

NPAFC
Doc. 1141
Rev. _____
Rev. Date:

**Abstracts of Scientific Documents Submitted to
the Commission for the 2008 Annual Meeting**

by

NPAFC Secretariat

*Suite 502, 889 West Pender Street
Vancouver, BC, V6C 3B2 Canada*

submitted to the

North Pacific Anadromous Fish Commission

November 2008

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

NPAFC Secretariat. 2008. Abstracts of scientific documents submitted to the Commission for the 2008 Annual Meeting. NPAFC Doc. 1141. 24 pp. (Available at <http://www.npafc.org>).

Abstracts of Scientific Documents Submitted to the Commission for the 2008 Annual Meeting

NPAFC Secretariat

Suite 502, 889 West Pender Street

Vancouver, BC, V6C 3B2 Canada

This document compiles abstracts of scientific research documents submitted to the Commission from the adjournment of the 2007 Annual Meeting to October 2008. A total of 49 documents (4 from Canada, 13 from Japan, 2 from Korea, 14 from Russia, 14 from the United States, and 2 from the Committee on Scientific Research and Statistics) were presented for the consideration of scientific research and statistics. Each abstract contained document number, title, and name of author(s) or agency (if available).

Table of Contents

Canada ----- 5-6

- [1092](#) Canadian highseas salmon surveys in 2008-2009
- [1105](#) Microsatellite stock identification of chum salmon on a Pacific Rim basis and a comparison with single nucleotide polymorphisms (SNPs)
- [1109](#) Canadian enhanced salmonid production during 1978-2007 (1977-2006 brood years)
- [1120](#) An update on catch trends for Pacific salmon in British Columbia Canada and the ongoing catch estimation review

Japan ----- 7-11

- [1084 \(Rev. 1\)](#) The cruise plans of Japanese research vessels involving incidental takes of anadromous fish in the North Pacific Ocean in 2008/2009 Fiscal Year
- [1085](#) Proposed cruise plans of Japanese research vessels for salmon in the North Pacific Ocean in 2008
- [1086](#) Incidental catches of anadromous fish by Japanese research vessel in the North Pacific Ocean in 2007
- [1087 \(Rev. 1\)](#) Proposed otolith marks for brood year 2008 salmon in Japan
- [1088](#) 2007 T/V *Oshoro maru* salmon research cruises
- [1113](#) Total lipid contents of chum and pink salmon in the North Pacific Ocean and the Bering Sea during the summer of 2007
- [1114](#) Releases of otolith marked salmon from Japan in the fall of 2007 and spring of 2008
- [1115](#) International salmon research aboard the R/V *Wakatake maru* in the central North Pacific Ocean and Bering Sea during the summer of 2008
- [1116](#) 2008 summer Japanese salmon research cruise of the R/V *Hokko maru*
- [1117](#) Preliminary 2007 salmon enhancement production in Japan
- [1118](#) Salmon stock assessment in the North Pacific Ocean, 2008
- [1137](#) Nonrandom distribution of chum salmon stocks in the Bering Sea and North Pacific Ocean during summer and fall in 2002 to 2004
- [1140](#) Salmon catch by species and region in 2007

Republic of Korea ----- 12

[1130](#) Otolith thermal mark for brood year 2007 and proposed thermal marks for brood year 2008 chum salmon in Korea

[1131](#) Korean chum salmon catch statistics and hatchery releases in 2007 and 2008

Russia ----- 13-17

[1095](#) Trawl survey plans for Pacific Salmon marine life period studies in the Far Eastern Seas in 2008 by Russia

[1097](#) Predator – prey relations between the Pacific lamprey *Lampetra tridentata* and Pacific salmon (*Oncorhynchus* spp.)

[1107](#) Marked salmon production by the hatcheries of Russia in 2008

[1108](#) The plan of salmon for the brood year 2008 marking at the hatcheries of the Far East of Russia

[1121](#) Distribution, biomass and age composition of chum salmon (*Oncorhynchus keta*) in the western Bering Sea in 2002-2006

[1122](#) Strategic plan for Far Eastern basin-scale Pacific salmon research program for 2006–2010 period

[1123](#) Trawl survey results for Pacific salmon marine life period studies in the western Bering Sea during summer and autumn period of 2007 (Results of 2007 research survey by R/V “*TINRO*”)

[1124](#) Reproduction indices of the north-eastern Sakhalin pink salmon

[1125](#) Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian economic zone). Part 1 – chum salmon *Oncorhynchus keta*

[1126](#) Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian Economic Zone). Part 2 – sockeye salmon *Oncorhynchus nerka*

[1127](#) Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian Economic Zone). Part 3 – chinook salmon *Oncorhynchus tshawytscha*

[1128](#) Results of Pacific salmon trawl surveys by R/V “Professor *Kaganovskii*” and R/V “*TINRO*” during summer of 2007 in the upper epipelagic layer of northwestern Pacific

[1129](#) Spatial distribution and abundance of Pacific salmon in the southern Okhotsk Sea during

autumn of 2007 (Results of 2007 research survey by R/V “*Professor Kaganovskii*”)

- [1136](#) Biostatistical information on salmon catches, escapement, outmigrants number, and enhancement production in Russia in 2007

United States ----- 18-22

- [1083 \(Rev. 1\)](#) Proposed thermal marks for brood year 2008 salmon in Alaska
- [1089](#) Releases of otolith marked salmon from Alaska in 2005
- [1090](#) Releases of otolith marked salmon from Alaska in 2006
- [1091](#) Releases of otolith marked salmon from Alaska in 2007
- [1093](#) United States cruise plan for Bering Sea research, September, 2008
- [1094](#) Southeast Alaska Coastal Monitoring (SECM) cruise plan for 2008
- [1104](#) Incidental catches of salmonids by U.S. groundfish fisheries in the Bering Sea/Aleutian Islands and the Gulf of Alaska, 1990-2008
- [1106](#) Interception of a PIT-tagged Columbia River Basin steelhead in the central North Pacific Ocean
- [1110](#) Annual survey of juvenile salmon and ecologically related species and environmental factors in the marine waters of southeastern Alaska, May–August 2007
- [1111](#) High seas salmonid coded-wire tag recovery data, 2008
- [1112](#) Paired comparisons of juvenile salmon catches between two research vessels fishing Nordic 264 surface trawls in southeastern Alaska, July 2007
- [1134](#) Washington, Oregon, and California Salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2007 season
- [1135](#) Alaska salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2007 season
- [1138](#) PACSNP: Progress on the development and standardization of single nucleotide polymorphisms (SNPs) baseline for genetic stock identification of chum salmon

The Committee on Scientific Research and Statistics (CSRS) ----- 23-24

- [1096](#) Report of the Research Planning and Coordination Meeting, Sokcho, Republic of Korea, April 10-11, 2008
- [1119](#) Recoveries of high-seas tags in 2007-2008 and tag releases in 2008 from high-seas research vessel surveys in the North Pacific Ocean

Canada

1092 Canadian highseas salmon surveys in 2008-2009

M. Trudel, J.F.T. Morris, M.E. Thiess, T.B. Zubkowski, and Y. Jung

Three surveys have been planned by the Canadian Program on High Seas Salmon for 2008-2009: a summer survey on June 18 – July 6, 2008, a fall survey on October 7 – November 15, 2008, and a winter survey on February 24 – March 24, 2009. The primary objectives of these surveys will be to (1) collect biological information on Pacific salmon (*Oncorhynchus* spp.) and associated epipelagic fish community, (2) describe the ambient oceanographic conditions, and (3) quantify the biomass of zooplankton and describe zooplankton species community composition in coastal waters of British Columbia and Southeast Alaska.

1105 Microsatellite stock identification of chum salmon on a Pacific Rim basis and a comparison with single nucleotide polymorphisms (SNPs)

T.D. Beacham, J.R. Candy, C.W. Wallace, S. Sato, S. Urawa, N.V. Varnavskaya, K.D. Le, and M. Wetklo

Variation at 14 microsatellite loci was analyzed for over 53,000 chum salmon (*Oncorhynchus keta*) sampled from 381 locations ranging from Korea to Washington, and the variation applied to estimate stock composition in mixed-stock fishery samples. High resolution of mixed-stock samples was possible, with reporting groups distributed as follows: Korean 1, Japan 7, Russia 8, Alaska 15, Canadian Yukon River 5, British Columbia 16, and Washington 5. The number of alleles observed at a locus was related to the power of the locus in providing accurate estimates of stock composition of single-population mixtures. Approximately 800 alleles were observed across the 14 microsatellites, providing the basis for high-resolution stock identification. Analysis of known-origin samples indicated that accurate regional estimates of stock composition were obtained. Estimated stock compositions of mixed-fishery samples from coastal Japan, the Sea of Okhotsk, the western Pacific Ocean, the Gulf of Alaska, and coastal British Columbia were quite different among samples, and clearly reflected the presence of local populations. Microsatellites have provided the ability to provide accurate estimates of stock composition from many locations in the Pacific Rim distribution of chum salmon. In comparison with single nucleotide polymorphisms (SNPs), the entire stock identification power of 30 mtSNPs was equal to or less than the power of a single microsatellite for six loci examined on a Pacific Rim basis. Accuracy and precision of stock composition estimates for western Alaska chum salmon populations provided by 61 SNPs were comparable to those provided by subsets of 1-3 microsatellites, with similar total allele counts in all marker sets. A minimum 300 and likely closer to 400 SNPs will probably be required on a Pacific Rim basis to provide accuracy and precision comparable to that currently obtained from the 14-microsatellite baseline.

1109 Canadian enhanced salmonid production during 1978-2007 (1977-2006 brood years)

R. Cook, J. MacDonald, and J.R. Irvine

The Salmonid Enhancement Program (SEP) in British Columbia, Canada was initiated in 1977 to rebuild stocks and increase catch through the expanded use of enhancement technology. The program comprises nearly 300 projects that produce chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), and sockeye salmon (*O. nerka*), as well as small numbers of steelhead salmon (*O. mykiss*) and cutthroat trout (*O. clarki*). Projects include hatcheries, fishways, spawning and rearing channels, habitat improvements, flow control works, lake fertilization, and small classroom incubators, and range in size from

spawning channels releasing nearly 100 million juveniles annually, to schools with classroom incubators that release fewer than one thousand. Data from facilities that operate outside the direction of SEP are not included in this report. Steelhead and cutthroat are a provincial government responsibility, but some enhancement takes place at SEP facilities under a cooperative arrangement. Steelhead and cutthroat numbers in this report do not include releases from facilities operated by the Freshwater Fisheries Society of British Columbia.

1120 An update on catch trends for Pacific salmon in British Columbia Canada and the ongoing catch estimation review

J.R. Irvine, R. Houtman, L. Biagini, and M. Poon

During 2007, Canadian Pacific salmon fisheries were again managed with a strong emphasis on conservation, with the result that many of the catches were relatively modest. This document reports preliminary estimates for retained commercial catch (numbers and total weight), recreational catch (numbers only) and aboriginal catch (numbers only) for the five major salmon species caught in British Columbia (B.C.) tidal waters from 1952 (commercial), 1953 (recreational), or 1951 (aboriginal) to 2007. Catches include non-Canadian fish caught in B.C. and exclude Canadian fish caught outside B.C. Some changes from previous documents resulted from ongoing efforts to standardize estimation approaches. Commercial estimates are sale slip based, and have been labeled as “preliminary” since 1996 because of problems with the sale slip program including non-compliance and misreporting. We summarise our catch estimation review in which we use all available information (sale slips, log books, interview and observer information), to re-estimate commercial catch for salmon for 1996-2004. The primary findings are that i) revised estimates tend to be higher than earlier estimates, and ii) differences between the two sets of estimates are generally modest in the early period but increase through the time series. Although revised estimates, and the approaches used to generate these have been presented to the Canada’s peer review system (PSARC), at the time of writing, this review has not been completed. We are therefore not able to recommend changes to the Canadian time series of commercial catch data.

Japan

1084 (Rev. 1) The cruise plans of Japanese research vessels involving incidental takes of anadromous fish in the North Pacific Ocean in 2008/2009 Fiscal Year

Fisheries Research Agency

Seven cruises of Japanese research vessels are scheduled to conduct the following scientific research for pelagic fishes in the North Pacific in 2008/2009 fiscal year. There are some possibilities of incidental catch of salmon during these cruises.

1085 Proposed cruise plans of Japanese research vessels for salmon in the North Pacific Ocean in 2008

T. Nagasawa, K. Morita and M. Fukuwaka

Four Japanese salmon research vessels have been tentatively scheduled to conduct the following scientific research in the North Pacific and the Bering Sea in 2008. (1) The *Hokko maru* will conduct research with a surface or midwater trawl to obtain information on the distribution, abundance and some biological characteristic of summering salmon in the North Pacific and Bering Sea. We will also get gear calibration data between the non-selective research gillnets and the surface- midwater trawl. We have planed two research cruises, one from early July to late July, and another from mid August to mid September. (2) The *Oshoro maru* will conduct research with gillnets, longline and hook and line to obtain data on the distribution and ecology of salmon and other pelagic fishes in the western North Pacific in May, and in the central North Pacific, eastern Bering Sea and Chukchi Sea from early July to late August. (3) The *Wakatake maru* will conduct research with gillnets and longlines to obtain data on the distribution and abundance of salmon along 180° longitude in the central North Pacific and Bering Sea from early June to late July. (4) The *Kaiun maru* will conduct research with gillnets to obtain data on the distribution and ecology of neon flying squid, salmon and other pelagic fishes in the western and central North Pacific Ocean from early July to early August.

1086 Incidental catches of anadromous fish by Japanese research vessel in the North Pacific Ocean in 2007

T. Nagasawa

Some Japanese research vessels conducted the scientific fisheries operation with possibilities of the incidental catch of anadromous fish in 2007. The R/V *Tomi maru* No.58, which conducted the experimental towing of the surface and mid water trawl gear to develop the commercial fishery on neon flying squid (*Ommastrephes bartrani*), pacific pomfret (*Brama japonica*) during a period from mid August to mid September in 2007, had caught a total of 793 pacific salmons incidentally. Total of 78 salmomids including 16 chum salmon, 51 pink salmon, 10 coho salmon, and 1 chinook salmon were caught by gill net survey for Pacific saury (*Cololabis saira*) in July 2007 (R/V *Hokushin maru*). Total of 175 salmonids including 167 chum, 1 pink, 13 and 7 chinook salmon were caught by surface trawl net operations or Pacific saury survey in June 2007 (R/V *Oumi maru*). Total of 218 salmonids including 193 pink, 21 chum, 3 coho and 1 chinook salmon were caught by surface trawl net operations for Pacific saury survey in June and July 2007 (R/V *Hokuho maru*). Total of 32 salmonids including 31 pink and 1 chum salmon were caught by surface trawl operations for Pacific saury survey in June and July 2007 (R/V *Kouryou maru* No. 63).

1087 (Rev. 1) Proposed otolith marks for brood year 2008 salmon in Japan

M. Takahashi and T. Tojima

In Japan, otolith marks are used for migration, growth and survival surveys of juvenile salmon in the coastal waters, and for offshore migration surveys in the Okhotsk Sea, North Pacific Ocean, and Bering Sea. In addition, hatchery origins of maturing adults are determined using thermal marks to evaluate their homing migrations. The proposed otolith marks for the 2008 brood year salmon include 54 discrete thermal patterns and one ALC (alizarin complexone) patterns. We plan to mark approximately 153 million chum, 22.6 million pink, 3.2 million masu, and 30 thousand sockeye salmon at 18 hatcheries. The thermal marking pattern is presented as the Hatch code notation (Hagen et al. 2000; Josephson et al. 2006). As the base mark, two rings in the first band have been adopted to distinguish Japanese chum and pink salmon from other stocks since 1999 brood year stock (Urawa et al. 2000). All thermal rings are induced by cooler temperature exposures. The ALC marks will be used for chum salmon surveys by Hokkaido Fish Hatchery.

1088 2007 T/V *Oshoro maru* salmon research cruises

Y. Kamei, S. Takagi, K. Sakaoka, Y. Kajiwara, J. Kimura, T. Meguro, H. Kudo, and M. Kaeriyama

In order to clarify the oceanic structure and marine ecosystem, oceanographic observations and fishing surveys (including salmonids) were conducted in the Northwest Pacific Ocean (along 155°E), Central North Pacific Ocean (along 44°N), Bering Sea, and Chukuchi Sea. Each survey was conducted during the Cruise #178 in May, and the Cruise #180 from July to August 2007. In May along 155°E, the Polar Front was observed in the vicinity of 43°15'N and the Subarctic Boundary was observed in the vicinity of 39°15'N. Three drift gillnet surveys were conducted along 155°E in May during Cruise #178. Salmonids were collected at 42.5°N and 41°N that were in the Transition Domain. Chum salmon was more abundant at 41°N than at 42.5°N, but pink salmon was more abundant at 42.5°N. This distribution pattern is as same as those over the past six years. Pacific pomfret was dominantly caught at 38°N in the Subtropical Waters. Each a drift gillnet and a surface longline survey, and three hook-and-line gear samplings were conducted along the 44°N between 167.5°E and 173.5°E in early July during Cruise #180-Leg 1. A total of fourteen chum, 60 pink, 29 coho, and a Chinook salmon were collected by every sampling gear. Most chum and a Chinook salmon were immature. Except for salmonids, pacific pomfret was caught by C-gear gillnet, and a large number of pacific saury were collected by F-gear gillnet. A total of 8 sockeye, 84 chum, 2 pink, 15 coho, and 2 Chinook salmon were collected by surface longline, hook-and-line gear, and bottom otter trawl surveys in the Bering Sea during the Cruise #180-Leg 2. ALL sockeye and pink salmon, and almost all coho salmon were collected in the southeast Bering Sea, on the other hand, 85.7% of chum salmon and all chinook salmon were collected in the northeast Bering Sea. Most sockeye salmon were adult fish. 83.3% of chum salmon collected in the southeast Bering Sea were immature, but about half of them collected in the northeast Bering Sea were matured. No salmonids were collected by any and every sampling gear in the Chukuchi Sea during the Cruise #180-Leg 3. Sampling periods in this year were too late to collect enough salmonids samples, especially adult fish, in the Bering Sea and the Chukuchi Sea.

1113 Total lipid contents of chum and pink salmon in the North Pacific Ocean and the Bering Sea during the summer of 2007

T. Kaga, S. Sato, K. Morita, and M. Fukuwaka

This document reports total lipid content (TL) of chum and pink salmon caught in the North Pacific Ocean and the Bering Sea in the summer (June-August) of 2007. TL of 1,077 chum and 162 pink salmon was measured. We classified salmons into several categories according to their fork length and compared the lipid content within

the same size category. The mean TL showed significant variability with years. The mean TLs of B, C class increased in 2001 and decreased in 2004. The fluctuation pattern of TL might be different between fish size. The mean TL in 2007 seemed as same as that of 2006. Using a fish fat meter, we can obtain much information on total lipid content with reducing cost and time from total lipid analysis. From those results the TL in the southern part of central Bering Sea was shown to be higher than in the southern part of western Bering Sea. The present and past studies suggested that the trophic status of high-seas salmon should be variable depending on the conditions of their ocean habitats related with ocean climate changes. We should continue long-term trophic monitoring of high-seas salmon to understand the relationship between fish growth and environmental condition.

1114 Releases of otolith marked salmon from Japan in the fall of 2007 and spring of 2008

M. Takahashi, M. Iida, K. Kusumo, Y. Okamura, H. Ikka, Y. Katayama, K. Ohmoto, M. Fukuhara, and T. Chiba

This document provided information of Japanese otolith mark releases, including release site, date, number, and mark patterns with images. In the spring of 2008, approximately 148.1 million chum, 34.2 million pink, 2.8 million masu, and 163 thousand sockeye salmon fry (2007 brood year) with thermal marks or ALC (alizarin complexone) patterns were released from 22 hatcheries in Japan. In addition, 477 thousand masu salmon smolts (2006 brood year) were released in the spring of 2008 after thermally marked. In the fall of 2007, 615 thousand juveniles of otolith-marked masu salmon (2006 brood year) were also released. Two thermal rings as base mark were adopted to distinguish Japanese salmon from other stocks. ALC marks were used for chum and pink salmon surveys by the Hokkaido Fish Hatchery. These data were uploaded to the database on the website of NPAFC Working Group on Salmon Marking (<http://npafc.taglab.org>).

1115 International salmon research aboard the R/V *Wakatake maru* in the central North Pacific Ocean and Bering Sea during the summer of 2008

M. Fukuwaka, N. Davis, M. Atcheson, Y. Yamamoto, and K. Toge

An annual high-seas salmonid research cruise was conducted in the central North Pacific Ocean and Bering Sea from June 6 to July 18, 2008 onboard the Japanese research vessel, *Wakatake maru*, to investigate salmon stock condition. Research cruise activities included collection of data on oceanography, primary production, zooplankton, salmonids, and other organisms. Average sea surface temperature in the central North Pacific Ocean in 2008 was 9.2°C, which was slightly warmer by 0.1°C than the average temperature in 2007. The Subarctic Boundary was located between 40°N and 41°N, which was similar to its location in seven of the previous ten years. In the central Bering Sea, sea surface temperature in 2008 was 6.6°C, which was 0.4°C cooler than in 2007. At 29 experimental fishing stations, a total of 7,175 salmonids was caught by longline and gillnet: 756 fish in the central North Pacific and 6,419 fish in the central Bering Sea. In the central North Pacific, chum salmon was the most abundant species (53.8% of the salmonid catch), followed by coho (31.3%), pink (10.3%), steelhead (3.2%), chinook (0.8%), sockeye (0.4%), and one masu salmon (0.1%) was also caught. In the Bering Sea, chum salmon was the most abundant species (75.7% of the salmonid catch), followed by sockeye (13.2%), pink (9.8%), chinook salmon (1.3%), and Dolly Varden (0.03%). A total of 1,516 salmonids was disk tagged during the survey, which included 2 sockeye, 132 chum, 11 pink, 70 coho, and 1 chinook salmon, and 8 steelhead released in the central North Pacific and 50 sockeye, 1,189 chum, 33 pink, 18 chinook salmon, and 2 Dolly Varden released in the Bering Sea. Nineteen water temperature and swimming-depth recording data storage tags were placed on chinook salmon. Snouts from seven adipose fin-clipped steelhead and one adipose fin-clipped coho salmon were collected for later potential retrieval of coded-wire tags. A PIT-tagged

steelhead was detected, which identified it as a summer-run hatchery-reared fish originating from the Snake River, USA. Other sampling and salmonid research activities included food habits analysis (all salmonids and seabirds), genetics (steelhead and chinook salmon), stable isotopes (steelhead, coho salmon, and their prey), endocrinological sampling (sockeye, chum, and pink salmon), zooplankton sampling, and seabird collection and observation.

1116 2008 summer Japanese salmon research cruise of the R/V *Hokko maru*

K. Morita, S. Sato, H. Tokuda, M. Iida, and M. Shinto

A summer high-seas research cruise to investigate biology of Pacific salmon was conducted in the Bering Sea from 1 July to 18 July (first leg) and from 20 August to 11 September (second leg) onboard the Japanese research vessel *Hokko maru*. Research cruise activities included the collection of data on oceanography, zooplankton, micronekton, salmonid fishes, and other organisms. A total of 7,530 salmonids were caught by trawl and angling: 3,737 fishes in the first leg and 3,793 fishes in the second leg. In the first leg, chum salmon was the most abundant species (85.3%), followed by chinook (8.6%), sockeye (5.6%), and pink salmon (0.5%). In the second leg, chum salmon was the most abundant species (79.3%), followed by sockeye (17.2%), chinook (3.3%), pink (0.1%), coho salmon and steelhead trout. Salmonids were measured for fork length, body and gonad weight, lipid content by fat meter, sexed, and removed scales for age determination. Isotope, genetic, otolith, stomach contents, lipid samples were obtained for future studies.

1117 Preliminary 2007 salmon enhancement production in Japan

M. Takahashi and T. Tojima

Four species of Pacific salmon (chum, pink, masu, and sockeye salmon) are currently enhanced in Japan. A total of 2,035 million juveniles and smolts were released from Japanese hatcheries in 2007. Approximately 1,870 million chum salmon fry were released in the spring of 2007, the almost same level as in the previous year. Japanese hatcheries also released 151 million pink salmon fry, 13,003 thousand juveniles and smolts of masu salmon, and 314 thousand juveniles and smolts of sockeye salmon. In 2007, a total of 7,238 thousand adult salmon were captured in rivers along the Japanese coasts. Chum and pink salmon accounted for 80.0 % and 19.8 % of the total river catches, respectively. Within Hokkaido, the number of adult returns was 10,381 fishes for anadromous masu salmon, and 982 fishes for anadromous sockeye salmon.

1118 Salmon stock assessment in the North Pacific Ocean, 2008

T. Nagasawa, M. Fukuwaka, K. Morita, and T. Azumaya

Results of annual research cruises on salmon stock assessment conducted by Japan in the summer of 2008 were summarized. Three Japanese salmon research vessels (*Oshoro maru*, *Kaiun maru* and *Wakatake maru*) conducted oceanographic observations, 38 gillnet (1,873 tans), 39 longline (935 hachi) and 20 hook and lines fishing operations in the western, central, eastern North Pacific, and the central Bering Sea from May to early August. Mean sea surface temperature and abundance of Pacific salmon in 2008 are compared to those from 1992 to 2007. Mean sea surface temperature at gillnet research stations in 2008 were close to the mean SST of 1992-2007. A total of 8,321 salmonids was caught using drift gillnets, longlines, hook and line, and trawl including 5,608 chum (67.4%), 1,385 pink (16.6%), 932 sockeye (11.2%), 282 coho (3.4 %), 87 chinook salmon (1.05%), 25 steelhead trout (0.3%) and 2 Dolly varden charr (0.02%). Mean CPUE of sockeye salmon in the summer of 2008 was lower than 2005 and 2006 years, but middle level in 1992-2007. Mean CPUE of chum salmon in 2007 was rather low level in the 1992-2008 even-years in the Bering Sea. Mean CPUE of pink salmon

in 2007 was moderate level for odd-years in 1992-2008.

1137 Nonrandom distribution of chum salmon stocks in the Bering Sea and North Pacific Ocean during summer and fall in 2002 to 2004

S. Sato, S. Moriya, T. Azumaya, H. Nagoya, S. Abe, and S. Urawa

Stock origins of chum salmon caught in Bering Sea and North Pacific Ocean during the summer and fall of 2002-2004 were estimated by mitochondrial DNA marker. The mixture samples of chum salmon were more than 97% immature fish in the fall of 2002 and 2003 and 80-88% in the summer of 2003 and 2004. Our genetic stock estimates and genetic-estimated CPUE suggested that immature fish were mostly of Asian (Japanese and Russian) origins, and were widely distributed in the surveyed areas of the Bering Sea during summer and fall. The stock abundance of North America was lower than those of Asian stocks in the survey areas. In the central Bering Sea, the Japanese stock was predominant compared to the other areas during summer and fall of 2002-2004. The present results suggest that the ocean distribution pattern of Japanese chum salmon showed no inter-annual variation within the survey years, and it was not significantly related with the limited sea surface temperature range (6.6-11.9°C).

1140 Salmon catch by species and region in 2007

Fisheries Agency of Japan

The total commercial catches of Pacific salmon by coastal and offshore areas in 2007 were reported. The total catches in coastal and offshore areas of Japan included 60.7 million (198.4 thousand tons) chum and 15.6 million (21.4 thousand tons) pink salmon.

Republic of Korea

1130 Otolith thermal mark for brood year 2007 and proposed thermal marks for brood year 2008 chum salmon in Korea

Yeongdong Inland Fisheries Research Institute

Korea released 5.0 million thermal marked chum salmon in March 2007 and 2008, respectively. The marks were 3,1,2H for 2007 and 3,2,1H for 2008 released salmon. We will mark approximately 2.5 million chum salmon in 2009, which covers about 50% of release of BY 2008 chum salmon at Namdae-cheon (river). Chum salmon will be marked at Yeongdong Inland Fisheries Research Institute using only 1 thermal mark (3,3nH).

1131 Korean chum salmon catch statistics and hatchery releases in 2007 and 2008

Yeongdong Inland Fisheries Research Institute

The catch of chum salmon in 2007 was increased in Korea. Total catch of chum salmon was 91,551 fish or 238.9 metric tons. The total fries of chum salmon released was 16,550 thousand fish in 2008 (2007 brood). Twenty-four thousands of juvenile cherry salmon were released to Namdae-cheon (stream) in April.

Russia

1095 Trawl survey plans for Pacific Salmon marine life period studies in the Far Eastern Seas in 2008 by Russia

Anonymous

The document summarizes trawl survey plans for Pacific salmon marine life period studies in the Far Eastern Seas in 2008 by Russia. The outline of materials, methods, surveys timing and theoretical background are provided.

1097 Predator – prey relations between the Pacific lamprey *Lampetra tridentata* and Pacific salmon (*Oncorhynchus* spp.)

D. Pelenev, A. Orlov, and N. Klovach

The paper reviews the interspecific relations between the Pacific lamprey *Lampetra tridentata* and species of Pacific salmon (genus *Oncorhynchus*) during pre-spawning migrations in the northwest Pacific. Lamprey's parasitism in relation to salmon, its distribution, and physiological condition of the prey fish species are considered.

1107 Marked salmon production by the hatcheries of Russia in 2008

E. Akinicheva and V. Volobuev

Marking of salmon of the brood year 2007 was conducted in Magadan, Kamchatski and Khabarovski regions of the Far East of Russia. Totally released were 43 million marked salmon. They are 29 million of chum, 9.6 million of sockeye, 1.6 million of coho, 0.78 million of chinook and 2 million of masu. 18 patterns of marking were used to mark the salmon of the brood year 2007.

1108 The plan of salmon for the brood year 2008 marking at the hatcheries of the Far East of Russia

E. Akinicheva and V. Volobuev

Marking of salmon of the brood year 2008 in Russia is to be conducted in four regions of the Far East: Magadan, Kamchatski, Khabarovski and Sahalinski. Marking will be conducted at 19 hatcheries of Russia and 25 patterns of marking will be used: 16 marking patterns for chum, 8 marking patterns for coho, 6 marking patterns for pink, 7 marking patterns for sockeye, 1 for masu and chinook. Some marking patterns will be used for different salmon.

1121 Distribution, biomass and age composition of chum salmon (*Oncorhynchus keta*) in the western Bering Sea in 2002-2006

E.A. Zavolokina and A.V. Zavolokin

A present document summarizes some results of program BASIS implementation by Russian Party during 2002-2006 period. Distribution, biomass and age composition of chum salmon (*Oncorhynchus keta*) in the western Bering Sea in 2002-2006 are discussed in detail. It has been shown that during summer period chum salmon dominates in terms of its biomass among other fish species in the upper epipelagic layer of the western Bering Sea (54-63 % of total fish biomass). Autumn period is characterized by strong interannual variations

(13-39 %) of this value.

1122 Strategic plan for Far Eastern basin-scale Pacific salmon research program for 2006–2010 period

V.P. Shuntov

This strategic plan substantiates content and priorities for fisheries research of Pacific salmon for 2006–2010 period. Overview of contemporary status of Pacific salmon stocks substantiates conclusion that their abundance is at historically high level. Current research status of Pacific salmon at different periods of their life cycle (freshwater, estuarine-coastal and marine) is provided. The achievements of recent years research are noted with a special emphasis upon insufficiently understood and controversial issues of Pacific salmon biology. The list of further comprehensive research activities is proposed to gain better forecasting of Pacific salmon abundance dynamics and returns, as well as to achieve better stock management.

1123 Trawl survey results for Pacific salmon marine life period studies in the western Bering Sea during summer and autumn period of 2007 (Results of 2007 research survey by R/V “TINRO”)

I.I. Glebov, S.V. Loboda, N.S. Vanin, N.A. Kuznetsova, A.M. Slabinskii, A.N. Starovoytov, and V.V. Sviridov

This document outlines results of ecosystem-based trawl surveys of the western Bering Sea during summer and autumn of 2007. First survey was carried out during June 15-July 16, 2007. During this 1-month survey Pacific waters off Kamchatka were covered by 14 trawl stations and western Bering Sea was well as 66 trawl stations. A total of 91.2 th. km² of Pacific Ocean and 496.2 th. km² of the Bering Sea were surveyed. According to survey results abundance and biomass of nekton and jellyfish species in the upper epipelagic layer of the western Bering Sea in June-July of 2007 amounted to 83.9 bln. inds. and 1066 th. t. Additional 17.7 bln. inds. and 202 th. t were estimated for Pacific waters off Kamchatka. The major share of abundance estimates (i.e., estimated number of individuals) was contributed to cephalopod species (77.1 %), whereas 20.2 % was attributed to fish species, and the remainder – to jellyfish species. Second comprehensive trawl survey of the western Bering Sea and adjacent Pacific waters was carried out during September 6- October 24, 2007. One of the major research goals of this survey was the estimation of juvenile Pacific salmon abundance during early marine period of life. Total of 100 trawl stations were carried out in the upper epipelagic layer of the western Bering Sea and 13 trawl stations were carried in the Pacific waters off Kamchatka. Total of 91.25 th. km² were surveyed in Pacific Ocean and 596.43 th. km² – in the western Bering Sea. Abundance and biomass estimates for nekton and jellyfish species totaled 108.4 bln. inds. and 1646 th. t for the western Bering Sea. Additional 29.2 bln. inds. (303 th. t) 2 of nekton and jellyfish species were estimated for Pacific waters off Kamchatka. Majority of these abundance (i.e., number of individuals) estimates were attributed to cephalopods (71.4 %) and fishes (15.8 %). Jellyfish species accounted for 12.8 % of total abundance estimates. Information on oceanographic conditions and Pacific salmon food habits during these surveys is also provided.

1124 Reproduction indices of the north-eastern Sakhalin pink salmon

A.M. Kaev and G.V. Geraschenko

The long-term data on numbers of pink salmon entries for spawning, wild and hatchery fry migrants and adult returns after feeding in the sea waters are presented. Peculiarities of spawning run and size composition of pink salmon are suggested to be related with returns of fish from different temporal groups. It is shown that since the

late 1980s, on average, pink salmon abundance was higher and fish were larger. This does not agree with the idea of determinative role of density-dependent factors in pink salmon stock dynamics.

1125 Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian economic zone). Part 1 – chum salmon *Oncorhynchus keta*

A.V. Bugaev, E.A. Zavolokina, L.O. Zavarina, A.O. Shubin, S.F. Zolotukhin, N.F. Kaplanova, M.V. Volobuev, and I.N. Kireev

This work has represented results of identification of regional local stocks of immature chum salmon on the data of trawl surveys of the R/V *TINRO* in the Bering–Aleutian Salmon International Surveys (BASIS) in the Western Bering Sea in summer-fall periods in 2002-2003. The system of districts of the Bering Sea part of the EEZ of RF, accepted in TINRO-Center for making biocenological researches was used in this work. Scale structure was used as a criterion for differentiation. The age composition of mixed marine samples was estimated for the total sample size of 4837 chum salmon individuals, including 3877 fishes which ages were identified in particular. In the analysis there were used three age groups - 0.1, 0.2 and 0.3, taking in the total more than 99% of immature chum salmon in the trawl catches. The basis scale line consisted of 5055 chum salmon individuals from the age groups 0.3 and 0.4. The results of the identification of the complexes of local stocks are as next: three stock complexes predominated in the Western Bering Sea in September-October 2002 in the districts 1-8 - Japan (41.1 %), Sakhalin (Kuriles) + the Amur River (34.8%) and the motherland shore of the Okhotsk Sea + Kamchatka (23.4 %). In the districts 9-12 the dominants were two complexes - Sakhalin-Amur River (47.5%) and Okhotsk Sea (32.1%). The percent of fishes originated in Japan was visibly lower (20.3%). The occurrence of Alaskan and Chukotkan chum salmon was extremely insufficient. In July-August 2003 in the districts 1-8 the ratio between chum salmon complexes was as next: Japan – 35.4%; Sakhalin (Kuriles) + Amur River – 23.5%; the motherland shore of the Okhotsk Sea + Kamchatka – 28.9%; Alaska – 10.3%; Chukotka – 1.9%. The occurrence of the complex of Alaska there was maximal for the whole observation period 2002-2003. In the districts 9-12 the part of Japan stocks was visibly lower – 9.2%. To the opposite the parts of Sakhalin-Amur River (41.6%) and Okhotsk + Kamchatka (44.3%) complexes were higher. The occurrence of Alaskan and Chukotkan chum salmon was minimal – respectively 3.5 and 1.4%. In September-October the part of chum salmon of Japan increased visibly. In the districts 3-8 its part reached up to 56.7% and in the districts 9-12 – up to 46.8%. The occurrence of the complexes of the Okhotsk Sea +Kamchatka was also high: 38.8% in the districts 3-8 and 48.7% in the districts 9-12. The parts of the complexes of Chukotka and Alaska were low, but the occurrence of American chum salmon was little bit increased up to 2.4% in the districts 3-8 and up to 3.3% in the districts 9-12.

1126 Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian Economic Zone). Part 2 – sockeye salmon *Oncorhynchus nerka*

A.V. Bugaev

This work has represented results of identification of regional complexes of local stocks of immature sockeye salmon on the data of trawl surveys of the R/V *TINRO* in the Bering–Aleutian Salmon International Surveys (BASIS) in the Western Bering Sea in summer-fall periods in 2002-2004. The system of districts of the Bering Sea part of the EEZ of RF, accepted in TINRO-Center for making biocenological researches, was used in this work. Scale structure was used as a criterion for differentiation. In the whole the ages of fishes in mixed marine

samples were estimated for the total sample size of 3691 sockeye salmon individuals, including 2678 fishes which ages were identified in particular. In the analysis there were used four age groups - 1.1, 1.2, 2.1 and 2.2, taking in the total more than 90% of immature sockeye salmon in the trawl catches. The basis scale line consisted of 8577 sockeye salmon individuals from the age groups 1.2 + 1.3 and 2.2 + 2.3. The results of the identification were as next: in 2002 the part of North American sockeye salmon stocks in the districts 5-8 was 41.1% and in the district 12 – 23.1%. The part of sockeye salmon stocks of West Kamchatka in the districts 5-8 was 18.0% and in the district 12 – 24.7%. The occurrence of the stocks of East Kamchatka + Chukotka in the catches was 40.9 % in the districts 5-8 and 52.2% in the district 12. In 2003 during the summer survey the part of the stocks of Alaska in the districts 3-8 was in average 43.0% and in the districts 9-12 – 34.8%. In the fall this part was respectively 39.4% and 15.1%. As for the Asian stocks, the most interesting was the mass occurrence of the stocks of West Kamchatka in this region, among these stocks the Ozernaya River sockeye salmon stock dominated in the abundance. The occurrence of the stocks of West Kamchatka in 2003 was as next: summer – 20.7% in the districts 2-8 and 29.6% in the districts 9-12; fall – 20.1% in the districts 5-8 and 52.4% in the districts 9-12. The complex of sockeye salmon stocks of East and North-East Kamchatka and of Chukotka is indigenous to the Western Bering Sea. Therefore the occurrence of sockeye salmon spawning in these regions was stably high there: summer – 36.3% in the districts 2-8 and 35.6% in the districts 9-12; fall – 40.5% in the districts 5-8 and 32.5% in the districts 9-12. In the fall of 2004 the occurrence of North American sockeye salmon stocks was 23.0% in the districts 3-8 and 16.1% in the district 12. The occurrence of sockeye salmon of West Kamchatka was the most evident (23.9%) in the district 12. To the North, in the districts 3-8 the part of these fishes was visibly reduced, up to 5.4%. The stocks of East Kamchatka and Chukotka predominated in the catches, their occurrence in the districts 3-8 was 71.6% and in the district 12- 60.0%.

1127 Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian Economic Zone). Part 3 – chinook salmon *Oncorhynchus tshawytscha*

A.V. Bugaev

This work has represented results of identification of regional complexes of local stocks of immature chinook salmon on the data of trawl surveys of the R/V *TINRO* in the Bering–Aleutian Salmon International Surveys (BASIS) in the Western Bering Sea in summer-fall periods in 2002-2004. The system of districts of the Bering Sea part of the EEZ of RF, accepted in TINRO-Center for making biocenological researches, was used in this work. Scale structure was used as a criterion for differentiation. Scale structure was used as an instrument of the differentiation. In the whole the ages of fishes in mixed marine samples were estimated for the total sample size of 756 chinook salmon individuals, including 480 fishes which ages were identified in particular. In the analysis there were used the age groups 1.1 + 1.2, taking in the total more than 90% of immature chinook salmon in the trawl catches. The basis scale lines of 2004-2005 consisted of 3196 chinook salmon individuals from the age groups 1.2 + 1.3 + 1.4. The result of the identification indicated predominance of the stocks of Alaska in the occurrence in the trawl catches in the Western Bering Sea in 2002-2004. The part of fishes of this complex varied in range 50.2-71.2%. The peak occurrence was in 2004. Moreover, that year a high density of fishes in the boundary area of the Bering Sea part of the EEZ of RF was displayed on the trawl catches of chinook salmon distribution. The other part of immature chinook salmon was represented by one stock of the Kamchatka River (East Kamchatka).

1128 Results of Pacific salmon trawl surveys by R/V “Professor Kaganovskii” and R/V “TINRO” during summer of 2007 in the upper epipelagic layer of northwestern Pacific

A.Ya. Efimkin, A.E. Lazhentsev, A.N. Starovoytov, and V.V. Sviridov

The document describes results of Pacific salmon trawl surveys by R/V “Professor Kaganovskii” and R/V “TINRO” during the summer of 2007 in the upper epipelagic layer of northwestern Pacific. Similar to previous year of research (2004 and 2006), the major purpose of upper epipelagic trawl survey of northwestern Pacific was the total estimation of adult pink salmon (primarily of Okhotsk Sea stocks) abundance during its preanadromous migration. Generally, the spatial extent of 2007 survey was similar to that of 2004 and 2006 surveys, incorporating waters off Kuril Islands and high-seas areas of northwestern Pacific beyond EEZ towards northern boundary of Subarctic Front. During the survey 68 trawl stations were carried out in upper 40 meters layer. This enabled collection of information on upper epipelagic layer's nekton community composition and structure during preanadromous migrations of Pacific salmon. The research results provided data on species composition, Pacific species percentages in catches and associated biological parameters. Also information on stomach contents for salmon and other species forage base and hydrological environment was collected. Information on abundance and biomass of all species of nekton and macrozooplankton was obtained.

1129 Spatial distribution and abundance of Pacific salmon in the southern Okhotsk Sea during autumn of 2007 (Results of 2007 research survey by R/V “Professor Kaganovskii”)

A.Ya. Efimkin, V.V. Kulik, N.S. Kosenok, O.S. Temnykh, A.N. Starovoytov, and V.V. Sviridov

The document provides results of ecosystem survey of upper epipelagic layer of southern Okhotsk Sea in 2007. These studies provide extension for established long-term time-series on postcatadromous juvenile Pacific salmon abundance and distribution in this area during autumn period. The survey took place during October 7-November 5 period being traditionally temporally linked to active offshore migration of juvenile Pacific salmon into central and southern basin areas. Total of 58 trawl tows were carried out in the upper epipelagic layer of the Okhotsk Sea, covering the area of 584 th. km². Total abundance and biomass estimates for nekton and jellyfish species were achieved for upper epipelagic layer of southern Okhotsk Sea. These estimates totaled 216850.4 mln. inds. and 1467.5 th. t., respectively. Pink salmon juveniles ranked second place among nekton species – 10.8% (143.3 th. t). Foods habits are examined for different size groups of pink and chum salmon.

1136 Biostatistical information on salmon catches, escapement, outmigrants number, and enhancement production in Russia in 2007

Pacific Research Fisheries Centre (TINRO-Centre)

Abstract is not available.

United States

1083 (Rev. 1) Proposed thermal marks for brood year 2008 salmon in Alaska

R. Josephson, D.S. Oxman, and B.A. Agler

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool applicable to a variety of situations. For brood year 2008, approximately 55 million sockeye, 639 million pink salmon, 572 million chum, 6 million coho, and 8 million Chinook salmon will be marked at 21 different hatcheries using 71 thermal marks.

1089 Releases of otolith marked salmon from Alaska in 2005

R. Josephson, D.S. Oxman, K. Van Kirk, and B.A. Agler

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool for a variety of situations. This document reports the thermal mark patterns applied to hatchery-raised salmon stocks released in Alaska during 2005. It includes five species of salmon from brood years 2003 through 2005. Release numbers, mark patterns, and release locations are summarized.

1090 Releases of otolith marked salmon from Alaska in 2006

R. Josephson, D.S. Oxman, K. Van Kirk, and B.A. Agler

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool for a variety of situations. This document reports the thermal mark patterns applied to hatchery-raised salmon stocks released in Alaska during 2006. It includes five species of salmon from brood years 2004 through 2006. Release numbers, mark patterns, and release locations are summarized.

1091 Releases of otolith marked salmon from Alaska in 2007

R. Josephson, D.S. Oxman, K. Van Kirk, and B.A. Agler

In Alaska, mass-marking of salmon using otolith thermal marking is an effective research and management tool for a variety of situations. This document reports the thermal mark patterns applied to hatchery-raised salmon stocks released in Alaska during 2007. It includes five species of salmon from brood years 2005 through 2007. Release numbers, mark patterns, and release locations are summarized.

1093 United States cruise plan for Bering Sea research, September, 2008

Auke Bay Laboratories

Scientists from the National Marine Fisheries Service (NMFS), Marine Ecosystem and Stock Assessment, Ocean Carrying Capacity (MESA-OCC) program will conduct a survey during Fall 2008 within the eastern Bering Sea to provide key ecological data on the pelagic ecosystem. Primary objectives of the survey will be to: 1) collect biological information on ecologically important fish species and to 2) describe the physical and biological oceanographic conditions of the eastern Bering Sea waters. The survey will begin 8 September 2008 in Dutch Harbor, Alaska and end on 30 September 2008 in Dutch Harbor, for a total of 21 sea days. The cruise will be conducted aboard the NOAA ship *Oscar Dyson*. Fish samples will be collected using a midwater rope trawl. At each station, the net will be towed at or near the surface for 30 minutes at speeds between 3.5 and 5 kts. All fish species will be counted and standard biological measurements including length and weight will be taken

from subsamples of each species. Diets of subsamples of marine fish will be examined onboard. Biological and physical oceanographic data will be collected at each trawl station as well as opportunistically during the survey.

1094 Southeast Alaska Coastal Monitoring (SECM) cruise plan for 2008

W.R. Heard, E.A. Fergusson, J.A. Orsi, M.V. Sturdevant, A.C. Wertheimer, and B.L. Wing

The Southeast Alaska Coastal Monitoring (SECM) project in Alaska was initiated in 1997 by the Auke Bay Laboratory, National Marine Fisheries Service, to study the habitat use and early marine ecology of juvenile (age-0) Pacific salmon (*Oncorhynchus* spp.) and associated epipelagic ichthyofauna. In 2008, SECM research is scheduled to be conducted at four intervals from late May to late August at up to 13 core stations in the northern region, and at eight stations in the southern region in June and July. This sampling schedule is similar to what was done in 2005, 2006, and 2007. One additional component will involve another inter vessel calibration of CPUE with the NOAA ship *John N. Cobb* and the RV *Medeia* in July.

1104 Incidental catches of salmonids by U.S. groundfish fisheries in the Bering Sea/Aleutian Islands and the Gulf of Alaska, 1990-2008

J.D. Berger

Incidental catches of Pacific salmonids in U.S. groundfish fisheries off Alaska are presented for 1977 through August 24, 2008. Estimated numbers of salmonids caught incidentally in these fisheries in the Bering Sea/Aleutian Islands were 30,501 in 1990; 79,142 in 1991; 83,405 in 1992; 289,284 in 1993; 138,369 in 1994; 45,311 in 1995; 141,265 in 1996; 117,524 in 1997; 121,128 in 1998; 61,833 in 1999; 67,550 in 2000; 101,278 in 2001; 122,167 in 2002; 248,744 in 2003; 520,416 in 2004; 786,914 in 2005; 414,255 in 2006 and 226,749 in 2007. In the Gulf of Alaska, incidental catches were 21,085 in 1990; 53,848 in 1991; 28,010 in 1992; 80,853 in 1993; 50,839 in 1994; 79,439 in 1995; 19,937 in 1996; 18,539 in 1997; 30,528 in 1998; 38,129 in 1999; 37,700 in 2000; 21,167 in 2001; 16,139 in 2002; 26,408 in 2003; 23,965 in 2004; 38,692 in 2005; 23,657 in 2006 and 43,462 in 2007. Through August 24, 2008, the incidental catches were 27,799 salmon in the Bering Sea/Aleutian Islands and 15,379 salmon in the Gulf of Alaska. The last joint venture operations took place in 1990 in the Bering Sea/Aleutian Islands, with an incidental catch of 152 salmon.

1106 Interception of a PIT-tagged Columbia River Basin steelhead in the central North Pacific Ocean

N.D. Davis, M. Atcheson, D. Marvin, and M. Fukuwaka

Steelhead, Chinook and coho salmon, and piscivorous birds caught during the summer, 2008, research operations of the R/V *Wakatake maru* were screened for the presence of a passive integrated transponder (PIT) tag using a hand-held detector. One PIT-tagged steelhead was found from among the 329 fish and 68 seabirds scanned. The steelhead was tagged in April, 2006, as a smolt in the Snake River of the Columbia River Basin, USA. This PIT tag detection demonstrates the feasibility of scanning immature and maturing salmonids during on-deck processing operations of high seas salmonid research cruises. The routine use of a PIT tag detector during high-seas cruises holds the potential to generate new information from tag detections of wild and hatchery fish, which could significantly increase our knowledge of the ocean distribution of steelhead, and other salmon that originate from areas where fish are routinely PIT-tagged prior to or during their freshwater out-migration.

1110 Annual survey of juvenile salmon and ecologically related species and environmental factors in the marine waters of southeastern Alaska, May–August 2007

J.A. Orsi, E.A. Fergusson, M.V. Sturdevant, B.L. Wing, A.C. Wertheimer, and W.R. Heard

Juvenile Pacific salmon (*Oncorhynchus* spp.), ecologically-related species, and associated biophysical data were collected along primary marine migration corridors in the northern and southern regions of southeastern Alaska in 2007. Up to 17 stations were sampled in epipelagic waters over four time periods (27 sampling days) from May to August. This survey marks 11 consecutive years of systematically monitoring how juvenile salmon interact in marine ecosystems, and was implemented to identify the relationships among biophysical parameters that influence the habitat use, marine growth, predation, stock interactions, and year-class strength of salmon. Typically, at each station, fish, zooplankton, surface water samples, and physical profile data were collected using a surface rope trawl, conical and bongo nets, water sampler, and a conductivity-temperature-depth profiler during daylight. Surface (3-m) temperatures and salinities ranged from 7.7 to 15.3 °C and 12.3 to 30.6 PSU from May to August. A total of 48,170 fish and squid, representing 17 taxa, were captured in 97 rope trawl hauls from June to August. Juvenile salmon comprised about 7% of the total fish and squid catch. Juvenile salmon occurred frequently in the trawl hauls, with pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), and coho salmon (*O. kisutch*) present in 51-92% of the trawls in the southern and northern regions, whereas juvenile Chinook salmon (*O. tshawytscha*) occurred in about 23% of the hauls. Of the 3,412 salmonids caught, over 97% were juveniles. Only two non-salmonid species represented catches of >30 individuals in either region: Pacific herring (*Clupea pallasii*) in the southern region (n = 44,637) and crested sculpin (*Blepsias bilobus*) in the northern region (n = 34). Catch rates of juvenile salmon in both regions were generally highest in June for all species except pink salmon. However, in the more extended, 11-yr time series in the northern region, juvenile pink salmon catches were among the lowest observed in June and July 2007, suggesting a poor adult return in the subsequent year. Mean size of juvenile salmon generally increased from June to July; however, condition residuals were lower than the long-term average for most species. Coded-wire tags were recovered from 14 juvenile coho salmon and five Chinook salmon (1 juvenile and 4 immature). All but one fish were from hatchery and wild stocks originating in southeastern Alaska. The non-Alaskan stock was a Chinook salmon that originated from the Upper Columbia River. Alaska enhanced stocks were also identified by thermal otolith marks from 67% of the chum and 4% of the sockeye salmon examined. Onboard stomach analysis of 95 potential predators, representing 8 species, did not provide evidence of predation on juvenile salmon. This research suggests that in southeastern Alaska, juvenile salmon exhibit seasonal patterns of habitat use and display species- and stock-dependent migration patterns. This third season of comparing biophysical parameters between the northern and southern regions of southeastern Alaska suggests that summer conditions differ between the regions. Long-term monitoring of key stocks of juvenile salmon, on seasonal and interannual time scales, will enable researchers to understand how growth, abundance, and ecological interactions affect year-class strength of salmon and to better understand their role in North Pacific marine ecosystems.

1111 High seas salmonid coded-wire tag recovery data, 2008

A.G. Celewycz, J.D. Berger, J. Cusick, N.D. Davis, and M. Fukuwaka

Information on high seas recoveries of salmonids (*Oncorhynchus* spp.) tagged with coded-wire tags (CWTs) has been reported annually to the International North Pacific Fisheries Commission (1981-1992) and to the North Pacific Anadromous Fish Commission (NPAFC, 1993-present). Data from these CWT recoveries are also reported into the coastwide on-line CWT recovery database (<http://www.rmfc.org>) maintained by the Regional Mark Processing Center (RMPC) of the Pacific States Marine Fisheries Commission (PSMFC). This document

lists recovery data for 89 CWT salmonids that will be reported to PSMFC/RMPC for the first time. These 89 CWTs were recovered from the 2006-2008 U.S. groundfish trawl fisheries in the Gulf of Alaska (21 Chinook salmon, *O. tshawytscha*) and eastern Bering Sea- Aleutian Islands (7 Chinook salmon), from the 2007 Pacific hake (*Merluccius productus*) trawl fishery in the Northern Pacific Ocean off Washington/Oregon/California (WA/OR/CA, 52 Chinook salmon), from the limited-entry non-hake groundfish trawl off WA/OR/CA (7 Chinook salmon), and from 2005 and 2008 Japanese research vessel operations in the central North Pacific Ocean (2 steelhead, *O. mykiss*).

1112 Paired comparisons of juvenile salmon catches between two research vessels fishing Nordic 264 surface trawls in southeastern Alaska, July 2007

A.C. Wertheimer, J.A. Orsi, E.A. Fergusson, and M.V. Sturdevant

Juvenile salmon (*Oncorhynchus* spp.) catches were compared from 28 surface trawl hauls conducted by two research vessels in marine waters of the northern region of southeastern Alaska, July 2007. This calibration study was initiated because the National Oceanic and Atmospheric Administration (NOAA) ship John N. Cobb was scheduled to be decommissioned in 2008. The Alaska Department of Fish and Game vessel Medeia was fished concurrently with the John N. Cobb in Icy and Chatham Straits. The vessels fished Nordic 264 rope trawls for 20 minutes synoptically at the surface along adjacent, staggered trawl paths. Trawl speed, distance trawled, and catch rates, species compositions, and size of juvenile salmon were compared between vessels. In paired-difference tests, trawl paths were significantly longer (11%, $P < 0.001$) for the Medeia compared to the John N. Cobb. The total number of juvenile salmon caught was also significantly greater ($P < 0.05$) for the Medeia than the John N. Cobb (1,064 vs. 639). However, no significant differences ($P > 0.1$) in catch between vessels were detected at the individual species level for pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), or coho (*O. kisutch*) salmon. Numbers of Chinook salmon (*O. tshawytscha*) caught were too low for statistical comparisons to be made. Overall species composition was not significantly different (Chi-square, $P = 0.31$) between the two vessels. Average size of all juvenile salmon was not different (analysis of variance, $P = 0.54$) between the two vessels, but significant species differences were noted ($P < 0.001$). This study will permit future catch-per-unit-efforts to be compared with the existing 11-year time series of data previously collected by the John N. Cobb in Southeast Alaska.

1134 Washington, Oregon, and California Salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2007 season

H.R. Bartlett

Recorded releases for Washington, Oregon, and California totaled just over 290 million fish in 2007. Releases for all species and location were not available for 2008. In release year 2007, chinook represented 59% of the total release; chum represented 17%, coho represented 13.5%, sockeye represented 5%, steelhead represented 5.5%. Ocean salmon fisheries conducted off the coasts of Washington, Oregon, and California are directed toward and harvest primarily chinook and coho salmon. Small numbers of pink salmon are harvested in odd numbered years. West Coast fisheries in the Pacific Fishery Management Council-managed waters occur from 0 to 200 nautical miles offshore between the U.S./Canada border and the U.S./Mexico border. Total 2007 exvessel value for the non-Indian commercial salmon fisheries within Washington, Oregon and California was \$11.6 million, an increase of 24% from 2006 (Pacific Fishery Management Council 2008). In terms of number of fish, the non-Indian commercial chinook harvest (163,000 fish) increased by 34% compared to 2006, however, the number of Chinook harvested was 78% below the long-term average (751,000 fish). Coho catch increased

in 2007 to 23,000 fish, over eight times the 2,700 coho recorded in 2006. Average weight per chinook was slightly less than the previous year (8%), while the coho average weight decreased by over 30%. Treaty Indian commercial fisheries off Washington are allocated a share of the total ocean salmon harvest. The treaty Indian commercial fisheries (inclusive of Ceremonial and Subsistence) harvested 25,600 chinook, and 40,000 coho. While the Chinook catch was less than the total catch in 2006, the coho catch was an improvement.

1135 Alaska salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2007 season

R.P. Josephson

In 2007 there were 27 private nonprofit, 2 federal, and 2 state hatcheries operating in Alaska. Most of these facilities (18) are located in southeast Alaska. The Cook Inlet and Prince William Sound region has 11 hatcheries and the Kodiak region has 2 hatcheries. Alaskan hatcheries released approximately 1.56 billion fish. Of the fish released 55% were pink salmon and 39% were chum salmon. Hatcheries in Prince William Sound and Cook Inlet contributed 52% and hatcheries in Southeast Alaska contributed 37% of the fish released. At this time last year, department biologists were expecting an all-species commercial catch of 179 million for the 2007 season. As it turned out, the all-species catch reached 213 million. The 2007 catch was well above forecast and ranked as the 4th largest salmon catch for the State of Alaska since 1960. In 2007, the overall catch of pink salmon was 144 million compared to the preseason projection of 108 million. Higher than expected pink salmon catch in 2007 was due to a record pink salmon return to Prince William Sound. The overall chum salmon catch was 17.2 million compared to the preseason projection of 24.8 million. Table 2 shows 2007 harvest numbers by salmon species and fishing area, in units of fish harvested, and Table 3 provides this information in units of pounds harvested. The 2007 ex-vessel value of the commercial harvest showed a large increase over the value of the catch in 2006. The preliminary estimate for the total value of Alaska's 2007 harvest is \$417 million well above the \$346 million in 2006, and while below record highs it is the greatest since \$487 million in 1995.

1138 PACSNP: Progress on the development and standardization of single nucleotide polymorphisms (SNPs) baseline for genetic stock identification of chum salmon

L.W. Seeb, S. Abe., S. Sato, W.D. Templin, S. Urawa, K. Warheit, and J.E. Seeb

Abstract TBA

The Committee on Scientific Research and Statistics (CSRS)

1096 Report of the Research Planning and Coordination Meeting, Sokcho, Republic of Korea, April 10-11, 2008

NPAFC Committee on Scientific Research and Statistics

The NPAFC Committee on Scientific Research and Statistics (CSRS) held its annual Research Planning and Coordinating Meeting (RPCM) in Sokcho, Republic of Korea, on April 10-11, 2008. The group included 36 participants from five member countries. The primary purpose of the RPCM is to discuss the 2008 national research plans and cruise activities, and to review the exchange of biological samples, data, and personnel, and the activities of sub-committee and working groups.

The Parties presented 2008 national research and cruise plans. Canada provided three cruise plans: a summer survey by a chartered vessel, a fall survey, and a winter survey by *W.E. Ricker*. Canada will also conduct two surveys by *W. E. Ricker* as part of the Strait of Georgia Salmon Program. Japan will conduct three cruise plans: a trawl survey by *Hokko maru* and research gillnets survey by *Wakatake maru* in the North Pacific and Bering Sea in summer. *Oshoro maru* will conduct an oceanographic and biological survey in the western North Pacific Ocean in May, and in the central North Pacific, Bering Sea and Chukchi Sea in June and July. Russia explained two research cruise plans: SakhNIRO will conduct surveys of juvenile salmon near Sakhalin, and KamchatNIRO will conduct trawl surveys near Kamchatka shores to predict the life history and behavior of pink salmon. The United States presented cruise plans for the eastern Bering Sea and the Southeast Alaska Coastal Monitoring (SECM): the NOAA ship *Oscar Dyson* will be used to collect biological information on ecologically important fish species and provide descriptions of the physical and biological oceanographic conditions in the eastern Bering Sea waters during the fall. The SECM survey will involve an inter-vessel calibration of juvenile salmon CPUE with the NOAA ship *John N. Cobb* and the RV *Medeia* in July. Korea reported that there will be four research plans for efforts focused on coastal areas on juvenile distribution, zooplankton biomass, nutrients, water properties such as temperature and salinity.

The Science Sub-Committee reported that the first meeting of Long-term Research and Monitoring Project (LRMP) was held on April 7–9, 2008. There was general agreement that this first LRMP meeting accomplished the objective of using the existing knowledge of climate impacts on Pacific salmon to begin identifying research and monitoring priorities in order to improve Pacific salmon forecasts. The Working Group on Stock Assessment discussed the following three items: 1) the update of historic catch data, 2) the update of salmon catch and release summary on the NPAFC website, and 3) the development of a working paper on the state of Pacific salmon in the NPAFC member countries. The Working Group on Salmon Marking discussed the status of the NPAFC otolith mark database, marking plans for brood year 2008 salmon, and the success of designating thermal mark patterns for specific countries. The chair presented a summary of otolith marking for the last 14 years. The Ad Hoc Working Group on Stock Identification reported that tissue requests have been largely met, and much progress has been made on Pacific Rim data bases for SNPs. The BASIS Working Group discussed the 2008 BASIS Symposium and agreed to include a review for BASIS Phase I as an introduction with the proceedings of BASIS Symposium (NPAFC Bulletin No. 5). Members of the working group agreed to create a web-based brochure on the NPAFC web site that would summarize pertinent results on salmon research provided at the BASIS Symposium. The Working Group on Salmon Tagging had prior e-mail communications on the terms of reference, NPAFC disc tag and poster, tag recovery procedures, tagging database, and other items. The terms of reference agreed by the working group are: 1) manage the high-seas tagging database

including the current INPFC/NPAFC tagging data and the future tagging activities, 2) coordinate the high-seas tagging experiments, 3) collect the release and recovery information and distribute them among the Parties, 4) report the annual summary of the high-seas tagging activity to the CSRS, 5) format disc tags with NPAFC logo for its future use, and 6) encourage reporting tag recoveries from the public. (modified from NPAFC Newsletter #24 reported by Y. Ishida)

1119 Recoveries of high-seas tags in 2007-2008 and tag releases in 2008 from high-seas research vessel surveys in the North Pacific Ocean

Working Group on Salmon Tagging, Committee on Scientific Research and Statistics

In 2007 and 2008, high seas tags were recovered from seven chum in Japan, seven sockeye in the US, and nine pink, one coho, and five chum salmon in Russia. In addition, one high-seas tagged chum salmon was recovered in the central Bering Sea the following day after it was tagged. No data storage tags were recovered during this time period. From June to July 2008, a Japanese research vessel, Wakatake maru, conducted 28 longline (840 hachi) operations to attach disk tags and data storage tags to salmonids. In September 2008, the NOAA Ship Oscar Dyson also conducted research trawling operations to attach data storage tags and disk tags to salmonids. A total of 224 salmonids (2 sockeye, 132 chum, 11 pink, 70 coho, and 1 Chinook salmon and 8 steelhead trout) in the central North Pacific and 1,373 salmonids (68 sockeye, 1,248 chum, 33 pink, and 22 Chinook salmon and 2 Dolly Varden) in the Bering Sea were tagged and released. These releases included one Chinook salmon released in the central North Pacific and 22 Chinook salmon released in the Bering Sea tagged with data storage tags.