THE NEWSLETTER OF THE NORTH PACIFIC ANADROMOUS FISH COMMISSION

## INSIDE THIS ISSUE



## PUBLISHED BY

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The Commission invites you to submit articles and photos or slides on NPAFC-related activities for publication in the newsletter.

Masthead photo: Fisheries Research Institute (FRI) High-Seas Archives, University of Washington

ISSN 1028-0227

Printed on recycled paper.

## PRESIDENT'S ADDRESS

As I begin my duties as president, I want to provide a few thoughts on our organization. I believe the Commission has become a model of positive and successful international cooperation. Its strength lies in the shared purpose and active efforts of member countries to ensure the conservation and sustainable use of North Pacific salmon resources for the benefit of domestic fishermen in their respective waters.

Multilateral organizations work most effectively when member countries cooperate and contribute equitably towards enforcement and scientific efforts. While membership in the North Pacific Anadromous Fish Commission (NPAFC) brings benefits in terms of conservation of salmon resources, it also involves obligations, including compliance with the prohibition of salmon fishing on the high seas of the North Pacific and responsible fishing practices consistent with the United Nations moratorium on large-scale pelagic driftnet fishing. Membership entails sharing the considerable tasks of surveillance of the North Pacific and conducting research to understand the biological aspects of North Pacific anadromous stocks. I am impressed by the cooperation and coordination among fisheries managers and scientists of NPAFC member countries in these endeavors.

There is evidence that salmon stocks in the North Pacific are vulnerable to changes in marine climate, which in turn, may be influenced by global climate change. What are the effects of marine climate changes on the distribution, abundance, and catches of salmon and other marine resources? We need intensive, comprehensive, and integrated research on anadromous stocks to answer this question and to support the conservation of salmon resources.

A workshop on climate change planned for March in Vancouver, BC, is a step in this direction (see *Climate Change & Salmon*, page 3). In addition, I would like the Commission to expand its collaborative efforts with other international research organizations in the near future.

A strong and effective NPAFC is critical to achieve conservation and sustainable use of North Pacific salmon resources. Let us build on our strengths to realize this goal.

1998 has been designated the International Year of the Oceans. Expo '98 in Lisbon, Portugal will showcase the expertise and initiatives of various countries in fisheries and ocean management. With the focus on oceans, I am sure countries will wish to renew their commitment to ensure the health of the oceans and other seas and the sustainable use of their marine resources.

I wish you all a very Happy New Year.

*—David Bevan*
*President, NPAFC*

Fuji Enterprise, Tokyo

**DAVID BEVAN**

*Top row, left to right*
**Garnet Jones, Steven Pennoyer, Loh-Lee Low, Koji Imamura, Shuji Ishida, Vladimir Fedorenko**
*Bottom row, left to right*
**Guy McMinds, Gerry Kristianson, Fran Ulmer, Irina Shestakova, Vladimir Izmailov, David Bevan**

Rennie Klymyk, Blanshard Studio, Victoria

Representatives of Canada, Japan, Russia, and the United States, the primary states of origin for salmon stocks in the North Pacific, met for the fifth annual meeting of the NPAFC. Observers from the Republic of Korea and the North Pacific Marine Science Organization (PICES) also attended. Koji Imamura, NPAFC president from 1996 to 1997, chaired the meeting. David Anderson, Minister of Fisheries and Oceans, Canada, attended the meeting to deliver a statement on behalf of his government.

The Committee on Enforcement (ENFO) reviewed unauthorized salmon fishing activities in 1997. Cooperative efforts resulted in the detection of six driftnet vessels engaged in illegal fishing operations. One of the vessels, *Nanao 55008*, was registered in the People's Republic of China (ROC); the ROC government indicated action would be taken against this vessel if sighted in an ROC port. Also, the ROC government seized the stateless vessel, *Pu Yu 6026*. The United States, in cooperation with Canada and Japan, seized the stateless driftnet vessel, *Cao Yu 6025*, fishing in the Convention area.

Member countries decided to maintain 1998 enforcement activities at similar levels to 1997 as a deterrent to the threat of potential unauthorized fishing activity. They concurred that the *Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas*, approved by the United Nations Food and Agriculture Organization (FAO) in 1993 and open for acceptance, could serve as a mechanism to obligate non-member states to support and cooperate with the objectives and principles of the Convention. Acceptance of the FAO Agreement would obligate a country to ensure that its fishing vessels not undermine the conservation measures adopted by regional fisheries organizations such as the NPAFC. Therefore, member countries decided to encourage, as appropriate, non-members to adopt it as soon as possible.

The Committee on Scientific Research and Statistics (CSRS) reviewed the status of North Pacific salmon stocks and discussed the effects of climate and ocean conditions on salmon production (see *CSRS Highlights*, page 4).

Elections were held for the 1998–99 term. David Bevan (Canada) was elected president (see *President's Address*, page 1) and Fran Ulmer (United States) vice-president. Dennis Brock (Canada) is the new Chair of the ENFO, replacing Shuji Ishida (Japan). Shuji Ishida replaces Vladimir Izmailov (Russia) as Chair of the Committee on Finance and Administration. Oleg Gritsenko (Russia) is the newly elected Chair of the CSRS, replacing Loh-Lee Low (United States).

The sixth annual meeting is scheduled for Moscow, Russia, November 1-6, 1998. ■

## NPAFC REPRESENTATIVES

### CANADA
**David Bevan**
Department of Fisheries and Oceans
**Garnet Jones**, B.C. Packers
**Gerry Kristianson**, Sport Fishing Institute

### JAPAN
**Koji Imamura**
Japan Sea Farming Association
**Shuji Ishida**
Fisheries Agency
**Nabuaki Tanaka**, Ministry of Foreign Affairs, Economic Affairs Bureau

### RUSSIA
**Vladimir Fedorenko**
Fisheries Representative in the U.S.A.
**Vladimir Izmailov**
Department of Fisheries
**Vladimir Pautov**
Dalryba

### UNITED STATES
**Guy McMinds**, Quinault Indian Nation
**Steven Pennoyer**, NOAA/NMFS
**Fran Ulmer**, Lieutenant Governor
State of Alaska

## NEW DEPUTY DIRECTOR

Hiroko Omori, the new Deputy Director of NPAFC, was introduced to the Commission in the opening address by the Japanese delegation at the 1997 annual meeting. Hiroko's home is Okayama Prefecture near Hiroshima, Japan. She studied fisheries sciences at Kyoto University, and received a BS in agriculture in 1989. Most recently, she has worked for the Fisheries Agency of Japan, International Affairs Division, Tokyo, specializing in the area of regional fisheries management organizations. Hiroko has also worked aboard a patrol vessel and as an inspector of fishing vessels at port. ■

NPAFC Archives

**SECRETARIAT STAFF**

*Standing, left to right*

Wakako Morris, Administrative Assistant

Hiroko Omori, Deputy Director

*Sitting, left to right*

Denise McGrann, Secretary

Irina Shestakova, Executive Director

For the latest information on El Niño and the Southern Oscillation, see the NOAA Office of Global Programs ENSO homepage:

http://www.ogp.noaa.gov/enso

## CLIMATE CHANGE & SALMON WORKSHOP

On March 26–27, 1998, an NPAFC workshop on climate change and salmon production will be held at the Landmark Hotel in Vancouver, BC, Canada.

### Purpose

Workshop discussions will focus on the impacts of climate change and the 1997–98 El Niño on salmon populations in the North Pacific, including impacts on smaller geographic regions, such as the Sea of Okhotsk, the Bering Sea, the Gulf of Alaska, and the coastal waters of the North America. The intent is to gain an understanding of the factors contributing to reduced salmon returns in 1997 and to provide information that would help forecast 1998 returns of salmon around the Pacific rim.

### Organization

The workshop will be organized by the NPAFC Secretariat and Steering Committee:

Oleg Gritsenko (Russia), Chair
Donald Noakes (Canada), Coordinator
Kiyoshi Wakabayashi (Japan)
Vladimir Karpenko (Russia)
Jack Helle (USA)

Sessions will include keynote and other invited presentations.

The working language of the workshop is English.

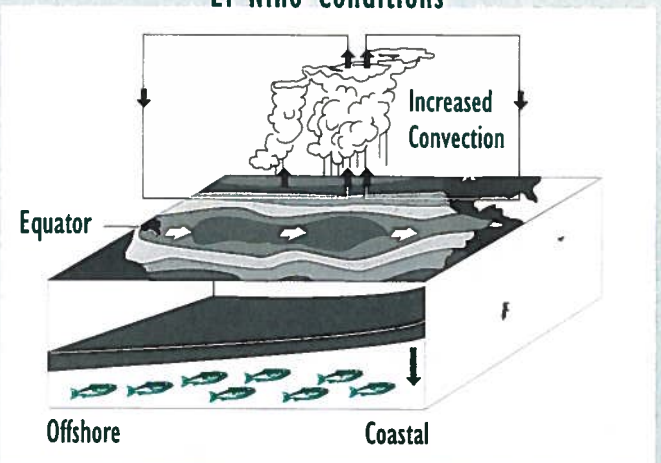
A summary report will be published by the Commission later in 1998.

### Contacts

Donald Noakes (Canada), e-mail address: noakesd@dfo-mpo.gc.ca, fax#: (250) 756-7141

The NPAFC Secretariat (Canada), e-mail address: irina@unixg.ubc.ca, fax#: (604) 228-1135.

### El Niño Conditions



# 1997 Committee on Scientific Research and Statistics

## Highlights 1996

The Committee on Scientific Research and Statistics (CSRS) met at the Commission's annual meeting in October 1997 to review the past year's scientific research and statistics and to coordinate research activities for the upcoming year. A complete summary of research findings will be published in the 1997 Annual Report.

Discussions focused on the status of Pacific Rim salmon stocks and the effects of climate change on salmon in the North Pacific Ocean. In light of dramatic low returns of some major economically-important stocks in 1997, scientists are addressing the relationship between changes in salmon abundance and ocean and atmospheric conditions. NPAFC scientists are gathering data from around the Pacific Rim, and will meet in March to discuss these issues.

(*See page 3 for information about the March workshop.*)

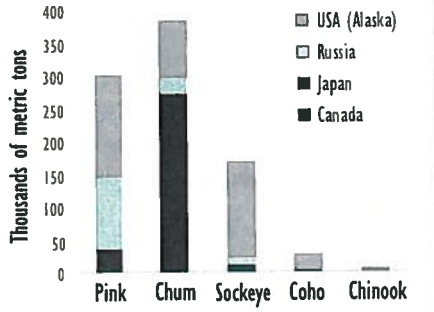
**Pacific Rim salmon catches** totaled about 890,000 metric tons (mt).

**Japan's salmon catches** totaled about 101 million fish or 297,000 mt. The largest catches were chum salmon (81 million fish), followed by pink salmon (20 million fish). Catches of other species were relatively minor.

**Russia's commercial salmon catch** totaled 154,230 mt or 94.5 million fish (81 million pink, 6.5 million chum, 6.2 million sockeye, 634 thousand coho, and 65 thousand chinook). The sport catch of all species was 442,600 salmon; pink sport catches were the largest, and subsistence catch was 1 million salmon. Foreign catches of all species within the Russian exclusive economic zone (including masu salmon) were 22,042 mt, which included 5,644 mt of sockeye.

**Canadian catches** were the lowest on record for the period 1952–1996 (31,685 mt).

**The US commercial catch** in Alaska was 176 million salmon (409,000 mt): 50 million sockeye, 21 million chum, 98 million pink, 6 million coho, and 512 thousand chinook. No information was presented on catches for other US west coast states.




**Japan released** 2.2 billion hatchery salmon, which is close to annual release levels maintained since 1983. Chum releases were 93% and pink salmon were 6% of the total release. The remaining releases were masu and sockeye salmon. Chum and pink salmon were released as fry. Masu and sockeye salmon were released as fry, juveniles, and smolts. In 1996, adult salmon captured for the enhancement program totaled about 8.3 million, of which approximately 73% was chum and 27% pink salmon.

**Russian hatcheries released** a total of 626 million salmon in 1996, including 311 million pink, 305 million chum, 2.4 million sockeye, 7.8 million coho, 0.5 million chinook, and 0.5 million masu salmon.

**Hatcheries in Alaska released** 999 million pink, 535 million chum, 75 million sockeye, 21 million coho, and 7 million chinook in 1996. No information was presented on releases in other US west coast states and Canada.

FRI High-Seas Archives, UW

**Masu Salmon, *Oncorhynchus masou*, on a weir near Ozeiki Hatchery, Plotnikova River, Kamchatka.**

# lights

## 1997

Andrew Hendry

Spawning Bristol Bay sockeye salmon, *Oncorhynchus nerka.*

**Preliminary indications** suggest that the 1997-98 El Niño/Southern Oscillation (ENSO) event could be the most intense in recent history, substantially exceeding the 1983 El Niño in intensity. Salmon catches, distribution, and migration patterns seemed to be more affected in the eastern North Pacific (particularly western Alaska and British Columbia) than in the western North Pacific.

**The Bristol Bay, Alaska sockeye catch** and total run were the lowest since 1978 (run of 18 million vs. predicted return of 33 million)—largely due to a lower-than-expected return of one stock (Kvichak). Sockeye, pink, and coho salmon showed similar patterns of weak returns to rivers in western (Bering Sea) and southwestern Alaska and average or strong returns to south central and southeastern Alaska. Chinook runs were strong in the Arctic-Yukon-Kuskokwim region and Cook Inlet.

**Preliminary data for Canadian salmon** indicate that the sharp downward trend in catches since 1990 is continuing, but overall catches will be higher in 1997 than in 1996 because sockeye escapements were higher in 1993 than in 1992.

Andrew Hendry

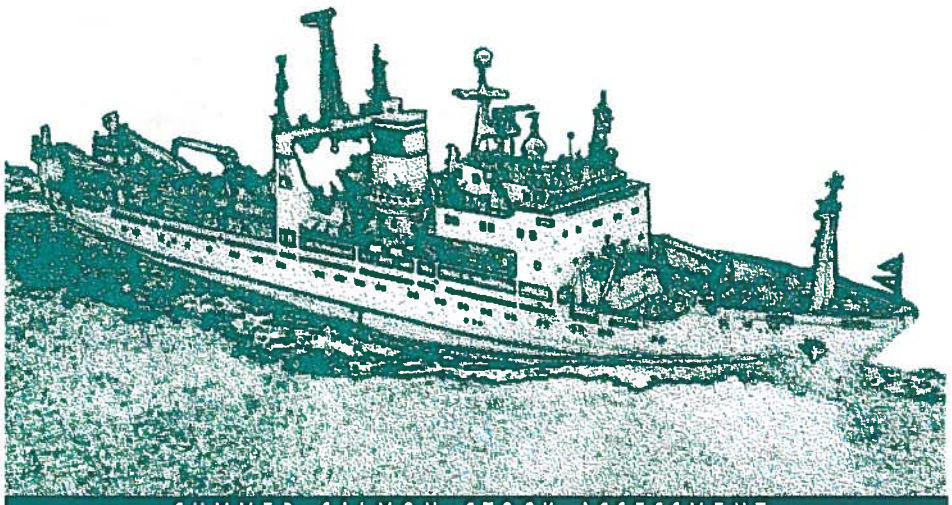
Spawning Bristol Bay sockeye salmon, *Oncorhynchus nerka.*

Due to record warm temperatures along the British Columbia coast, Fraser River sockeye returned in very high proportion through the northern Johnstone Strait route. The run size was about the magnitude predicted (17–18 million), but fish size was the smallest on record and the magnitude of the return indicated that substantially lower survival than the long-term average had occurred. It is unclear whether this was due to lower-than-average freshwater survival in the lakes as fry, lower survival in the marine environment, or both. The timing of the migration was more protracted than usual, an anomaly not noted in more northern stocks of sockeye (Skeena, Nass). Both odd-year pink and chum salmon catches appear to be well below the long-term average. Chinook catches have decreased steadily since the early 1970s, and the 1997 catch was the second lowest on record. Coho catches were by far the lowest on record.

**Russian salmon catches** were generally near forecast levels. Pink salmon catches were at or near record levels in northern and southern Kamchatka, Sakhalin, and the southern fishing area. Chum were at extremely low levels in the Amur River and in northeastern Sakhalin. Sockeye returns to the Ozernaya River were much lower than expected (3,500 mt catch vs. 5,000 mt forecast; 500,000 fish escapement vs. 1 million target), and there was no return to Chukotka. Kamchatka River sockeye catches were higher than expected. Chinook and coho returns were lower than average. Preliminary data indicate that pink salmon escapement was close to optimum in most areas. Chum and Ozernaya River sockeye escapements were insufficient. Unfavorable ocean conditions in the wintering areas of pink salmon were hypothesized to be the cause of declines in pink salmon catches in Sakhalin and the southern fishing area. In 1996–97 north winds prevailed, tropic water impinged on the wintering area, and plankton patches were dispersed. A preliminary estimate of pink salmon survival was only 25%. No anomalous conditions were noted in water masses where sockeye usually occur.

**Japanese chum salmon runs** were about 90% of the 1996 historical high level, and were 75 million fish (54 million in Hokkaido and 21 million in Honshu). Early chum salmon runs were generally larger in population and higher in return rates than later runs. Pink salmon runs were smaller than expected. Overall body sizes of both chum and pink salmon were larger than in 1996.

*—Loh-Lee Low*
*1996–97 Chair, CSRS*



## SUMMER SALMON STOCK ASSESSMENT

FRI High-Seas Archives, UW

Biological sampling on board the *Oshoro maru*.

Summer high seas stock-assessment surveys are conducted annually by the Fisheries Agency of Japan aboard four Japanese salmon research vessels (*Oshoro maru*, *Hokusei maru*, *Hokko maru*, and *Wakatake maru*). The surveys provide a valuable time series of data on oceanographic conditions, and the relative abundance, age composition, size, and maturity of salmon in the western and central North Pacific Ocean, Bering Sea, and Gulf of Alaska.

The survey results in 1997 were compared to the previous six-year mean (odd-year mean for pink salmon). Mean sea surface temperatures were significantly lower (approximately 1.2° C colder) in the western and central North Pacific and significantly higher in the Bering Sea (1.0° C warmer) and Gulf of Alaska (1.8° C warmer). Sockeye salmon abundance increased in the Bering Sea and Gulf of Alaska, and overall abundance was 19% higher. Chum salmon abundance decreased in the Bering Sea and Gulf of Alaska (9% lower overall). Pink salmon abundance increased in the Bering Sea (43% higher overall) compared to the previous odd-year mean. The abundance of coho salmon in all areas, chinook salmon in the Bering Sea, and steelhead trout in the Gulf of Alaska in 1997 was lower. There was a remarkable increase in the percentage of ocean age .2 sockeye salmon and ocean age .1 chum salmon in all areas. Changes in body size of salmon in 1997 included: (1) a decrease of the size of ocean age .2 sockeye salmon in all areas, (2) a decrease in the size of ocean age .2 chum salmon in all areas except the Bering Sea, and (3) an increase in the size of pink salmon in all areas except the Bering Sea. The percentage of immature sockeye salmon in the western North Pacific and immature chum salmon in all areas increased compared to the previous six-year mean.

*—Yukimasa Ishida*
*Fisheries Agency of Japan*

## WINTER RESEARCH

Information on the ocean ecology and status of salmon populations in the North Pacific Ocean in summer is extensive, but limited for other seasons, especially in winter when few surveys are conducted because of severe weather conditions. The results of wintertime, trans-Pacific surveys aboard the Japanese research vessel *Kaiyo maru* in December 1992 and January 1996 indicate that in winter, salmon are distributed in a narrower area and at lower sea surface temperatures (less than 8° C) than in summer. The amount of food in salmon stomachs is less in winter than in summer, possibly due to a food shortage. Zooplankton biomass is also lower in winter than in summer.

A new winter survey is underway (*Kaiyo maru*, February 1998) to address some important questions: Is salmon distribution in February limited to the same areas and sea temperatures that were observed in December and January? Can a shortage of food and severe ocean conditions in winter cause growth deterioration and mortality in salmon? What are the significant differences in salmon habitat conditions between midwinter and summer? Scientists from Canada, Japan, Russia, and the United States, cooperating under the auspices of NPAFC, are participating in the research.

*—Yukimasa Ishida*
*Fisheries Agency of Japan*

FRI High-Seas Archives, UW

Sampling salmon blood for growth and sex hormone studies aboard the *Kaiyo maru*, January 1996.

## HIGH SEAS SALMON RESEARCH AWARD

On behalf of the American Institute of Fishery Research Biologists (AIFRB), Jack Helle presented the *Outstanding Group Achievement Award* to the former International North Pacific Fisheries Commission (INPFC) at the 1997 NPAFC annual meeting.

The American Institute of Fishery Research Biologists, an internationally recognized professional society, presents this award to a group or agency whose efforts exemplify outstanding contributions to fisheries research or fisheries resource policy. The award was presented to the INPFC for their outstanding scientific contributions to understanding the life history of Pacific salmon on the high seas. The award is represented by a wooden salmonid, hand-carved in the totemic style of Native People of the Pacific Coast of North America with an engraved plaque attached. An embossed certificate also accompanies the award.

In 1953, ratifications were exchanged between Canada, Japan, and the United States to create the International Convention for the High Seas Fisheries of the North Pacific Ocean. The purpose of the Convention was to ensure the maximum sustained productivity of the fisheries resources of the North Pacific. The INPFC was established to promote and coordinate the scientific research and to recommend the required conservation measures to secure the maximum sustained productivity of fisheries of joint interest.

Prior to 1953 and the creation of the INPFC, very little was known about the geographic limits and life history of salmon on the high seas. During the more than 40 years of its existence many hundreds of scientific documents were produced including 53 volumes of the prestigious Bulletin of the INPFC. Research showed clearly that salmon from North America and Asia intermingled on the high seas. This finding made it apparent to all parties that international cooperation in research and management was imperative to conserve the Pacific salmon on the high seas.

Dick Carlson

**President Koji Imamura (right) accepting award to the former INPFC from Jack Helle.**

On February 11, 1992, the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean was signed at Moscow by Canada, Japan, the Russian Federation, and the United States. The new Convention established the NPAFC, which continues to promote the conservation of anadromous stocks of salmon in the North Pacific Ocean and its adjacent seas and serve as a forum for the cooperation and coordination of scientific research and enforcement activities.

The AIFRB recognizes the outstanding contributions to fishery science made by the INPFC. This was truly pioneering science accomplished under very harsh conditions during all seasons of the year far from land. We applaud all who were involved in this research and wish we could recognize all of you. The NPAFC is continuing the tradition of promoting and coordinating scientific research on salmonids on the high seas so impressively accomplished by the INPFC.

The award will be displayed at the Vancouver, British Columbia headquarters of the NPAFC.

*—Clark Hubbs, President AIFRB*

## FIRST NPAFC BULLETIN

Salmon are one of the most valuable fish resources in the North Pacific and play important roles in the ocean ecosystem and in the economics and cultures of Pacific Rim countries. In October 1996, NPAFC held a symposium in Sapporo, Japan to discuss important issues concerning the conservation of salmon in the North Pacific.

NPAFC is pleased to announce the publication of their first scientific Bulletin, *Assessment and Status of Pacific Rim Salmonid Stocks*. The bulletin includes a collection of 48 peer-reviewed scientific papers presented at the Sapporo symposium. Topics range from historical trends in fisheries stock condition and hatchery production to components of salmon life history and population ecology affecting stock assessment and status.

### Editors

David W. Welch
Douglas M. Eggers
Kiyoshi Wakabayashi
Vladimir I. Karpenko

### Technical Editors

Hisashi Endo and
David W. Welch

NPAFC Bulletin No. 1 is available upon request from the Secretariat.

**NPAFC and PICES cooperate in research on Climate Change and Carrying Capacity (CCCC) under the Global Ecosystem Dynamics Program (GLOBEC)**

### PICES CCCC Task Teams

**BASS**
BASin Studies in the deep Pacific Basin
Cochairs: Dick Beamish, Makoto Terazaki

**MODEL**
Conceptual and theoretical studies and MODELs
Cochairs: Ian Perry, Sinjae Yoo

**REX**
Regional EXperiments in 10 ecosystems along the continental margins
Cochairs: Anne Hollowed, Vladimir Radchenko, Tokio Wada

**MONITOR**
Coordinated MONITORing programs in the subarctic Pacific.
Cochairs: Yasunori Sakurai, Bruce Taft

In 1993, PICES and the Global Ocean Ecosystem Dynamics Program (GLOBEC) agreed to jointly organize an international science program on *Climate Change and Carrying Capacity* (CCCC) to address how climate change affects ecosystem structure and the productivity of key biological species at all trophic levels in the open ocean and coastal North Pacific. Trophic levels are the positions of organisms in a food web or pyramid. For example, in ocean food webs, the first trophic level is the primary producers, which are often single-celled plants called phytoplankton.

The primary role of the PICES-GLOBEC CCCC Program (cochairs: Yutaka Nagata and Patricia Livingston) is communication, facilitation, and coordination of studies through task teams. In 1997, three task teams (BASS, MODEL, and REX) held meetings to outline the current state of knowledge and identify cooperative research projects, which are in various stages of implementation.

BASS held a symposium, "Ecosystem Dynamics in the Eastern and Western Gyres of the Subarctic Pacific," which included invited papers on climate, nutrient dynamics, various trophic levels, and oceanic forcing. Oceanic forcing is the effect on productivity of physical factors (e.g., currents and water temperature) that are not changed by organisms at the various trophic levels within an ecosystem. Discussions on desirable future research followed, for example: studies on seasonal distribution and abundance of fish and zooplankton inhabiting surface waters, standardization or intercalibration of methods for studying and sampling midwater fish, and updating data bases of seabird distribution in the North Pacific.

MODEL convened a session at the PICES annual meeting on "Models for Linking Climate and Fish" and explored simple mass-balance models. Mass-balance models attempt to describe the rates and amounts of energy flowing between different ecosystem components.

In addition, MODEL contacted North Pacific ocean-circulation modelers to explore possibilities of making their results widely available. An inventory and description of these models, which includes contacts for access to results, will soon be available on the PICES web site or by request to the PICES Secretariat.

REX held a workshop to review the status of national research programs and to identify areas for cooperative research. Participants reviewed GLOBEC and other research programs in sessions on forcing, and trophic-level and ecosystem response. The workshop proceedings and recommendations will be published this year in the PICES Scientific Report Series.

A new task team, MONITOR, was formed at the 1997 PICES annual meeting. This team will assist in the development of a coordinated monitoring program to detect and describe events, such as El Niño, that strongly affect the Subarctic Pacific.

BASS proposed two symposiums: one at the 1998 PICES annual meeting in Fairbanks, Alaska for presentation of initial research findings of impacts from the 1997–1998 El Niño event, and another symposium in 1999 for a more complete reporting of impacts.

MODEL will convene a small workshop in 1998 to facilitate standardization or intercalibration of lower trophic level physiological models and to assemble a nutrient database.

For more information on the CCCC Program and other PICES activities see their web page: http://pices.ios.bc.ca/.

*—Pat Livingston*
*e-mail: Pat.Livingston@noaa.gov*
*Cochair, PICES CCCC Program*