

## REPORT OF IMPLEMENTATION PANEL ON THE CCCC PROGRAM

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The Executive Committee of the Climate Change and Carrying Capacity Program Implementation Panel (hereafter CCCC-IP/EC) met from 14:00–16:30 hours on October 28, 2007. The meeting was chaired by Drs. Harold P. Batchelder and Michio J. Kishi. The Co-Chairmen welcomed the attendees and after brief introductions of those present (*CCCC Endnote 1*), the agenda was reviewed and adopted with slight modifications (*CCCC Endnote 2*).

### **Business from PICES XV (Agenda Item 3)**

The minutes from PICES XV (October 2006, Yokohama, Japan) were accepted. No other items on-going from last year's meeting required discussion.

### **Review of procedures for Best Presentation Awards and Closing Ceremony**

Awards for CCCC best oral and poster presentations were announced at the Closing Session. The PICES Secretariat provided a list of oral presentations in CCCC-sponsored sessions (Topic Sessions S3 and S5 and CCCC Contributed Paper Session) that were eligible for this award. Drs. Kishi and Batchelder agreed to serve as judges to determine the best CCCC oral presentation. Due to a conflict between the Topic Session S5 and the CCCC Contributed Paper Session (convened by both Co-Chairmen), Dr. Vera Agostini agreed to evaluate the oral presentations from Session S5. Drs. Suam Kim, Agostini, Thomas C. Wainwright and Batchelder agreed to select the CCCC Best Poster Award for PICES XVI. CCCC-IP/EC gave two Best Presentation Awards in 2007; one to Tadanori Fujino (Hokkaido University, Japan) for his presentation on "*Regime shift of mesopelagic fish – Long-term biomass index change of Maurolicus japonicus in the Japan/East Sea*"

(co-authored by Kazushi Miyashita, Yasuma Hiroki, Tsuyoshi Shimura, Shinya Masuda and Tsuneo Goto) in the CCCC Contributed Paper Session, and the second to Motoko R. Kimura (Hokkaido University, Japan) for her presentation on "*A breakdown of habitat isolation among coastal fish by artificial habitat modification*" (co-authored with Hiroyuki Munehara) in the Topic Session S5. Shusaku Kobayashi (Hokkaido University, Japan) won the CCCC Best Poster Award for his paper on "*Brown trout (Salmo trutta) movements between a stream and the sea in Hokkaido, northern Japan*" (co-authored with Takaomi Arai, Kentaro Honda, Yuji Noda and Kazushi Miyashita).

### **Documentation of scientific sessions (Agenda Item 4)**

CCCC-IP/EC discussed responsibilities for documenting CCCC-sponsored scientific sessions and workshops at PICES XVI. Dr. Batchelder reminded the Committee that documentation of scientific sessions and workshops is required from session/workshop convenors. At PICES XVI this responsibility rests with: Mr. Jake Schweigert for the CCCC/FIS Topic Session (S3) on "*Towards ecosystem-based management: Recent developments and successes in multi-species modeling*"; Dr. Kerim Y. Aydin (who delegated responsibility to Dr. Elizabeth A. Logerwell) for the FIS/CCCC/BIO Topic Session (S5) on "*Fisheries interactions and local ecology*", Dr. Batchelder for the CCCC Contributed Paper Session, and Dr. Jacquelynne King for the POC/CCCC workshop (W6) on "*Climate scenarios for ecosystem modeling*". These session and workshop summaries were provided either to Dr. Batchelder or directly to the PICES Secretariat by the end of Friday, November 2, and are included in the *Session Summaries* chapter of this Annual Report.

### Progress reports of Task Team activities (Agenda Item 5)

CCCC-IP/EC received brief oral reports of CCCC Task Team activities from the Co-Chairmen or representatives of MODEL (Conceptual/Theoretical and Modeling Studies Task Team) and CFAME (Climate Forcing and Marine Ecosystem Response Task Team). By November 2, both Task Teams provided written reports with a summary of progress made since PICES XV and recommendations for planned activities for 2008 (for details see MODEL and CFAME reports included elsewhere in this Annual Report).

Items of significance reported for CFAME were:

- An overview of the CFAME inter-sessional workshop (May 2007) on “*Linking climate-forcing mechanisms to indicators of species ecosystem-level changes: A comparative approach*” where an approach was developed to enable comparison of climate forcing variables and mechanisms linking climate and key species in the California Current, Oyashio/Kuroshio, and East China Sea/Yellow Sea ecosystems;
- An overview of the recently completed 2-day workshop (October 26–27, 2007) on “*Climate scenarios for ecosystem modeling*” to develop and facilitate collaborations between CFAME and Working Group 20 on *Evaluations of Climate Change Projections* on forecasting the impacts of climate change (as represented by IPCC projection scenarios) on regional ecosystems and species of the North Pacific (the workshop was well attended, with ca. 50 participants from all PICES member countries);
- An 8-step plan for completing CFAME work in preparation for the conclusion of the CCCC Program following the 2008 PICES Annual Meeting (including workshops highlighted in the next two bullets);
- A proposal for an inter-sessional workshop (April 2008) on “*Linking and visualizing climate forcing and marine ecosystem changes: A comparative approach*” to examine the revisions made in each set of ecosystem mechanism tables for the three selected ecosystems after the 2007 CFAME

workshops, and to review draft versions of the graphic representations of ecosystem mechanisms and climate/ocean scenarios provided by WG-20 prior to the workshop (CFAME Endnote 3);

- A proposal for a 1½-day workshop at PICES XVII on “*Climate scenarios for ecosystem modeling (II)*” to discuss the results from research activities related to applying output from WG 20 regional climate models and IPCC global models to CFAME ecosystem models and present them to the broader PICES community, with an emphasis to leading into FUTURE (CFAME Endnote 4);
- Discussion of the FUTURE Science Plan, with the following key recommendations: (1) to sustain the recent momentum in transitioning from the CCCC Program to FUTURE by supporting projects begun by CFAME and MODEL; (2) to give greater emphasis in FUTURE to ocean acidification, since it is viewed as an emerging and important societal issue; (3) to link FUTURE to a new U.S. activity on “*Comparative Analysis of Marine Ecosystem Organization*” (CAMEO), which has a strong marine resource management focus.

Items of significance reported for MODEL were:

- A new project proposed by Dr. Kishi on “*Bottom-up ecosystem-based management modeling using NEMURO and NEMURO.SAN*” (BUMBAM.NEMURO) to transition existing PICES ecosystem models into management analysis, and also to link NEMURO suite models with management-oriented models such as Ecopath with Ecosim;
- A proposal for a 1-day CCCC/POC Topic Session at PICES XVII on “*Marine system forecast models: Moving forward to the FUTURE*” with focus on multi-disciplinary coupled models designed to forecast marine systems in the PICES region, including both strategic (long-term) and tactical (short-term) forecasts linking across two or more disciplines (MODEL Endnote 3);
- A new PICES project proposed by Dr. Bernard A. Megrey on “*Marine ecosystem model inter-comparisons*” whose goal is quantitative comparison of different

structures and parameterizations of ecosystem models using identical physical forcing (*MODEL Endnote 4*);

- A proposal for a 1-day CCCC/ESSAS workshop at PICES XVII to launch the project on “*Marine ecosystem model inter-comparisons*” (*MODEL Endnote 5*);
- Opportunities for collaborative research under the pan-regional synthesis phase of U.S. GLOBEC and a new U.S. CAMEO initiative.

### **FUTURE Science Plan (Agenda Item 6)**

CCCC IP/EC members reviewed the draft Science Plan (version 4.2) for a new PICES scientific program, FUTURE (Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Ecosystems). There was a general consensus that the direction of the proposed program is good, and that the focus is consistent with past and ongoing activities of the CCCC Program. Two major differences between CCCC and FUTURE are the emphasis on forecasting and on education, communication and outreach in the latter. FUTURE is consistent with the planned activities of MODEL and CFAME, and it is envisioned that the activities of these two Task Teams could easily be transitioned to, or transformed in, some fashion to be a part of the new program. Below are some specific comments on the FUTURE Science Plan that were presented at the Open Forum during PICES XVI:

1. The Science Plan’s generic goals are understanding, forecasting, and communication. The document needs better balance of these three core elements. The present document overemphasizes the forecasting element relative to an apparent underemphasis on understanding and communication.
2. The Executive Summary and text overemphasize “models” as deliverables. Models are a tool to understanding and a means to provide forecasts; the deliverable should be scientific assessments of future conditions through improved understanding of mechanisms and incorporation of those mechanisms into forecast models.
3. Many different types of models are advocated in the current Science Plan—coupled climate–ocean models; coupled biophysical models; management models; ecological models that integrate across disciplines; perhaps socio-economic modeling of potential impacts of climate change scenarios. The emphasis on models of many kinds may require multiple modeling Task Teams, as in some cases the communities of scientists needed to do this modeling are greatly different or have not been previously involved in PICES.
4. Lack of mechanistic understanding of how climate is linked to the biology of key higher trophic level species will limit the ability to estimate impacts on fish from projected future climate scenarios. There should be an increased emphasis in the Science Plan on some short-term achievable goals.
5. The strategy-specific approach table near the end of the plan (retrospective, monitoring, *etc.*) is more appropriate to an Implementation Plan than to a Science Plan. A Science Plan should provide the vision, short- and long-term objectives, and rationale for the projected research that might occur under FUTURE. Details should be deferred to the Implementation Plan. The CCCC IP/EC members suggest deleting this detail from the Science Plan.
6. CFAME suggests that perhaps “ocean acidification” issues might be emphasized more in FUTURE than it is in the present version. It is possible (and even suggested) that changes in ocean acidity may be impacted by source waters, which may be “predictable” from climate projections coupled to regional circulation models. The severity of acidification-related impacts on ocean ecology might therefore be predictable.
7. Focus the early sections of the Science Plan on some of the positives rather than emphasizing the “doom and gloom” aspects of global warming. Global warming might lead to conditions that present new opportunities—perhaps new fisheries or expansions of species into new ranges, which might need scientific advice. The document needs a better balance of positives

- and negatives (although it is likely that negatives will dominate, no matter what).
8. PICES scientific programs should, in general, emphasize “ecosystems”, not just the fish populations within ecosystems. It has been difficult to attract and entrain physical oceanographers into some activities of PICES, perhaps because PICES and the CCCC Program are viewed more as a fish program than as an ecosystem program. The FUTURE Science Plan should maintain an emphasis on climate forcing and its impacts on marine ecosystems, not just on fish.
  9. Many other comments received from the discussions held in the MODEL and CFAME meetings were guidance for implementation rather than Science Plan issues and are not summarized here, but were provided to the FISP Study Group.

#### **Changes in CCCC-IP/EC and Task Team membership (Agenda Item 7)**

CCCC-IP/EC thanked Dr. Aydin, current North American Co-Chairman of CFAME, for agreeing to continue in this position throughout the coming year for the purposes of inter-sessional work. However, he is unlikely to attend PICES XVII, so may ask that his responsibilities be delegated to another North American for that meeting.

MODEL noted that Canadian and Russian membership is poorly represented, but since the Task Team will be reorganized with the closing of the CCCC Program next year, there is no urgency to request new members at this time.

#### **Proposals for new subsidiary bodies (Agenda Item 8)**

The Executive Committee did not receive any proposals for new CCCC subsidiary bodies.

#### **Planning for PICES XVII (Agenda Item 9)**

The following sessions and workshops were proposed:

- a 1-day CCCC/POC Topic Session on “*Marine system forecast models: Moving forward to the FUTURE*” (MODEL Endnote 3);
- a CCCC Poster Session (CCCC Endnote 3);
- a 1½-day CCCC/POC workshop on “*Climate scenarios for ecosystem modeling (II)*” (CFAME Endnote 4); and,
- a 1-day CCCC/ESSAS workshop on “*Marine ecosystem model inter-comparisons*” (MODEL Endnote 4).

#### **Theme proposal for PICES XVIII (Agenda Item 10)**

CCCC-IP/EC has no specific suggestions for the Science Board Symposium theme at PICES XVIII (Busan, Korea).

#### **Review of planned CCCC inter-sessional activities and travel support requests/priorities (Agenda Item 11)**

CCCC-IP endorsed a proposal by CFAME for an inter-sessional workshop on “*Linking and visualizing climate-forcing mechanisms and marine ecosystem changes: A comparative approach*” (CFAME Endnote 3).

CCCC-IP/EC requests travel support for:

- 1 Korean scientist (Yellow Sea/East China Sea fish expert) and 1 North American scientist (California Current fish or plankton expert) to attend the CFAME inter-sessional workshop on “*Linking and visualizing climate-forcing mechanisms and marine ecosystem changes: A comparative approach*” (priority level 1);
- 1 invited speaker for the CCCC/POC Topic Session at PICES XVII on “*Marine system forecast models: Moving forward to the FUTURE*”(priority level 1);
- 1 invited speaker for the CCCC/ESSAS workshop at PICES XVII on “*Marine ecosystem model inter-comparisons*” (priority level 2);
- 1 CFAME member to attend the 2008 ESSAS Annual Meeting in Halifax, Canada (priority level 3); it is noted that at least one CFAME member would already be attending as a current ESSAS member.

### Report of the April 2006 CCCC Symposium (Agenda Item 12)

Dr. Batchelder reported on the status of the special issue resulting from the PICES/GLOBEC Symposium on “*Climate variability and ecosystem impacts on the North Pacific: A basin-scale synthesis*” (Co-conveners: Drs. Harold P. Batchelder and Suam Kim) held April 19–21, 2006, in Honolulu, U.S.A. A total of 90 scientists from 12 countries met in Hawaii. Nineteen papers were submitted for the special issue. Several have been rejected by reviewers and ~15 papers should be published, with a mix of papers on each of the three symposium sub-themes: (1) Regime shifts; (2) Ecosystem productivity and structural responses to physical forcing; and (3) Pan-Pacific comparisons. The target date for submitting the collection of recommended papers to the Chief Editor of *Progress in Oceanography* is January 2008.

### CCCC Action Plan (Agenda Item 13)

No time was spent on this issue at the meeting, except for Dr. Batchelder suggesting that he will update the CCCC Action Plan using information provided by CFAME and MODEL.

### Relations with other international programs and organizations (Agenda Item 14)

ICES and regional/national GLOBEC programs remain the highest priority relations for the CCCC Program. CCCC-IP/EC identified linkages with ICES, GLOBEC International, and

the North Pacific Research Board (NPRB) as high priorities for the coming year. Also, there are several regional coastal observing programs in the Northeast Pacific (PaCOOS, PNW-IOOS, AOOS), as well as numerous programs in the Northwest Pacific (CREAMS, NEAR-GOOS, others), that PICES should maintain connections with. CCCC-IP must interact closely with NPAFC to address salmon issues of interest to the CCCC Program in the North Pacific.

### Preparation of CCCC report to Science Board (Agenda Item 15)

Dr. Batchelder agreed to summarize the discussions and progress of CCCC for the near-term needs by Science Board and for the PICES Annual Report.

### Other business (Agenda Item 16)

#### Projected CCCC publications

Proceedings from the 2006 PICES/GLOBEC Symposium will be published as a special issue of *Progress in Oceanography* in 2008 (Guest Editors: H. Batchelder and S. Kim).

A final report of the CCCC Program is expected to be published in the PICES Scientific Report series. It is likely that this report will be completed prior to PICES XVII. Drs. Kishi and Batchelder will take the lead on this, but anticipate asking for assistance from many of the past CCCC and Task Team Chairmen.

### CCCC Endnote 1

#### Participation list

##### Members

Kerim Y. Aydin (U.S.A.)  
Harold P. Batchelder (U.S.A., Co-Chairman)  
William R. Crawford (Canada)  
Suam Kim (Korea)  
Michio J. Kishi (Japan, Co-Chairman)  
William T. Peterson (U.S.A.)  
Thomas C. Wainwright (U.S.A.)

##### Observers

Young-Shil Kang (Korea)  
Yeong-Hye Kim (Korea)  
Hyun-Jeong Lim (Korea)

**CCCC Endnote 2**

**CCCC/IP-EC meeting agenda**

1. Welcome and opening remarks
2. Adoption of agenda
3. Business from last year's meeting
4. Review of responsibilities for documenting CCCC Topic Sessions and workshops
5. Progress reports of Task Team (CFAME and MODEL) activities
6. PICES FUTURE Science Plan: Discussion and recommendations
7. Changes in CCCC-IP/EC and Task Team membership
8. Proposals for new CCCC subsidiary bodies
9. Planning for PICES XVII
10. Theme proposal for PICES XVIII
11. Review of planned CCCC inter-sessional activities and travel support requests
12. Report on the 2006 CCCC Symposium
13. CCCC Action Plan—Evaluation for accuracy; updating for CCCC activities
14. Relations with other international programs and organizations
15. Preparation of the CCCC report to Science Board
16. Other business

**CCCC Endnote 3**

**Proposal for a CCCC Poster Session at PICES XVII**

North Pacific ecosystems and their response to climate variability have experienced intense study through GLOBEC and similar programs over the past 10 years. The PICES Climate Change and Carrying Capacity (CCCC) Program addressed the question of “how do interannual and decadal variation in ocean conditions affect the species dominance, biomass and productivity of the key zooplankton and fish species in North Pacific ecosystems”. Ultimately, a goal of the CCCC Program was to forecast possible consequences of climate variability on the North Pacific ecosystem. As the CCCC Program nears completion, it is worthwhile to examine the program's successes on addressing the key elements: climate change, carrying capacity, and

forecasting. This evaluation will provide useful in moving forward with successor PICES integrative programs like FUTURE: Forecasting and Understanding Trends, Uncertainty and Responses of North Pacific Ecosystems. We invite abstracts for posters that infer processes from patterns and link climate, ocean physics, populations and ecosystems. Provocative abstracts that retrospectively examine the successes and shortcomings of the CCCC Program are welcome, as are more traditional presentations on climate, ecosystems and forecasting.

Recommended convenors: Harold P. Batchelder (U.S.A.) and Michio J. Kishi (Japan).