

REPORT OF MODEL TASK TEAM

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The meeting of the MODEL Task Team was held from 13:30-17:30 hours on October 19, 2002. The Co-Chairmen, Dr. Bernard A. Megrey and Dr. Francisco E. Werner called the meeting to order and welcomed the participants (*MODEL Endnote 1*). The Task Team reviewed the draft agenda and it was adopted (*MODEL Endnote 2*). During the meeting, participants

- Discussed the achievements of MODEL relative to the goals and terms of reference for the CCCC Program and the MODEL Task Team;
- Developed a new plan of work;
- Generally reviewed the achievements and accomplishments of MODEL over the past year; and
- Discussed the membership of MODEL and selection of a new MODEL Co-Chairman.

MODEL accomplishments in 2002

- Held two successful joint workshops:
 - MODEL/REX Workshop to *Develop a marine ecosystem model of the North Pacific Ocean including pelagic fishes* (co-sponsored by Nakajima Foundation and Nemuro-city), January 24-27, 2002, Nemuro/Yokohama, Japan;
 - MODEL/BASS Workshop on *Using models to test hypotheses on affects of climate change on the North Pacific subarctic gyre system*, April 21-22, 2002, La Paz, Mexico.
- Published the results from the MODEL/REX Workshop in PICES Scientific Report No. 21 (2002).
- Following a request made at the 2002 Nemuro MODEL Workshop, Dr. Yury I. Zuenko (Russia) assembled a list of data from the Sea of Okhotsk that might be used to parameterize or validate the NEMURO model for that location (*MODEL Endnote 3*).

- Conducted a successful joint workshop session with the GLOBEC Focus 3 Working Group during the GLOBEC Open Science Meeting, October 18, 2002, Qingdao, People's Republic of China.

MODEL Workplan for 2003

Workshops

- Convene an inter-sessional workshop to *Embed NEMURO and NEMURO.FISH into a 3-D circulation model*;
- Begin to plan for a modeling workshop to be held in cooperation with the GLOBEC Focus 3 Working Group;
- Conduct an inter-sessional workshop with BASS to complete work on linking NEMURO to ECOATH/ECOSIM.

Topic Session at PICES XII

- Plan and convene a half-day Topic Session on *Comparison of modeling approaches to describe ecological food webs, marine ecosystem processes, and ecosystem response to climate variability* (tentative title).

Publications

- Publish the NEMURO model and its results in the primary scientific literature. Targeted outlets include the *Canadian Journal of Fisheries and Aquatic Science*, *Transactions of the American Fisheries Society*, *ICES Journal of Marine Science*, *Ecological Modeling and Progress in Oceanography*.

NEMURO extensions

- Add Fe limitation to phytoplankton production;
- Add microbial food web;
- Split ZL into copepods and euphausiids;
- Add sinking rate of phytoplankton to detritus pool;
- Consider changing model unit from nitrogen to carbon;

- Parameterize NEMURO to a coastal region;
- Continue developing methods to link NEMURO to ECOPATH/ECOSIM and to models of fish growth;
- Work toward embedding NEMURO into larger scale 3-D ocean model;
- Modify NEMURO as required to accommodate BASS and REX needs.

NEMURO diagnostics

- Validate model output against data for station A7 and the Bering Sea;
- Perform side-by-side comparison of NEMURO Box Model and NEMURO MATLAB model to same equations and data.

New group

- Establish an Experimental Design Team, with the objective to help guide and prioritize future advancements, extensions, validations, and calibrations of NEMURO.

Relations with other programs

- Establish links with other programs such as GLOBEC and ICES.

Workshop proposals and requests for travel support

MODEL Workshop in 2003

In the past year, significant progress has been made on developing NEMURO, the PICES lower trophic level marine ecosystem model. This has mainly been a result of two highly focused international workshops held in January 2000 (Nemuro, Japan) and January 2002 (Nemuro/Yokohama). Interest in the model from other CCCC Task Teams is growing and collaborative projects between MODEL, BASS and REX have been successful. To date, implementation of NEMURO has been primarily in 0-D or 1-D, and mostly used to explore seasonal variability in the eastern and western subarctic gyres. Now there is a need to couple basin-scale models with coastal system models. 3-D circulation models may provide this capability. For these cooperative endeavors to continue to be successful, extending NEMURO to include a circulation model is required.

The MODEL Task Team proposes a small workshop (8-10 people) to *Embed NEMURO and NEMURO.FISH into a 3-D circulation model*, to be held in March 2003, at Frontier Research System for Global Change, Yokohama, Japan. The participants would consist of a core group of individuals who have been the driving force behind the design and implementation of NEMURO. Drs. Michio J. Kishi (Japan), Bernard A. Megrey and Francisco E. Werner (U.S.A.) are recommended as convenors. Funding is requested for one scientist from North America to attend.

MODEL/GLOBEC Workshop in 2004

A proposal for a joint workshop on *Methods to develop models of individuals and populations* will be developed by the MODEL Task Team and GLOBEC Focus 3 Working Group in 2003. The workshop will be conducted in spring 2004, in Europe (location TBD). The plan is to focus on the representation of biological processes and how they differ regionally, to compare model conceptualization, and to perform model inter-comparisons. Possible focal points include functional response (e.g., ingestion), predator-prey relationships, starvation, predation and food condition mortality. Drs. Bernard A. Megrey, Francisco Werner and Bred de Young (Canada) are recommended as convenors. Funding is requested for one scientist to attend.

Membership and selection of MODEL Co-Chairman

The term of MODEL Co-Chairman Dr. Bernard A. Megrey was lapsing and there was discussion as to who might be suggested to take his place. It was mentioned that MODEL needed to maintain the momentum in its activity and it would be advantageous to select someone with a solid background of past model activities, goals, and interactions with other components of the CCCC Program. The Chairman of the Science Board and the Co-Chairman of the CCCC Implementation Panel would approach a few individuals to see if they might be interested¹.

¹ Dr. Shin-ichi Ito (Japan) was recommended by the CCCC-IP and approved by Science Board.

No new members were introduced but MODEL recommended that the current membership be reviewed to make sure the Task Team was composed of the appropriate mix of disciplinary points and views, and has proper international representation.

MODEL Task Team recommendations

1. Convene a MODEL workshop in March 2003, in Yokohama, Japan (hosted by the Frontier Research System for Global Change), to integrate NEMURO and NEMURO.FISH into a 3-D circulation model. Travel support for one North American participant is requested.
2. Formalize working relationships and improve communication between MODEL, GLOBEC Focus 3 Working Group on *Modeling and predictive capabilities* and ICES Study Group on *Modeling of physical/biological interactions*, through the establishment of cross-group liaisons or the exchange of ex-officio members.
 - To encourage cooperative modeling activity and to more effectively integrate across trophic levels and spatial and temporal scales;
 - To work towards identifying methods and techniques to couple biochemical, and mechanistic biological life cycle models, with the aim of including fishes as top predators.

3. Convene a half-day Topic Session at PICES XII (Seoul, Republic of Korea) on a modeling topic with the tentative title *Comparison of modeling approaches to describe ecological food webs, marine ecosystem processes, and ecosystem response to climate variability*. Request travel support for one invited speaker.
4. Work with GLOBEC Focus 2 and Focus 3 Working Groups to organize a workshop (20-30 people) to discuss the development of models for individuals and populations.
5. Re-evaluate the membership of MODEL with respect to appropriate disciplinary and international representation.
6. PICES should consider holding their science meeting in alternating years. In the “off” year, resources typically allocated toward conducting the Annual Meeting would be devoted to assisting the work conducted by Task Teams and Working Groups.

The synthesis phase of the CCCC Program will require increased activities of Task Teams. Finding the resources to support the work is an ongoing problem. Meeting every other year would accelerate the pace of research progress and provide opportunities for improving participation of junior scientists and under-represented countries (capacity building).

MODEL Endnote 1

Participation List

Members

Shin-ichi Ito (Japan)
Michio J. Kishi (Japan)
Bernard A. Megrey (U.S.A., Co-Chairman)
Hiroaki Saito (Japan)
Francisco E. Werner (U.S.A., Co-Chairman)
Yury I. Zuenko (Russia)

Observers

Ming Ge (China)
Gennady A. Kantakov (Russia)
Vladimir I. Karpenko (NPAFC)
Maki Neguchi-Aita (Japan)
S. Lan Smith (Japan)
Yasuhiro Yamanaka (Japan)

MODEL Endnote 2

MODEL Meeting Agenda

1. Review accomplishments in 2002:
 - a. Overview of a MODEL/REX Workshop to *Develop a marine ecosystem model of the North Pacific Ocean including pelagic fishes*, January 2002, Nemuro/Yokohama, Japan
 - b. Overview of a joint BASS/MODEL Workshop on *Using models to test hypotheses on affects of climate change on the North Pacific subarctic gyre system*, April 2002, La Paz, Mexico
 - c. Review of joint GLOBEC-PICES working group sessions, October 2002, Qingdao, People's Republic of China
 - d. Discuss MODEL White Paper submitted to the CCCC Integration Workshop
2. MODEL Integration Work Plan:
 - a. Main scientific question to be solved by MODEL through integration
 - b. Important and competing hypotheses generated to address the question
 - c. Methods or types of models to be developed to prove or refute the working hypotheses
 - d. Future planned workshops for hypothesis testing
3. Discuss plans for 2003:
 - a. Workshop to build a 3-D NEMURO model (Yokohama, Japan, March 2003)
 - b. Need/ideas for joint workshop(s) with REX, MONITOR and BASS
 - c. Proposed inter-sessional activities
 - d. Structure of the fish IBM for herring and saury
 - e. Links with spatially explicit models (including NEMURO)
 - f. Target-outlets for publication beyond PICES Scientific Report Series and PICES Press
4. Requests for travel to future meetings
5. Membership and selection of MODEL Co-Chairman
6. MODEL Task Team recommendations
7. Other new business

MODEL Endnote 3

Sea of Okhostk data for NEMURO

Water temperature

	sea surface	subsurface	bottom	source
winter (February)	-1.0- -1.5	-0.5- -1.5	no data	Zuenko, Yurasov, 1997
summer (August)	10-15	-1.5- 1.0	-1.5- -1.8	

monthly data are available (Figurkin)

Nutrients

seasonal data are available (Matveev)

Primary production, gC/m² day

	1994	1997	Source
summer	1...3	1...2	Naletova, p.c.

Chlorophyll a, mkg/l

	1992	1993	
summer	1.25	1.13	Mordasova, Metreveli, 1997

Net phytoplankton in the layer 200-0 m, mg/m³

	1985	1986	1991	1992	1993	1997	Source
spring		300...500					
summer		50...100	50...100	< 50	200...1000	50...100	Lapshina, 1996; Gorbatenko, 1997; Nezhlin et al., 1997
autumn	10...30						Gorbatenko, 1997
mean annual in 100-0 m						1120	Markina, Cherniavsky, 1984

Bacteria, mg/m³ in 0-50 m layer

	1992	1993	1994		Source
summer	77	292	336	Sorokin et al., 1995, 1997	

Microzooplankton, mg/m³

	1993	Source
summer	1910	Sorokin, p.c.

Net zooplankton (averaged for 80-90-s, Gorbatenko, 1997), mg/m³

	Sagitta	Amphipoda	Euphausia	Large Copepods	Small Copepods	Total
winter	376	37	774	120	100	1424
spring	341	53	336	135	211	1139
summer	113	138	514	560	456	1891
autumn	199	41	810	200	344	1712

a lot of data for certain cruises in the period since 1984 are available (Gorbatenko)

Destruction, gC/m² day

	1997	Source
summer	0.5...2	Shuntov, 2001

