REPORT OF BIOLOGICAL OCEANOGRAPHY COMMITTEE

The BIO Committee and interested participants (*BIO Endnote 1*) met under the chairmanship of Dr. Michael Dagg from 14:00-18:00 h on October 28, 2009 in Jeju, Korea. The agenda for the meeting can be found in *BIO Endnote 2*.

AGENDA ITEM 3
Reports from BIO subsidiary bodies

Advisory Panel on *Micronekton Sampling Intercalibration Experiment*

MIE-AP submitted its final report which summarized the activities and findings obtained from three cruises. Its title is "*Report on the Advisory Panel on the Micronekton Gear Intercalibration Experiment*", edited by Prof. Evgeny Pakhomov and Dr. Orio Yamamuro. A presentation summarizing the report was given by one of the contributing authors, Dr. Ric Brodeur. The Committee provisionally accepted the report, pending minor editing and a few additions and modifications that were discussed by BIO. It is anticipated that the final version will be completed within 2–3 months and sent to the PICES Secretariat to be published as a PICES Scientific Report.

Advisory Panel on *Marine Birds and Mammals*

A summary of recent activities by the Advisory Panel on Marine Birds and Mammals (MBM-AP) was presented by Dr. William Sydeman (See the AP-MBM report in the Annual Report for more details). A proposal for a 1-day workshop titled *"Location matters: Importance of spatial variability in physical-biological interactions to understanding, forecasting and managing marine ecosystems"* was presented to the Committee for discussion later in the meeting.

Section on *Carbon and Climate*

A report on the activity of the Carbon and Climate Section (CC-S), whose activities are jointly overseen with POC, was given by Dr. James Christian (see the CC-S elsewhere in the Annual Report). A data synthesis workshop, seen as a continuation of unfinished business from the 2009 workshop, was proposed for PICES-2010. CC-S will conclude its first 5-year term at PICES-2010 and is proposing to develop new Terms of Reference during the coming year, prior to their review by POC/BIO in 2010.

Joint PICES/ICES Working Group on *Forecasting Climate Change Impacts on Fish and Shellfish*

A report on the Working Group on Forecasting Climate Change Impacts on Fish and Shellfish (WG-FCCIFS) was given by Dr. Anne Hollowed, summarizing the activity of this joint ICES-PICES Working Group. Of particular note are the activities proposed for the symposium entitled "*Climate change effects on fish and fisheries*" to be held in Sendai, Japan, from April 26–29, 2010.

FUTURE

A summary of the inaugural meetings of the three FUTURE Advisory Panels, distributed earlier in the day by Science Board Chairman, Dr. John Stein, was presented by the BIO Committee Chairman.

AGENDA ITEM 4
BIO Working Groups

Working Group on *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean* (WG 22) is currently chaired by Drs. Shigenobu Takeda (Japan) and Fei Chai (U.S.A.). An activity report was

presented by Dr. William Crawford (See WG 22 report for more details). This is the last year for the Working Group and a final Topic Session was proposed for PICES-2010.

Working Group on *Comparative Ecology of Krill in Coastal and Oceanic Waters around the Pacific Rim* (WG 23) is currently chaired by Drs. William Peterson (USA) and Song Sun (China). An activity report was presented by Ms. Tracy Shaw (See WG23 report for more detail). A workshop focusing on krill was proposed to be held at the Sendai symposium in April 2010. The title is "*Examining the linkages between physics and fish: how do zooplankton and krill data sets improve our understanding of the impacts of climate change on fisheries?"*

AGENDA ITEM 5
Topic sessions and workshops

Summaries of the topic sessions and workshops at PICES-2009 can be found in the Session Summaries chapter of this Annual Report.

Eight topic sessions and three workshops were proposed for sponsorship by the BIO Committee at PICES-2010. After discussion, the following list of BIO Committee priorities for topic sessions was developed:

1. BIO paper session;
2. "*Understanding the role of iron in regulating biogeochemical cycles and ecosystem structures in the North Pacific Ocean*" (see *BIO Endnote 3*);
3. "*The Practical Handbook at 50: a celebration of the life and career of Tim Parsons*" (*BIO Endnote 4*);
4. "*Impact of climate variability on marine ecosystems: understanding functional responses to facilitate forecasting*" (see *POC Endnote 5(4)*);
5. "*Census of marine life: Exploring ocean life. Past, present and future*" (*BIO Endnote 5*);
6. "*Comparing the two major gyres of the subarctic North Pacific - seasonal and interannual variability and its predictability*" (see *POC Endnote 5(2)*);
7. "*Observations of ecosystem mixing under climate change*" (see *FIS Endnote 5*);
8. "*Ecosystem models: Are they useful for management or forecasting biological response to climate change?*" (see *FIS Endnote 4*);
9. "*Location matters: Importance of spatial variability in physical-biological interactions to understanding, forecasting and managing marine ecosystems*" (see *AP-MBM Endnote 5*).

Workshops proposed by BIO for PICES-2010 (Both proposed workshops are of equally high priority for the Committee):

1. "*Marine Ecosystem Inter-Comparisons III*" (*BIO Endnote 6*);
2. Final CC-S data synthesis workshop (see *POC Endnote 4*).

AGENDA ITEM 6
Updates on symposia and meetings previously endorsed by BIO

The 5th International Zooplankton Production Symposium on "*Population connections, community dynamics and climate variability*" will be held during March 14-18, 2011, at Pucón, Chile. Dr. Julie Keister has been appointed as the PICES representative. A draft brochure for this meeting is attached (*BIO Endnote 7*).

Last year it was reported that the Expo 2012 Organizing Committee (Yeosu, Korea) expressed interest in hosting the 2nd International Symposium on "*Effects of climate changes on the world's oceans*" in the early spring of 2012. Dr. Sinjae Yoo reported that planning for this symposium is continuing.

AGENDA ITEM 7
Relationships with other international programs and organizations

Short presentations were given from representatives of the following programs:

Ecosystem Studies of Sub-Arctic Seas

Dr. George Hunt gave a presentation on the recent and planned activity of ESSAS, mentioning in particular the proposed ESSAS Open Science Meeting "*Comparative studies of climate effects on polar and sub-polar ocean ecosystems: progress in observation and prediction*" to be held in Seattle, USA in May 2011. He requested PICES financial support of $20,000 in order to bring early career scientists from PICES Asian countries to the meeting, and asked that a PICES member be appointed to the Steering Committee.

Integrated Marine Biogeochemistry and Ecosystem Research

Dr. Yoo gave a presentation on recent and proposed activities of IMBER. IMBER will contribute $2000–$3000 towards a WG 22 topic session at PICES-2010, should it be approved by Science Board. IMBER proposes to make FUTURE a contributing program. IMBER asked BIO to provide verbal support for an IMBER summer school in August 2010 titled "*Ocean dynamics and marine ecosystems in the context of climate change*", and the scientific meeting, "IMBIZO II", proposed for October 10–14, 2010 in Crete. These requests will be brought to Science Board.

Census of Marine Life

A presentation was given by Dr. Vera Alexander. CoML will have a final meeting in London, in October 2010.

North Pacific Research Board

A presentation was given by the Director of NPRB, Dr. Clarence Pautzke, summarizing some of the recent NPRB activities that are highly relevant to PICES, including the BSIERP-BEST program in the Bering Sea that is jointly supported by NPRB and the US National Science Foundation. It was noted by the BIO Chairman that NPRB has provided financial support for many PICES research activities in the past years.

AGENDA ITEM 9
Publications for upcoming year resulting from BIO sponsored activities were updated

Krill papers from the 4th International Zooplankton Symposium will be published as a special volume of *Deep-Sea Research II* (DSR II), edited by W. Peterson and S. Kawaguchi: Approximately 16 papers have been accepted and were sent to journal editor, John Milliman, in April.

The OECOS Special Volume (Drs. Atsushi Yamaguchi and Charles Miller, editors) is being prepared for publication in DSR II. About half the papers are complete and others are under final revision by authors.

The IFEP special volume on SEEDS II is in press with DSR II and should be published in November 2009.

A special section of the Journal of Oceanography (Vol 65, No 5, 2009) was recently published and contained three papers under the heading of "PICES North Pacific Carbon Synthesis"

AGENDA ITEM 10
North Pacific Ecosystem Status Report II – 2003–2008

A brief update on the status of this report was given by Dr. Dagg. Seven of the nine regional chapters are nearing completion and a synthesis workshop will be held in Hawaii in December 2009. Anticipated publication as a PICES Special Publication is March 2010.

AGENDA ITEM 11
BIO Action Plan

Not discussed.

AGENDA ITEM 12
FUTURE Implementation Plan

Not discussed.

AGENDA ITEM 13
Other items

It was noted that the next BIO Chairman is to be electedby Committee members in one year, with duties to begin after the end of the PICES-2010 in Portland, U.S.A.

Information on the proposed restructuring of the Annual Meeting was given. This will be further discussed at the Science Board meeting

The BIO Committee meeting adjourned by 17:55 h.

BIO Endnote 1

BIO participation list

Members	Observers
Michael J. Dagg (U.S.A.)	George Hunt Jr. (ESSAS)
Angelica Peña (Canada)	Vera Alexander (CoML)
Hiroaki Saito (Japan)	Ric Brodeur (U.S.A.)
Michael Seki (U.S.A.)	Seok-Gwam Choi (Korea)
Atsushi Tsuda (Japan)	William Crawford (Canada)
Harumi Yamada (Japan)	Reila Domokos (U.S.A.)
Atsushi Yamaguchi (Japan)	Ian Dutton (NPRB)
Sinjae Yoo (Korea)	Anne Hollowed (U.S.A.)
	Young-Shil Kang (Korea)
	Clarence Pautzke (NPRB)
	C. Tracy Shaw (U.S.A.)
	Yvette Spitz (U.S.A.)
	William Sydeman (U.S.A.)
	Yutaka Watanobi (Japan)
	Xuelei Zhang (China)

BIO Endnote 2

BIO meeting agenda

1. Welcome and Introductions
2. Agenda additions and changes – approval of agenda
3. Reports from subsidiary bodies:
   - MIE-AP
   - MBM-AP
   - CC-S
4. Working group reports:

   - WG 22: *Iron Supply and its Impact on Biogeochemistry and Ecosystems in the North Pacific Ocean*. Shigenobu Takeda (Japan) and Fei Chai (USA).
   - WG 23: *Comparative Ecology of Krill in Coastal and Oceanic Waters around the Pacific Rim*. William Peterson (USA) and Song Sun (China).
5. Topic sessions and workshops
   (a) completed
   (b) proposed for PICES-2010 – Portland, U.S.A.
   Theme sessions:
   - *The Practical Handbook at 50: a celebration of the life and career of Tim Parsons*
   - *Observations of Ecosystem Mixing under Climate Change*
   - *Ecosystem Models: Are they useful for management or forecasting biological response to climate change?*
   - *Natural Supplies of Iron to the North Pacific and Linkages Between Iron Supply and Ecosystem Responses*
   - *BIO paper session*
   Workshops:
   - *CC-S data synthesis workshop*
6. Updates on symposia and meetings endorsed by BIO
7. Relationships with other international programs and organizations.
   - ESSAS – Ecosystem Studies of SubArctic Seas- George Hunt
   - IMBER – Integrated Marine Biogeochemistry and Ecosystem Research - Sinjae Yoo
   - CoML – Census of Marine Life - Vera Alexander
   - NPRB – North Pacific research Board - Clarence Pautzke
   - WG-FCCIFS – Working Group on Forecasting Climate Change Impacts on Fish and Shellfish - Anne Hollowed
8. Financial requests
9. Publications for upcoming year
10. North Pacific Ecosystem Status Report – II
11. Discussion of BIO Action Plan
12. Discussion of FUTURE Implementation Plan and new Advisory Panels
13. Other items
14. Meeting adjourned

BIO Endnote 3

Proposal for a 1-day BIO Topic Session at PICES 2010 on *Understanding the role of iron in regulating biogeochemical cycles and ecosystem structures in the North Pacific Ocean*

Iron plays a key role in regulating the biogeochemical cycles of carbon and nitrogen, and pelagic ecosystem structures in the North Pacific Ocean, yet our understanding of these effects remains limited. External sources of iron, such as Asian dust, rivers, sediments, and volcanoes supply large amounts of iron to the North Pacific, while the physical processes of upwelling, meso-scale eddies, boundary currents, and tidal mixing transport deep waters with high iron concentration to the upper ocean. Biological uptake, zooplankton grazing, remineralization, and iron chemistry change the forms of iron and its distribution in the North Pacific Ocean. This session invites papers that address physical, biological and chemical processes controlling iron distribution and transformation, linkages between iron and ecosystem responses, and impacts on carbon and nitrogen cycles. We particularly invite papers that combine recent progress from field observations and modeling studies that relate iron cycling to ecosystem structures and carbon fluxes in the North Pacific Ocean.

Co-convenors: Mark Wells (U.S.A.), Angelica Pena (Canada), and Toshi Saino (Japan)

Potential invited speakers: Keith Moore (U.S.A.), Phoebe Lam (U.S.A.), Hajime Obata (Japan), One modeler outside PICES countries, who develops more detailed iron chemistry , Jay Cullen (Canada), Maurice Levasseur (Canada)

BIO Endnote 4

Proposal for a ½ day BIO Topic Session at PICES-2010 on
The Practical Handbook at 50: a celebration of the life and career of Tim Parsons

The importance of Strickland and Parsons' "*A practical handbook of seawater analysis*" to the development of oceanographic science is difficult to overstate. The first version of the manual, "*A manual of sea water analysis*", was published by the Fisheries Research Board of Canada in 1960. Half a century on, we are in a position to examine the role that this manual and its descendants have played in the development of biological and chemical oceanography. This session invites papers on the role that the development and standardization of analytical methods has played in the evolution of oceanography, and the evolution of our understanding of planktonic ecosystems that methodological innovation has catalyzed.

Convenor: James Christian (Canada)

Possible invited speakers: Timothy R. Parsons (Canada), R. Ian Perry (Canada), David M. Karl (U.S.A.)

BIO Endnote 5

Proposal for a ½ day BIO Topic Session at PICES-2010 on
"Census of Marine Life: Exploring ocean life. Past, present and future"

The Census of Marine Life (CoML) is a global scientific initiative to assess and explain the changing diversity, distribution and abundance of marine species in the past and present, and to build the capacity to project future diversity. CoML is a broad global initiative of unprecedented size and scope that has engaged more than 2000 scientists and ocean professionals from over 80 countries with a common mission towards improving the understanding of life in the ocean. This session at PICES will summarize the past 10 years of results from the global CoML program, highlighting specific products and how CoML products information and data can be used or applied. Contributors will discuss findings and discoveries with particular attention to the information released at the CoML Finale in London just a few weeks earlier. Discussions will look for additional ways to

apply the newly released CoML information to answer the growing global questions of ocean acidification and climate change, and the role of marine biodiversity information with managing through ecosystem approaches and marine spatial planning. The session will conclude with a discussion of lessons learned for CoML, exploring some of the most successful (and some not-so successful) aspects of the program in the context of developing any future coordinated marine biodiversity efforts.

Co-convenors: Michael Feldman (US CoML Program manager), Andrew Rosenburg (University of New Hampshire and Chairman of the US National Committee for CoML), and Clarence Pautzke (US National Committee for CoML and North Pacific Research Board).

BIO Endnote 6

Proposal for a 2-day BIO Workshop on "*Marine Ecosystem Inter-Comparisons III*"

The objective of the Marine Ecosystem Model Inter-comparison Project (MEMIP) is to compare the performance of various lower trophic level marine ecosystem simulation models at predicting the abundance and distribution of coastal zooplankton functional groups. Models with high performance will be used to examine the future state of the marine ecosystem to global climate change. This workshop builds upon the discussions and planning accomplished at the successful workshop held at the PICES 2009 meeting. The workshop will be technical, hands-on, and focus on parameterizing, executing and calibrating three test bed versions of a biogeochemical lower trophic level (LTL) marine ecosystem models. At each test bed 3-6 ecosystem models will be run. Specific ecosystem models (*i.e.*, NPZD, NEMURO and CoSINE) will be executed. Some models will be tuned to run in a specific region and others will be applied to areas different from where they were calibrated. Model skill assessment will be evaluated. The models will be used to identify important mechanisms that control secondary production, zooplankton biomass and variability, as well as bounding the levels of uncertainty in model predictions by calculating ensemble statistics. Comparisons at multiple locations will provide information on the spatial-temporal robustness of particular model structures and parameterizations. The products of the comparison will contribute to FUTURE by estimating the uncertainty and the limits of forecasting.

In order to maximize productivity during the workshop, we prefer participation be limited to the MEMIP working group members.

Conveners: Bernard A. Megrey (U.S.A.), Shin-ichi Ito (Japan), Hal Batchelder (U.S.A.), Yvette Spitz (U.S.A.), Guimei Liu (China)

Travel support is requested for one Asian and one North American scientist to attend the workshop.

BIO Endnote 7

Draft brochure of the 5th Zooplankton Production Symposium on *Population Connections, Community Dynamics, and Climate Variability*. Pucón, Chile, March 14-18, 2011

Symposium Scope

Zooplankton play a pivotal role in aquatic ecosystems and global biogeochemical cycles. They function as prey for economically important fish, grazers of primary production, and drivers of carbon and nutrient cycles. Their population and community dynamics including their growth, mortality, distribution, and diversity structure the ecosystem. At the same time, a changing environment influences their dynamics. Climate change is profoundly impacting marine ecosystems through changes in zooplankton. A combination of new technologies and techniques together with classical in situ and laboratory studies are needed to understand the changing ecosystems. In response to the need to understand zooplankton dynamics, their sensitivity to change,

and the resultant effects on ecosystems, ICES and PICES are holding the *5th International Symposium on Zooplankton Production* as an international forum to discuss zooplankton and their role in the global ecosystem.

Sessions

- Effects of climate variability on secondary production and community structure,
- Ecological interactions: links to upper and lower trophic levels,
- Zooplankton life histories: spatial connectivity, dormancy, and life cycle closure,
- Small scale processes and patterns,
- Zooplankton in upwelling and coastal systems,
- Zooplankton in polar ecosystems and extreme environments,
- Zooplankton physiology and bioenergetics,
- The role of zooplankton in biogeochemical cycles.

Workshops

- Zooplankton IBMs,
- Advances in genomic and molecular studies of zooplankton,
- Updates and comparisons of zooplankton time series,
- Impacts of ocean acidification,
- Automated visual plankton identification,
- New technologies.

Request input from the community for up to two more session topics or workshops.

Structure

A combination of sessions and workshops, with sessions as broad topics and workshops as focused topics (such as modeling, matching observations and models, measuring rates and production, comparative studies).

Talks

Plenary: Monday morning = 30–60 minutes each to introduce the themes of the conference/sessions. Friday afternoon wrap-up and beginning of each session = 30 minutes each.

Parallel sessions – 15 minutes per talk = 10 talks per session. At most, two parallel sessions (8–10 sessions depending on length of each. Some sessions could be full-day).

Daily schedule

The basic formula is a 0900 start, with 1030–1100 coffee breaks, 1.5 hrs for lunch, and afternoon coffee break, ending by 1730.

Socials

- Reception Monday evening.
- ½-day excursion Thurs afternoon/evening.
- Heavy hors d'oeuvre and drinks poster sessions Tuesday and Wednesday evenings, with posters starting at 0600, food and drinks at 1830, all ending at 2030.

Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Plenary – Theme introductions	2 parallel sessions	Workshops	2 parallel sessions	2 parallel sessions
Lunch	Lunch	Lunch	Excursion	Lunch
2 parallel sessions	2 parallel sessions	Workshops		Poster session
				Plenary – big picture, wrap up talks
				Closing ceremony
Welcome Reception	Poster session	Poster session	Symposium Dinner	

Outcomes

A special issue of ICES Journal of Marine Science, scheduled for publication in 2012.

Symposium Convenors

- Rubén Escribano
- Julie Keister
- Delphine Bonnet

Scientific Steering Committee

- David Mackas
- Sanae Chiba
- Ángel López-Urrutia
- Catherine Johnson