

## REPORT OF THE IMPLEMENTATION PANEL ON THE CCCC PROGRAM



The Executive Committee of the Climate Change and Carrying Capacity Program Implementation Panel (CCCC-IP/EC) met from 18:00-20:00 hours on October 2, 2005. The meeting was chaired by Drs. Harold P. Batchelder and Suam Kim. The Co-Chairmen welcomed the attendees, and after brief introductions of those present (*CCCC-IP Endnote 1*), the agenda was reviewed and adopted with slight modifications (*CCCC-IP Endnote 2*).

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

The minutes from PICES XIII (Honolulu, U.S.A.) were accepted as is, with one minor correction. Under Agenda Items 6 and 7, the report from PICES XIII incorrectly stated that "...Dr. Thomas C. Wainwright (U.S.A.) to serve as Co-Chairman-elect after PICES XIV"; this should actually state that "...Dr. Thomas C. Wainwright (U.S.A.) to serve as Co-Chairman-elect after PICES XIII, and to assume the Co-Chairmanship after PICES XIV". No other items on-going from last year's meeting required discussion.

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

Awards for best CCCC presentation and best meeting poster will be announced at the Closing Session. The procedure of nomination and selection for the CCCC Best Presentation Award by a young scientist will be identical to that used at PICES XIII. The Secretariat provided a list of presentations that are eligible for this award. Drs. Suam Kim and Shin-ichi Ito agreed to serve as judges to determine the best CCCC presentation from the eligible papers in the various CCCC Topic Sessions and Workshops: S4, S5 and W3. Dr. Francisco E. Werner was nominated and agreed to represent the CCCC

Program on the Best Poster Award Committee for PICES XIV.

Dr. Chiyuki Sassa, (Seikai National Fisheries Research Institute, Japan) won the CCCC Best Presentation Award for his paper on "*Recruitment processes of jack mackerel (Trachurus japonicus) in the East China Sea (ECS) in relation to environmental conditions*" (co-authored by Y. Tsukamoto, Y. Konishi, S. Xie, Y. Watanabe and H. Nakata), presented in the CCCC/MODEL Topic Session (S5).

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

CCCC-IP/EC discussed responsibilities for documenting CCCC-sponsored Topic Sessions and Workshops at PICES XIV. Dr. Batchelder reminded the Committee that documentation of scientific sessions and workshops is required by session/workshop convenors. For CCCC at PICES XIV this responsibility rests with: Mr. Gordon A. McFarlane for the Topic Session (S4) on "*The comparative response of differing life history strategists to climate shifts*"; Mr. Jacob Schweigert and Dr. Yury I. Zuenko for the Topic Session (S5) on "*Modeling climate and fishing impacts on fish recruitment*"; Dr. Michael Schirripa for the Topic Session (S6) on "*Evidence of distributional shifts in demersal fish in relation to short- and long-term changes in oceanographic conditions*"; Dr. Harold Batchelder for the CCCC Poster Session on "*GLOBEC and GLOBEC-like studies in the North Pacific: Observing pattern and inferring process*"; and Dr. Jun Nishioka for the IFEP/MODEL Workshop (W3) on "*Modeling and iron biogeochemistry: How far apart are we?*". These session summaries were provided to Dr. Batchelder by the end of Thursday, October 6, are included in elsewhere in this Annual Report.

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

CCCC-IP/EC received reports of CCCC Task Team activities from Co-Chairmen or representatives of MODEL and CFAME. On October 6, all Task Teams provided final reports that included a summary on their progress since PICES XIII and recommendations and planned activities for 2006, and even some for 2007 (*see MODEL and CFAME reports for details*).

Items of significance for CFAME were:

- a status report from the May 2005 CFAME Workshop held in Victoria, Canada;
- discussion on preparation for a proposed January 2006 CFAME Workshop on “A comparison of regional mechanisms for fish production: Ecosystem perspectives” to be held at the University of Tokyo, Japan, and potential invited workshop participants; and
- potential CFAME synthesis papers to be presented and submitted as manuscripts for the 2006 CCCC Synthesis Symposium.

Other business items were:

- a proposal for a workshop at PICES XV brought forward from Dr. Richard J. Beamish (Canada);
- an update on the development of the new POC WG on *Evaluation of climate change projections* by the POC Chairman, Dr. Michael G. Foreman (*POC Endnote 5*); and
- a proposal brought forward by George Hunt for CFAME collaboration with a new GLOBEC regional program on *Ecosystem Study of Sub-Arctic Seas* (ESSAS). A 3-day workshop is planned in June 2006 to develop approaches for inter-comparing sub-Arctic ecosystems (*CCCC Endnote 3*). CFAME believes that the goals of ESSAS align well with some of the synthesis goals of CFAME and supports future collaboration of PICES and ESSAS.

The workshop proposed by Dr. Beamish would be sponsored primarily by FIS (*FIS Endnote 3*), and would identify key commercial species that might best be used as indicators of climate variability. Due to concerns regarding potential overlap with other CFAME activities, especially

the January 2006 workshop, and to the WG 16 report which is not yet widely disseminated, CFAME recommended against co-sponsoring this workshop at the present time. Instead, CFAME suggested revisiting this issue after the January 2006 workshop results are known.

During the MODEL Task Team business meeting, participants:

- reviewed the accomplishments of MODEL over the past year;
- discussed proposals for the next major PICES scientific program;
- developed future plans for 2006-2007;
- discussed requests for travel to future meetings;
- discussed the maintenance of the MODEL web page; and,
- discussed the MODEL membership and the selection of a new MODEL Co-Chairman.

Details of these discussions are provided in the MODEL Task Team report included elsewhere in this Annual Report.

**Progress report of the Advisory Panel on Iron fertilization experiment in the subarctic Pacific Ocean (Agenda Item 6)**

A report was received from Dr. Jun Nishioka of IFEP-AP. A complete description of their activities and plans can be found in the IFEP-AP report elsewhere in this Annual Report. Items of significance for IFEP-AP were:

- a report of the successful IFEP/MODEL Workshop on “*Modeling and iron biogeochemistry: How far apart are we?*” held at PICES XIV (IFEP Agenda Item 3);
- an update on the SEEDS-II Workshop to be held October 17-18, 2005, at the University of Tokyo, Japan (*IFEP-AP Endnote 4*);
- development of proposals for an IFEP/MODEL Workshop on “*Modeling iron biogeochemistry and ocean ecosystems*” (*IFEP-AP Endnote 5*) and a BIO Topic Session on “*Synthesis of in situ iron enrichment experiments in the eastern and western subarctic Pacific*” at PICES XV (*IFEP-AP Endnote 6*); and
- an update on several recent publications resulting from the previous iron fertilization

experiments in the subarctic Pacific (*IFEP Agenda Item 6*).

When the BASS Task Team of CCCC was disbanded at PICES XIII, IFEP-AP became orphaned within PICES. A proposal was made at PICES XIV for the BIO Committee to adopt the Panel. This proposal was accepted by BIO at their meeting on October 7, 2005. Governing Council agreed to move the responsibility for IFEP-AP from the CCCC Program to the BIO Committee. Activities of IFEP-AP up to and including PICES XIV will be supervised by CCCC and included as part of the CCCC report. Any activities of IFEP-AP following PICES XIV will be supervised by BIO.

#### **Changes in CCCC-IP/EC and Task Team membership (Agenda Items 5 and 7)**

The CCCC-IP/EC decided to:

- **Endorse** MODEL's request to extend Dr. Shin-ichi Ito's term as Co-Chairman for one additional year (to end at PICES XV);
- **Consider** MODEL's request for two new members from Korea (replacing Drs. Sinjae Yoo and Jae-Hak Lee), and addition of one new member (TBD) from Canada;
- **Recognize and welcome** Dr. George L. Hunt (U.S.A.) as a new member of CFAME and Dr. Jun Nishioka (Japan) as a new member of IFEP-AP.

CCCC-IP/EC proposed that Mr. Gordon (Sandy) A. McFarlane (Canada) succeed Dr. Harold Batchelder as North American Co-Chairman of the CCCC Program effective May 1, 2006, and to serve in this capacity through the conclusion of the CCCC synthesis phase and development of the next PICES integrative scientific program, or through PICES XVIII (2009), whichever comes earlier. Mr. McFarlane is exceptionally qualified to lead CCCC-IP/EC through the synthesis phase because of his prior service in CCCC, including a term as Co-Chairman of BASS and member of CFAME.

Suggested changes in membership will be forwarded to Science Board and Governing Council for further actions.

The CCCC Co-Chairmen thanked Dr. Francisco E. Werner (U.S.A.) for his service as MODEL Co-Chairman. Dr. Thomas C. Wainwright (U.S.A.) will replace him as North American Co-Chairman of MODEL, per the decision made at PICES XIII.

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

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

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

The following sessions and workshops were proposed:

- a ½-day CCCC/MODEL Topic Session on "*Modeling and historical data analysis of pelagic fish, with special focus on sardine and anchovy*" (*MODEL Endnote 4*);
- a 1-day POC/MONITOR/CCCC Topic Session on "*Synchronous and asynchronous responses of North Pacific boundary current systems to climate variability*" (*POC Endnote 7*);
- a 1-day CCCC/FIS Topic Session on "*Key recruitment processes and life history strategies: Bridging the temporal and spatial gap between models and data*" (*CFAME Endnote 5*);
- a 1-day BIO (IFEP-AP) Topic Session on "*Synthesis of in situ iron enrichment experiments in the eastern and western subarctic Pacific*" (*IFEP-AP Endnote 6*);
- a 1-day IFEP/MODEL Workshop on "*Modeling iron biogeochemistry and ocean ecosystems*" (*IFEP-AP Endnote 5*); and
- a ½-day CCCC Paper Session on "*Patterns and processes of North Pacific ecosystem responses to physical forcing and climate change*". Convenors will be Harold Batchelder (U.S.A.) and Suam Kim (Korea).

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

CCCC-IP/EC has no specific theme suggestions for the Science Board Symposium at PICES XVI (October 2007, Canada).

**Update on the April 2006 CCCC Symposium  
(Agenda Item 11)**

Dr. Batchelder reviewed the current status on the planning of the PICES/GLOBEC Symposium on “*Climate variability and ecosystem impacts on the North Pacific: A basin-scale synthesis*”. He noted that the CCCC Topic Session on “*The impacts of large-scale climate change on North Pacific marine ecosystems*” at PICES XIII was a preliminary step toward the April 2006 symposium. Co-convenors for the symposium are Drs. Harold Batchelder (U.S.A.) and Suam Kim (Korea). A seven member Steering Committee for the symposium has been formed. They met informally at PICES XIII to develop a timeline and agenda for the meeting. The Steering Committee consists of Drs. Makoto Kashiwai (Japan), Gordon A. McFarlane (Canada), Vladimir I. Radchenko (Russia), Yasunori Sakurai (Japan), Franklin B. Schwing (U.S.A.), Sinjae Yoo (Korea), and Francisco E. Werner (GLOBEC International). All, except Dr. Kashiwai were able to attend the *ad hoc* meeting. Subsequent discussions and planning occurred via e-mail correspondence. The symposium will occur April 19-21, 2006, in Honolulu, U.S.A. Originally, the venue was planned as the East-West Center on the University of Hawaii campus. However, the space there was not sufficient, and the venue was changed to the Ala Moana Hotel, near the Convention Center in Waikiki. The change in venue will enable all posters to be displayed throughout the meeting, increase the time devoted to dedicated poster viewing, and permit 36 contributed oral presentations (up from the original 30 speaking time slots).

The meeting has three sub-themes: (1) Regime shifts, (2) Ecosystem productivity and structural responses to physical forcing, and (3) Pan-Pacific comparisons. A preliminary announcement of the symposium was published in July 2004 in PICES Press (Vol. 12, No. 2). A six-panel flyer of the meeting was distributed to the PICES mailing list in mid-2005.

Invited speakers for each theme and for the two “perspective” talks were identified and contacted to determine their willingness to present an

invited talk and prepare a manuscript for inclusion in the symposium proceedings. Drs. James E. Overland (U.S.A.) and Shoshiro Minobe (Japan) will develop an overview paper on *regime shifts*, and one of them will present the talk. Dr. Sinjae Yoo (Korea), plus others of his selection, will develop an overview paper on *ecosystem productivity and structural responses to physical forcing*, and Dr. Yoo will give the talk. Dr. David Mackas (Canada), plus others of his selection, will develop an overview paper on *Pan-Pacific comparisons*, and Dr. Mackas will make the presentation at the symposium. Drs. John Davis (Canada) and Makoto Kashiwai (Japan) have agreed to give the perspectives talks.

A 35-minute Closing Discussion Panel is on the agenda. Panelists (probably 4 in number) have not yet been confirmed. Dr. Batchelder suggested that the panelists be Drs. William T. Peterson (U.S.A.; indicated willingness), Francisco E. Werner (GLOBEC International, indicated willingness), Laura Richards (Canada), and Dr. Kuh Kim (PICES Science Board Chairman). We discussed other possible panel members, considering disciplinary expertise and national representation. Except for Drs. Werner and Peterson, none have been contacted regarding this discussion panel.

Primary sponsors of the symposium are PICES and GLOBEC International. Potential co-sponsors were identified and several have been contacted by the PICES Secretariat regarding co-sponsoring the symposium. The following organizations have agreed to support the symposium (at various financial commitments): Pacific Islands Fisheries Center of NOAA, North Pacific Research Board, North Pacific Fisheries Management Council, Western Pacific Fishery Management Council, Pelagic Fisheries Research Program of the University of Hawaii, and SCOR. We are still awaiting responses from the U.S. GLOBEC National Program, Alaska Fisheries Science Center and Northwest Fisheries Science Center of NOAA, and *Exxon Valdez* Oil Spill Trustee Council regarding co-sponsorship. As most of these organizations are U.S.-related, CCCC-IP/EC suggests that the PICES Secretariat contact potential co-sponsors

from other PICES member nations (APN, Frontier Institute, Canada DFO, *etc.*). Korean delegates to CCCC IP/EC suggested that a letter be sent to the President of KORDI requesting their co-sponsorship of the CCCC Symposium.

### **CCCC inter-sessional activities and travel support requests (Agenda Item 12)**

The following inter-sessional meetings were proposed for the period between October 2005 and October 2006:

- a CCCC/MODEL Workshop on “*Global comparison of sardine, anchovy and other small pelagics—building towards a multi-species model*” to be held on November 14-17, 2005, in Tokyo, Japan (*MODEL Endnote 3*); travel funds from PICES for this workshop were already requested (and awarded) last year;
- a CCCC/CFAME Workshop on “*A comparison of regional mechanisms for fish production: Ecosystem perspectives*” to be held in January 2006, in Tokyo, Japan (*CFAME Endnote 4*);

CCCC-IP/EC requests travel support for:

- 2-3 CCCC scientists to attend the 4<sup>th</sup> International Zooplankton Production Symposium in spring 2007, in Hiroshima, Japan; it was noted that this symposium is already co-sponsored by PICES;
- Dr. Kenneth A. Rose (U.S.A.) to present MODEL contribution to the April 2006 CCCC Symposium (the highest priority request of MODEL);
- 2 experts on the Sea of Okhotsk and Yellow Sea/East China Sea to attend the CCCC/CFAME Workshop in January 2006, in Tokyo, Japan (the highest priority request of CFAME);
- 1 invited speaker for the CCCC/FIS Topic Session on “*Key recruitment processes and life history strategies: Bridging the temporal and spatial gap between models and data*” at PICES XV (second priority request of both CFAME and MODEL);
- 1 invited speaker for the CCCC/MODEL Topic Session “*Modeling and historical data analysis of pelagic fish, with special focus on sardine and anchovy*” at PICES

XV (second priority travel request of MODEL);

- 1 MODEL scientist to attend the joint IFEP/MODEL Workshop on “*Modeling iron biogeochemistry and ocean ecosystems*” at PICES XV;
- 1 CCCC/CFAME scientist to attend the June 2006 ESSAS/PICES Workshop on sub-Arctic ecosystems comparison (proposed for St. Petersburg, Russia), if PICES agrees to co-sponsor this workshop (third priority request of CFAME).

### **Future PICES integrative scientific program (Agenda Item 13)**

CFAME did not have time to discuss themes proposed as a future integrative scientific program of PICES. MODEL provided comments on proposals in their report.

### **CCCC Action Plan (Agenda Item 14)**

No time was spent on this issue in the CCCC-IP/EC meeting, except for Dr. Batchelder suggesting that he would develop a CCCC Action Plan using the planned activities of CFAME and MODEL from last year and this year, using a template provided by Science Board. This will be done following the January 2006 CFAME Workshop and prior to the 4<sup>th</sup> inter-sessional Science Board meeting in April 2006.

### **Relations to other international organizations and programs (Agenda Item 15)**

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 CCCC-IP should maintain connections with. Closer links with GOOS and the Census of Marine Life (CoML) initiative are promising areas to support, as was evidenced by the presentations made by Dr. Robin Rigby at PICES XIV on the CoML NaGISA project. The

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Census of Marine Zooplankton (CMarZ) would be a good CoML project to establish more formal connections with. Finally, CCCC-IP must interact closely with NPAFC to address salmon issues of interest to the CCCC Program in the North Pacific.

Dr. Kenneth Drinkwater, Chairman of the ICES Cod and Climate Change Program, attended the CCCC-IP/EC meeting in 2004 (PICES XIII). He invited the CCCC Program to participate in a broadly based theme organized around climate and marine ecosystems at the ICES Annual Science Conference in 2006, in Maastricht, the Netherlands. Moreover, he suggested that the ICES and PICES meetings in 2006 have identical themes that would apply to both the CCCC and CCC Programs. The goal is to have several invited CCCC scientists attend the ICES Annual Science Conference in September 2006, and several CCC scientists attend the PICES Annual Meeting in October 2006. CCCC-IP/EC was in favor of this suggestion at PICES XIII. No one was present at the CCCC-IP/EC meeting that could comment on potential sessions proposed by ICES at their recent Annual Science Conference, but there may be sessions that will be of cross-interest (and parallel) between ICES and PICES in 2006. [ADDENDUM: *At the Science Board meeting, Dr. Skip McKinnell provided a list of themes occurring at the 2006 ICES Annual Science Conference. Science Board recommended that a theme titled, "Large-scale changes in the migration of small pelagic fish and the factors modulating such changes" be co-sponsored by PICES.*]

### Other business (Agenda Item 17)

#### 2006 ESSAS/PICES Workshop

CCCC-IP/EC recognizes that ESSAS and goals CCCC are complementary and recommends that PICES should support ESSAS effort in general, and the June 2006 ESSAS/PICES Workshop on comparing sub-Arctic ecosystems, specifically (CCCC Endnote 3).

#### PICES website content

- MODEL requests that the PICES website serve and maintain the MODEL Portal that was formerly hosted by Dr. Bernard A.

Megrey on a NOAA server that is no longer available. MODEL offers to supply all documents, codes, presentation files to the PICES Secretariat for posting on the PICES website. If the PICES website cannot serve this, MODEL requests that PICES outsource web hosting to a commercial web server for MODEL products. [ADDENDUM: *At the Science Board meeting, TCODE Chairman, Dr. Igor Shevchenko, offered to host the MODEL Portal on a web server that supports TCODE metadata. He also noted that this server could also accommodate a password-protected member section if that is desired as well. The TCODE Chairman will work with Dr. Irina Ishmukova (Russia), who is a member of MODEL Task Team, to accomplish this.*];

- Dr. Harold Batchelder, Chairman of the *ad hoc* web publishing/oversight committee, recommends that a "Current Ocean Events" section be created on the PICES website. The recently revised PICES website is a great improvement over the prior design, but it is now primarily a repository for PICES documents (annual meeting reports, scientific reports, newsletters, calendar, address book) and does not have an emphasis on current ocean status and current events. During the past year, many PICES affiliated scientists have been consulted by and quoted by media regarding anomalous ocean conditions along the US west coast—just to cite one example. It is suggested that PICES establish a section of the website devoted to such "high profile stories", and actively engage scientists within the PICES community to contribute material to this section. Basically, it is desirable to get more timely ocean science news easily accessible from the PICES website.

#### Projected CCCC publications

- Selected papers on NEMURO and NEMURO.FISH models are expected to be published as a special issue of *Ecological Modelling* in 2006 (Guest editors: M. Kishi, B. Megrey, S.-I. Ito, and F. Werner);
- Selected papers from the IFEP SERIES experiment are currently under review and are projected to be published as a special

issue of *Deep-Sea Research II* in 2006 (Guest Editors: P. Boyd and P. Harrison);

- Selected papers from the CCCC/GLOBEC Symposium on “*Climate variability and ecosystem impacts on the North Pacific: A basin-scale synthesis*” are expected to be published as a special issue of *Progress in Oceanography* in late 2007 or early 2008 (Guest editors: H. Batchelder and S. Kim);
- Five-year synthesis of iron fertilization experiments in the subarctic North Pacific is intended to be published in the PICES Scientific Report Series in 2007.

2007 PICES/ICES Young Scientist Conference

This issue was not discussed at the meeting.

### Recommendations to Science Board (Agenda Item 18)

- CCCC-IP/EC **recommends the approval** of changes in CCCC-IP/EC membership requested under Agenda Items 5 & 7 above;
- CCCC-IP/EC **recommends the approval** of the workshops and travel requests detailed above.

### CCCC Endnote 1

#### Participation list

##### Members

Kerim Y. Aydin (CFAME Co-Chairman)  
 Harold P. Batchelder (CCCC-IP Co-Chairman)  
 Shin-Ichi Ito (MODEL Co-Chairman)  
 Oleg Katugin (Russia)  
 Suam Kim (CCCC-IP Co-Chairman)  
 William T. Peterson (U.S.A.)  
 Yasunori Sakurai (Japan)  
 Francisco E. Werner (MODEL Co-Chairman)  
 Akihiko Yatsu (Japan; CFAME Co-Chairman)  
 Sinjae Yoo (Korea)

##### Observers

Gordon A. McFarlane (Canada)  
 Stewart (Skip) M. McKinnell (PICES Deputy Executive Secretary)  
 Jun Nishioka (Japan)  
 Hiroaki Saito (Japan)

### CCCC Endnote 2

#### CCCC-IP/EC meeting agenda

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| <ol style="list-style-type: none"> <li>1. Welcome and opening remarks</li> <li>2. Adoption of agenda</li> <li>3. Business from last year’s meeting</li> <li>4. Review of responsibilities for documenting CCCC Topic Sessions and workshops</li> <li>5. Progress reports of Task Team (CFAME and MODEL) activities</li> <li>6. Progress report of the Advisory Panel on <i>Iron fertilization experiment in the subarctic Pacific Ocean</i></li> <li>7. CCCC-IP/EC chairmanship rotation</li> <li>8. Proposals for new CCCC subsidiary bodies</li> <li>9. Planning for PICES XV</li> <li>10. Theme proposal for PICES XVI</li> </ol> | <ol style="list-style-type: none"> <li>11. Update on the April 2006 CCCC Synthesis Symposium</li> <li>12. Review of planned CCCC activities and travel support requests/priorities for October 2005-October 2007 period</li> <li>13. Future PICES integrative scientific program</li> <li>14. CCCC Action Plan</li> <li>15. Relations with other international programs and organizations</li> <li>16. Preparation of CCCC report to Science Board</li> <li>17. Other business</li> <li>18. Recommendations to Science Board</li> </ol> |
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## CCCC Endnote 3

**Proposal for a ESSAS/PICES Workshop comparing sub-Arctic seas**

Support from PICES is sought for a proposed workshop to compare four sub-Arctic marine ecosystems, those of the Okhotsk Sea/Oyashio region, the Bering Sea, the Newfoundland/Labrador Shelf and the Barents Sea. This would thus include areas with currents both to and from the Arctic, and those with marginal ice zones at quite low and rather high latitudes. PICES and a new GLOBEC regional program on *Ecosystem Study of Sub-Arctic Seas* (ESSAS) share the goal of developing comparative studies of the sub-Arctic seas and understanding how climate variability will affect their productivity and ability to support sustainable commercial and subsistence harvests. The goals of the workshop will be: 1) to lay the groundwork for developing the data sets needed to achieve the appropriate comparisons; and, 2) to commence establishing the teams necessary to synthesize available data and develop models for predicting the effects of climate variability on these ecosystems.

It is expected that the workshop will build upon extant syntheses and on-going and planned synthesis efforts. For example, the syntheses in the PICES North Pacific Ecosystem Status Report, and the ESSAS Science Plan and the Appendix to the ESSAS Science Plan that assembled data from each of the sub-Arctic seas should provide much basic information. Additionally, papers such as those by Aydin *et al.* (2002) examining the similarities and differences between the eastern and western Bering Sea, Hunt and Megrey's comparison of the Bering and Barents Sea ecosystems (in press), and the recent work by Ciannelli *et al.* comparing the Barents Sea and the Gulf of Alaska systems (in press) will provide a solid basis for moving forward with the analyses of these ecosystems. The workshop will also take advantage of advances made in a planned January 2006 CFAME Workshop on developing indices for North Pacific comparisons, and the results of workshops in the Norwegian funded program, Norway-Canada Comparisons of Marine Ecosystems (NORCAN), to be held in the autumn of 2005 and the late spring of 2006.

The NORCAN workshops will develop specific plans for comparisons between the Barents Sea and the Labrador Shelf, including the use of biophysical models, and will initiate research on physical forcing, zooplankton dynamics and climate impacts on fish populations in these sub-Arctic seas.

Many of the synthesis products available to date have provided an excellent compendia of information about a particular sub-Arctic ocean basin, but few have explicitly compared mechanisms and responses to climate forcing across basins or between the Atlantic and Pacific systems. If the comparative method is to be used successfully, it will be necessary to identify important underlying structuring features of the ecosystems and how climate forcing, acting on those mechanisms, will result in ecosystem change. It will also be necessary to develop data sets that can be used in predictive modeling efforts. These data sets will have to be sufficiently closely aligned that inter-regional comparisons will be fruitful. Although all systems are unique, there must be a search for basic elements common to many, if not all, that can be usefully employed in a comparative approach.

The proposed ESSAS/PICES Workshop will be a significant step in achieving the goals of the PICES CFAME Task Team of putting "Particular emphasis... on testing ecosystem-level hypotheses, through review and examination in a collaborative environment, of (i) comparisons between regional and/or basin ecosystems; (ii) linkages in time, space, or seasonality between climate and ecosystems; and (iii) responses of regional ecosystems to basin-scale forcing." The workshop will, through its review of the existing syntheses of North Pacific data sets and comparisons with data from North Atlantic systems, provide a solid basis for the development of revisions and updating of the pilot PICES North Pacific Ecosystem Status Report published in December 2004.



