. Proposal for a Study Group on *Indicators of Human Well-Being: Benefits and Health*

WG 19 proposed (see WG 19 report elsewhere in the PICES 2008 Annual Report) that because socio-economic issues seem to be integral to the activities of so many Working Groups, establishment of a Study Group on *Indicators of Human Well-Being: Benefits and Health* under Science Board is recommended.

MEQ-2008

MEQ also considered advice on the structure and content of future North Pacific Ecosystem Status Reports, and specifically the inclusion of EBM-related topics in status reports. An incremental version of NPESR is being recommended by Science Board, and the Committee agreed that enhanced information on pollution and socio-economics should be considered for inclusion. The Committee discussed the need to identify key pressures in each region, and how indicators on status and trends describing human well-being should be determined, and concluded that further review on these topics is needed. The Committee recommends the establishment of a PICES Study Group on “*Indicators of Human Well-Being: Benefits and Health*” to assist in this effort. Terms of Reference suggested by WG 19 are provided in *MEQ Endnote 4*. Criteria for nomination of membership, if the Study Group is approved, are suggested to be qualified social scientists, primarily those with strong economics background, with understanding of natural science, particularly marine science, who are working on questions relating to marine ecosystem approaches and management issues (*MEQ Endnote 4*).

AGENDA ITEM 9

Proposals for Topic Sessions and workshops at PICES-2009

The Committee proposes that the following Topic Sessions and workshops to be convened at PICES-2009:

- a ½-day MEQ Topic Session on “*Mitigation of harmful algal blooms*” (*HAB-S Endnote 5*);
- a ½-day MEQ Topic Session on “*The role of submerged aquatic vegetation in the context of climate change*” (*MEQ Endnote 5*);
- a 1-day MEQ/FIS Topic Session on “*Marine spatial planning in support of integrated management – tools, methods, and approaches*” (*MEQ Endnote 6*);
- a ½-day MEQ workshop on “*Cyst forming HAB species*” [later renamed to “*Review of selected harmful algae in the PICES region: V. cyst forming HAB species*”] preceded by a 1-day laboratory demonstration (*HAB-S Endnote 4*);
- a 1-day MEQ/FIS Workshop on “*Advanced aquaculture strategies and technologies and interactions between aquaculture activity and environment*” [later renamed as “*Interactions between aquaculture and marine eco-systems*”].

AGENDA ITEM 10

Theme for PICES-2010

No suggestions were presented.

AGENDA ITEM 11

Relations with other international programs and organizations

- MEQ recommended that PICES co-sponsor, with ICES and FAO, the Lowell Wakefield Symposium on “*Ecosystems 2010: Global progress on ecosystem-based fisheries management*” in consideration of it being an international topic and of substantial interest to PICES;
- presentation was made by Dr. Ruduolf Wu, representing GESAMP (Group of Experts on Scientific Aspects of Marine Environmental Protection), on potential areas for collaboration with PICES.

AGENDA ITEM 12

Items with financial implications

Proposed inter-sessional meetings

The following inter-sessional meetings were endorsed by MEQ:

- 6th International Conference on “*Marine bioinvasions*” (co-sponsored by ICES, PICES, U.S. National Sea Grant College Program, Pacific States Marine Fisheries Commission and Portland State University), August 24–27, 2009, Portland, U.S.A.;
- 26th Lowell Wakefield Symposium on “*Ecosystems 2010: Global progress on ecosystem-based fisheries management*” (primary sponsor: Alaska Sea Grant; co-sponsored by PICES), spring or fall 2010, Anchorage, U.S.A.

Proposed publications

The following publications, discussed at last year’s PICES Annual Meeting, are still proposed but are now expected to be published in 2008–2009:

- a final report of Working Group on *Ecosystem-based Management Science and its Application to the North Pacific* (WG 19) in the PICES Scientific Report series (2009);
- a WG 19 brochure on ecosystem-based management (2009) in a format similar to the FERRRS Advisory Report brochure.

Travel requests

- Invited speakers (up to \$10,000) from the Pacific and early career scientists from PICES member countries to attend the 6th International Conference on “*Marine bioinvasions*”, August 24–27, 2009, Portland, U.S.A.;
- 2 non-American PICES members to co-convene the 26th Lowell Wakefield Symposium on “*Ecosystems 2010: Global progress on ecosystem-based fisheries management*”, spring or fall, 2010, Anchorage, U.S.A.;
- 1 invited speaker for the MEQ Workshop on “*Review of selected harmful algae in the PICES region: V. Cyst forming HAB species*” at PICES-2009;
- 1 invited speaker for the MEQ/FIS Workshop on “*Interactions between aquaculture activity and environment*” at PICES-2009.

MEQ Endnote 1

MEQ participation list

Members

Chuanlin Huo (China)
 Glen Jamieson (Canada, Chairman)
 Hak-Gyoon Kim (Korea)
 Kunio Kohata (Japan)
 Olga Lukyanova (Russia)
 Steve Rumrill (U.S.A.)
 Darlene Smith (Canada)
 Yasunori Watanabe (Japan)

Observers

Katsuyuki Abo (Japan)
 Kevin Amos (U.S.A.)

Ingrid Burgetz (Canada)
 David Fluharty (U.S.A.)
 Graham Gillespie (Canada)
 Yoichiro Ishibashi (Japan)
 Masaa Katoh (Japan)
 Du Niu (China)
 Jeung Sook Park (NOWPAP)
 Jake Rice (Canada)
 Peter Ross (Canada)
 Tatyana Semenova (Russia)
 Gongke Tan (China)
 Tom Therriault (Canada)
 Vera Trainer (U.S.A.)
 Mark Wells (U.S.A.)
 Ruduolf Wu (GESAMP)

MEQ Endnote 2

MEQ meeting agenda

1. Welcome and introductions.
2. Approval of agenda.
3. Progress report of the MEQ Section on *Ecology of harmful algal blooms in the North Pacific and HAB activities related to "Development of the prevention system for harmful organism's expansion in the Pacific Rim"* supported by a special fund from the Government of Japan" [Trainer]
4. Progress report of MEQ/FIS WG 19 on *Ecosystem-based management science and its application to the North Pacific* [Jamieson]
5. Progress report of MEQ WG 21 on *Non-indigenous Aquatic Species and NIS activities related to "Development of the prevention system for harmful organism's expansion in the Pacific Rim"* supported by a special fund from the Government of Japan" [Smith and Radashevsky]
6. Discussion on the next major PICES scientific program, FUTURE: Roles for MEQ and respective member countries, i.e. MEQ Strategic/Action Plan [Jamieson]
 - a) Task Team on "*PICES Understanding, Linking and Synthesis of Ecosystems*" (PULSE) (Jamieson)
 - b) Support from MEQ for the Identification of Ecologically and Biologically Sensitive Areas in international waters in the North Pacific (Rice)
7. Proposals for new subsidiary bodies (*e.g.*, Working Groups, *etc.*; requires Terms of Reference and list of potential members)
 - a) WG on *Environmental interactions of mariculture (WGEIMA)* (Amos and Burgetz)
 - b) SG on *Indicators of Human Well-being: Benefits and Health (SGHWB)* (Jamieson)
8. 2008 MEQ Best Presentation and Poster awards
9. Proposals for Topic Sessions and workshops at PICES-2009 in Korea (Jeju Island)
10. Suggestions for the theme for PICES-2010 in the USA.
11. Relations with other international organizations/programs
12. Items with financial implications
 - a) Proposed inter-sessional meetings for 2009 and beyond
 - b) Proposed publications for 2008 and beyond
 - c) Travel support requests
13. Other business

Note: I would like to remind everyone that Science Board will not be considering unfinished proposals for topic sessions, working groups, or meetings. The minimum requirements for topic sessions at PICES 18 (Jeju Is., Korea), which have to be discussed at our meeting, are:

1. Title
2. Duration
3. Convenors (the names listed have agreed to do this)
4. Description of session

MEQ Endnote 3

**Meeting report for proposed Working Group on
Environmental Interactions of Marine Aquaculture (EIMA)
October 28, 2008**

Meeting summary

1. Introductions and Context. Each meeting participant provided some background as to their personal and their countries' interest in marine aquaculture, and how this may fit within the context of the proposed working group and the terms of reference that were developed in April 2008. Broad descriptions of the type of marine aquaculture and challenges were provided, primarily by Japan and Russia. This was due primarily to limits in the available time and was provided as part of general context and background as to the areas of interest in marine aquaculture science, rather than as part of country-specific reporting. A summary of the information shared is provided as an Annex (EIMA Meeting Annex 2).
2. Discussion on Proposed Terms of Reference: The remainder of the meeting on October 28 focused on the four activities being proposed to the MEQ and FIS committees. The following refinements were made to the terms of reference that were presented at the end of *Session 5: Mariculture technology and husbandry for alternate and developing culture species*.
 - a. Term of Reference 1: *Inventory* and evaluate current approaches of PICES members to assess and model aquaculture- environment interactions.
Although the first proposed activity under this TOR was to list types of aquaculture and culture technologies, it was felt that expanding the overall TOR to include an inventory provided additional clarity as well as the possibility of a useful additional deliverable.
 - b. Term of Reference 2: For clarification, included wording to specify the application of scientific methods for risk assessment methodologies and their application in PICES member countries.
 - c. Term of Reference 3: no substantive changes or additions.
 - d. Term of Reference 4: The importance of linking to other existing PICES working groups was added to this activity. As there is an abundance of expertise in oceanographic modeling which will be critical to include as part of the first term of reference in relation to aquaculture activities, there is the possibility of linking to activities already underway. Additionally, there are linkages to WG-21 (*Non-indigenous species*) and WG-19 (*Ecosystem Based Management Science*) and the FUTURE Science program.
3. As part of a general discussion regarding next steps, the possibility of putting in a request for a session or workshop at the next PICES meeting was considered, as was the utility of site tours of marine aquaculture facilities.
4. On October 29, a brief meeting was convened to discuss the proposal developed by Hyun-Jeong Lim (Republic of Korea) for a workshop "*Advanced aquaculture strategies and technologies and its effects (interactions between aquaculture activity and environment)*". The participants at this impromptu meeting concluded that the proposal that had been developed was of interest to the group and would be useful in advance of the PICES XVIII meeting in Korea next year.

EIMA Meeting Annex 1**EIMA meeting participants**

Katsuyuki Abo (Japan)
Kevin Amos (U.S.A.)
Ingrid Burgetz (Canada)
Marsha Gear (U.S.A.)
Toyomitsu Horii (Japan)
Hyun-Jeong Lim (Korea)
Olga Lukyanova (Russia)

EIMA Meeting Annex 2

Context, opportunities and interests in marine aquaculture science

Some information was shared as part of the introductory discussion on the type of marine aquaculture that is currently being practiced in some regions as well as the future directions for the industry in these regions. Although the information that was shared was not meant as a complete overview of the industry within any given country, it does provide useful information on the background and areas of interest that could be built on as part of any future EIMA working group.

As such, the information captured below may be considered for use as a starting point for any future country-specific descriptions. **The information is not meant to be comprehensive nor did each representative at the meeting provide background information of this sort.**

Japan

Marine aquaculture in Japan is primarily comprised of small, hereditary, family businesses located in areas with very low water exchange and in close proximity to other aquaculture activities (e.g., very intensive). Increasingly, there is a shift to open ocean farming of higher-value fish (e.g., tuna), which will require both a shift in practices from small family businesses and a concurrent application of environmental models to guide placement of new activities.

For both the current and future marine aquaculture activities require the identification of good indicators that can be used to monitor the environment and provide a baseline for environmental improvements. There is also a need for the identification of the factors that are most important prior to application of models for expansion into new areas.

Another area of interest is the use of marine aquaculture for stock enhancement activities, although it was recognized that this area of activity requires different approaches and models than for

Russia

Marine aquaculture production is being undertaken along the coastal areas of the Japan Sea. Currently, there is interest in the development of aquaculture in this region beyond the limited production that is currently taking place.

In the coming years, aquaculture research studies will be focusing on efficient technologies for growing invertebrates and salmons, disease challenges, ecological aspects (carrying capacity for different trophic groupings) and risk assessment for mariculture activities.

United States of America

Under the new aquaculture program at the NOAA Fisheries Service, there is increased interest in scientific information related to the interactions between aquaculture activities and the environment. As well, there are research programs and projects focusing on disease challenges, enhancement activities and on-land aquaculture are being funded.

DRAFT 6 – 10/28/08

**DRAFT PICES Action Plan to form a Working Group on
*Environmental Interactions of Marine Aquaculture - EIMA***

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

Mission statement

Develop standard methods and tools to assess and compare the environmental interactions and characteristics of existing and planned marine aquaculture activities in PICES member countries.

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 working groups 19 (*Ecosystem Based Management Science*) and 21 (*Non-indigenous Species*), and two ICES groups (Working group on Environmental Interactions of Marine Aquaculture and Working Group on Pathology and Diseases of Marine Organisms).

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 prioritize 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.
 - b) Review the scientific literature to ascertain if these possible interactions have been determined to be significant.
 - c) Identify methodologies used to predict the effects of these interactions and the history/uncertainty associated with these predictions.
 - d) 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. Review and assess current, risk assessment methods used to assess environmental interactions of aquaculture and determine what, if anything, should be changed for application in PICES countries to reflect ecosystem-specific aspects. Following the review and assessment, identify appropriate 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 “c)” 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), Stewart Johnson (3), Jon Chamberlain (1), Nick Mandrak (2)
Graham Gillespie (2), Dario Stucchi (1) Edward Black (2)
Japan – Toyomitsu Horii (2), Tatamiji Yamamoto (1), Michio Kishi (1) (Pathologist?)
Korea – Hyun Jeong Lim (2), Oh Hyun Taik (1) Myung Ae Park (3)
Russia – Valery E. Terekhova (3), Galina S.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

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

MEQ Endnote 4

**Proposed Terms of Reference for a new Study Group on
“Indicators of Human Well-Being: Benefits and Health”**

1. Identify potential indicators of human-well being and human impacts in relation to PICES marine ecosystem status and trends. Evaluate the Millennium Ecosystem Report Indicators for their appropriateness
2. How might these measures be quantified and standardized across member countries? Are the data available to quantify these?
3. How can these measures be used in ecosystem models and management strategy evaluation frameworks?
4. Identify longer-term issues that might be covered by a working group on this topic (governance structures for implementation, *etc.*).

Suggested Co-Chairs: Makino Mitsutaku (Japan) and David Fluharty (U.S.A.)

Suggested members:

Shang Chen (China)
Keith Criddle (U.S.A.)
Dohoon Kim (Korea)
Olga Lukyanova (Russia)
Ian Perry (Canada)
Chang Seung (U.S.A.)
TBD (Japan)

MEQ Endnote 5

**Proposal for a ½-day MEQ Topic Session at PICES-2009 on
*“The role of submerged aquatic vegetation in the context of climate change”***

This session is to focus on the practical measures utilizing submerged aquatic vegetation (SAV) such as seaweeds and sea grasses in coping with climate change in coastal regions. We would like to discuss immediate and practical SAV measures that mitigate and adapt against global warming and sea level rise. Participants will present work highlighting their ideas on such practical measures against climate change and global warming as well as on other pertinent subjects.

Convenors: Fred Short (U.S.A.), and (2 TBD) and Ik-Kyo Chung (Korea)

MEQ Endnote 6

**Proposal for a 1-day MEQ/FIS Topic Session 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

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 Douvère, Intergovernmental Oceanographic Commission, UNESCO, Paris, France