



# ENFORCEMENT EVALUATION AND COORDINATION MEETING

MAY 14-17, 2001, PETROPAVLOVSK-KAMCHATSKY, RUSSIA

REPRESENTATIVES FROM CANADA, Japan, Russia and the United States met in Petropavlovsk-Kamchatsky, Russia from May 14-17, 2001 for the annual EECM. The EECM was proposed and accepted by the NPAFC Committee on Enforcement (ENFO) during the Annual Meeting in November 2000. Russia offered to host the meeting, with arrangements coordinated by the North-East Region Directorate, Federal Border Service (NRD-FBS). While in Petropavlovsk, participants conducted an enforcement patrol of the Convention Area on board a U.S. Coast Guard C-130 patrol aircraft, and visited a fish processing cooperative and a salmon hatchery.

The meeting opened with remarks from Mr. Vladimir Fedorenko, Executive Director of the NPAFC, and from Lieutenant Commander Greg Busch, who stood in for Captain Vince O'Shea, ENFO Chairman. The meeting included discussion by each Party on enforcement efforts and results; evaluation of the work produced by the *ad hoc* patrol coordination group; enforcement plans for the remainder of 2001; organizational structure of the agencies primarily responsible for High Seas Driftnet (HSDN)

enforcement; points of contact for HSDN cases; and information needs to improve and standardize enforcement practices. The Parties broadly exchanged information on lessons learned and stressed the importance of better communication, coordination of effort and information sharing. All Parties validated their points of contact and method for sharing information.

The operational highlight of the meeting was the first ever enforcement patrol of the Convention Area by a U.S. Coast Guard C-130 patrol aircraft staged out of Petropavlovsk-Kamchatsky with representatives from each Party. The flight did not detect any illegal activity within the Convention Area, however, it did detect a vessel illegally driftnet fishing about 15 nautical miles inside the Russian Exclusive Economic Zone. The Federal Border Service ship *DZERZHINSKY*, which was on patrol within the Convention Area, intercepted and boarded the vessel and determined that it was in violation of Russian Law. The vessel, which was later identified as the fishing vessel *SAKHFRAKHT-3*, was directed to

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EECM participants after C-130 flight.  
Photo by Greg Busch

# RESEARCH PLANNING & COORDINATING MEETING

MARCH 19–20, 2001, SEATTLE, WA, U.S.A.

IN MARCH, THE NPAFC Research Planning & Coordinating Group (RPCG) met in Seattle, USA. In her opening remarks, NPAFC President F. Ulmer summarized issues related to salmon and environmental changes. She pointed out the importance of large-scale, multi-year international cooperative research and the need for consistent data collection by all countries to provide basic information on salmon. She also emphasized that NPAFC is in a good position to coordinate research on these issues, and encouraged the RPCG to develop a specific project-oriented plan. The Group reviewed the 2001 CSRS workplan; cruise activities; exchange of biological samples, data, and personal; publications; and cooperation with relevant international organizations.

## Science Sub-Committee (SSC)

SSC considered two topics: (1) Research plans of all countries, including joint studies of salmon in the Bering Sea, and (2) NPAFC publications, in particular, publication of review reports presented at the juvenile workshop on October 29, 2000 in Tokyo. SSC discussed the proposals for studies in various regions of the Bering Sea. Aiming at the implementation of the program of studies in the Bering Sea, SSC recommended the following schedules: (1) to develop a proposal for studies of salmon in the Bering Sea; (2) to circulate a proposal among the representatives of all Parties for their consideration and amendments; (3) to submit the revised and amended version to the NPAFC President for further consideration and obtaining financial support. SSC also discussed and adopted a decision on the requirements to the format, review procedure and final version of the review papers of the juvenile workshop.

## Working Group on Stock Assessment

The Working Group discussed reporting of catch statistics, and the NPAFC contribution to the North Pacific Ecosystem Status Report. They agreed to provide catch statistics for preparation of a report for the Annual Meeting in October 2001. The report will include records from 1970 to 2000, and preliminary estimates for the 2001 season. It was also agreed that the preliminary 2001 catch report will include a brief description of significant fishery and stock results. It was noted that final catch statistics for the 2000 fishing season are not yet available for all members, and will be provided at the Annual Meeting. For the North Pacific



*EECM in session.*

*Photo by Greg Busch*

## EECM 2001

*(continued from page 1)*

recover driftnets left in the water and escorted to port for further action by Russian authorities.

The participants also toured the Seroglazka Fish Processing Plant Cooperative and the Malkinsky Fish Hatchery, one of five salmon hatcheries located on the Kamchatka Peninsula. Plant and hatchery managers provided the participants with outstanding tours of their facilities. The Hatchery Manager stated that the philosophy of all five hatcheries is to augment natural runs without negatively impacting returns. The Malkinsky Hatchery releases approximately 1.3 million chinook and sockeye salmon smolt each year and expects returns of between 10,000 and 65,000 adult salmon.

The meeting was highlighted by receptions hosted by the NRD-FBS, Kamchatrybvod and the NPAFC Secretariat. In addition, the Malkinsky Fish Hatchery hosted a dinner for the participants, along with an opportunity to visit a local hot spring. The receptions and dinner allowed participants to strengthen relationships and provided an important opportunity to exchange views in an informal and friendly setting. This meeting was the first of its type ever hosted by the Russian Federation, and was the result of two years of planning by the Committee on Enforcement. The great success of this meeting was the direct result of the hard work of both the meeting hosts as well as the attendees.

*LCDR Greg Busch  
Seventeenth Coast Guard District  
U.S.A.*



Ecosystem Status Report sponsored by PICES, members agreed to provide information on the availability of time series of data for catches, escapements and hatchery releases. The data sets will be identified by species, for fisheries and geographic areas within each country, to be specified by each country. This will provide the basis for selection of data for a report on the status of North Pacific salmon stocks. This report could be presented to the joint meeting on the marine mortality of salmon in the North Pacific and North Atlantic Oceans, and the Baltic Sea in March 2002, as well as NPAFC's input to the PICES report.

### **Working Group on Salmon Marking**

The Working Group discussed three items:

(1) coordination of marks to minimize duplication between countries; (2) creation of common database of mark releases and web access of the database; and (3) publication of the proceedings of the workshop on salmonid otolith marking. They agreed that each country or region should have a thermal mark coordinator who could help mitigate problems in the event that conflicts arise during the period of thermal marking. Members of the working group would serve in that role initially for their respective countries. The format of a common database has been agreed upon by the Parties and preliminary data has been provided and is contained in spreadsheets maintained by the Secretariat. The proposal for the design and layout of the web pages was prepared by the Japanese Party. It was agreed that such a format would be acceptable. Timing of the transfer of the data to a database for web access will depend on availability of resources from the Secretariat and assistance from the U.S. Party. The published proceedings from the workshop on salmonid otolith marking should be available by the next Annual Meeting. The workshop coordinators will serve as the editors of the publication.

### **Ad Hoc Working Group on Stock Identification**

The status of existing genetic (allozyme) databases were discussed and reviewed. The most current chinook salmon database was presented to the Commission in 1999. Development of a standardized baseline for sockeye salmon is presently being coordinated by laboratories of the U.S. Party. Each laboratory will provide internally standardized allele samples from 35 to 70 of the highest frequency alternate alleles to be analysed at the Alaska Department of Fish and Game, Anchorage. Standardized baselines from each lab will be combined, and the baseline will be tested through simulations. Submission of an NPAFC document describing potentially identifiable groups of sockeye salmon from the

Pacific Rim is planned for 2001. The chum salmon database has been used and tested extensively by the Parties. It is currently undergoing a significant revision with new submissions from the Parties. New (unpublished) data are available from Russia, Japan, and United States (Alaska); in addition, published data from 117 populations from Southeast Alaska, British Columbia, and Washington will be added. It will be distributed to interested Parties in 2001 and formally reviewed in a document planned for the 2001 Annual Meeting.

### **COOPERATION WITH RELEVANT INTERNATIONAL ORGANIZATIONS**

P. Livingston, PICES representative, provided information about the North Pacific Ecosystem Status Report and the Workshop on "Impact of Climate Variability on Observation and Predation of Ecosystem and Biodiversity Changes in the North Pacific", which was held in Honolulu, Hawaii on March 7-9, 2001. Y. Ishida, Chairman of the CSRS, reported to the RPCG on the status of the preparation for the Joint Scientific Meeting on the marine mortality of salmon in the North Pacific and North Atlantic Oceans, and the Baltic Sea by NPAFC, NASCO, IBSFC and other international organizations. The RPCG members agreed on the dates (March 14-15, 2002), a tentative agenda, and other issues related to the meeting. The Secretariat will forward the result of the group's discussion to NASCO and IBSFC for their consideration.

*Yukimasa Ishida  
CSRS Chairman*



*NPAFC President Fran Ulmer and CSRS  
Chairman Yukimasa Ishida at the RPCM.*

*Photo by NPAFC*

# NPAFC INTERNATIONAL WORKSHOP ON SALMONID OTOLITH MARKING

MARCH 21, 2001, SEATTLE, WA, U.S.A.

THE NORTH PACIFIC ANADROMOUS FISH COMMISSION (NPAFC) held an international workshop, "Salmonid Otolith Marking" on March 21, 2001 at the University of Washington in Seattle, U.S.A. Salmonid otolith marking technologies have been well developed during the past two decades, and North Pacific Rim countries have initiated mass releases of marked juveniles in order to get information on the biology and management of Pacific salmon. The purpose of the workshop was to exchange information on recent otolith marking technologies and the application of these techniques among countries. The workshop included 14 oral and three poster presentations with 70 participants.

How to mark small juvenile salmon without injury has long been a concern for salmonid researchers and managers. Thermal otolith marking is a universal way to mark large numbers of hatchery salmon during embryonic and yolk absorption stages, creating distinct mark patterns in the otoliths by water temperature controls. Similar otolith marks are produced by the dry method developed by Russian scientists. This technique can provide high quality otolith marks without special equipment. Chemical otolith marks using strontium or fluorescent substances may be used to supplement mark patterns in hatcheries, because the number of unique thermal or dry marking codes is limited.

In 2000 approximately one billion otolith marked juvenile salmon were released from hatcheries in North Pacific Rim countries. Many marking objectives have been achieved without organized rules for pattern assignment. A standardized system of organizing pattern information on otoliths potentially offers a larger number of patterns, and also provides the opportunity for coordinating marks between countries to avoid mark duplications in mixed-stock fishery analysis. The NPAFC Working Group on Salmon Marking would play an important role by coordinating otolith mark patterns among countries and creating an Internet-accessible database of otolith mark releases.

To know how we can apply otolith-marking technologies to the biology and management of salmon is essential. The early applications of otolith marking techniques supported scientific research to distinguish wild and hatchery salmon during early sea life. A recent rapid increase in the number of otolith mark releases has made it possible to track the migration of specific salmon stocks throughout their entire ocean life from coastal waters to the high seas. Current salmon research using otolith marks includes ocean distribution, migration speed, abundance, feeding success, growth, and straying of otolith-mark groups, and interactions between wild and hatchery stocks.

Applications of otolith marking for stock assessment and management of fisheries have increased in recent years. In Alaska an otolith marking and recovery program for in-season stock management is well established. Mass otolith marking is an effective tool for estimating the contributions of hatchery fish to overall natural spawning escapement. To minimize the effect of hatchery production on wild salmon populations, this information is critical.

The North Pacific Rim countries (Canada, Japan, Russia, and USA) are successfully conducting mass otolith mark releases under common rules. Otolith mark recovery data will enable us to develop a valuable time series of stock-specific biological information that is indispensable to the sustainable conservation of salmon stocks in the North Pacific area.



*A snapshot at the Workshop.  
Photo by NPAFC*

*Shigehiko Urawa  
Co-Chair of the Workshop Coordinators*



# CLIMATE CHANGE AND THE STATUS OF MARINE LIVING RESOURCES OF THE RUSSIAN FAR EAST

**THE CORRELATION BETWEEN CLIMATE CHANGES** and population fluctuations of marine living resources in the northern part of the Pacific Ocean, including the main fishing species in the seas of the Russian Far East, is well known and discussed in the many works of Russian scientists (Klyashtorin 1994; Moiseev 1996; Shuntov et al. 1993). In some cases, these changes are so important for the coastal fisheries and native population of these areas that they are called "waves of life." As a rule, the climate changes (decrease or increase of water temperature under the effect of atmospheric circulation) mostly affect pelagic species with short life cycles. For the northern part of the Pacific Ocean, these species are Japanese pilchard, Californian sardine, herring, and Pacific salmon; for the southern part of the Pacific Ocean, they are Pacific sardine and Jack mackerel. The scientific analysis of the last few years also shows that the pollock population can fluctuate depending on climate changes. Figure 1, based on the data of Klyashtorin (1996), shows the changes in catches of different species in the Pacific Ocean, and herring in the Atlantic Ocean, in the 20th Century. There is a clear trend toward the increase in catches in 1930–1940 and 1980–1990 for Japanese pilchard, Californian sardine, salmon and pollock. For the same periods of time, catches of Pacific herring, Peruvian anchovy and Atlantic herring were declining (Klyashtorin 1996).

The specific mechanisms of these occurrences are not clear yet, but these factors must be taken into consideration when managing living marine resources in the North Pacific Ocean, as well as in making investment decisions in fisheries.

It is becoming obvious that fish resources are very sensitive both to the intensity of fishing operations and to the climatic changes that affect environmental conditions and changes in the fish population.

Russian scientists foresee changes in the marine ecosystems of the North Pacific Ocean in the end of the 20th and beginning of the 21st Century. This might result in the decline of population not only of Japanese pilchard (this is a fact already), but also the decline of the salmon and pollock populations. At the same time the herring population is to further increase.

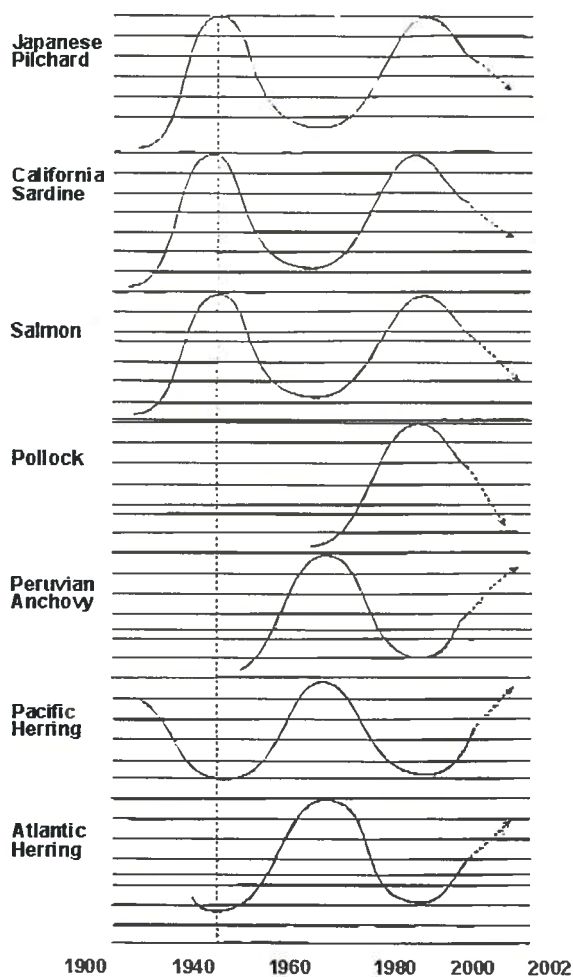


Fig. 1. Catch fluctuations of selected species depending on climate change (Klyashtorin 1996).



Professor  
Vyacheslav K. Zilanov  
NPAFC President  
1993–1995

# INCREASE IN BODY SIZE WITH DECREASE IN POPULATION SIZE OF CHUM SALMON RETURNING TO HOKKAIDO, JAPAN SINCE LATE 1990s

JAPANESE CHUM SALMON STOCKS have rapidly increased in number from the late 1970s owing to successful hatchery technology and favorable oceanic conditions. Population dynamics of salmon in the North Pacific are known to be dependent on long-term variations in the climate. Recently, due to a new regime shift, salmon stocks, which have been on the increase since the 1980s, have begun to decline in the late 1990s. It has been discovered that the body size of chum salmon returning to Japan decreased with the increase in population size, and that the mean age at maturity grew older. As to their possible causes, several hypotheses have been presented, for instance, changes in sea surface temperature and salinity, genetic directional selection to larger fish by fishing gear, and global warming. It has been our firm belief that the factor controlling the phenomenon is the population density-dependent effect. The reasons are that a) the oceanic conditions for salmon in the North Pacific have been favorable since the 1980s, resulting in both an increase in the biomass and survival rate of Japanese chum salmon popula-

tions; b) decrease in body size and aging have occurred simultaneously; and c) due to this fact, there is no possibility of genetical selection working on the adults at the time of capture and the taking of roe. As aforementioned, chum salmon returning to Hokkaido took a downward trend after peaking out at about 54 million in 1995 and declining to approximately 32 million in 2000. Figure 1 shows the changes over the years in the population size of Hokkaido chum salmon and mean fork length of female four-year chum returning to eleven rivers in Hokkaido from 1953 to 1999. As can be seen, the body size of adult chum increased with the decline in returns. The relationship between the biomass and body size indicates significant negative correlation (North Pacific biomass:  $r^2=0.762$ ,  $P<0.001$ , Hokkaido biomass:  $r^2=0.745$ ,  $P<0.001$ , Fig. 2). The facts suggest a clear effect of the biomass on the changes in body size, supporting the hypothesis that it is the result of the population density-dependent effect.

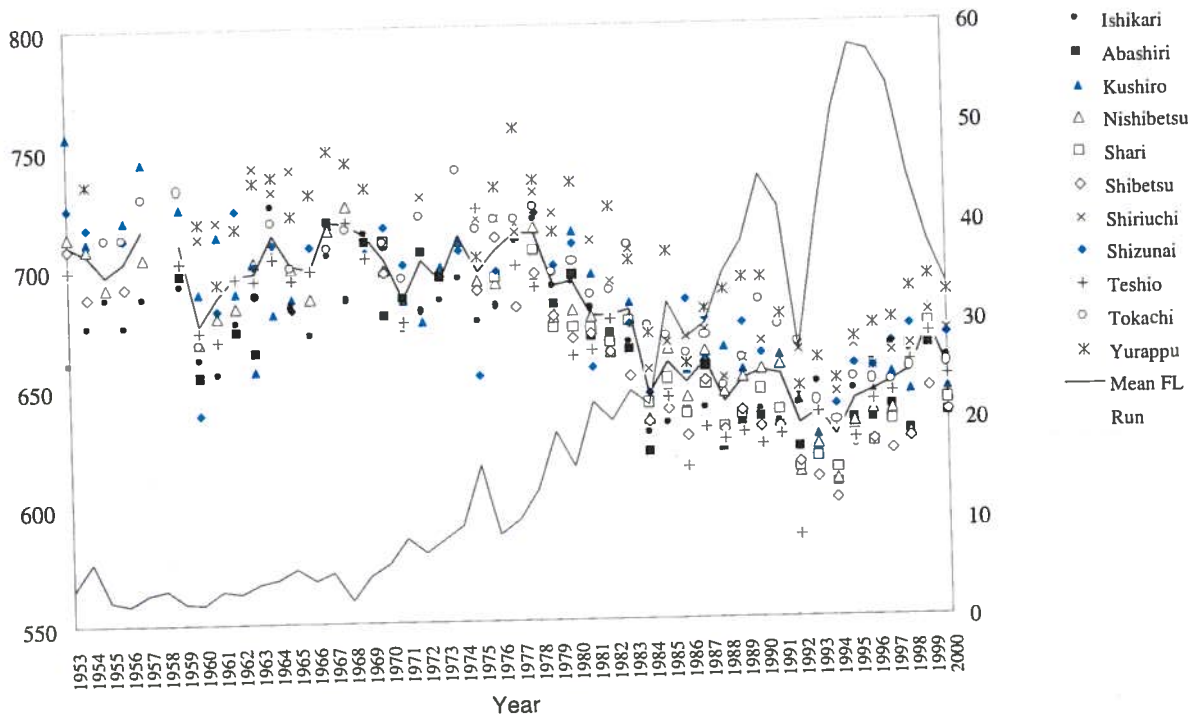


Fig. 1. Annual changes in population size and mean body size of 4-age female adults returning to 11 rivers in Hokkaido chum salmon in 1953–2000.

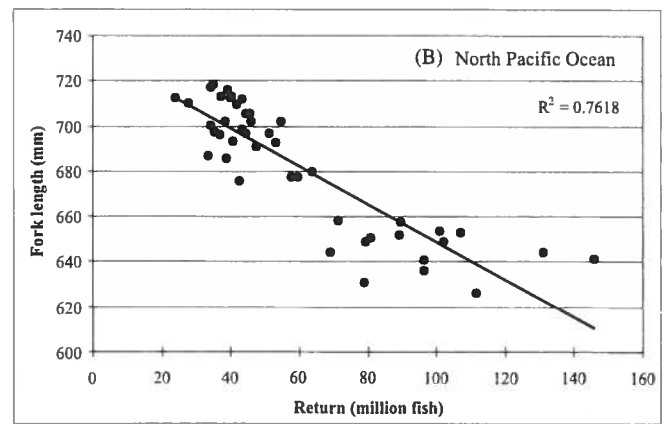
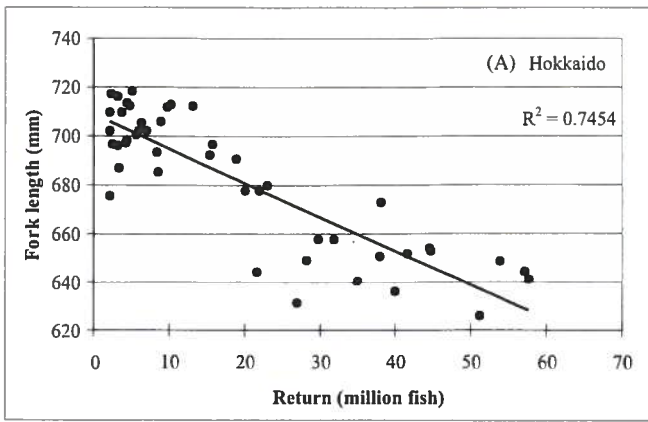


Fig. 2. Relationships between return to Hokkaido (A) and to North Pacific Rim nations (B)

By the way, although release of salmon fingerlings has decreased somewhat in recent years, there has been no major drop in the number of juvenile hatchery salmon released in Hokkaido (about a billion is released per year). Hatchery technology has not undergone any change. Thus, the fall in returns suggests a decline in the survival rate of Hokkaido chum salmon stock. It indicates that the increase in enhanced salmonids is not the cause, as has been feared, of smaller and older adult salmon returns, but then, at what point has the survival rate dropped? The larger body size of the returning adult salmon does not support the possible decline in the carrying capacity of the North Pacific. Then, are juvenile salmon diminished during their early ocean life? It is a priority matter and we must rally our research efforts to find an answer.

Masahide Kaeriyama<sup>1</sup> and Kiyoshi Katsuyama<sup>2</sup>

<sup>1</sup>Hokkaido Tokai University, Japan

<sup>2</sup>Fisheries Agency of Japan



Photos: (above) Spawning of chum salmon.

(right) Alevins of chum salmon.

by National Salmon Resources Center, Japan





# News from Secretariat

**Joint Meeting on the Causes of Marine Mortality of Salmon in the North Pacific and North Atlantic Oceans, and in the Baltic Sea** will be held in Vancouver, Canada on March 14–15, 2002, organized by North Pacific Anadromous Fish Commission (NPAFC), North Atlantic Salmon Conservation Organization (NASCO), and International Baltic Sea Fishery Commission (IBSFC). The focus of the meeting is to review new information on the causes behind recent changes in the ocean mortality of salmon. Its objective is to compare the increased marine mortality of salmon stocks observed in recent years in the North Pacific and North Atlantic Oceans and in the Baltic Sea. It is hoped that comparison of this information will lead to a better understanding of the mechanisms which have resulted in increased marine mortality in recent years, identify research priorities, and stimulate increased cooperation and exchange of information in the future.

## Provisional Agenda

1. Introduction (Opening remarks)
2. Status of salmon stocks and fisheries
3. Possible factors associated with increased marine mortality
  - (a) Climate
  - (b) Fish farming, enhancement, and ocean ranching
  - (c) Predation and competition
  - (d) Migration, post smolt survival, and ocean rearing areas
  - (e) Ecosystem changes and effects on salmon
  - (f) Freshwater life-history
  - (g) Other relevant factors

## Speakers

The speakers will be nominated by NPAFC, NASCO, IBSFC, and other international organizations and selected by the Organizing Committee.

Please visit [www.npafc.org](http://www.npafc.org) for further information.

**Second International Symposium on Stock Enhancement and Sea Ranching** (NPAFC co-sponsored) will be held in Kobe, Japan on January 28–February 1, 2002. The Symposium will focus on topics such as techniques for releasing juveniles and evaluating stocking effectiveness; conservation of natural stocks; utilization of enhanced stocks; and specific sea ranching projects. Various target species such as marine fish (including salmonids), crustaceans, cephalopods, and other shellfish will be considered. Please visit [www.jasfa.or.jp/english/symposium/index.htm](http://www.jasfa.or.jp/english/symposium/index.htm) for further information.

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<http://www.npafc.org> for more information  
on events, publications, scientific  
documents, and salmon catch statistics.

## 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: Port Petropavlovsk-Kamchatsky. Photo by Wakako Morris.

ISSN 1028-0227

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