NORTH PACIFIC ANADROMOUS FISH COMMISSION

Established by Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean.

ANNUAL REPORT 1996

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LETTER OF TRANSMITTAL

In compliance with Rule 17(f) of the Rules of Procedure, it is my pleasure as President of the North Pacific Anadromous Fish Commission to present my compliments to the Parties and their Representatives and to transmit herewith the Fourth Annual Report of the North-Pacific Anadromous Fish Commission.

KOJI IMAMURA
PRESIDENT
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I. INTRODUCTION

The North Pacific Anadromous Fish Commission (the Commission) was established under the provisions of Article VIII of the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed at Moscow on February 11, 1992 by Canada, Japan, the Russian Federation and the United States of America (original Parties). The Convention entered into force on February 16, 1993. The States which negotiated and signed the Convention are the major States of origin for salmon stocks in the North Pacific Ocean.

1. SHORT INTERPRETATION OF THE CONVENTION

(1) Foundation and Goals of the Convention

The Convention is based on the recognition that anadromous stocks intermingle extensively during their migrations on the high seas of the North Pacific; that the States of origin have the primary interest in and responsibility for such stocks; that the fisheries for anadromous stocks should be conducted only in waters within the 200-mile zones and that the States of origin make expenditures and forego economic development opportunities to establish favourable conditions to conserve and manage these stocks.

The Convention also recognizes the importance of scientific research for the conservation of anadromous stocks in the North Pacific Ocean and the desire of the major States of origin to promote the acquisition, analysis and dissemination of scientific information pertaining to anadromous stocks and ecologically related species in the North Pacific Ocean as well as to coordinate efforts and to establish an effective mechanism of international cooperation for their conservation.

The goal of conservation is consolidated by such measures as: (a) prohibition of directed fishing for anadromous fish in the Convention Area; (b) minimization to the maximum extent of the incidental taking of anadromous fish; and (c) prohibition of the retention on board a fishing vessel of anadromous fish taken as an incidental catch during fishing for non-anadromous fish.


(2) Convention Area

The area to which the Convention applies is the waters of the North Pacific Ocean and its adjacent seas, north of 33° N.Lat. beyond the 200-mile zones of the coastal States. For scientific purposes the activities under the Convention may extend farther southward in the North Pacific Ocean beyond the 200-mile zones.

(3) Species

The anadromous fish covered by the Convention are as follows: chum salmon, coho salmon, pink salmon, sockeye salmon, chinook salmon, cherry salmon, steelhead trout.

(4) Scientific Approach

The Convention authorizes fishing for anadromous fish in the Convention Area for scientific research purposes under national and joint research programs approved by the Commission. It is understood that such taking of anadromous fish for scientific research purposes must be consistent
with the needs of a program and with the provisions of the Convention and should be reported to the Commission.

The Parties to the Convention cooperate in the conduct of scientific research in the Convention Area, which may include, as appropriate, research on other ecologically related species. The Parties also cooperate in collecting, reporting and exchanging biostatistical information, fisheries data, including catch and fishing effort statistics, biological samples and other relevant data pertinent to the purposes of the Convention.

The Parties upon the Commission's request provide catch, enhancement and other technical information and materials pertaining to areas adjacent to the Convention Area from which anadromous stocks migrate into the Convention Area. The Convention provided for the development of cooperative programs, including observer programs, to collect fishing information in the Convention Area for the purpose of scientific research. The Convention also provides for cooperation in scientific exchanges such as seminars, workshops, and exchanges of scientific personnel.

(5) Measures to Promote Compliance with the Convention by Non-Members

The Parties invite the attention of any State or entity not party to the Convention to any matter relating to their fishing activity which could negatively affect the conservation of anadromous stocks within the Convention Area and agree to encourage them to adopt laws and regulations consistent with the provisions of the Convention.

The Parties shall not transfer the registration of the vessels registered under their respective laws and regulations for the purpose of avoiding compliance with the provisions of the Convention.

The Parties take actions individually or collectively in accordance with international and their respective domestic laws to prevent unauthorized fishing activities by any State or entity not party to the Convention and trafficking in illegally harvested anadromous fish.

(6) Enforcement

All necessary measures shall be taken by each Party to ensure its nationals and fishing vessels flying its flag comply with the provisions of the Convention. Each Party has the authority to board, inspect and detain fishing vessels of the other Parties found operating in violation of the Convention. Article V of the Convention gives the details of the enforcement mechanism and provides that only the authorities of the Party to which the violating person or vessel belongs may try the offense and impose penalties. It is also stipulated that imposed penalties shall be commensurate with the serious nature of the infractions.

The Parties cooperate in exchange of information on any violation of the provisions of the Convention and on enforcement action. The Parties exchange their enforcement plans.

(7) Accession to the Convention

Other States may accede to the Convention at the invitation of the Original Parties by unanimous agreement. The Convention shall become effective for any such other State on the date of deposit of that State's instrument of accession.
(8) **Withdrawal**

Any Party may withdraw from the Convention 12 months after the date on which it formally notifies the Depositary of its intention to withdraw.

(9) **Depositary**

The Government of the Russian Federation is the Depositary.

2. **SHORT DESCRIPTION OF THE COMMISSION**

(1) **Objective**

The objective of the Commission is to promote the conservation of anadromous stocks in the Convention Area. The Commission may also consider matters related to the conservation of ecologically related species in the Convention Area.

(2) **Authority**

The Commission has the authority to:

2.1 **Conservation**

Recommend to the Parties measures for the conservation of anadromous stocks and ecologically related species in the Convention Area.

2.2 **Exchange of Information**

Promote the exchange of information on any activities contrary to the provisions of the Convention, especially with respect to fishing for and trafficking in anadromous fish, as well as on responsive action taken by the Parties and, as appropriate, by any State or entity not party to the Convention.

2.3 **Schedules of Penalties**

Consider and make proposals to the Parties for the enactment of schedules of equivalent penalties for activities contrary to the provisions of the Convention.

2.4 **Relief of Damages**

Consider possible means to relieve the damage which may be suffered by a State of origin as a result of fishing in violation of the Convention and, for that purpose, develop methods to identify the origin of fish which may be taken in violation of the Convention.

2.5 **Enforcement**

Review, evaluate actions taken, and recommend additional action to be taken by the Parties to ensure effective and diligent enforcement of the provisions of this Convention.
2.6 Scientific Research

Promote the exchange of catch and effort information in respect of activities of Parties and, as appropriate, any State or entity not party to the Convention for conducting scientific research and for coordinating the collection, exchange and analysis of scientific data regarding anadromous stocks and ecologically related species, including data to identify the location of origin of anadromous stocks, and provide a forum for cooperation among the Parties with respect to such anadromous stocks and ecologically related species.

2.7 Certificates of Origin

Consider and make proposals to the Parties for the enactment of a program for certificates of origin attesting that products of anadromous fish are from fish which were lawfully harvested.

2.8 Cooperation with International Organizations

Cooperate, as appropriate, with relevant international organizations, inter alia, to obtain the best available information, including scientific advice, to further the attainment of the objectives of the Convention.

2.9 Cooperation with Other States and Entities

Where appropriate, invite any State or entity not party to the Convention to consult with the Commission with respect to matters relating to the conservation of anadromous stocks and ecologically related species in the Convention Area.

2.10 Incidental Taking of Anadromous Fish

Recommend measures to avoid or reduce incidental taking of anadromous fish in the Convention Area.

2.11 Other Measures

Recommend to the Parties any measures needed to further the attainment of the objectives of the Convention.

2.12 Amendments

Recommend amendments to this Convention and to the Annex to the Convention.

(3) Status

The Commission has legal personality and such legal capacity in its relations with other international organizations and in the territories of the Parties as may be necessary to perform its functions and achieve its ends. The immunities and privileges which the Commission and its officers enjoy in Canada are subject to the Headquarters Agreement between the Commission and the Government of Canada.
(4) **Headquarters**

The Headquarters of the Commission is located at Vancouver, Canada. The mailing address is:

6640 Northwest Marine Drive  
Vancouver, B.C. V6T 1X2  
Canada  
Phone: (604) 228-1128  
Fax: (604) 228-1135  
e-mail: wmorris@unixg.ubc.ca

(5) **Secretariat**

The Commission established a Secretariat composed of Executive Director, Deputy Director, Administrative Assistant and Secretary.

(6) **Languages**

The Commission has three official languages: English, Japanese, and Russian. All regular meetings of the Commission are provided with simultaneous translation into the above official languages. The Annual Report of the Commission is produced in three official languages.

(7) **Representation**

Each Party is a member of the Commission and may appoint to the Commission not more than three representatives, who may be accompanied at the meetings of the Commission by experts and advisers.

(8) **Structure**

The Commission may establish such subordinate bodies as it deems necessary. The Commission has established three committees: Scientific Research and Statistics (CSRS), Enforcement (ENFO), Finance and Administration (F&A). There were further established the Science Sub-Committee and several working groups under CSRS and ENFO umbrellas.

(9) **Votes**

Each Party has one vote in the Commission. All important matters shall be decided by consensus among all Parties that are States of origin of anadromous stocks which migrate into the Convention Area. A matter shall be deemed to be important if any Party that is a State of origin of anadromous stocks which migrate into the Convention Area considers it to be important.

(10) **Officers**

The Commission elects a President and a Vice-President for a two-year term. They shall not be representatives of the same Party.
11) Meetings

The Commission meets at least once annually. Any meeting of the Commission other than the regular annual meeting may be called by the President at such time and place as the President may determine, upon the request of a Party with the concurrence of another Party, provided that at least one of these two parties is one of the original Parties.

12) Rules


13) Budget

The budget of the Commission is divided equally among the Parties. Each Party pays the expenses incurred by its representatives, experts and advisers. The Parties conduct scientific and enforcement activities in the Convention Area at their own expense.

14) Publications

The Commission publishes an Annual Report, and a Statistical Yearbook. In addition, the Commission shall publish such reports from time to time as it may deem desirable.


The Inaugural Meeting of the Commission was held in Ottawa, Canada, on February 24, 1993.

The Meeting of Sub-Committee on Enforcement was held in Vancouver, Canada, on April 27-29, 1993.

The Inaugural Meeting of the Committee on Scientific Research and Statistics was held in Vladivostok, Russia, on June 22-24, 1993.

The First Annual Meeting of the Commission was held in Vancouver, Canada, on November 1-5, 1993.

The Second Annual Meeting was held in Vladivostok, Russia, on October 10-15, 1994.

A Research Planning and Coordinating Meeting was held in Seattle, U.S.A., on March 6-10, 1995.

The Third Annual Meeting of the Commission was held in Seattle, U.S.A., on November 5-10, 1995.

The Fourth Annual Meeting of the Commission was held in Tokyo, Japan, on October 21-25, 1996.

An International Symposium on Assessment and Status of Pacific Rim Salmon Stocks was held in Sapporo, Japan, on October 28-29, 1996.
The Annual Report summarizes the activities of the Commission in 1996. The Report includes all major discussions, which took place at the Fourth Annual Meeting in Tokyo, Japan.

The 1996 Annual Report is printed in English, Japanese and Russian. (October 21-25, 1996), as well as information on the International Symposium on Assessment and Status of Pacific Rim Salmon Stocks.
II. FOURTH ANNUAL MEETING - 1996

1. TIME AND PLACE OF MEETING

The Fourth Annual Meeting of the Commission was held at the Ministry of Foreign Affairs in Tokyo, Japan, from October 21 to 25, 1996. Plenary sessions were held under the chairmanship of Mr. Koji Imamura (President of the Commission); the first session on October 23, and the second (final) session on October 25.

The Committee on Enforcement (ENFO) met on October 21 and 22, with Mr. S. Watanabe of Japan as Chairman.

The Committee on Scientific Research and Statistics (CSRS) met from October 21 to October 24, with Dr. L.L. Low of USA as Chairman.

The Committee on Finance and Administration (F&A) met on October 24 with Mr. V. Izmailov of Russia as Chairman.

2. PARTICIPANTS

North Pacific Anadromous Fish Commission
Fourth Annual Meeting
21-25 October 1996 Tokyo, Japan

(Left to right) Hisashi Endo, Yasuo Takase, Satoshi Watanabe, Fran Ulmer, Vladimir Pautov, David Bevan, Koji Imamura, Guy McMinds, Steven Pennoyer, Gary Williamson, Vladimir Izmailov, Loh-Lee Low, Irina Shestakova
Persons participating in the meeting were as follows:

**CANADA**
**Representatives**
David Bevan (Head of Delegation)
Gary Williamson

**Advisers and Experts**
RichardBeamish
Dennis Brock
Robert Martinolich
Skip McKinell
David Meerburg
Robert Steinbock
David Welch

**RUSSIA**
**Representatives**
Vladimir Izmailov (Head of Delegation)
Vladimir Pautov

**Advisers and Experts**
Oleg Gritsenko
Vladimir Karpenko
Alexandr Kurmasov
Sergei Sinyakov
Tatiana Spivakova
Valery Toloknev
Victor Tsiger
Natalia Varnavskaya

**OBSERVERS**
Chong Guk Park
(Republic of Korea)
Malcom Windsor (North Atlantic Salmon Conservation Organization (NASCO))
Richard Beamish (North Pacific Marine Science Organization (PICES))

**JAPAN**
**Representatives**
Satoshi Watanabe (Head of Delegation)
Koji Imamura
Yasuo Takase (Alternate Representative)

**Advisers and Experts**
Hiroyasu Adachi
Eiko Aoki
Takahiko Irie
Yukimasa Ishida
Tsumoay Iwata
Masahide Kaeriyama
Kiyoshi Katsuyama
Tetsuya Kuroi
Yoshiiiko Machida
Akinari Maejima
Tadamasu Makino
Masao Mori
Kazuya Nagasawa
Akira Niwa
Kouhei Ooishi
Shigeki Takaya
Hiroshi Unno
Kazuaitako Utsumi
Kiyoshi Wakabayashi

**UNITED STATES**
**Representatives**
Steven Pennoyer (Head of Delegation)
Guy McMinds

**Advisers and Experts**
Fran Ulmer
Linda Behnken
David Benton
Alvin Burch
Michael Dahlberg
Douglas Eggers
Sarah Francia
Harold Geiger
David Hanson
William Hines
Stephen Kennedy
Loh-Lee Low
Katherine Myers
Paul Niemeier
Kristine Noroz
Douglas Ogden
William Quigley
Steven Springer
Mark Thomas

**SECRETARIAT**
Irina Shestakova (Executive Director)
Hisashi Endo (Deputy Director)
Wakako Morris (Administrative Assistant)
Marijke Nap (Secretary)

**INTERPRETERS**
**English-Japanese**
Reiko Hineno
Midori Ota
Itsko Sakai
Yoshiko Soeda
Miyuki Takagi
Isako Yamazaki

**English-Russian**
Mitsuru Eguchi
Alexei Rachubo
Tomoko Shibata
Alexandr Vergus
Igor Yejelev
Mari Yonehara
3. AGENDA

An agenda for the meeting was adopted by the Commission as follows:

(1) Opening by the President of NPAFC, Mr. Koji Imamura
(2) Opening addresses, introduction and report on delegation memberships
(3) Introduction of observers
(4) Adoption of agenda
(5) Meeting procedures
   a. Attendance at meetings
   b. Schedule of sessions
   c. Press policy
   d. Minutes
(6) Executive Director’s report
(7) Consideration of enforcement
   a. Exchange of information on activities contrary to provisions of the Convention (Article IX 2.)
   b. Review and evaluation of enforcement actions (Article IX 5.)
   c. Enactment of schedules of equivalent penalties (Article IX 3.)
   d. Program for Certificates of Origin (Article IX 7.)
   e. Measures to avoid or reduce incidental taking of anadromous fish (Article IX 12.)
   f. Means to relieve the damage to a State of origin (Article IX 4.)
   g. Invitations to State or entity (Article IX 10.)
   h. Cooperation with relevant international organizations (Article IX 9.)
   i. Other measures needed (Article IX 13.)
   j. Adoption of ENFO Report
(8) Consideration of scientific research and statistics
   a. Review of 1996 Workplan
   b. Review of scientific research activities (Article IX 6.)
   c. Coordination of scientific research activities (Article IX 6. and 8.)
   d. Statistical Yearbook (Rules of Procedure 19 (k))
   e. Other publications (Rules of Procedures 25)
   f. Observer programs (Article VII.4)
   g. Methods for identification of fish origins (Article IX 4.)
   h. Measures for the conservation of anadromous stocks and ecologically related species (Article IX 1.)
   i. Measures to avoid or reduce incidental taking of anadromous fish (Article IX 12.)
   j. Cooperation with relevant international organizations (Article IX 9.)
   k. Development of 1997 Workplan
   l. Invitations to State or entity (Article IX 10.)
   m. Other measures needed (Article IX 13.)
   n. 1996 International Symposium on Stock Assessment
   o. Adoption of CSRS Report
(9) Administrative and fiscal matters
   a. Consideration of Auditors’ Report and selection of an auditor
   b. Financial situation in current fiscal year
   c. Staff salaries
   d. Budget estimate for fiscal year beginning July 1, 1997
   e. Budget forecast for fiscal year beginning July 1, 1998
   f. Administrative report for 1996
   g. Administrative matters
   h. Schedule of future Annual meetings
   i. Adoption of F&A Report
(10) Discussion on a draft Memorandum of Understanding between NPAFC and PICES (MOU)
(11) Process to recommend that certain other states of origin be invited to accede to the Convention (Article XVIII)
4. OPENING REMARKS

At the First Plenary Session, there were addresses of welcome, and statements by Canada, the Russian Federation, the United States, and Japan:

Mr. Koji Imamura, President, addressed the meeting as follows:

Good morning. I would like to open the Fourth Annual Meeting of the NPAFC and welcome the delegations from Canada, Japan, Russia, and United States, and observers from the Republic of Korea, PICES and NASCO.

As we meet here in Japan, this completes the full round of venues to hold the Annual Meeting of the Commission.

I believe that the Commission has been managed smoothly. As we proceed with the second iteration of rotating the location of the Annual Meeting of the Commission among the Parties, it is extremely important to expand and elucidate our discussions regarding scientific issues, while cooperating with other relevant international organizations, so that we can make this Commission more active and effectively.

I would like to ask your cooperation in advance to ensure that this meeting will be smooth and productive.

Thank you very much.

Mr. David Bevan, Head of Canadian delegation, addressed the meeting as follows:

I would like to open the Fourth Annual Meeting of the NPAFC and welcome the delegations from Canada, Japan, Russia, and United States, and observers from the Republic of Korea, PICES and NASCO.

As we meet here in Japan, this completes the full round of venues to hold the Annual Meeting of the Commission.

I believe that the Commission has been managed smoothly. As we proceed with the second iteration of rotating the location of the Annual Meeting of the Commission among the Parties, it is extremely important to expand and elucidate our discussions regarding scientific issues, while cooperating with other relevant international organizations, so that we can make this Commission more active and effectively.

I would like to ask your cooperation in advance to ensure that this meeting will be smooth and productive.

Thank you very much.

Mr. David Bevan, Head of Canadian delegation, addressed the meeting as follows:

Mr. Chairman, distinguished representatives from Japan, the Russian Federation and the United States, it's a pleasure for the Canadian delegation to participate in the Fourth Annual Meeting of the North Pacific Anadromous Fish Commission. We extend our appreciation to the Government of Japan for hosting this meeting and the excellent facilities that have been provided. We also thank the Government of Japan for its considerable efforts in arranging the related symposium next week in Sapporo. We thank the Secretariat for its able support in organizing this meeting.

Canada would like to welcome observers from the Republic of Korea, PICES and the North Atlantic Salmon Conservation Organization - otherwise known as NASCO.

During 1996, the Contracting Parties continued to coordinate enforcement strategies and actions against the threat of salmon poaching on the high seas of the North Pacific Ocean. Substantive discussions have already taken place in the Enforcement Committee which met earlier this week to review its activities during the last year and to coordinate its program for next year. Considerable resources have been dedicated by each Party to ensuring compliance by non-Parties with the provisions of the North Pacific Anadromous Stocks Convention. There was again an incident of unauthorized salmon fishing in the Convention Area during July which was dealt with expeditiously by the U.S. authorities. The cooperative enforcement efforts have succeeded in deterring unauthorized fishing this year. We would hope that the Parties will continue to cooperate to maintain similar levels of enforcement effort during 1997.
We note the increased contacts by the Secretariat during the year including its participation at the Kyoto Conference in December 1995. The Kyoto Conference resulted in the Kyoto Declaration and Plan of Action which provide countries and regional fisheries organizations with significant policy directions to promote sustainable fisheries development and to enhance the contribution of fisheries to food security. Canada pays tribute to the Government of Japan for organizing this important gathering.

Canada welcomes the decision of the Republic of Korea to accede to the Convention and we hope that it will do so as soon as possible. We also hope that the People’s Republic of China will find it possible to join the NPAFC at some time in the near future.

We continue to believe that it is important for the Parties to encourage non-member States to become party to the FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. Canada has drafted a resolution on this matter for consideration by the Commission.

Canada welcomes the increasing dialogue and cooperation on scientific research between the Commission and the North Pacific Marine Science Organization. We would like to promote further opportunities for constructive cooperation between the two organizations in this direction.

The North Pacific Anadromous Stocks Convention was a milestone on the road towards enhanced international cooperation to ensure that high seas fishing activities are conducted in a rational, sustainable and responsible manner. The new international agreements that have been signed or adopted in the past year, including the UN Agreement on Straddling and Highly Migratory Fish Stocks and the FAO Code of Conduct for Responsible Fishing, also constitute in Canada’s view important gains. Canada applauds the U.S. government’s recent ratification of the UN Fish Agreement and is actively encouraging all governments to bring the Agreement into force as soon as possible. For our own part, the Minister of Fisheries and Oceans will shortly introduce legislation to bring Canadian laws into line with the Agreement, which will enable Canada to lead by example through its own early ratification.

Mr. Chairman, we look forward to productive discussions this week to help advance the interests of the Commission. Thank you.

Mr. Vladimir Izmailov, Head of Russian delegation, addressed the meeting as follows:

Dear Chairman, dear Ladies and Gentlemen, the Russian delegation cordially greets all participants with the opening of the Fourth Annual Meeting of NPAFC. We also send greetings to the observers: to the representatives of the Republic of Korea, NASCO and PICES. The Russian delegation thanks the Japanese Party for the invitation and nice organization of our work.

We would like especially to thank the Secretariat for the coordination of our work and for proceeding with all information in time.

It is the Russian delegation’s view that successful cooperative efforts were undertaken in the previous period for achievement of purposes of the Convention and first of all, for prevention of unauthorized fishery in the Convention Area.

The exchange of information on scientific research and reproduction of salmon stocks let us more successfully manage and protect them.
Information on salmon trading also is very interesting and useful.

I would like to wish the Annual Meeting a successful work.

Mr. Steven Pennoyer, Head of the U.S. delegation, addressed the meeting as follows:

Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen, it is the sincere pleasure of the U.S. Delegation to participate in the Fourth Annual Meeting of the North Pacific Anadromous Fish Commission. I would like to express my appreciation to the Japanese government for their hospitality in hosting and providing the facilities for this meeting. For many of us, this is one of many trips to Tokyo made in recent years, for others this is the first opportunity to visit this great city. Whatever the case may be, we are impressed by the kindness and warmth extended by our Japanese hosts.

I wish to acknowledge the tireless efforts of the Secretariat in ensuring the necessary coordinations were made for this meeting. Many times, while the various Delegations are afforded the opportunities to tour and enjoy the amenities of Tokyo, the Secretariat has worked long and late to make sure reports are written and copies made. Thank you.

The United States would like to acknowledge and welcome the observers from the Republic of Korea, PICES and NASCO. As we have done in past meetings, the United States wishes to take this opportunity to reiterate its support for the People's Republic of China and the Republic of Korea to accede to the Convention.

This year only one violation of the Convention was reported during the Enforcement meeting, once again demonstrating the effectiveness of coordinated enforcement and surveillance efforts among the Contracting Parties. We are very optimistic that this level of success will continue.

The United States is especially pleased at the willingness of the Parties to cooperate on scientific matters. During the past two days, deliberations of the CSRS have produced fruitful discussions on salmon biology and ecology as a result of the high quality of the scientific papers submitted by all countries. One of the most encouraging aspects of this scientific exchange was that the papers were developed in the context of the Commission's Science Plan, a plan which will serve as a blueprint for future work of the Commission in gaining a better understanding of ecosystem dynamics regarding salmonid production including predator-prey relationships. We also note that much of the research that was discussed in the CSRS is an integral part of the broader PICES-GLOBEC plan for studying the climate change and carrying capacity of the North Pacific Ocean. The United States looks forward to further cooperative research under the CSRS. The United States notes, however, that more progress on the matter of information exchange and scientific research on ecologically-related species needs to be made.

I wish to thank the Fisheries Agency of Japan for their organization of the up-coming International Symposium on Assessment and Status of Pacific Rim Salmonid Stocks to be held in Sapporo next week. In particular, I wish to thank the Steering Committee and Local Organizing Committee for their efforts in coordinating the logistics for the symposium. Sponsorship of such symposiums and scientific exchanges is an important function of the NPAFC, and will provide for a more complete understanding of the marine ecosystems of the North Pacific. We anticipate that the symposium will be a success and the results will be distributed to a wide and diverse audience.

The United States would like to recognize and welcome Mr. Guy McMinds of the United States as a Representative; Mr. Imamura as President of the Commission; Mr. David Bevan of Canada as Vice-President of the Commission; and Mr. Tanaka of Japan as a Representative.
Mr. Chairman, we look forward to the work ahead of us these next few days and are willing and ready to further advance the interests of the Commission. Thank you, Mr. Chairman and may I introduce the United States Delegation.

Mr. Satoshi Watanabe, Head of Japanese delegation, addressed the meeting as follows:

Thank you Mr. Chairman. My name is Watanabe, Director General of Oceanic Fisheries Department of the Fisheries Agency of Japan. I represent the Japanese delegation. On behalf of Japan, let me extend my cordial welcome to delegations of Canada, the Russian Federation, U.S.A. and observers from the Republic of Korea and NASCO.

Japan is now in the best season of the year. Now the weather is stable and trees are bearing fruits; this is the best time to familiarize yourself with cultures and lifestyles of the Japanese people.

We will make our utmost efforts to make your stay comfortable and pleasant despite a busy schedule. If there is any inconvenience you may suffer, please let us know.

Since the entry into force of the North Pacific Anadromous Stocks Convention, four years have elapsed. We are satisfied that so far the Convention has been functioning successfully.

We are also pleased to note that annual meetings have been organized smoothly thanks to the dedicated efforts of the Contracting Parties and the Secretariat and are confident that the Fourth Annual Meeting will be as fruitful as the past three meetings.

Chairman, Mr. Imamura introduced the observers from the Republic of Korea (Mr. Chong Guk Park); PICES (Dr. Richard Beamish); NASCO (Dr. Malcolm Windsor)

Mr. Chong Guk Park, observer of the Republic of Korea, addressed the meeting as follows:

Mr. Chairman, distinguished delegates:

Please let me introduce myself to you. I am Chong Guk Park, fishery attaché at the Embassy of the Republic of Korea in Japan. It is particular honour to participate in the 4th Annual Meeting of the NPAFC as an observer.

I would like to tell you Korean Government's position. Korea has been continuing to artificially hatch and release salmon (chum) along the river, "Nam-dae-chon" in the eastern coastal waters since 1960's. If we see the statistics for recent three years, we let 19,660,000 salmon back and caught 119,672 salmon (the rate of return: 1.16%) in 1993. In 1994 we let 16,110,000 salmon back and caught 136,200 salmon (the rate of return: 1.14%). In 1995 among 15,800,000 we caught back 143,115. The rate of return rose to 1.43%.

I would like to point that Korean Government is sincerely cooperating under the framework of stipulations of the UNCLOS concerning anadromous stocks and Convention on North Pacific Anadromous Fish Commission and is guiding Korean fishermen not to unlawfully catch anadromous stocks or catch them together with other kinds of fish on the high seas.

Regarding the certification measures of the state of origin of salmon, our government is of the position that we are supporting the measures for the preservation and management of salmon resources unless the measures are out of the WTO regulations on the state of origin.
Our government is now taking domestic steps for joining the NPAFC as a full member, but due to some issues to be further considered and procedures required, the entrance is now being delayed.

We would like to discuss with you the issue of inserting Korea as origin state to the anadromous stocks into the annex of the Convention, before becoming a full member of the NPAFC.

I would like to conclude my statement asking your advice on the above-mentioned matters. I wish you a very successful meeting. Thank you, Mr. Chairman.

Dr. Richard Beamish, observer of PICES, addressed the meeting as follows:

Mr. Chairman, in addition to being a member of the Canadian delegation I am here at this meeting representing the North Pacific Marine Science Organization or PICES. As a PICES representative, I am inviting the members of the NPAFC to work cooperatively with PICES to further develop our joint science plans. In Nemuro, this spring, the science plan for the NPAFC was presented to PICES by Dr. Dahlberg and Dr. Warren Wooster proposed that the two organizations begin immediately to cooperate on the implementation of the two science plans. To further this initiative PICES would like to propose that we continue our discussions on the integration of these two plans in the spring of 1997, possibly in Vancouver.

Thank you Mr. Chairman for this opportunity to represent PICES at this meeting.

Mr. Malcolm Windsor, observer of NASCO, addressed the meeting as follows:

Thank you very much for your kind invitation to attend your 4th Annual Meeting as an observer. On behalf of the President and the Council of NASCO I bring you greetings. It is a particular pleasure for me to be here. We also have three Parties who are signatories to both Treaties, Canada, Russia, and the US.

My Council has already decided that it would wish to cooperate more closely with other international organizations managing fisheries. But some Commissions, such as yourselves and the International Baltic Sea Fishery Commission, not only share experience in fisheries generally but specifically in managing salmon. We all know that anadromous fish are a very special breed that have unique lifestyles, economic values and some have very different aspects to their use, e.g. sport and recreation as well as food. Certainly they have distinct political aspects surrounding their conservation and use. They are species that attract a wide range of attention from Non-Government Organizations and, certainly in our case, salmon has a very high profile in each North Atlantic country. We have eighteen Non-Government Organizations as observers and we welcome their dialogue.

In this situation there will be many aspects of management that we will find of common interest. It makes a great deal of sense if we can learn from each other. It could save us a great deal of time and effort. I am, for example, very impressed with your successes in enforcement. We in NASCO would like to understand the areas where the three salmon Commissions have made progress but we would also like to understand where and how we have failed. In NASCO we have had our fair share of both and we are not afraid to examine our failures. For all these reasons it seems to us essential to be aware of the ups and downs of each salmon Commission, whether it be in the Baltic, the Pacific or the Atlantic. The species we are managing are rather close in their biology and perhaps also in their politics. For this reason we were delighted to welcome your Executive Secretary, Ms. Irina Shestakova, to our Annual meeting in Gothenburg earlier this year. I see that she has written a very useful report reviewing the working methods of both Organizations.
It is very useful that you are organizing a symposium in Sapporo in conjunction with this meeting. It is perhaps particularly on these occasions that we should try to achieve good liaison. There is a large distance between the Atlantic and the Pacific, but it is important that our Organizations keep in touch on items of mutual interest. By operating in a consistent and coherent way we can all be stronger. NASCO can give you its commitment to such cooperation. I wish you a very successful meeting.

5. CONSIDERATION OF ENFORCEMENT

At the First Plenary Session, this item (agenda item 7) was referred to the Committee on Enforcement (ENFO) for consideration and report at the Second Plenary Session.

The Committee reviewed agenda item 7 and submitted its report for the Commission's consideration and adoption. The Commission adopted the ENFO Report including all its recommendations. Discussions and recommendations on this agenda item are summarized below:

(1) Review of Terms of Reference

The committee reviewed the Terms of Reference and made no comments with respect to possible changes or additions.

(2) Exchange of Information on Activities Contrary to Provisions of the Convention

The Committee reviewed unauthorized fishing activities in 1996 on the basis of information provided by Canada, Japan, Russia and the U.S. Canada, Japan and Russia informed the Parties that no illegal drift net vessels were observed on the high seas. Japan explained to the Parties its policy with respect to former drift net vessels. The U.S. informed the Parties that in July 1996, U.S. patrol discovered and documented a Taiwan drift net fishing vessel, which was targeting salmon and fishing with a large-scale high-seas drift net in the Convention Area. The seizure of the vessel and arrest of the master and crew were made by Taiwan authorities acting on a request from the United States. There was a joint U.S./Japan enforcement operation in the Convention Area during 1996.

All Parties provided detailed reports which contain a description of their enforcement activities, including discovery of the above mentioned violation of the provisions of the Convention.

Japan provided information on its import and export of salmon and trout.

Japan again stated that salmon imports into Japan from Taiwan, China and North Korea required prior approval and were permitted only when the salmon was recognized as originating from legitimate sources.

(3) Review and Evaluation of Enforcement Actions

Each Party agreed to the usefulness and continuation of pre-season enforcement planning. The committee reviewed 1996 enforcement activities of each country.

Canada expressed its requirement for an air base other than in Adak, Alaska or Midway Island, which are shutting down. Currently travel time to patrol area is greater than time spent on actual patrol.
All Parties expressed the view that in order to continue their success in achieving the goals of the Convention related to the cooperative enforcement activities, it is important to keep the appropriate level of enforcement in the area in the future.

The Committee reviewed information from the Secretariat on the status of requests for lists of former commercial driftnet vessels.

The Committee recommended that a request for a list of former commercial driftnet vessels again be sent to North Korea.

(4) Enactment of Schedules of Equivalent Penalties

There were no comments from the Parties on this item.

(5) Program of Certificates of Origin

There were no comments from the Parties on this item.

(6) Measures to Avoid or Reduce Incidental Taking of Anadromous Fish

In view of the high degree of compliance with the provisions of the Convention, there were no proposals from the delegations.

(7) Means to Relieve the Damage to a State of Origin

In view of the high degree of compliance with the provisions of the Convention, there were no proposals from the delegations.

(8) Invitations to State or Entity

With regard to observers at the Commission’s 1997 Annual Meeting, the committee recommended that an invitation be extended to the People’s Republic of China and/or the Republic of Korea to attend in an observer capacity the Fifth Annual Meeting if either state has not acceded to the Convention by that time. The committee recommended that countries which are not salmon producers but which may be involved in Pacific salmon trade (Thailand, Malaysia) be invited to send representatives to act as observers and to provide information on their measures to curtail possible illegal trade.

(9) Cooperation with Relevant International Organizations

The Committee recommended that the Commission cooperate with NASCO by exchanging information on enforcement activities and by inviting NASCO to send an observer to the Commission’s meetings.

The Parties reviewed cooperation on enforcement with other international fisheries organizations. The Russian Party informed the Committee that the Parties to the Bering Sea Convention are developing the procedure of cooperation with other concerned regional organizations by inviting them to be observers at the Convention’s Annual Conference. The Russian Party expressed the view that such cooperation would be useful for NPAFC.
(10) **Other Measures Needed**

In view of the high degree of compliance with the provisions of the Commission, there were no other proposals from the delegations.

(11) **Supporting the Convention by Non-Members Through Alternative Mechanisms**

The Committee again recommended that the Parties should, as appropriate, encourage States or entities not party to the Convention to whom the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, approved by the Food and Agriculture Organization (FAO) in 1993, is open for acceptance, to deposit their instruments of acceptance with the Director-General of the FAO as soon as possible.

(12) **Other Matters**

The Parties discussed the frequency of the Enforcement Committee meeting. The Parties agreed to continue meeting annually as enforcement cooperation and related information exchange are fundamental objectives of the Commission. The Parties agreed however that the time available for the Committee should be shortened to one day and this should be held as close as possible prior to the First Plenary session.

6. **CONSIDERATION OF SCIENTIFIC RESEARCH AND STATISTICS**

At the First Plenary Session, this item (agenda item 8) was referred to the Committee on Scientific Research and Statistics (CSRS) for consideration and report at the Second (Final) Plenary Session.

The Committee reviewed agenda item 8, and submitted its report for the Commission's consideration and adoption. The Commission adopted the CSRS Report including all its recommendations. Discussions and recommendations on this agenda item are summarized below.

(1) **Review of Terms of Reference**

The interim terms of reference for the committee adopted by the Commission at the Commission's Inaugural Meeting in February 1993 were reviewed. No recommendation was made under this agenda item.

(2) **Review of 1996 Workplan**

The Committee reviewed the 1996 Workplan, and discussed the exchange of samples and data. The Committee recommended that:

1. Parties are encouraged to exchange samples and data among scientists.
2. The Secretariat should be informed of such exchanges.
3. A more official procedure for exchanges may be considered in the future if necessary.
3.1 Canada

(i) **Anatomical Specialization in the Gut of Pacific Salmon: Evidence for Oceanic Limits to Salmon Production?**

The stomach (but not intestine) of chum salmon is greatly enlarged relative to other species of Pacific salmon. This permits the exploitation of gelatinous zooplankton (jellyfish, ctenophores, and salps) as a major food source, which are an abundant but low energy prey unused by other species of salmon. The unique gut structure of chum therefore allows efficient feeding on a little-exploited branch of the food web and reduces inter-specific trophic competition. The development of this remarkable anatomical specialization suggests that salmon abundances were previously high enough that the resulting trophic competition led to evolutionary selection to reduce trophic competition. As total salmon abundances in the North Pacific are now probably the highest of this century, the carrying capacity of the ocean rather than freshwater could limit overall salmon production if abundances are once again approaching pre-exploitation levels.

(ii) **Do Steelhead School Selectively in the North Pacific Ocean?**

Prior to 1995, 195 coded-wire tagged steelhead were recovered in high seas commercial and research fishing operations. Between 1984 and 1989, eight matching tags were recovered. Matching tags are defined as fish from the same release group caught in the same fishing operation on the high seas. A test of hypothesis was developed to determine whether these recoveries were significantly different from what would be expected if steelhead populations moved in an uncoordinated manner. The overall test indicated that some tagged steelhead populations travelled in a significantly (P < 0.05) coordinated manner on the high seas. The temporal and spatial pattern of recoveries indicated that steelhead released in Idaho were not found in the Gulf of Alaska to the same extent as steelhead released from British Columbia and Washington. Recoveries of Idaho steelhead appeared south of the Aleutian Islands at a younger age than did steelhead from British Columbia.

(iii) **Production of Fraser River Sockeye Salmon in Relation to Decadal Scale Changes in the Climate and the Ocean**

The abundance changes of the combined Fraser River sockeye salmon stocks can be separated into productivity regimes that correspond to changes in climate trends. The most distinct change occurred when there was a major change in the climate over the Pacific Ocean in the winter of 1976-1977. The existence of natural shifts in abundance trends means that the high returns that occur during periods of high productivity would not be expected to occur during the low productivity periods. The response of Fraser River sockeye to climate changes may be a specific example of a more general response by a number of species of fishes in the Pacific and perhaps in other oceans. Because the shift from one regime to the other occurred quickly in the 1970s, future shifts could also occur quickly. The time that a shift occurs, therefore, is an important reference point for fisheries management, thus, it is necessary to detect natural shifts in productivity when attempting to manage fishing impacts to ensure that economic expectations are sound and that overfishing does not occur.

(iv) **Synchrony of Abundance Trends of Chinook and Coho Populations Off Oregon, Washington and in the Strait of Georgia in Comparison to the Trends in All-Nation Catches of Pacific Salmon**

The recent studies that describe the trends in abundance of chinook and coho stocks were reviewed to show that the abundance fluctuations are related to large scale climate events. The abundance
trends of chinook and coho populations off Washington and Oregon and in the Strait of Georgia are also linked with the trends of Pacific salmon populations that occur farther north but the trends are opposite in phase.

The implications of these decadal scale shifts in the mean productivity trends for assessment biologists are that the shifts occur quickly and that these natural impacts must be separated from a data series before the effects of fishing and habitat degradation can be studied. The implications for managers are that good management may not be equated to producing more fish and that management should be more precautionary during regimes that reduce carrying capacity. Certainly, past and future management strategies should be assessed using this new knowledge that changes in catch trends may be linked to climate-ocean shifts. Projections of the impacts of global warming should also be reassessed to consider how these natural shifts may be affected in addition to the familiar response of fishes to temperature.

(v) The Relationship Between Time of Ocean Entry and Residence in the Strait of Georgia for Three Chinook Salmon Rearing Types

Daily growth increments were used to estimate the date of ocean entry of hatchery, wild ocean, and wild stream chinook life-history and rearing types. The mean date of ocean entry for ocean age .0 juveniles that resided in the Strait of Georgia later in the year, was late May to mid-June and was surprisingly similar among the life-history and rearing types. The wild ocean life-history type had the greatest diversity in ocean entry times, with a relatively large number entering in late June and July, after most hatchery fish had entered salt water. In the November sample, hatchery fish were most abundant, followed by wild stream type, then followed by wild ocean type.

(vi) Biology of Ocean Age .0 Hatchery, Wild Ocean, and Wild Stream Type Chinook in the Strait of Georgia

The pattern of otolith daily increments was used to study the first year of ocean residence of hatchery-reared, wild ocean-, and wild stream-type chinook. Several checks of the accuracy of the otolith estimates of life-history and rearing types indicate that the determinations appeared reliable. There was a gradual decline in the percentage of hatchery fish in the catches that approached a percentage between 50-65% by the end of the year, depending on the assumptions made. The three rearing and life-history types were distributed throughout the strait and to depths ranging from 40-60 m although there were some differences in concentration with wild fish tending to be in the south and hatchery in the north. The mean size differences that existed in the early samples, persisted throughout the year, but based on one sample of fish older than ocean age .0, the mean sizes of the three types may eventually be about equal. Wild stream-type juveniles remained in the strait and were more abundant relative to wild ocean-type juveniles than in the past. One reason for this is the large number of ocean-type hatchery fish that are now part of the total population.

3.2 Japan

(i) The 1996 Japan-U.S. Cooperative High-Seas Salmon Research Cruise of the Wakatake maru and a Summary of 1991-1996 Results

A cooperative Japan-U.S. high seas salmon research cruise program, begun in 1991, in the central North Pacific and Bering Sea in June and July was continued in 1996. The objective of these cruises is to collect data for salmon stock assessment in the North Pacific Ocean. Research cruise activities included collection of data on physical oceanography, primary production, macro-zooplankton, micro-nekton, salmonids, and salmonid predators. A total of 6,013 salmonids was caught by longline and gillnet. Chum salmon were abundant in the catch (75% of salmonids), followed by
sockeye (15%), coho (4%), chinook (3%), and pink salmon (2%), and steelhead (<1%). Three Dolly Varden were caught. A total of 691 salmon (95% chum, 4% sockeye, and 1% chinook) were tagged and released north of 47° 30' N from longline operations. Snouts from 17 steelhead with clipped fins were sampled for later potential recovery of coded-wire tags.

Since 1994, there has been an apparent warming trend in June and July sea surface temperatures in the central North Pacific and the Bering Sea. In 1996, the average sea surface temperature was 1.1°C warmer in the central North Pacific and 0.6°C warmer in the Bering Sea than the previous five year average (1991-1995).

In the Subarctic Current, relative abundance of chum salmon caught in research-mesh gillnets has increased substantially. In 1996, chum salmon were the smallest mean size observed since the beginning of the program in 1991. Age composition of the catch in 1996 was not analyzed, but small mean size of chum salmon may be due to a large proportion of young (ocean age 1) fish in the catch. From 1995 to 1996, pink and coho salmon relative abundance and mean size decreased. Gelatinous zooplankton (ctenophores, coelenterates, and salps) have been the most common prey of chum salmon since 1994. Since 1991, coho salmon have fed almost exclusively on squid, and pink salmon have fed on amphipods, squid, and pteropods. Steelhead often ate squid and fish, and small pieces of floating debris were found in their stomach contents in 1996.

In the Bering Sea, relative abundance of sockeye and chum salmon increased substantially in 1996, and mean sizes were the smallest observed since 1991. Relative abundance of pink salmon was much greater in odd years than even. In 1996, the mean size of pink salmon was larger than in 1991 to 1994, but smaller than in 1995. Since 1993, the relative abundance of chinook salmon has increased, and the mean size of chinook was larger in 1996 than in 1995. Sockeye salmon fed on squid, fish, amphipods, and copepods and increased their predation on euphausiids in 1996. In addition to gelatinous zooplankton, chum salmon preyed on fish, pteropods, and amphipods and, in 1996 consumed substantially more euphausiids than in previous years. Pink salmon ate squid, amphipods, copepods, and euphausiids, and in 1996, increased their predation on fish. Chinook salmon consumed squid, fish, and euphausiids. More empty stomachs of sockeye, chum, pink, and coho salmon, and steelhead were observed in gillnet-caught fish than in longline-caught fish. However, the percentage of empty chinook salmon stomachs was higher among longline-caught fish.

(ii) The 1996 International Cooperative Salmon Research Cruise of the Oshoro maru and a Summary of 1994-1996 Results

The 1996 international cooperative salmon research cruise of the Oshoro maru was reported and data collected from 1994 to 1996 were summarized. An objective of international cooperative high-seas salmon research conducted under the NPAFC Science Plan is salmon stock assessment through annual surveys along standard transects in the North Pacific Ocean and Bering Sea. Salmon surveys conducted by the Oshoro maru, Hokkaido University, Faculty of Fisheries, along 180° in the central North Pacific Ocean in June since 1978 have provided a valuable time series of fisheries and oceanographic data. This was the third consecutive year of cooperative Japan-U.S. research gillnet sampling for salmon along a 145° W transect in the central Gulf of Alaska in early July. In 1996, Oshoro maru catches by gillnet totalled 361 salmon in the central North Pacific (180° transect) and 1,982 salmon in the central Gulf of Alaska. At longline stations, 17 salmon along the 180° transect and 33 salmon in the Gulf of Alaska were tagged and released. Biological samples and data were collected from salmon for various studies of distribution, abundance, stock origins, maturity and growth, food habits, bioenergetics, and other aspects of ocean biology and ecology.

In the central Gulf of Alaska from 1994 to 1996, salmon were caught by research gillnet (C-gear) in two oceanic domains, the Subarctic Current and the Dilute Domain. From 1994 to 1996, mean sea surface temperatures in early July at gillnet stations along the 145°W transect decreased from 10.7°C to 9.8°C in the Subarctic Current and from 11.5°C to 10.2°C in the Dilute Domain. In both
domains, chum salmon (predominantly immature ages .1 and .2 fish) were usually the most abundant species in gillnet catches. Maturing sockeye (predominantly age .2), pink (age .1), and coho (age .1) salmon were more abundant in the Dilute Domain, and chinook salmon and steelhead were more abundant in the Subarctic Current. In the Dilute Domain, there was a substantial (approximately 50%) decrease in the abundance of sockeye salmon and an increase in the abundance of coho salmon from 1994 to 1996. Percentages of maturing chum salmon in the Dilute Domain decreased from 40% in 1994 to 5% in 1996. Size-at-age of chum, pink, and coho salmon was substantially larger in C-gear catches in the Gulf of Alaska than in the central North Pacific. Squid, primarily Berryteuthis anonychus, was the dominant prey of all species except chum salmon, which had a much more diverse diet (primarily euphausiids, amphipods, pteropods, and gelatinous zooplankton). This corroborates the results of earlier studies, and highlights the importance of B. anonychus, in the diets of salmon in the Subarctic Current area of the Gulf of Alaska. In the Dilute Domain, prey composition of stomach contents of all species was more diverse and the mean stomach content index (prey weight×100/body weight) was often lower than in the Subarctic Current. From 1994 to 1996, there was an increase in the mean percentage of squid, presumably Gonatus middendorffi, in the stomach contents of sockeye, pink, and coho salmon in the Dilute Domain. Only three consecutive years of data from the 145°W transect in the Gulf of Alaska are available, but there is an apparent even-odd-year cycle in salmon abundance, size, and food habits.

(iii) Serum Steroid Hormone Profiles of Pacific Salmon During Overwintering in the North Pacific Ocean

Serum steroid hormone (17α, 20β-dihydroxy-4-pregnen-3-one (DHP), estradiol-17β (E2), 11-ketotestosterone (11-KT), and testosterone (T)) profiles of five species of Pacific salmon (chinook, chum, coho, pink, and sockeye salmon) during overwintering in three different sampling areas of the North Pacific Ocean in January 1996 were examined in order to clarify the relationship between their age and gonadal development. No significant differences in any serum steroid hormone levels were observed in three species (chinook, coho, and pink salmon) of the same age among three sampling areas. In contrast, quite interesting differences of serum levels of 11-KT and T in males and those of E2 and T in females were detected among different ages of chum and sockeye salmon during overwintering. These findings are discussed in relation to the shift from feeding migration to spawning migration of salmonids.

(iv) Variation in Prey Size Selectivity of Fingerling Chum Salmon in Sea Life: Effects of Stomach Fullness and Prey Abundance

Prey size selection by fingerling chum salmon was studied with respect to variations related to the stomach fullness of fish and prey abundance in the coastal waters of the Japan Sea off northern Honshu, Japan. Fingerlings mainly fed on zooplankton, and their diets consisted of two size groups of major prey taxa. Fingerlings showed two behavioral patterns: selective foraging for the larger prey and non-selective foraging. The effects of prey abundance on the selectivity of fish were different between the size groups. Fingerlings intensified foraging selectively with an increase in the abundance of the larger prey. On the contrary, the abundance of the small prey did not influence the prey size selectivity. The stomach fullness of fish was also positively correlated with the prey size selectivity. Since the abundance of the larger prey and the stomach fullness of fish varied independently each other, both are considered to be important factors affecting the prey size selection and diet composition of fingerling chum salmon in the ocean.
(v) **Formation Periodicity of Increment and Allometric Growth in Juvenile Chum Salmon Otolith**

Otolith growth and rate of increment formation in juvenile chum salmon were examined to determine whether otoliths could be used to back-calculate body sizes at various juvenile life history stages. Sagittal otoliths in newly hatched chum alevins were examined. The fish had an average total length of 19.5 mm, and their sagittae were approximately 312 $\mu$m long. As the fish grew, the relationship between body length and sagitta length was allometric: sagitta length ($\mu$m) = 312 + 35.9 $\times$ (body length (mm) - 19.5)$^{0.790}$. Increment periodicity was found to occur on a daily basis, which was ascertained by a fluorescent marking experiment. The results of this work show that individual growth in juvenile chum salmon can be estimated by features readily detected in their otoliths.

(vi) **Changes in Body Size and Age at Maturity of a Chum Salmon Population Released from Hokkaido in Japan**

The body size of Hokkaido chum salmon at maturity showed a significant decreasing trend from 1979 to 1984, and has levelled off since 1985. A significant negative relationship between the population size and fork length was observed ($r < -0.8$, $P < 0.001$). In the Hokkaido chum salmon population, the average age of a brood-year population at maturity has gradually increased from 3.7 years in 1972 to over 4 years since the 1980 brood year. A significant positive relationship between population size and average age of a brood-year population at maturity was observed in the Hokkaido chum salmon population ($r = 0.909$, $P < 0.001$). The result of growth analysis back-calculated from scales showed that the growth reduction occurs after the second year, especially in the third year of oceanic life in the Japanese chum salmon population. The synchronous phenomena of both a decrease in body size and an increase in age at maturity may be a negative population-density effect caused by intraspecific competition, because of a rise in survival rate and favorable oceanic conditions for the Hokkaido chum salmon population. In salmonid enhancement production, therefore, it is extremely important to maintain an optimum population size by clarifying the mechanisms of population regulation such as density-dependent effects, and by monitoring biological characters of population such as migration patterns, body size, age composition, fecundity, and egg size.

(vii) **Life History Strategy and Migration Pattern of Juvenile Sockeye and Chum Salmon**

Life histories of juvenile sockeye and chum salmon show a conditional strategy, which includes two tactics of residence and migration. Sockeye salmon usually remain in lakes and rivers if they can obtain sufficient resources such as food and habitat, whereas salmon migrate seaward when they do not have enough resources to satisfy their energy requirements. Their migration pattern, controlled by effects of "prior residence" and "precedent migration," may be a trade-off between the profitability of resource acquisition and risks such as osmoregulation, energetic demands of swimming, exposure to predators, and mobilization to non-adaptable habitats by water currents.

(viii) **Salmon Stock Assessment Aboard the Japanese Salmon Research Vessels in the North Pacific Ocean, 1996**

The results of salmon stock assessment research conducted by Japan in 1996 were summarized. Mean sea surface temperatures and abundance, age composition, maturity, and food habits of salmonids in 1996 are compared to the previous five-year means. Four Japanese salmon research vessels (Oshoro maru, Hokusei maru, Hokko maru, and Wakatake maru) conducted oceanographic observations, 76 gillnet fishing operations (3,718 tan), and 38 longline fishing operations (908 hachi) in the western and central North Pacific Ocean, Bering Sea, and Gulf of Alaska from June to August 1996. Mean sea surface temperatures in the central North Pacific and Bering Sea in 1996
were 0.49°C and 0.62°C warmer, but those in the western North Pacific and Gulf of Alaska were 0.61°C and 0.80°C colder than the previous five-year means. A total of 17,940 salmonids was caught by fishing operations, including 2,296 sockeye (13%), 6,614 chum (37%), 6,733 pink (38%), 1,940 coho (11%), and 226 chinook (1%) salmon, and 128 steelhead (<1%) and 3 Dolly Varden. The abundance of sockeye and chum salmon in 1996 was higher in the Bering Sea, but lower in the Gulf of Alaska compared to the previous five-year means. In the western North Pacific, sockeye salmon abundance was two times higher, but chum salmon abundance was lower than the past mean. The abundance of pink and coho salmon was higher in the western North Pacific, but lower in other areas. Chinook salmon in the Bering Sea and steelhead in the Gulf of Alaska were more abundant than the previous five year mean. In 1996, there was a remarkable increase in the percentage of ocean age .1 sockeye salmon in the Bering Sea and age .1 chum salmon in the western and central North Pacific, and the Bering Sea. The mean body size of salmon changed in 1996 as follows: (1) an increase in body size of sockeye and chum salmon in the Gulf of Alaska, (2) a decrease in body size of pink and ages 0.1 and 0.2 chum salmon, but an increase in body size of age .1 sockeye salmon in the Bering Sea, and (3) a decrease in body size of some age groups of chum and coho salmon, but an increase in body size of pink salmon in the western North Pacific, compared to the previous five-year mean. The dominant prey organisms of salmon in 1996 were copepods and squids in the western North Pacific, euphausiids and fishes in the Bering Sea, and squids in the central North Pacific and the Gulf of Alaska.

(ix) Salmon Tagging Experiments and Recovery of Salmon Lacking Adipose Fin Collected by Japanese Salmon Research Vessels in the North Pacific Ocean, 1996

Two Japanese salmon research vessels conducted 38 longline operations in the North Pacific Ocean in 1996. A total of 639 salmon (619 chum, 16 sockeye, and 4 chinook salmon) in the Bering Sea, 50 salmon (11 pink, 6 chum, 33 coho salmon) in the Gulf of Alaska, and 52 salmon (15 sockeye, 36 chum, and one coho salmon) in the central North Pacific Ocean, were tagged and released, respectively. Double tagging with Japanese and U.S. disc tags was conducted for some of these fish in order to increase recovery rates.

Four Japanese salmon research vessels conducted a survey for salmonids lacking fins, and 53 steelhead, four coho, four sockeye, and one pink salmon lacking the adipose fin and other fins or both were recovered. The percentage of steelhead lacking adipose fin (41.4% = 53/128 = steelhead lacking an adipose fin/the total steelhead catch) was higher in 1996 than in the previous four years (21.9% in 1992; 26.1% in 1993; 30.5% in 1994; 37.1% in 1995). Snout samples were collected from these fish and provided to the U.S.A. for coded-wire tag examination.

(x) Outline of Oceanographic Conditions in the Northwestern Pacific during the Summer of 1996

Oceanographic conditions in the northwestern Pacific during the summer of 1996 are described using data obtained by Japanese salmon research vessels. Temperature and salinity sections indicated that the extent of Western Subarctic Water was slightly weaker than that of 1995. Sea surface temperature anomalies were positive north of 45°N and negative south of 45°N.

(xi) Summary of Wintering Salmon Research Aboard the Research Vessel Kaiyo maru in January 1996

The FAJ conducted the second international cooperative trans-Pacific survey on wintering salmon in the North Pacific Ocean aboard the R/V Kaiyo maru from 5 January to 29 January 1996. A similar survey by FAJ was conducted aboard the Kaiyo maru in December 1992. Four Japanese scientists, one U.S. scientist, one Canadian scientist, and one Russian scientist took part in the 1996 survey.
The vessel was used to sample standard transects in the western, central, and eastern North Pacific Ocean. The objective of the survey was to elucidate the ecology and distribution of wintering salmon.

A large (208 m long, 63.2 m head rope) trawl was used to catch salmon from the surface to 50 m. The survey included 22 surface trawl operations for collecting salmon and 23 oceanographic stations using a CTD system. Plankton were sampled at all trawl stations with NORPAC and bongo nets. Oceanographic and plankton data were also sampled continuously at the surface with an EPCS system.

The total catch of salmon was 1,346 fish (51 sockeye, 767 chum, 439 pink, 57 coho, and 32 chinook salmon). In the western North Pacific Ocean, young (ocean age .1) chum, pink, and chinook salmon accounted for most of the catch. Immature sockeye and chum salmon (ocean age .2 or older) occurred mainly in the central and eastern North Pacific. These results suggest that immature (including young) sockeye and chum salmon migrate eastward from the western to central North Pacific Ocean in winter. Chum, pink, and coho salmon were larger in mean fork length and higher in mean condition factor in the Gulf of Alaska than in the western North Pacific Ocean. The oceanographic data indicated that in January the thermocline is deeper and the halocline is shallower in the central and eastern North Pacific than in the western North Pacific. The EPCS survey showed that high-temperature areas generally coincided with areas of low zooplankton density.

(xii) **Vertical Distribution of Salmon Determined by an Acoustic Survey in the North Pacific Ocean in the Winter of 1996**

A survey of Pacific salmon was conducted in the North Pacific Ocean in January 1996. Salmon were caught by trawl net at predetermined stations. At the same time, an acoustic survey was made along the line between and over the stations using a quantitative echo sounder with frequency of 50.0 kHz and depth range of 200 m. Clear marks recorded on a paper chart were interpreted as signals from fish, and were counted. The zonal acoustic counts corresponded fairly well to the salmon catch by number in the trawl net. The acoustic data also showed that salmon were not distributed below the salinocline or in waters colder than 4°C. Most of salmon were found in waters where the temperature was between 4°C to 8°C and the depth was 25 m to 55 m. Analysis of the difference in vertical distribution between daytime and nighttime showed that many fewer salmon were found in the nighttime with the echo sounder.

(xiii) **Estimation of Pink and Chum Salmon Digestion Coefficients Based on Data Collected from Ship-Board Experiments**

Digestion experiments for pink and chum salmon were conducted in the North Pacific Ocean in summer from 1991 to 1993. Data were analyzed using the exponential model and five fitting methods to estimate the digestion coefficient. Estimates of the digestion coefficient were different among fitting methods and the year in which the experiment was conducted. Based on the 1992 experiments, in which the largest number of chum salmon were examined, digestion coefficients for chum salmon are estimated to be 0.12-0.14 per hour. Digestion coefficients for pink salmon are estimated to be 0.11-0.17, although the number of fish examined was not sufficient.

(xiv) **Data Record of Japanese Salmon Research Vessel in 1995: I-Catch Data, II-Oceanographic Data**

This limited-circulation document is a listing of salmonid catch and oceanographic data records for Japanese salmon research vessels in 1995.
(xv) *Distribution of Pacific Salmon in the North Pacific Ocean and Its Adjacent Seas, 1956-1996*

This joint Japan-Canada study examines the distribution of five species of Pacific salmon (sockeye, chum, pink, coho, and chinook salmon) using historical data collected by Japan, Canada, and the U.S.A. in the North Pacific Ocean and its adjacent seas from 1956 to 1996. In winter, the distributions of all species were very narrow and overlapped, but were slightly different from each other. In spring, their distributions expanded and overlapped, but areas of high density were different between species. High densities of sockeye salmon were located in the northernmost area, and southward followed by chum, pink, chinook, and coho salmon. In summer, the distributions shifted northward and overlapped closely in the western North Pacific, Bering Sea, and Gulf of Alaska. A possible interaction in spatial distribution between different species and desirable future research are discussed.

3.3 Russia

(i) *Influence of the Marine Abundance of Pink and Sockeye Salmon on Growth of Ozernaya River Sockeye, 1970-1994*

An extended data set on the size of Russian sockeye salmon from 1970-94 was used to examine the effect of salmon abundance on sockeye growth. The length and weight of mature Ozernaya River sockeye was substantially reduced in years when the marine abundance of pink salmon from western and eastern Kamchatkan populations was high, and slightly reduced when the ocean abundance of Kamchatka sockeye populations was high. The strongest statistical relationships were found for fish from separate age groups; measured relationships using pooled data from all age groups combined were statistically insignificant. We estimate that in the absence of pink salmon the most strongly affected age groups would be almost twice the size at maturity that they would be if both the eastern and western Kamchatkan pink salmon populations were simultaneously at peak observed abundances. Trophic competition in the ocean can therefore have a significant influence on the productivity of salmon populations for the most strongly affected age-groups, and we conclude that the salmonid carrying capacity of the ocean is sufficiently limited that it should be considered in the management of salmon populations.

(ii) *Stock Condition and Fishery of Masu and Sea of Japan Pink Salmon*

Information on the masu and pink salmon fishery in the Sea of Japan was presented. Salmon catch, species composition by month and year, stock origins, seasonal changes in fishing grounds in the Sea of Japan, and catch per gillnet are analyzed. Calculations were made from data obtained in Japanese gillnet surveys conducted in 1970-1991 in the Sea of Japan. In the beginning of the season in the offshore waters of the Sea of Japan masu salmon is the main target of the fishery. Chum salmon are only occasionally caught in the Sea of Japan in spring, and not in every year. This indicates that chum salmon originating from rivers of the Sea of Japan, usually do not spend the winter in the Sea of Japan, and probably migrate to the Pacific Ocean and to the Okhotsk Sea. In March and April, pink and masu salmon did not form concentrations in the 200-mile economic zone of Russia in the Japan Sea. A decreasing trend in masu salmon catch and catch per gillnet is clear, and indicates a reduction in masu salmon abundance over the entire area of its distribution. Pink salmon reproduction has also been reduced to a low level. Information about the origin of pink and masu salmon in the Japan Sea indicates that almost all pink salmon and part of the masu salmon in commercial catches are of Russian origin. The authors suppose that masu salmon of Russian origin are caught not only by offshore, but also by coastal fisheries.
(iii) Early Marine Period Life of the Pacific Salmon

A manuscript in Russian on the biology of juvenile pink, chum, sockeye, coho, and chinook salmon during their early marine period in Asiatic coastal waters was summarized. The manuscript includes twenty years (1974-1993) of investigations in the coastal waters of Kamchatka. The purpose of the research was to determine the causes of mortality and to estimate mortality of juveniles during the early marine period.

The manuscript consists of four sections including: (1) the stating of a problem (3 chapters devoted to the history, materials and methods, and the characteristics of coastal waters as the habitat for salmon juveniles), (2) the ecology of juveniles of five species (5 chapters), (3) the factors determining survival and brood production (3 chapters), and (4) a summary, references (655 pages), and a supplement of two figures and two tables.

Less than ten predators of salmon were found: in Hokkaido, the Japanese dace, in Sakhalin, the Siberian char (southwest) and Asian smelt (northwest); in Amur estuary, the lamprey; in Kamchatkan waters, the Siberian char and Asian smelt (west coast), Asian smelt, and the Arctic char (northeast coast). Bird predators were the Arctic and common terns and the kittiwake.

Keys for species identification were developed that could be used during the downstream migration and coastal and offshore periods. Inter- and intra-specific interactions among salmon juveniles included food competition and prey-predator relationships. Prey-predator relationships take place between juveniles of coho, chinook, and sockeye salmon of older age groups and underyearlings of pink, chum, and sockeye salmon. The extent of pink (0.13 - 21.1%) and chum salmon mortality (0.24 - 8.0% of generation) in the estuaries of seven rivers in Karaginski area was estimated.

Zooplankton consumption by salmon juveniles in northeast Kamchatka (Uala and Karaginski Bays) was estimated. In the coastal waters off Kamchatka, there were high predation rates on smaller pink and chum salmon, some with residual yolk sacs. In Karaginski Bay the Arctic char and Asian smelt consumed up to 11.2 - 28.8% of pink salmon and 1.8 - 16.8% of chum salmon. High juvenile mortality does not take place in years of early migration down the river that coincide with the timing of mass development of zooplankton. Optimum conditions for survival occurred when the biomass of zooplankton is 200 mg/m³ in June and 400 mg/m³ in July.

Since 1987 there has been a mass infestation of all salmon juveniles with trematoda Cryptoccotyle sp. larvae in coastal waters of northeast Kamchatka, resulting in a 10% mortality in some generations. Recommended measures to improve the survival rate and productivity include: (1) removal of predators, (2) removal of hatcheries, and (3) rational stock exploitation.

3.4 United States

(i) Known Ocean Ranges of Stocks of Pacific Salmon and Steelhead as Shown by Tagging Experiments, 1956-1995

Maps of known ocean ranges of major stocks of Pacific salmon and steelhead as shown by recoveries of tagged fish reported to the former International North Pacific Fisheries Commission (INPFC) and to NPAFC were presented. Distribution plots were prepared for all coastal recoveries (1956-1995) of salmonids tagged with external (high-seas) tags during INPFC- and NPAFC-related tagging experiments in the North Pacific Ocean and ocean recoveries (1980-1995) of coded-wire tagged salmonids released from North American streams.
(ii) Tag Returns in 1996 - International High-Seas Salmon Tagging

The Fisheries Research Institute (FRI), School of Fisheries, University of Washington, serves as the processing center for all North American recoveries of Canadian, Japanese, Russian, and U.S. high-seas salmonid tags and recoveries of U.S. high-seas salmonid tags by all nations. By agreement with the National Research Institute of Far Seas Fisheries, FAJ, FRI also reports recoveries of tagged salmon released during cooperative Japan-U.S. high-seas salmon tagging. An all-agency (Canada, Japan, Russia, and United States) high-seas tag release and recovery computer database (1954-present), maintained and updated by FRI, is available upon request to the Parties of NPAFC, so that all member nations can have access to a common database.

From 1 September 1995 through 31 August 1996, eight Japan-U.S. tags were returned to FRI (1 sockeye, 2 chum, 4 pink, and 1 coho salmon). These fish were released in 1995 and 1996 during international cooperative tagging operations aboard Japanese research vessels in the central North Pacific, Bering Sea, and Gulf of Alaska in June and July. The tagged fish were recovered in coastal areas around the Pacific Rim from Ketchikan in southeastern Alaska to Miyagi Prefecture on the Pacific coast of Honshu Island, Japan. The recovery of a tagged sockeye salmon in a terminal fishery near the Bear River, Alaska, was a northwestern extension of the known range of North Alaska Peninsula sockeye salmon in the Bering Sea. A tagged coho salmon released south of the Alaska Peninsula in late June and recovered over two months later in the Niukluk River, Norton Sound, Alaska, represents the northernmost coho stock recovered during 41 years of high-seas salmon tagging.

All of the tagged salmon recovered in 1995-1996 were double-tagged with both FAJ and FRI external disk tags. The use of tags with a U.S. address may improve the return of FAJ tags by North American fishermen. In 1997, FRI plans to design a new high-seas disk tag that will make the fish readily identifiable as a salmon tagged and released for international cooperative high-seas tagging research.

(iii) Incidence of Coded-Wire Tagged Salmonids in Commercial and Research Catches in the North Pacific Ocean and Bering Sea, 1995-1996

The results of sampling for coded-wire tagged salmonids by scientists on research vessels and by U.S. observers on groundfish vessels in the North Pacific Ocean and Bering Sea from 1 January 1995 through 31 August 1996 were summarized. Release and recovery information from 80 coded-wire tagged salmonids is reported for the first time: 2 recoveries during 1 September – 31 December 1995, and 78 recoveries from 1 January through 31 August 1996. Six coded-wire tagged chinook salmon of Snake River, Washington origin were recovered from trawl catches off the Pacific Coast of Washington state. These fish are representatives of Snake River fall chinook salmon listed under the Endangered Species Act. The recovery of a coded-wire tagged coho salmon from the Nehalem River, Oregon represents a significant northwest range extension for Oregon coho salmon in the Gulf of Alaska. The recovery of a coded-wire tagged sockeye salmon from a Prince William Sound, Alaska hatchery marks the first instance of the recovery of a coded-wire tagged sockeye salmon on the high seas.


A workshop on “Salmon Age at Maturity,” held 13-14 November 1995 in Juneau, Alaska, was sponsored by the National Marine Fisheries Service (NMFS) Ocean Carrying Capacity (OCC) research program and the University of Alaska Fairbanks (UAF) School of Fisheries and Ocean Sciences. The goal of the workshop was to investigate effects of changes in climate, fish
production, and ocean productivity on salmonid maturation schedules in natural environments. The two key scientific questions were: (1) when is the onset of maturation in natural environments? and (2) what are the types of factors affecting maturation (freshwater growth, marine growth, genetic, etc.), and do they affect maturation independently?

Invited speakers reviewed the historical increase of maturation age, particularly in stocks of chum salmon, and reviewed the literature on an array of pertinent topics ranging from life history evolution, salmonid reproductive strategies, genetic variation of growth and maturation, to physiological factors that influence maturation age, particularly nutrition and endocrine regulation. Abstracts from these talks are included in this document. Workshop participants also identified a list of important research questions related to the general question of why age of maturation has increased, including questions related to alternative hypotheses about energetics and nutrition and how they may have varied historically and geographically. These questions were categorized into four potential avenues of research described towards the end of the document.


The preliminary results of a survey of the ocean distribution of young salmon by the NMFS, Auke Bay Laboratory, on the F/V Great Pacific, a 124 ft. stern trawler were summarized. Twenty-three transects, 60-120 nmi apart, covered waters off southeastern Alaska, Prince William Sound, Kodiak Island, the Shumagin Islands, Unimak Pass, the Aleutian Islands west to Amchitka Pass, and parts of the southern Bering Sea and Bristol Bay in July and August 1996. Salmon were sampled with a midwater rope trawl, which was towed at 5.0 kts over nearshore (0-10 nmi), shelf, slope (200 m contour), and oceanic habitats out to 60-120 nmi. The net fished from the surface to a depth of about 13 m (41 m horizontal opening). A total of 105 tows, each 5 nmi long, was completed. Near-surface temperatures were relatively warm (12-13°C) off southeastern Alaska, and sea temperatures were lower (5-6°C) and salinities were higher in Aleutian waters. The total catch of young salmonids was 12,057 fish, including 9,484 juveniles (ocean age .0; 4,701 pink, 1,932 chum, 1,414 sockeye, 1,405 coho, and 31 chinook salmon, and 1 steelhead) and 2,573 immatures (ocean ages .1 or older; 2,059 chum, 411 sockeye, and 99 chinook salmon, and 4 steelhead). The midwater trawl also captured 2,025 adult salmon (1,438 pink, 260 chum, 178 coho, 132 sockeye, and 17 chinook) and a wide variety of other species, including salmon shark, blue shark, jack mackerel, opah, Pacific saury, herring, cod, Atka mackerel, sand lance, capelin, sablefish, prowfish, pollock, pomfret, sandfish, lumpsuckers, daggertooh, wolf-eel, and Bering Sea wolffish.

The preliminary results show striking inter- and intra-specific differences in the distribution, body size, and food habits of young salmon. Juvenile pink, chum, sockeye, and coho salmon predominated by numbers in catches from southeastern Alaska westward across the entire Gulf of Alaska to Unimak Pass. Westward from Unimak Pass into the Aleutians, only immature salmon, mostly chum and sockeye, were found. In the Gulf of Alaska, the peak abundance of juvenile pink salmon shifted from nearshore and shelf habitats off southeastern Alaska to slope habitats off central Alaska. Along most Gulf of Alaska transects, larger juvenile salmon were found farther offshore, and immatures were generally caught over or beyond the slope. Westward of Unimak Pass, the mean body size of immature chum salmon was significantly larger than that of immature sockeye salmon (p < 0.01) in all habitats. The largest immature chum salmon occurred in nearshore habitats, and their mean size decreased significantly from nearshore to oceanic habitats. On-deck analyses of major food items showed that euphausids and hyperiid amphipods were the primary foods of immature chum and sockeye salmon in the westward region. A low percentage of empty stomachs and high mean stomach fullness indicated that the waters over the continental slope are important rearing areas, particularly for immature sockeye salmon. Sizeable collections of young pink, chum, and sockeye salmon from all regions were taken for ongoing laboratory analyses of
food habits, age, growth, stock origins (genetic and thermal otolith marks), and other biological information.

(vi) Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Regions as Projected for 1997

This is a preliminary assessment report of the status of individual groundfish stocks managed by the United States in the Bering Sea/Aleutian Islands region for 1997. The historical catch statistics, estimates of maximum sustainable yields, acceptable biological catches (ABCs), and total allowable catches (TACs) are reported for each stock. The abundance of the most abundant species, pollock, is average for the main eastern Bering Sea stock, and low for the Bogoslof and Aleutian Islands stocks. All pollock stocks are generally on a moderate declining trend. Pacific cod is high and relatively stable in abundance. All flatfish species, except Greenland turbot, are high and stable in abundance. Greenland turbot is low and declining in abundance. Rockfish stocks are low to average levels of abundance, but stable. Sablefish is low and declining. Atka mackerel abundance is still relatively high but on a declining trend after achieving a peak level of abundance in 1991. The sum of the preliminary 1997 ABCs for the groundfish complex is 2.67 million t in 1996 to 18.57 million t projected for 1997. The preliminary numbers for 1997 are expected to be updated in December 1996 when the North Pacific Fishery Management Council meets to set the 1997 fishing regulations.

(vii) Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Gulf of Alaska as Projected for 1997

This is a preliminary assessment report of the status of individual groundfish stocks managed by the United States in the Gulf of Alaska for 1997. The historical catch statistics, estimates of maximum sustainable yields, ABCs and TACs are reported for each stock. The abundance of Pacific cod and arrowtooth flounder is above target stock size. The abundance of deep-water flatfish, shallow water flatfish, flathead sole, demersal shelf rockfish, northern rockfish, pelagic shelf rockfish, other slope rockfish, and thornyheads and Atka mackerel not well known. The sum of the preliminary 1997 ABCs for the groundfish complex is 550,000 t, up from 475,000 t in 1996.

(viii) Incidental Catches of Salmonids by U.S. Groundfish Fisheries in the Bering Sea/Aleutian Islands, Gulf of Alaska, and the Pacific Coast, 1990-1996

4.1 Canada

Six species of Pacific salmon are harvested in British Columbia coastal waters. Sockeye, pink, and chum salmon are mainly harvested in commercial net fisheries while chinook and coho salmon are targeted by commercial, troll, and (increasingly) by sport fisheries located primarily in the Strait of Georgia. Steelhead constitute a minor component of the catch, and are not discussed in this document.

In general, escapement goals are established in Canada for major sockeye, pink, and chum stocks, and fisheries are managed to meet these escapement objectives. Chinook and coho fisheries are managed to achieve specified harvest rates although escapement goals have also been established for key stocks.

The 1995 catch of 45,048 t was well below average for the period 1952-1995 (65,910 t). Approximately half the 1995 catch was composed of pink (18,611 t). Pink catches rebounded from the 1994 all-time low (3,277 t) to near the historical average (20,807 t). Sockeye catches in 1995 at 10,300 were nearly one-third of those recorded in 1994 and well below the average catch of 16,995 t. Catches of chum (10,641 t) were about one-half of those in 1994 and below the 1952-1995 average of 13,601. Chinook salmon production has decreased steadily since the early 1970s and the 1995 catch of 1,342 t was the lowest catch on record and well below the average catch of 5,380 t. Coho salmon catches (4,154 t) were also down from 1994 and well below the long term average of 9,127 t.

4.2 Japan

In 1995, the total commercial catch of all salmon species was approximately 84 million fish or 253,000 t (round weight). The largest catches were chum salmon (70 million fish, 232,000 t), followed by pink (14 million fish, 20,000 t). Catches of other species were relatively minor.

4.3 Russia

In 1995, the total commercial catch for all salmon species was 118 million fish or 190,120 t. The largest catches were pink salmon (104 million fish, 145,303 t) and chum salmon (8.2 million fish, 28,233 t). Sport catches totaled 1.6 million salmon. Subsistence catches were 2.4 million salmon. Catches by the foreign fishery fleet in the far-eastern Russian exclusive economic zone were 7.6 million salmon (18,983 t) in 1994 and 11.7 million salmon (28,316 t) in 1995.

4.4 United States

(i) Preliminary 1995 Commercial Salmon Catches in Alaska

The 1995 Alaskan commercial harvest was 218 million salmon (447,000 t) distributed as 128 million pink (195,000 t), 64 million sockeye (160,000 t), 19 million chum (66,000 t), 6 million coho (21,000 t), and 650 thousand chinook (5,000 t) salmon. This set another all-species catch record; the previous record was 196 million salmon caught in 1994.
Preliminary 1995 Commercial Salmon Catches in Washington, Oregon, California and Idaho

The 1995 commercial salmon harvest was approximately 4.5 million fish (11,000 t, round weight) in Washington, 0.3 million fish (1,000 t) in Oregon, and 0.6 million fish (4,000 t) in California. The species composition of the combined Washington, Oregon, and California commercial catch by number of fish was 50% pink, 19% chinook, 14% chum, 9% coho, and 7% sockeye salmon, and 1% steelhead. There was no commercial harvest in Idaho.

(5) Salmonid Enhancement Production

5.1 Canada

The Salmonid Enhancement Program (SEP) in British Columbia, Canada was undertaken in 1977 to rebuild stocks and increase catch through the expanded use of enhancement technology. This report tabulates release data for the program by species and stage (1977-1995), program contribution to commercial fisheries and recoveries by catch component, and average post-release survival rates by brood year, species, stock and release stage for selected projects. Egg and release production targets for 1996 by facility and detailed descriptions of the current enhancement techniques now being utilized by SEP are appended. Steelhead and cutthroat data are not included in this report as their assessment is a provincial responsibility. In 1995, approximately 0.5 billion juvenile salmon (42% chum, 32% sockeye, 13% pink, 10% chinook, and 3% coho) were released from SEP facilities.

5.2 Japan

In 1995, about 2.151 billion juvenile salmon were released from Japanese hatcheries, which was 2.6% less than in 1994. Chum salmon releases in 1995 were approximately 93.9%, and pink salmon were approximately 5.5% of the total releases. The remaining releases were masu and sockeye salmon. The development stage of chum and pink salmon was the fry stage, that of masu and sockeye salmon contained fry, juvenile, and smolt stages.

In 1995, adult salmon captured for the enhancement program totalled about 6.0 million fish, of which approximately 92.2% were chum, and 4.0% were pink salmon.

5.3 Russia

In 1995, approximately 0.5 billion salmon fry were released from Russian hatcheries.

5.4 United States

(i) Alaska

In 1995, 1.5 billion juvenile salmon were released from Alaskan hatcheries: 920 million were pink salmon and 473 million were chum salmon. Hatcheries in Prince William Sound and Cook Inlet contributed 56% of the fish released.
(ii) Washington, Oregon, California, and Idaho

In 1995, approximately 0.5 billion juvenile salmon were released from Washington (64% of total), Oregon (17%), California (16%), and Idaho (3%) hatcheries. The releases were predominantly chinook salmon (63% of the total), and also included coho (15%), chum (13%), and sockeye (2%) salmon, and steelhead (7%).

(6) Coordination of Scientific Research Activities

6.1 Report of the Science Sub-Committee on Status of Science Plan

(i) The Science Plan

The Science Plan was reviewed, and no changes were proposed.

(ii) Other Activities

On 25 June 1996, in Nemuro, Japan, a meeting of the NPAFC Science Sub-Committee was held consisting of Drs. Beamish, Karpenko, Wakabayashi, and Dahlberg to discuss several items of interest. Dr. Karpenko brought a Russian manuscript on salmon biology, and the Science Sub-Committee agreed that a summary of the manuscript should be submitted to CSRS of NPAFC. A request from Mr. Jeff Rodgers of Oregon State University for access to the electronic file of NPAFC/INPFC high seas tag release and recovery data was reviewed, but a consensus on releasing the tag data was not obtained.

6.2 Report of the Working Group on Methodology Standardization

Substitute members of the Working Group on Methodology Standardization met during the Fourth Annual Meeting to develop a report for the CSRS. During the past year, some progress was made on agreement on the content of a questionnaire. The Working Group should follow the schedule below:

1. Complete and agree on questionnaire format . . . . . . . . . . . . . . . . . . 1 January 1997
2. National Parties to have questionnaire completed . . . . . . . . . . . . . . . 1 July 1997
3. Working Group to collate and integrate information from questionnaires and provide progress report to CSRS . . . . . . . 15 September 1997

A Chairperson (Vladimir Karpenko) was selected for the Working Group. Nancy Davis replaced Steve Ignell as the U.S. member to the Working Group.

The report was endorsed by the Committee.

6.3 Report of the Working Group on Stock Assessment

The Working Group on Stock Assessment met, reaffirmed that Don Noakes is the chairperson, and agreed on goals for the coming year. Before the next meeting the group will assemble a data set suitable for an exploratory analysis, perform an analysis, and prepare a report. The first task is to look for relationships in the high-seas stock assessment data and inshore run strength of selected groups of salmon stocks. By mid-December the group plans to have age-specific Bristol Bay sockeye catch data, pink salmon catch data by geographic region, and published high-seas stock
assessment information assembled in a single spreadsheet to be circulated to members of the Working Group.

6.4 Other Matters

The Committee recommended that members of CSRS will meet next spring for about two days to discuss coordination of 1997 scientific research activities within NPAFC Parties and coordination with activities of the North Pacific Marine Science Organization (PICES). The meeting shall take place in Vancouver, Canada.

(7) Statistical Yearbook

7.1 Status of Development of a Machine-Readable Version of Previous INPFC Statistical Yearbooks

The Secretariat made a short report on the status of the development of a machine-readable version of the INPFC Statistical Yearbooks. A contract was made between a Chinese scientist and the Secretariat in February 1996. Under the contract, data of all the INPFC Statistical Yearbooks will be keypunched into a computerized spreadsheet file. To date, keypunching has been finished for data from 1952 to 1961.

7.2 Status of Progress on the 1993 and 1994 NPAFC Statistical Yearbooks

The Secretariat submitted a draft NPAFC 1993 Statistical Yearbook.

The Secretariat also informed the Committee of the current status of progress on the 1994 NPAFC Statistical Yearbook.

7.3 Report on the Status of Obtaining Catch Statistics From Countries That Are Not Members of the North Pacific Anadromous Fish Commission

The Secretariat has sent a letter to People's Republic of China (PRC), Republic of Korea (ROK), Democratic People's Republic of Korea (DPRK), Poland, and Taiwan reminding them of the Commission's request for statistical data that would be included in the NPAFC Statistical Yearbook. To date, data have been submitted from Poland and Taiwan, and these data were included in the draft 1993 NPAFC Statistical Yearbook. ROK has responded positively, informing the Secretariat that it would provide the requested data through PICES. No response has been received from PRC and DPRK.

The Committee recommended that the Secretariat continue efforts to obtain catch data from countries that are not members of the NPAFC, in cooperation with PICES if appropriate.

(8) Other Publications

A newsletter proposed by US scientists was reviewed by the Committee and it recommended that the Commission should publish a newsletter, which would include topics on scientific research and other activities of the Commission, twice a year.
The Third Annual Meeting's decision on publications of the proceedings of the 1996 Symposium as the first NPAFC Bulletin was reconfirmed.

(9) Methods for Identification of Fish Origins

9.1 Report of the Working Group on Stock Identification and Growth

A working group was established in March 1995 to develop a report on the use of tags, scale pattern analysis, otolith microstructure, parasitic infection, and genetics for stock identification of salmon in the North Pacific Ocean. The 1996 report of the working group includes a history and comprehensive bibliography of previous studies using each technique. Additional information for this report was provided by the Parties during the CSRS meeting. The group reviewed ongoing research on stock identification and growth. The members agreed that better coordination of research and standardization of methods is needed. The group plans to continue these discussions via electronic mail, and will provide a progress report to the CSRS at the next annual meeting.

(10) Cooperation with Relevant International Organizations

10.1 Report of the Science Sub-Committee on Coordination of the Implementation of NPAFC and PICES Science Plans

Michael Dahlberg, Chairperson of the Science Sub-Committee, represented the NPAFC at the meeting of the Executive Committee of the Climate Change and Carrying Capacity (CCCC) Implementation Panel of PICES on 23 June 1996 in Nemuro, Japan. The agenda consisted of five items, one of which dealt with PICES cooperation with NPAFC. The Committee agreed that common aspects of the PICES CCCC Science Plan and that of the NPAFC should be identified and discussed with members of the NPAFC Science Sub-Committee present at the workshop, with a view to integrating research activities where appropriate. In particular, studies of physical forcing of the lower trophic level may contribute to the goals of the NPAFC program.

The PICES Implementation Panel met on 26 June 1996 and briefly discussed a paper prepared by Dr. Warren Wooster that compared the PICES CCCC and the NPAFC Science Plans; many elements of the plans were found to be similar. During the meeting, Dr. Wooster proposed that the two organizations should work together to meet common research goals. The Science Sub-Committee decided to convey this proposal to CSRS. Dr. Wakabayashi stated that any salmon research in the North Pacific should be led by NPAFC.

The Science Sub-Committee recommended that the CSRS should discuss the proposal made by Dr. Wooster and examine the progress on mutual cooperation between NPAFC and PICES.

The report was endorsed by the Committee.

10.2 Implementation of the CSRS Recommendation 95 S/9, Made at the Third Annual Meeting

At the Third Annual Meeting, the Committee recommended that the Commission:

1. requests assistance from PICES to obtain data from its members that are non-NPAFC members to complete data tables for the statistical yearbook, and
2. requests that PICES considers contributing additional data tables to the statistical yearbook to serve mutual needs of the two organizations.

To pursue the above recommendation, the Committee recommended that the Commission should remain in contact with PICES.

10.3 Other Matters

With regard to observers at the Commission's 1997 Annual Meeting, the Committee recommended that the following organizations be invited to send representatives to act as observers:

- Asia Pacific Fisheries Commission
- Food and Agriculture Organization of the United Nations
- Indo-Pacific Fishery Commission
- Inter-American Tropical Tuna Commission
- Inter-Governmental Oceanographic Commission
- International Commission for the Conservation of Atlantic Tunas
- International Council for the Exploration of the Sea
- International Pacific Halibut Commission
- North Atlantic Salmon Conservation Organization
- North Pacific Marine Science Organization (PICES)
- Northwest Atlantic Fisheries Organization
- Pacific Salmon Commission

(11) Development of the 1997 Workplan

The Committee recommended the following workplan to be used for CSRS in 1997:

<table>
<thead>
<tr>
<th>Work Plan Item</th>
<th>Interim Term of Reference</th>
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<tr>
<td>(A) report on last year's salmon catches, escapement, and wild and artificial production of juvenile salmon;</td>
<td>1</td>
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<tr>
<td>(B) review results of salmon stock assessment research and the condition of salmon stocks;</td>
<td>1 and 6</td>
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<tr>
<td>(C) review and summarize results of this year's salmon research beyond 200-mile limit;</td>
<td>2</td>
</tr>
<tr>
<td>(D) exchange biological samples as necessary;</td>
<td>5</td>
</tr>
<tr>
<td>(E) review and summarize salmon research plans for next year beyond 200-mile limits;</td>
<td>5</td>
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<tr>
<td>(F) propose data exchanges;</td>
<td>5</td>
</tr>
<tr>
<td>(G) review any documents submitted to the Commission prior to this year's annual meeting;</td>
<td>6 and 7</td>
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(H) the Parties will review any research proposals submitted in accordance with Article VII paragraph 6;

(I) consider international collaboration with relevant organizations;

(J) consider a report to the Commission.

Each Party’s specific research and vessel cruise plans in relation to the 1997 Workplan are outlined below.

11.1 Research Plans

(i) Canada

Canada was unable to provide final research plans at this time as work planning will not be approved until the spring. It is expected that two cruises will be carried out using the W.E. Ricker to survey the distribution of juvenile Pacific salmon during their migration north along the coast and offshore into the open ocean. These surveys will try to establish how juvenile salmon use ocean currents in their migration, and establish what biological factors motivate the migration.

Canada is proposing to expand its study of the marine survival and growth of Fraser River sockeye salmon. These stocks have recently had poor marine survival that appears to be related to a recent change in climate and ocean conditions. Large scale declines in growth of adult salmon and survival of juvenile salmon occurred concurrently in 1990, and appear to have occurred in a defined geographic area off central and southern British Columbia.

The Strait of Georgia studies on the effects of climate changes on the carrying capacity of juvenile salmon are expected to continue.

(ii) Japan

J-1 Life History, Distribution, Growth, and Feeding Ecology

This set of studies is designed to address the following issues: Investigate the distribution of salmonids, by ocean age and maturity, based on data accumulated by research vessels in the North Pacific Ocean. Identify factors affecting salmonid distributions, such as ocean temperature and interactions with other species. Investigate growth variations of salmonids, based on age and body size of adult salmonids returning to spawning rivers and biological data of salmonids collected by research vessels in the North Pacific Ocean. Examine formation of hard tissues, such as otolith and scales, in order to clarify the growth mechanisms. Conduct experiments in order to clarify external (water temperature and feeding conditions) and internal (fish density) factors that cause growth variations of salmonids. Investigate the feeding ecology of salmonids in the North Pacific Ocean. Establish methods to assess the nutritional condition of salmonids. Identify mechanisms of variations in feeding ecology and nutritional condition.

J-2 Population Dynamics, Mortality, Carrying Capacity, and Ocean Environment

This research addresses the following issues: Estimate the survival rates of salmonids from changes in salmonid abundance by age group and by year, based on data collected by research
vessels. Investigate the occurrence of salmonids affected by diseases or predators, and distribution of predators. Investigate factors affecting the survival, such as predation, starvation, and diseases, by experimental methods. Establish methods to assess the carrying capacity of salmonid populations based on accumulated meteorological and oceanographic data (including plankton data) and biological data of salmonids, and examine the relationships between meteorological and oceanographic factors and salmonid carrying capacity.

J-3 Stock Assessment, Biological Monitoring, and Stock Identification

This research is undertaken to address the following issues: Develop methods for stock identification of salmonids including juveniles: (1) scale and otolith pattern analysis, (2) genetic analysis, and (3) artificial and biological tagging. Continue salmon research vessel surveys in summer, and establish methods to assess salmonid abundance and biological characters by species and stock. Establish methods of estimating abundance and survival of juvenile salmonids before wintering. Monitor genetic and reproductive characters, population structure of mature salmonids returning to their natal rivers. Improve biological monitoring methods for primary and secondary producers, competitors, and predators of salmonids in the North Pacific Ocean.

(iii) Russia

R-1 Mortality of Pink Salmon in the Western Bering Sea

The isolation of pink salmon populations in northeastern Kamchatka makes it possible to estimate the stock abundance of each generation at different stages of life. Based on the results of direct estimation of abundance of fry, smolts, and juveniles in Karaginski Bay and stock abundance of adults returning to spawn, Russia hopes to estimate pink salmon mortality during the 1980s-1990s. Habitat conditions associated with different brood years will be examined to identify the reasons for changes in mortality rates.

R-2 Abundance and Feeding Conditions in the Western Bering Sea

An evaluation of the abundance and feeding conditions of pink and chum salmon in the western Bering Sea will be undertaken during the fall of 1997. A pelagic rope trawl of 54.41/192 m and a vessel of the ST-R type will be used for research and survey purposes. In addition, to evaluate habitat conditions, oceanographic information and zooplankton are being collected in areas where salmon juveniles are being fished.

R-3 Stock Identification

Stock identification will be conducted using genetic and scale markers. Basic data will be collected from the main sockeye, pink, and chum salmon populations, and from sampling of other salmon species.

Genetics. Research will be developed on an expanded geographic range of native populations of pink, sockeye, and chum salmon: the data on some populations from the Kuril Islands and Kamchatka River Basin will be added to the database, characterizing genetic divergence of those species. The electrophoretic study of Asian chinook salmon will be initiated. Research on distribution of Pacific salmon in the ocean will be focused on stock identification of pink, chum, sockeye, and chinook salmon in mixed sample collections from the Bering Sea and Pacific Ocean in the area to the east of Northern Kuril Straits.
Scales. Investigations concerning scale sampling and processing techniques will be aimed at their standardization. This will help with correct analysis of growth characteristics. The sampling and processing of other materials (otoliths, data on parasites, etc.) are also included in the program.

R-4 Environmental Impact

The main task of these investigations is to estimate quantitatively the influence of environmental factors (temperature, hydrological conditions) on salmon mortality during the embryo - larval stage. The observations are being conducted in the basin of the Bolshaya River, western Kamchatka. For comparison, qualitative indices of salmon reproducing in wild and regulated conditions were taken. The results could be used for the development of methods of forecasting salmon returns.

The influence of environmental factors on abundance dynamics of stocks of western and eastern Kamchatka pink salmon and sockeye salmon of Ozernaya River will be estimated.

R-5 Distribution and Migrations of Russian Salmon at Sea

Research will be undertaken during May-October 1997 in the Russian EEZ. Ichthyological, hydrobiological, and oceanological data are being collected to determine feeding habits and migration patterns of local salmon stocks during their pre-spawning period. Fishing vessels equipped with driftnets and scientific equipment will be used to collect that information.

(iv) United States

U-1 Salmon Growth in the Eastern North Pacific

This set of studies is designed to address the following questions. Do salmonids distribute to maximize growth and minimize predation, or is there no active selection of habitat? What are the effects of temperature, water current structure, and predator-prey densities on growth of salmonids and ecologically-related fish species? Is the growth of salmonids in the Alaska Coastal Current (ACC) limited by food supply or by competition? The salmonid growth studies comprise: (1) bioenergetic modeling of the effects of habitat quality and fish density on the growth rates of salmonids and ecologically related species; (2) studies on trophic dynamics, diet overlap, and prey selectivity among fishes in the ACC; and (3) prediction of year-class strength and adult size of southeast Alaska pink salmon based on first-year scale and otolith growth.

U-2 Salmon Distribution in the ACC Ecosystem

This research examines how the broad- and fine-scale spatial distributions of salmonids and ecologically related species are related to the biological and physical features of the ACC epipelagic ecosystem. Research activities include: (1) broad-scale field studies of salmonids that include a basic description of the physical and biological properties of the ACC using a combination of ship surveys and satellite observations; and (2) fine-scale field studies that focus on aggregations of salmonids or other fish to look for specific processes or factors that influence their spatial patterns in the ACC.
U-3 Stock Identification

This research program is designed to develop biological markers capable of identifying stocks of salmon in the North Pacific Ocean. These biological markers include genetic characters developed from protein electrophoresis and DNA, and non-genetic characters derived from scale pattern analysis and thermal marks on otoliths. The United States is also continuing international cooperative high-seas tagging studies and recovery of coded-wire tagged salmonids in ocean fisheries and research vessel operations. These data will assist in identifying the origins of stocks harvested in mixed-stock fisheries, and to determine the oceanic distribution of stocks. The first task is to develop standardized methods of genetic analysis among parties, and to identify important stocks of salmon that should be included in the database.

U-4 Retrospective Analyses

Retrospective analyses to provide information on long-term trends in growth and abundance of salmon include: (1) analysis of scale growth patterns of Karluk Lake sockeye salmon, and a summary of historical salmon research in the Karluk Lake area, (2) use of nitrogen content in sediments in selected bays in southeastern Alaska, as an index of salmonid abundance, and (3) resumption of monitoring of escapement and outmigrants in Sashin Creek, Little Port Walter, Alaska.

11.2 Proposed Vessel Cruises

(i) Canada

No plans were submitted.

(ii) Japan

Five Japanese salmon research vessels are tentatively scheduled to conduct the following scientific research in the Sea of Okhotsk, western and central North Pacific, Bering Sea, and Gulf of Alaska in 1997. In the case of gillnet operation, gillnets less than 2.5 km in length at sea will be used. The *Hokko maru* will conduct research with gillnets to obtain information on the distribution and stock abundance of Asian salmon at stations along 165°E longitude in July. The *Shunyo maru* will conduct research with a surface trawl to obtain data on the distribution and ecology of Japanese origin chum salmon and Sakhalin origin pink salmon juveniles in the Sea of Okhotsk and western North Pacific from early July to mid-August. The *Wakatake maru* will conduct research with gillnets and longlines to obtain data on the distribution and stock abundance of salmon along 179°30'W longitude in the North Pacific and Bering Sea from early June to late July. The *Oshoro maru* will conduct research with gillnets, longlines, and a small trawl to obtain data on the distribution, ecology, and maturation of salmon and other pelagic fishes in the North Pacific, Bering Sea, and Gulf of Alaska from early June to mid-August. The *Hokusei maru* will conduct three cruises for oceanographic observations and research with gillnets to obtain data on the distribution and ecology of salmon and other pelagic fishes in the western North Pacific Ocean from June to August. The *Hokusei maru* will also conduct a cruise for oceanographic observations and research with gillnets to obtain data on the distribution and ecology of salmon and other pelagic fishes in the western North Pacific Ocean in October.
(iii) **Russia**

No plans were submitted.

(iv) **United States**

Proposed cruises by the United States will continue to survey salmon in the North Pacific.

(12) **Invitation to State or Entity**

With regard to observers at the Commission's 1997 Annual Meeting, the Committee recommended that the following States be invited to send representatives to act as observers if they are not members of the Commission:

- People's Republic of China
- Republic of Korea.

(13) CSRS made no recommendations on *Measures for the conservation of anadromous stocks and ecologically related species; Observer Programs; and Other measures needed* under respective agenda items.

(14) **1996 International Symposium on Assessment and Status of Pacific Rim Salmonid Stocks**

14.1 **Report of the Symposium Steering Committee**

Dr. Wakabayashi (Acting Chairperson of the Steering Committee) made a short report on this matter.

14.2 **Review of the Procedure and Contents of the Symposium Materials**

At the Third Annual Meeting, the Committee recommended that the proceedings of the Symposium be published by the Commission as the first NPAFC Bulletin.

The Committee recommended that an editorial committee, which consists of one member from each country, should be established for the publication of the Bulletin, and that the Bulletin should be published within one year after the Symposium.

Members were nominated as follows: David Welch (Canada), Kiyoshi Wakabayashi (Japan), Vladimir Karpenko (Russia), and Douglas Eggers (United States).

The editorial committee will decide on procedures for the publication.

The Committee also recommended that Hisashi Endo (Secretariat) be designated as a technical editor for the publication.
7. **Administrative and Fiscal Matters**

At the First Plenary Session, this item (agenda item 9) was referred to the Committee on Finance & Administration (F&A) for consideration and report at the Second Plenary Session.

The Committee reviewed agenda item 9 and submitted its report for the Commission's consideration and adoption. The Commission adopted the F&A Report, including all its recommendations. Discussions and recommendations on this agenda item are summarized below.

1. **Review of Terms of Reference**

The Committee made no comments on Terms of Reference.

2. **Financial Situation in Current Fiscal Year and Audit**

The Committee discussed the Commission's financial situation in the 1996/97 fiscal year. The Committee approved the projected expenses for the current fiscal year with the understanding that the contributions by each Party shall be $135,000.

The Commission referred agenda item 9(c) for consideration by the Heads of Delegation, who reviewed and approved the annual salaries for the staff members in 1996/97 f.y.

<table>
<thead>
<tr>
<th>Projected Expenditures for 1996/97 Fiscal Year</th>
<th>(Canadian dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditures:</td>
<td>Projected Expenditures</td>
</tr>
<tr>
<td>Personnel Services</td>
<td>$ 267,100</td>
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<td>Other than Personnel Services</td>
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</tr>
<tr>
<td>(1) Travel</td>
<td>57,500</td>
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<td>(2) Communication</td>
<td>18,000</td>
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<td>(3) Contractual Services</td>
<td>103,000</td>
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<td>(4) Printing</td>
<td>23,000</td>
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<td>(7) Equipment</td>
<td>3,000</td>
</tr>
<tr>
<td>(8) Miscellaneous</td>
<td>5,000</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>$ 247,700</td>
</tr>
<tr>
<td>Expenditures - Grand Total</td>
<td>$ 514,800</td>
</tr>
</tbody>
</table>

| Income:                                     |                     |
| Contributions                               | $ 540,000           |
| Interest                                    | 14,000              |
| Income - Grand Total                        | $ 554,000           |

Income: $ 554,000
Less Expenditure: ($514,800)
Transfer to Contingency Fund: $ 39,200

Appropriation per Party: $ 135,000

The Committee received and adopted the Auditor's Report (Appendix 1 on page 48).

The Committee recommended the selection of KPMG Peat Marwick Thorne as auditors for the current year.
(3) **Budget Estimate for Fiscal Year Beginning July 1, 1997**

The Committee approved a general fund budget for fiscal year 1997/98 of $564,000.

The Committee recommended adoption of the Budget Estimate for the fiscal period beginning July 1, 1997.

**Budget Estimate for the Fiscal Year Beginning July 1, 1997** (Canadian Dollars)

<table>
<thead>
<tr>
<th>Expenditures:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. <strong>Personnel Services</strong></td>
<td>$ 267,700</td>
</tr>
<tr>
<td>B. <strong>Other Than Personnel Services</strong></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td>47,000</td>
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<td>Communications</td>
<td>18,000</td>
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<tr>
<td>Contractual Services</td>
<td>118,000</td>
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<tr>
<td>Printing</td>
<td>41,000</td>
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<tr>
<td>Rentals</td>
<td>55,000</td>
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<tr>
<td>Supplies</td>
<td>9,000</td>
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<tr>
<td>Equipment</td>
<td>3,300</td>
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<tr>
<td>Miscellaneous</td>
<td>5,000</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td>$ 296,300</td>
</tr>
<tr>
<td><strong>Expenditures - Grand-total</strong></td>
<td>$ 564,000</td>
</tr>
</tbody>
</table>

**Income:**
- Contributions: $540,000
- Estimated Interest: 14,000
- **Income - Grand Total**: $554,000

**Income**
- $554,000
- Less Expenditures
- Transfer from Contingency Fund ($10,000)

**Appropriation per Party**: $135,000

(4) **Budget Forecast for Fiscal Year Beginning July 1, 1998**

The budget forecast of $569,000 (Canadian funds), of which $540,000 will be covered by the Parties' contributions, was presented.

The budget forecast is intended for the guidance of the Parties and will not be considered for adoption by the Commission until the 1997 Annual Meeting.

(5) **Working Capital Fund**


(6) **Administrative Report for 1996**

The Committee reviewed and adopted the Administrative Report for 1996 which provides information on actions of the Commission after the Commission's Third Annual Meeting, describes actions taken with respect to decisions made at the meeting, and summarizes activities of the Secretariat.
7. Administrative Matters

The Heads of Delegation agreed to establish a working group to develop options for the organization of the Secretariat, rules and roles of staff, to review the duties, classification and compensation of the Secretariat staff and to consider hiring procedures for the Executive Director and the Deputy Director. The working group, composed of members nominated by the Parties and chaired by the U.S.A., will meet in Vancouver and forward its proposals in writing to the Parties prior to April 1, 1997.

The F&A will consider the proposals and make recommendations to the Commission at the next Annual Meeting. The Parties will determine by correspondence if an ad hoc F&A meeting will be required prior to the next Annual Meeting.

8. Draft Memorandum of Understanding between NPAFC and PICES (MOU)

This item was referred for further consideration at the Fifth Annual Meeting.

9. Process to Recommend that Certain Other States of Origin Be Invited to Become Parties to the Convention

The Parties agreed that the Commission shall renew the invitation to the People's Republic of China to accede to the Convention.

The Parties reviewed the statement made by the observer from the Republic of Korea at the First Plenary Session and agreed that the Secretariat continue contacts with the Korean authorities to facilitate the Republic of Korea's accession to the Convention.

10. Amendment to the Rule of Procedure 14 and 15

The Rule of Procedure 14 was adopted as amended:

"The officers of the Commission shall be selected in accordance with Article VIII, Paragraph 11, of the Convention for a two-year term beginning with the adjournment of the annual meeting and ending at the adjournment of the second subsequent annual meeting, taking into due account the principle of rotation among the Parties."

The Rule of Procedure 15 was adopted as amended:

"The Commission shall select the Chairpersons of the committees, established in accordance with Rules of Procedure 9,10 and 11, taking into due account the principle of rotation among the Parties. The Chairpersons shall be appointed for a term of two years."

11. Other Business

News Release

Representatives of Canada, Japan, Russia, and the United States, the primary states of origin for salmon stocks in the North Pacific, met in Tokyo, Japan, on October 21-25, 1996, for the Fourth Annual Meeting of the North Pacific Anadromous Fish Commission (NPAFC). Observers from Republic of Korea, the North Atlantic Salmon Conservation Organization (NASCO) and the North Pacific Marine Science Organization (PICES) were also in attendance. The meeting was chaired by Mr. Koji Imamura, President of the NPAFC.
The NPAFC was established by the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean (the Convention) which entered into force on February 16, 1993. The Convention prohibits directed fishing for salmonids on the high seas of the North Pacific Ocean and includes provisions to minimize the amount of salmonids taken in other fisheries. The NPAFC promotes the conservation of salmonids in the North Pacific and its adjacent seas and serves as a venue for cooperation in and coordination of enforcement activities and scientific research.

The NPAFC’s committees on Enforcement, Finance and Administration, and Scientific Research and Statistics met to consider activities of the Parties in support of the objectives of the Convention.

The Committee on Enforcement reviewed unauthorized salmon fishing activities in the Convention Area in 1996 on the basis of information provided by the Parties. The cooperative enforcement efforts of the Parties resulted in the detection of a Taiwan drift net vessel actively engaged in fishing with a large scale drift net in the Convention Area. The seizure of the vessel and arrest of the master and crew were made by the Taiwan authorities acting on a request by the United States Government. All Parties pledged to maintain 1997 enforcement activities in the Convention Area at levels similar to those of 1996, as a deterrent to the threat of potential unauthorized fishing activity.

The Parties 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 oblige non-member States to support and cooperate with the objectives and principles of the Convention. A country’s acceptance of the FAO Agreement would, inter alia, obligate it to ensure that its fishing vessels do not undermine the effectiveness of conservation and measures adopted by such regional fisheries organizations as the NPAFC. The Parties decided, as appropriate, to encourage States or entities not party to the Convention to whom the FAO Agreement is open, to adopt the FAO Agreement as soon as possible.

The Committee on Scientific Research and Statistics discussed scientific research on a broad range of issues concerning Pacific salmonid stocks including: predator-prey relationships and other biological and ecological dynamics of salmonid production. Parties continued discussions regarding the coordination of the NPAFC Science Plan with the activities of the North Pacific Marine Science Organization and the Global Ocean Ecosystem Dynamics program (PICES-GLOBEC) for studying the climate change and carrying capacity of the North Pacific Ocean. Total salmon catch among the Parties in 1995 was 951,168 metric tons. In addition, nearly 5.2 billion juvenile salmon were released in the Convention Area in 1995.

The Committee on Finance and Administration considered and adopted the 1996/97 budget. Administrative topics were discussed and approved.

The NPAFC will hold an International Symposium on the Assessment and Status of Pacific Rim Salmonid Stocks, on October 28-29, 1996, in Sapporo, Japan. The symposium will review: (1) the status of salmonid stocks in the North Pacific Ocean in terms of life history, population ecology, and the ecosystem; (2) methods of monitoring and assessing salmonid stocks; and (3) the present knowledge concerning factors affecting salmonid production. Symposium participants will also discuss future research necessary for the assessment of salmonid stock conditions in the North Pacific and methodology for cooperative research.

The Fifth Annual Meeting of the NPAFC is scheduled to be held in Victoria, Canada, the week of October 27, 1997.

For Information
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Tel: (604) 228-1128
Fax: (604) 228-1135
e-mail: wmorris@unixg.ubc.ca
12. **PLACE AND TIME OF THE FIFTH, SIXTH AND SEVENTH ANNUAL MEETINGS**

The Fifth Annual Meeting will be held in Victoria, B.C., Canada, on the week of October 27, 1997.

Russia extended an invitation to hold the Sixth Annual Meeting in Russia. The exact place and time will be decided at the next annual meeting.

The United States extended an invitation to hold the Seventh Annual Meeting in the United States. The exact place and time will be decided at the next annual meeting.

The above invitations were accepted by the Commission.

13. **CLOSING REMARKS**

Closing remarks were made by a spokesperson of each Party as follows:

**Closing remarks by Mr. David Bevan, Head of Canadian delegation:**

*Mr. Chairman, distinguished Representatives, Ladies and Gentlemen,*

*Canada is pleased with the discussions that have taken place this week in particular with respect to the cooperative efforts of the Parties to implement effective enforcement and surveillance programs to ensure compliance with the Convention. We are encouraged that each of the Parties will continue to cooperate to maintain similar levels of enforcement effort during 1997.*

*We believe it is important to strengthen the exchange of scientific research on anadromous stocks. We maintain our view that these scientific programs should be undertaken in a comprehensive, coordinated and efficient fashion to achieve optimal results. We should promote further opportunities for constructive cooperation in this direction.*

*Canada is pleased with the Commission’s renewed agreement that the Parties will encourage non-member States to become party to the FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. We believe that this will be helpful to broaden non-member States’ support for the Convention’s objectives.*

*Mr. Chairman, Canada extends its appreciation for your able and confident chairmanship this week. We also thank the Chairmen of the three committees and the Secretariat staff, the interpreters and technicians for their full support in ensuring a smooth meeting. We express our appreciation to our host country, Japan, for the excellent arrangements, their warm hospitality, and in particular for hosting the reception earlier this week.*

*We look forward to being your hosts for the Fifth Annual Meeting next year in Victoria, British Columbia.*

**Closing remarks by Mr. Vladimir Izmailov, Head of Russian delegation:**

*Respected Mr. Chairman! Ladies and Gentlemen!*

*Today we have evaluated the results of the proceedings of this week’s meeting.*
The decisions adopted by us attest to the fact that during the preceding period owing to the efforts by our Commission we have achieved considerable success.

In the field of ensuring preservation of anadromous resources in the North Pacific every year there are fewer violators of fishery prohibitions in the Convention Area and less and less unlawfully caught salmon goes to the markets of the countries of the Pacific Rim.

This allows to bring forward the issue of possible shortening of duration of the annual meetings of the Committee on Enforcement.

The scientific data on salmon resources are becoming deeper and more reliable, the contacts between NPAFC and other international organizations, the cooperation with PICES are also strengthening.

The decision by the Fourth NPAFC Session on publication of a Newsletter will hopefully lead to finding new partners for cooperation.

I am very glad to have seen the fruit of the resolution of various problems related to the operation of NPAFC.

In conclusion, together with expressing gratitude to the Chairman for the excellent way in which he has led us through the proceedings of the Meeting and to the members of the Japanese Party for the organization of the Meeting and for providing us with an excellent venue, I would also like to express my gratitude to the Secretariat and interpreters.

Closing remarks by Mr. Steven Pennoyer, Head of the U.S. delegation:

Mr. Chairman, Fellow Delegates, Ladies and Gentlemen, I think we can all agree that the Commission has come a very long way since its inception in February 1993 to ensure our mutual concerns regarding our valuable salmon resources are addressed.

Within four years, the Commission has developed an international fisheries enforcement regime which is unrivalled by any other organization in the world. The cooperative enforcement efforts of Commission members have succeeded in deterring unauthorized fishing in the Convention Area, as evidenced by a single violation of the Convention this year. We are pleased that this high level of vigilance against unauthorized fishing will be maintained.

Though we are again disappointed that the Republic of Korea and the People's Republic of China will not accede to the Convention this year, we nevertheless, are pleased that the Republic of Korea is actively taking steps towards acceding to the Convention. We are still hoping that China will reconsider accession to the Convention. We also encourage them to adopt the FAO Compliance Agreement which could serve as a mechanism to support and cooperate with the objectives and principles of the Convention.

During the past four years, the Commission has also developed a comprehensive science plan to focus research to better understand factors affecting salmonid production including: predator-prey relationships, climate change and carrying capacity, and population dynamics. Many components of the Commission's science plan are at the forefront of scientific research as it relates to anadromous species which complements and parallels the PICES-GLOBEC program on Climate Change and Carrying Capacity of the North Pacific Ocean.

As I stated during our opening address, the United States is greatly impressed with the high quality of the scientific research presented at the CSRS, but also desires each member of the
Commission to increase their submission of data regarding ecologically-related species which will enhance the understanding of ecosystem dynamics of anadromous species.

As you all can see, the Commission has made significant progress in scientific research and enforcement. The international symposium on Assessment and Status of Pacific Rim Salmonid Stocks will be a hallmark of the Commission’s efforts to collect scientific information as evidenced by the interest of attending scientists throughout the world. Hopefully, with the collective efforts of all members, the Commission will be regarded as one of the preeminent conservation organizations in the world.

I wish to thank you Mr. Chairman for your stewardship, the Secretariat for its assistance in the smooth operation of the meeting, as well as our gratitude towards our Japanese hosts for their hospitality. Aside from the meetings, the various receptions hosted by the Fisheries Agency of Japan and the Canadian Delegation provided an opportunity to become better acquainted with members of each National Party. We hope this beautiful fall weather will continue for our Japanese hosts and wish the other delegations a safe trip home.

Closing remarks by Mr. Satoshi Watanabe, Head of Japanese delegation:

Thank you Mr. Chairman.

As the host nation, we are very happy that we were able to hold the Second Plenary Session at this time as initially promised, that is, that the Meeting proceeded according to the original schedule.

Though it seems there were, of course, various issues at each of the Committees, we highly value the fact that all the issues were resolved within the scheduled time due to the leadership of the Chairman of each Committee.

There were various discussions held during this year’s Annual Meeting, however, first and foremost, Japan is most satisfied that almost no fishing vessels violating the Convention were acknowledged in the Convention Area, that is, in the high seas of the North Pacific due to the cooperation in enforcement and other measures taken by each Contracting Party.

We would also like to express our satisfaction that the NPAFC is taking the initiative in both name and in substance in the field of salmonid resource research.

We have been lucky with the weather while the Commission meeting was held, maybe because of your hard work. I’m sure you’ve all enjoyed the nice fall weather in Japan. I hope any inconveniences caused due to our poor management can be more than offset by good weather. Many of the scientists here will also participate in the symposium to be held in Sapporo. It is colder in Sapporo than in Tokyo. I hope you take care of yourselves and hope that the symposium will be of great success.

Last but not least, I would like to extend my deep appreciation to the Executive Director, Mrs. Shestakova, and all the staff of the Secretariat, and also to the interpreters who struggled everyday in translation.

Thank you very much.
APPENDIX 1

AUDITORS' REPORT TO THE COMMISSION

We have audited the balance sheet of the North Pacific Anadromous Fish Commission (the "Commission") as at June 30, 1996 and the statements of income and expenditures and changes in general and working capital funds, International North Pacific Fisheries Commission Reserve Fund and changes in cash for the year then ended. These financial statements are the responsibility of the Commission's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Commission as at June 30, 1996 and the results of its operations, changes in funds and changes in cash for the year then ended in accordance with the accounting principles disclosed in note 2 to the financial statements.

Our audit was made for the purpose of forming an opinion on the basic financial statements taken as a whole. The current year's supplementary information included in the schedule is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such supplementary information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated, in all material respects, in relation to the basic financial statements taken as a whole.

KPMG Peat Marwick Thorne
Chartered Accountants

Vancouver, Canada
August 1, 1996
**STATEMENT OF ASSETS AND LIABILITIES AND FUND BALANCES**

June 30, 1996 with comparative figures for 1995

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<thead>
<tr>
<th></th>
<th>1996</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
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<td></td>
</tr>
<tr>
<td>Cash and term deposits (note 3)</td>
<td>$ 526,262</td>
<td>$ 470,087</td>
</tr>
<tr>
<td>Interest and other receivables</td>
<td>7,879</td>
<td>8,561</td>
</tr>
<tr>
<td>Current portion of advance to employees</td>
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<td><strong>Total Assets</strong></td>
<td>$ 534,141</td>
<td>$ 492,745</td>
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<tr>
<td><strong>Liabilities and Fund Balances</strong></td>
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<tr>
<td>Liabilities balances:</td>
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<td>Accounts payable and accrued expenses</td>
<td>$ 28,828</td>
<td>$ 5,723</td>
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<td>Contribution received in advance</td>
<td>135,000</td>
<td>202,456</td>
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<td><strong>Total Liabilities</strong></td>
<td>163,828</td>
<td>208,179</td>
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<td>Fund balances:</td>
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<td>INPFC Reserve Fund (note 2(a))</td>
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<td>Working capital fund:</td>
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<td>170,010</td>
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<td>Severance fund</td>
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<td>Moving fund</td>
<td>47,547</td>
<td>40,000</td>
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<td><strong>Total Fund Balances</strong></td>
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<td>Commitments (note 5)</td>
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<td><strong>Total Liabilities</strong></td>
<td>$ 534,141</td>
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See accompanying notes to financial statements.
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Contributions from</td>
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<td>540,000</td>
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<td>Contingency Severance Moving</td>
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<td>Interest</td>
<td>17,034</td>
<td>-</td>
<td>-</td>
<td>17,034</td>
</tr>
<tr>
<td>Levies (note 2(b))</td>
<td>-</td>
<td>13,621</td>
<td>1,459</td>
<td>20,000</td>
</tr>
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<td></td>
<td></td>
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<td>557,034</td>
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<td>Benefits</td>
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<tr>
<td>Overtime</td>
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<td>-</td>
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<td></td>
<td>258,250</td>
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<td>-</td>
<td>258,250</td>
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<td>Other:</td>
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<td>Travel</td>
<td>22,902</td>
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<td>-</td>
<td>22,902</td>
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<td>Printing</td>
<td>14,161</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Rentals</td>
<td>61,572</td>
<td>-</td>
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<tr>
<td>Supplies</td>
<td>7,527</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Equipment</td>
<td>7,773</td>
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<td>Miscellaneous</td>
<td>3,400</td>
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<tr>
<td>Moving expenses</td>
<td>-</td>
<td>-</td>
<td>12,453</td>
<td>12,453</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>232,391</td>
<td>-</td>
<td>12,453</td>
<td>244,844</td>
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<td>Excess of income over</td>
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<tr>
<td>expenditures</td>
<td>490,641</td>
<td>-</td>
<td>12,453</td>
<td>503,094</td>
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<td>Fund balances,</td>
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<td></td>
<td></td>
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<tr>
<td>beginning of period</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>-</td>
<td>89,996</td>
<td>1,220</td>
<td>40,000</td>
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<td>Transfers:</td>
<td></td>
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<td></td>
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<td>Excess (note 2(a))</td>
<td>(66,393)</td>
<td>66,393</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Fund Balances,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>end of period</td>
<td>$ -</td>
<td>$ 170,010</td>
<td>$ 2,679</td>
<td>$ 47,547</td>
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</table>

See accompanying notes to financial statements.
**STATEMENT OF INPFC RESERVE FUND**

Year ended June 30, 1996, with comparative figures for 1995

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Income</td>
<td>$ 6,857</td>
<td>$ 7,032</td>
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<td>Expenditures:</td>
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<td></td>
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<td>Communications</td>
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<td>-</td>
</tr>
<tr>
<td>Contracts</td>
<td>208</td>
<td>-</td>
</tr>
<tr>
<td>Printing</td>
<td>6,960</td>
<td>197</td>
</tr>
<tr>
<td></td>
<td>10,130</td>
<td>197</td>
</tr>
<tr>
<td>Excess (deficiency) of income over expenditures</td>
<td>(3,273)</td>
<td>6,835</td>
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<tr>
<td>INPFC Reserve Fund balance, beginning of year</td>
<td>153,350</td>
<td>146,515</td>
</tr>
<tr>
<td>INPFC Reserve Fund balance, end of year</td>
<td>$ 150,077</td>
<td>$ 153,350</td>
</tr>
</tbody>
</table>

See accompanying notes to financial statements.

**STATEMENT OF CHANGES IN CASH**

Year ended June 30, 1996, with comparative figures for 1995

<table>
<thead>
<tr>
<th></th>
<th>1996</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of cash:</td>
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<tr>
<td>Contributions from contracting parties</td>
<td>$ 472,544</td>
<td>$ 539,956</td>
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<tr>
<td>Interest</td>
<td>24,389</td>
<td>18,824</td>
</tr>
<tr>
<td>Levies</td>
<td>35,080</td>
<td>33,006</td>
</tr>
<tr>
<td>Provincial sales tax and goods and services taxes recovered</td>
<td>676</td>
<td>13,835</td>
</tr>
<tr>
<td>Salary advances</td>
<td>14,097</td>
<td>1,548</td>
</tr>
<tr>
<td></td>
<td>546,786</td>
<td>607,169</td>
</tr>
<tr>
<td>Use of cash:</td>
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<td></td>
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<td>Personnel services</td>
<td>250,750</td>
<td>238,334</td>
</tr>
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<td>Travel</td>
<td>22,902</td>
<td>47,603</td>
</tr>
<tr>
<td>Communications</td>
<td>24,865</td>
<td>16,416</td>
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<td>Contracts</td>
<td>87,187</td>
<td>145,049</td>
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<td>Printing</td>
<td>14,022</td>
<td>96,118</td>
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<td>Rentals</td>
<td>61,572</td>
<td>52,726</td>
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<td>Supplies</td>
<td>7,237</td>
<td>7,362</td>
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<tr>
<td>Equipment</td>
<td>7,773</td>
<td>8,081</td>
</tr>
<tr>
<td>Moving expenses</td>
<td>10,904</td>
<td>42,349</td>
</tr>
<tr>
<td>Miscellaneous expense</td>
<td>3,399</td>
<td>2,257</td>
</tr>
<tr>
<td>Repayment of advance from Russia</td>
<td>-</td>
<td>55,000</td>
</tr>
<tr>
<td></td>
<td>490,611</td>
<td>711,295</td>
</tr>
<tr>
<td>Increase (decrease) in cash</td>
<td>56,175</td>
<td>(104,126)</td>
</tr>
<tr>
<td>Cash, beginning of period</td>
<td>470,087</td>
<td>574,213</td>
</tr>
<tr>
<td>Cash, end of period</td>
<td>$ 526,262</td>
<td>$ 470,087</td>
</tr>
</tbody>
</table>

Cash is comprised of cash and term deposits.

See accompanying notes to financial statements.
NOTES TO FINANCIAL STATEMENTS
Year ended June 30, 1996

1. General
The North Pacific Anadromous Fish Commission (the "Commission") was established on February 16, 1993 jointly with the contracting parties, Canada, USA, Japan and Russia, in accordance with the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean.

2. Significant accounting policies
The financial statements are prepared in accordance with the Handbook of the Commission. With the exception of certain departures in accounting for fixed assets, leases and holiday pay as described below, these financial statements are prepared in accordance with generally accepted accounting principles. The following is a summary of the significant accounting policies used in the preparation of these financial statements.

(a) Fund accounting
The financial statements include the results of three funds:
The General Fund accumulates the current period operating income and expenditures.
The Working Capital Fund represents the income from levies, under and overaccruals from the previous period and the accumulated excess of income over expenditures of the General Fund. This fund is comprised of reserves for contingencies, severance pay and moving expenditures.
The International North Pacific Fisheries Commission (INPFC) Reserve Fund is being used to cover the cost of printing INPFC publications. At June 30, 1996, all INPFC obligations have been fulfilled. The INPFC Reserve fund earns interest on funds on deposit.

(b) Levies
In accordance with the provisions in the Commission's Handbook an amount is calculated, based on salaries of all foreign officers of the Commission, which is estimated to be equal to their contribution for income taxes which would otherwise be payable. The amount so calculated is deducted by the Commission from the salaries paid, and recorded in the Working Capital Fund under the caption "levies".

(c) Equipment
Equipment acquired by the Commission is expensed in the year of acquisition (note 4).

(d) Leases
Assets acquired by the Commission under the terms of leases, which would be classified as capital leases under generally accepted accounting principles, are not capitalized. The leases are recorded as if they were operating leases and the payments are included with operating expenditures.

(e) Income tax
The Commission is a non-taxable organization under the Headquarters Agreement with the Government of Canada.
(f) **Foreign exchange**

Transactions originating in foreign currencies are translated at the exchange rate prevailing at the transaction dates. Assets and liabilities denominated in foreign currency at the balance sheet date are translated to equivalent Canadian amounts at the rate of exchange on that date.

(g) **Holiday pay**

The Commission records the cost of staff holiday pay on a cash payments basis. The financial statements do not include an accrual for holiday pay earned but not yet paid.

(h) **Contributed services**

The Commission does not include the amount of contributed services and rent in the statement of income and expenditure.

(i) **Statement of changes in cash**

The statement of changes in cash is presented without financing and investing activities separated because they are not material or meaningful for presentation.

(j) **Comparative figures**

Certain of the comparative figures have been reclassified to conform with the basis of presentation adopted in the current year.

3. **Cash and term deposits**

Cash and term deposits include $154,806 (1995 - $134,151) in separate bank accounts which are designated for the INPFC Reserve Fund. The remaining Reserve Fund balance has not been segregated in separate bank accounts.

4. **Equipment**

<table>
<thead>
<tr>
<th></th>
<th>Cumulative cost at June 30, 1995 (note 2(j))</th>
<th>Amounts expensed during the year</th>
<th>Cumulative cost at June 30, 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture and fixtures</td>
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<td>$1,255</td>
<td>$17,742</td>
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<td>Appliances</td>
<td>6,632</td>
<td>74</td>
<td>6,706</td>
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<tr>
<td>Office equipment</td>
<td>27,983</td>
<td>5,643</td>
<td>33,626</td>
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<tr>
<td></td>
<td><strong>$51,102</strong></td>
<td><strong>$6,972</strong></td>
<td><strong>$58,074</strong></td>
</tr>
</tbody>
</table>

5. **Commitments**

(a) As at June 30, 1996, the Commission is obligated under equipment leases to minimum annual payments as follows:
Office space is supplied at no charge to the Commission by the Government of Canada through the Departments of Fisheries and Oceans and Public Works.

(b) Pension plan

The Commission has a contributory defined benefit pension plan which covers substantially all of its employees. The pension plan is administered through the International Fisheries Commissions Pension Society. The pension plan provides pension benefits based on length of service and final average earnings.

Based on actuarial evaluation as at January 1, 1993, the Commission had a funding excess of $60,547. The pension plan assets were $384,749 at June 30, 1996.

**SCHEDULE OF STATUS OF GENERAL AND WORKING CAPITAL FUND EXPENDITURES**

**Year ended June 30, 1996**

<table>
<thead>
<tr>
<th>Personnel services:</th>
<th>Original budget appropriations</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent</td>
<td>$ 220,500</td>
<td>$ 220,447</td>
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<tr>
<td>Benefits</td>
<td>26,000</td>
<td>26,134</td>
</tr>
<tr>
<td>Overtime</td>
<td>4,000</td>
<td>3,926</td>
</tr>
<tr>
<td>Temporary</td>
<td>8,000</td>
<td>7,743</td>
</tr>
<tr>
<td></td>
<td>258,500</td>
<td>258,250</td>
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<td>Other:</td>
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<td></td>
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<tr>
<td>Travel</td>
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<tr>
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<td>102,000</td>
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<td>14,500</td>
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<tr>
<td>Rentals</td>
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<td>Supplies</td>
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<tr>
<td>Equipment</td>
<td>12,000</td>
<td>7,773</td>
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<tr>
<td>Miscellaneous</td>
<td>4,500</td>
<td>3,400</td>
</tr>
<tr>
<td></td>
<td>260,500</td>
<td>232,391</td>
</tr>
<tr>
<td>Total general fund expenses</td>
<td>519,000</td>
<td>490,641</td>
</tr>
<tr>
<td>Total moving fund expenditures</td>
<td>17,000</td>
<td>12,453</td>
</tr>
<tr>
<td>Total</td>
<td>$ 536,000</td>
<td>$ 503,094</td>
</tr>
</tbody>
</table>
### APPENDIX 2

**List of NPAFC Scientific Research Papers authorized for distribution and citation**

<table>
<thead>
<tr>
<th>Doc. #</th>
<th>Origin</th>
<th>Title</th>
<th>Author</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>U.S.A.</td>
<td>Species ecologically related to North Pacific salmonids</td>
<td></td>
<td>Jun 1993</td>
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<tr>
<td>8</td>
<td>Canada</td>
<td>A Canadian view on anadromous fisheries science activities in the North Pacific</td>
<td></td>
<td>Jun 1993</td>
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<tr>
<td>15</td>
<td>U.S.A.</td>
<td>Caloric Content of Oceanic Zooplankton and Fishes for Studies of Salmonid Food Habits and Their Ecologically Related Species</td>
<td>N.D. Davis</td>
<td>Sep 1993</td>
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<tr>
<td>16</td>
<td>Japan</td>
<td>Reports on the Research of Salmon Resources in the North Pacific Ocean in 1992</td>
<td></td>
<td>Sep 1993</td>
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<td>Japan</td>
<td>Reports on the Research of Salmon Resources in the North Pacific Ocean in 1993</td>
<td></td>
<td>Sep 1993</td>
</tr>
<tr>
<td>22</td>
<td>U.S.A.</td>
<td>Tag Returns in 1993 - United States High Seas Salmon Tagging</td>
<td>K.W. Myers</td>
<td>Sep 1993</td>
</tr>
<tr>
<td>23</td>
<td>U.S.A.</td>
<td>Results of the 1993 NMFS Bering Sea Crab Survey Executive Summary</td>
<td>B.G. Stevens, R.S. Otto</td>
<td>Sep 1993</td>
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<tr>
<td>25</td>
<td>U.S.A.</td>
<td>Preliminary Stock Assessment and Fishery Evaluation Report for the Groundfish Resources of the Bering Sea/Aleutian Islands Region as Projected for 1994</td>
<td></td>
<td>Sep 1993</td>
</tr>
<tr>
<td>Doc.#</td>
<td>Origin</td>
<td>Title</td>
<td>Author</td>
<td>Date</td>
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<td>----------</td>
</tr>
<tr>
<td>28</td>
<td>Japan</td>
<td>Japan's View on Conception of Salmon Research for the Committee on Scientific Research and Statistics</td>
<td></td>
<td>Sep 1993</td>
</tr>
<tr>
<td>31</td>
<td>Canada</td>
<td>Upper Thermal Limits on Oceanic Distribution of Pacific Salmon (Oncorhynchus, spp.) in the Spring</td>
<td>D.W. Welch, A.I. Chigirinsky, Y. Ishida</td>
<td>Oct 1993</td>
</tr>
<tr>
<td>32</td>
<td>Japan</td>
<td>Data Record of Japanese Salmon Research Vessels in 1992, I - Catch Data, II - Oceanographic Data</td>
<td></td>
<td>Jun 1993</td>
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<tr>
<td>39</td>
<td>Japan</td>
<td>Japan's View Concerning how to Deal with Ecologically Related Species</td>
<td></td>
<td>Oct 1993</td>
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<td>61</td>
<td>U.S.A.</td>
<td>Decreasing Size of North Pacific Salmon (Oncorhynchus sp.): Possible Causes and Consequences</td>
<td>B. Bigler, J.H. Helle</td>
<td>Oct 1994</td>
</tr>
<tr>
<td>Doc.#</td>
<td>Origin</td>
<td>Title</td>
<td>Author</td>
<td>Date</td>
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<tr>
<td>63</td>
<td>U.S.A.</td>
<td>Use of Historical Scale Characters to Apportion Chinook Salmon from Stocks of Alaska, British Columbia, and Washington</td>
<td>N.D. Davis</td>
<td>Sep 1994</td>
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<td>64</td>
<td>U.S.A.</td>
<td>Scale Growth and Life History Patterns in Pink Salmon in Periods of Low and High Abundance</td>
<td>K.W. Myers</td>
<td>Sep 1994</td>
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<tr>
<td>65</td>
<td>U.S.A.</td>
<td>Tag Returns and Releases in 1994 - United states High Seas Salmon Tagging</td>
<td>K.W. Myers</td>
<td>Sep 1994</td>
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<tr>
<td>69</td>
<td>U.S.A.</td>
<td>Indirect Evidence for Bioenergetic Control of Salmonid Spatial Distributions in the Central North Pacific</td>
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III. INTERNATIONAL SYMPOSIUM ON ASSESSMENT AND STATUS OF PACIFIC RIM SALMONID STOCKS

1. TIME AND PLACE OF THE SYMPOSIUM

The International Symposium on Assessment and Status of Pacific Rim Salmonid Stocks was held at the Hokkaido University in Sapporo, Japan on October 28-29, 1996.

The symposium was prepared by the steering committee of the NPAFC, names shown below, with the help of the NPAFC Secretariat. The local arrangements were made by a local organizing committee established by the host country.

Steering Committee
Douglas Eggers (State of Alaska, Department of Fish & Game, U.S.A.)
Osamu Hiroi (Hokkaido Salmon Hatchery, Japan)
Donald Noakes (Pacific Biological Station, Canada)
Sergey Sinyakov (Kamchatka Fisheries & Oceanography Research Institute, Russia)
Akira Taniguchi (Tohoku University, Japan (Chairperson))
Kiyoshi Wakabayashi (National Research Institute of Far Seas Fisheries, Japan)

Local Organizing Committee
Yukimasa Ishida (National Research Institute of Far Seas Fisheries)
Masahide Kaeriyama (Hokkaido Salmon Hatchery)
Kiyoshi Katsuyama (Fisheries Agency of Japan)
Hiroshi Ueda (Hokkaido University)
Kohei Yamauchi (Hokkaido University (Chairperson))

2. PURPOSES OF THE SYMPOSIUM

The purposes of the symposium were 1) to review the status of salmonid stocks in the North Pacific Ocean from the view points of life history, population ecology, and ecosystem; 2) to review methods in monitoring and assessment of stocks; and 3) to review the present knowledge concerning factors affecting salmonid production. The symposium also discussed future research necessary for assessment of salmonid stock conditions in the North Pacific and methodology for the cooperative work.

Salmonid fish are one of the most valuable fish resources in the North Pacific Ocean which plays an important role as components of its ecosystem, and in economics and culture of the Pacific Rim countries. The NPAFC Symposium proved itself as a remarkable venue for exchange of scientific information and discussions on important issues of the conservation of anadromous fish in the North Pacific Ocean.

3. SHORT DESCRIPTION OF THE SYMPOSIUM'S CONTENT

There were 29 oral and 32 poster presentations of the scientific papers during 2-day symposium.

(I) Background Papers - Historical Trends of Fisheries, Stock Condition, and Hatchery Production

Trends in the status of Pacific salmon populations in Washington, Oregon, California, and Idaho
Robert Kope and Tom Wainwright
History and current status of salmon stocks in British Columbia
M.A. HENDERSON and C.C. GRAHAM

Alaska (Fisheries and stock condition)
D. EGGERS

Historical trends of fisheries and stock condition in Japan
O. HIROI

Historical trends of fisheries and stock condition of Pacific salmon - Russia
V.I. RADCHENKO

A historical perspective on salmonid production from Pacific Rim hatcheries
Conrad MAHINKEN, Gregory RUGGERONE, William WAKNITZ, and Thomas FLOGG

Note: Background papers were introduced at the oral sessions.

(2) Presentations by Topic

2.1 Topic 1 - Components of Salmonid Life History Concerning Stock Assessment and Status

Oral Presentations:

Growth studies from 1956-95 collections of pink and chum salmon scales in the central North Pacific Ocean
R.V. WALKER, K.M. MYERS, and S. ITO

Seasonal growth patterns of Pacific salmon (Oncorhynchus spp.) in offshore waters of the North Pacific Ocean
Yukimasa ISHIDA, Soto-o ITI, Yasuhiro UENO, and Junko SAKAI

Changes in size and age at maturity of two North American stocks of chum salmon (Oncorhynchus keta) before and during a major regime shift in the North Pacific Ocean
John H. HELLE and Margaret S. HOFFMAN

Dynamics of a chum salmon, Oncorhynchus keta, population released from Hokkaido in Japan
Masahide KAERIYAMA

Thermal limits on the ocean distribution of steelhead trout
D.W. WELCH, Y. ISHIDA, K. NAGASAWA, and J.P. EVESON

Biochemical approach in understanding growth condition of salmonids
Teruo AZUMA, Takashi YADA, Yasuhiro UENO, and Munehico IWATA

Correlations between homing migration and reproduction of salmonid fish
Hiroshi UEDA, Ayako SATO, Masahide KAERIYAMA, Akihisa URANO and Kohei YAMAUCHI

Numerical simulations of Fraser River sockeye salmon homing migrations in a dynamic marine environment
Dale KOLODY and Michael HEALEY
Poster Presentations:

Blood plasma levels of insulin-like growth factor-I in Pacific salmon in offshore waters in winter
Katherine W. Myers, Nancy D. Davis, Walton W. Dickhoff, and Shigehiko Urawa

Variation in prey size selectivity of fingerling chum salmon (Oncorhynchus keta) in sea life: effects of stomach fullness and prey abundance
Toshiya Suzuki and Masa-aki Fukuwaka

Caloric value of high-seas prey organisms and simulated salmon ocean growth and prey consumption
N.D. Davis, K.W. Myers, and Y. Ishida

Apparent movement patterns of juvenile masu salmon (Oncorhynchus masou) appearing in the coastal waters near Cape Erimo, Hokkaido, Japan
Shuichi Mano and Hirofumi Hayano

Life history strategy and migration pattern of sockeye (Oncorhynchus nerka) and chum salmon (O. keta)
Masahide Kaeriyama and Hiroshi Ueda

Age determination and growth of lacustrine sockeye salmon, Oncorhynchus nerka, in Lake Toya
Hiroyuki Sakano, Masahide Kaeriyama, and Hiroshi Ueda

Predation risk as an opportunity for compensatory growth in juvenile coho salmon?
Ulrich G. Reinhardt and Michael C. Healey

2.2 Topic 2 - Salmon Population Ecology Affecting Stock Assessment and Status

Oral Presentations:

Ocean distribution of Asian and North American chinook salmon (Oncorhynchus tshawytscha) estimated by tag parasites, Myxobolus arcticus and M. kisutchi (Myxozoa: Myxosporea)
S. Urawa, K. Nagasawa, L. Margolis† and A. Moles

Are naturally-occurring parasite "tags" stable? An appraisal from four case histories involving Pacific salmonids
L. Margolis†

Simulations of the even-year Asian pink salmon (Oncorhynchus gorbuscha) genetic baseline to determine accuracy and precision of stock composition estimates
S. Hawkins, N. Varnavskaya, J. Pohl, and R.L. Wilmot

Estimates of stock composition of chum salmon in highseas test fisheries in the western North Pacific Ocean and Bering Sea
Gary A. Winans, Paul B. Aebersold, Yukimasa Ishida, and Shigehiko Urawa

A comparison of methods of stock identification for sockeye salmon (Oncorhynchus nerka) in Barkley Sound, British Columbia
T.D. Beacham, L. Margolis†, and R.J. Nelson

Estimating salmon escapement using area-under-the-curve, aerial observer efficiency, and stream-life estimates: the Prince William Sound pink salmon example
Brian G. Bue, Stephen M. Fried, Samuel Sharr, and Daniel G. Sharp

† Deceased
Ocean mortality of northeast Kamchatka pink salmon and the factors its forming
V.I. KARPENKO

**Poster Presentations:**

Migration timing, a life history trait important in the genetic structure of pink salmon
A.J. McGREGOR, S. LANE, M.A. THOMASON, L.A. ZHIVOTOVSKY, W.W. SMOKER, and
A.J. GHARRETT

Scale and otolith patterns prove growth history of Pacific salmon
Masa-aki FUKUWAKA

Genetic variation in Asian populations of chum salmon, *Oncorhynchus keta* (Walbaum)
N.V. VARNAVSKAYA, R.L. WILMOT, C.M. KONDZELA, V. EFREMOV, V.A. DAVYDENKO,
Xi. LIUAN, E.A. SBOEVA, and C.M. GUTHRIE III

Determining area of origin of pink salmon juveniles on their catadromous migration in the Okhotsk Sea in 1995 using genetic stock identification technique
N.VARNAVSKAYA, V. EROKHIN, and V. DAVYDENKO

Genetic stock identification of chum salmon harvested incidentally in the 1994 and 1995 Bering Sea trawl fishery
Richard L. WILMOT, Christine M. KONDZELA, Charles M. GUTHRIE, and
Michele S. MASUDA

An overview of gene detection methods used to study population variations in salmonids
James E. SEE, Christopher HABICH, Jeffery B. OLSEN and Lisa W. SEE

An attempt of identification of the Okhotsk Sea chum salmon origin and life history by means of scale features
A.M. KAЕВ

Identification of long and short-term reared masu salmon with quantified scale characteristics
Kazumasa OHKUMA

Mark-recapture estimation of masu salmon (*Oncorhynchus masou*) smolt numbers in the Masuhoro River, northern Hokkaido
Hirofumi HAYANO, Yasuyuki MIYAKOSHI, Makoto FUJIWARA,
Kei-ichi Sugiwaka, Mahito MIYAMOTO, Mitsuhiro NAGATA, James R. IRVINE

Estimation of aerial observer efficiency and pink salmon stream life in Prince William Sound, Alaska
Stephen M. FRIED, Samuel SHARR, Daniel G. SHARP, John WILCOCK, and Brian G. BUE

Planning the accuracy and precision of Pacific salmon escapement estimates using aerial observation methods
Harold J. GEIGER, Brian G. BUE, and Stephen M. FRIED

On the possibility of using pink salmon survival measure (R/E) in the forecast of chum salmon return in north-east of Kamchatka
S.A. SINYAKOV and A.G. OSTROUMOV

Salmon abundance in offshore waters of the North Pacific Ocean and its relationship to coastal salmon returns
Yukimasa ISHIDA and Soto-o ITO
Change in number of Sakhalin-Kuril Pacific salmons in connection with hatchering development
L.D. KHOREVIN

Irina SHESTAKOVA

Stock condition and fishery of masu and Japan Sea’s pink salmon
V.V. TSIGER and V.G. MARKOV'TSEV

Forming peculiarities of abundance and production Kamchatkan salmon during marine period of life
V.I. KARPENKO, V.G. EROKHIN, and V.P. SMORODIN

The role of riparian vegetation in the environment of masu salmon juveniles, *Oncorhynchus masou*
Mitsuhiro NAGATA, Hirokazu SATO, Mahito MIYAMOTO, Shin-ichi OHKUBO, Seiji YANAI,
Yu NAGASAKA, Tomoya AOYAMA, Tatsuya TAKAMI, Hiroshi KAWAMULA
and Hiroshi KAWAMURA

Regions of optimal reproduction of pink salmon
O.F. GRITSENKO, and N.V. KLOVACH

Do hatchery salmon affect the North Pacific Ocean ecosystem?
William R. HEARD

Incidental bycatch of Pacific salmon during Russian bottom trawl surveys in the Bering Sea and some remarks on its ecology
V.I. RADCHENKO and I.I. GLEBOV

A summary of chum salmon (*Oncorhynchus keta*) propagation in Korea
Ki Baik SEONG

Evaluation of the reliability of in-season run size estimation techniques used for southern British Columbia chum salmon (*Oncorhynchus keta*) runs
P. RYALL

2.3 Topic 3 - Relation of North Pacific Ecosystem, Climate and Oceanographic Changes to Salmon Stock Production

Oral Presentations:

Interaction between chum salmon and fat greenling juveniles in the coastal Sea of Japan off northern Hokkaido
Hiroshi KAWAMURA, Mahito MIYAMOTO, and Mitsuhiro NAGATA

Predation by salmon sharks (*Lamna ditropis*) on Pacific salmon (*Oncorhynchus spp.*) in the North Pacific Ocean
Kazuya NAGASAWA

On ecosystem functioning of Lake Kurilskoye, southern Kamchatka
L.V. MILOVSKAYA, M.M. SELIFONOV and S.A. SINYAKOV

Recent changes in the marine distribution of juvenile chum and coho salmon off Canada
R.J. BEAMISH and M. FOLKES

On the coherence of salmon abundance trends and environmental factors
D.J. NOAKES, R.J. BEAMISH, L. KLYASHTORIN, and G.A. McFARLANE
Asian salmon stocks condition and long-term water dynamics in the north-western Pacific
V.I. Radchenko

Long-term climate change and pink salmon stock fluctuations
L.B. Klyashtorin and F.N. Rukhlov

Long-term variability in Alaskan sockeye salmon abundance determined by analysis of sediment cores
Bruce P. Finney

Poster Presentations:

Fish and seabird predation on juvenile chum salmon (Oncorhynchus keta) in Japanese coastal waters, and an evaluation of the impact
Kazuya Nagasawa

Fluctuations in abundance of pink salmon (Oncorhynchus gorbuscha) in the North Pacific Ocean
M.J. Jaenicke, O.A. Mathisen, and V.I. Radchenko

The proceedings of the Symposium will be published by the end of 1997 as the first NPAFC scientific bulletin.