

INPFC DOCUMENT Ser. No. 2693 Rev. No.

SUMMARY OF U.S.-U.S.S.R. COOPERATIVE HIGH SEAS
SALMONID TAGGING OPERATIONS IN 1983

by

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Submitted to

International North Pacific Fisheries Commission
by the United States National Section

September 1983

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THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

Harris, Colin K. 1983. Summary of U.S.-U.S.S.R. cooperative high seas salmonid tagging operations in 1983. (Document submitted to 1983 annual meeting of the INPFC, November 1983, Anchorage, U.S.A). 13 pp. Fisheries Research Institute, University of Washington, Seattle.

SUMMARY OF U.S.-U.S.S.R. COOPERATIVE HIGH SEAS
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BACKGROUND

In the last few years the U.S.S.R.'s Pacific Scientific-Research Institute of Fisheries and Oceanography (TINRO) has been expanding its research program on marine life of salmonids, and has initiated a high seas salmonid research emphasis. The first recent attempt to sample salmonids on the high seas (i.e., other than on-going research on juvenile salmonids in the Okhotsk Sea and Litke Strait areas) was in 1980, when the NPS Schubertovo was used to catch salmon for tagging in the northwestern Pacific Ocean. That program, for which the Fisheries Research Institute (FRI) provided tags and anesthetic, was largely unsuccessful due to a combination of poor weather and poor gear performance. The very deep, small-meshed herring seine employed proved to be ineffective for capturing salmon on high seas. Original plans were for the Schubertovo and the two U.S. tagging vessels to work cooperatively, but the respective study areas overlapped little. Cooperation consisted instead of daily radiotelephone exchange of technical information, catch and effort data, positions, and sampling plans (Harris et al. 1980).

In January 1983 the U.S. National Marine Fisheries Service (NMFS) received from TINRO plans for another high seas salmon tagging program to be carried out in May to July in the North Pacific Ocean (42° - 50° N, 175° E- 180°) and in the Bering Sea (53° - 58° N, 175° E- 180°). The NPS Nemirov, a newly built medium freezer trawler (SRTM), would employ a new high seas salmon purse seine modelled after specification sent by FRI in

1979. The plans included participation of two U.S. scientists, who would board the vessel in the U.S.S.R. and disembark at Dutch Harbor, Alaska, following a two-day discussion of results and recommendations for future work.

TINRO's stated objectives were: 1) Experimental salmon fishing with purse seine gear; 2) salmon tagging in the areas of high seas fishing; 3) collection of data on spatial and biological structure of the populations; 4) data collection for the differentiation of local stocks; and 5) collection of data on salmon growth and feeding, carrying capacity, and meteorological conditions. The objectives of the United States in the proposed cooperative program were: 1) To provide technical assistance and advice, and to provide certain materials such as tags, anesthetic, and oceanographic sampling gear; 2) to collect scale samples and biological data for its own purposes relative to on-going high seas salmonid research; and 3) to help establish, at least on an informal basis, a forum for U.S.-U.S.S.R. exchange of information, data, and samples useful in research of mutual benefit.

The cruise plans were reconfirmed during the 4-8 April 1983 U.S.-U.S.S.R. bilateral talks on fisheries assessments held in Seattle. Mr. Theodore Merrell, NMFS, and I were selected to be the initial U.S. participants.

DESCRIPTION OF VESSEL, GEAR AND SAMPLING METHODS

The NPS Nemirov, a 54.8 m medium freezer trawler, was built in 1981 for side-trawling and purse seining. All deck equipment is electrically

powered. The purse/trawl cable winches are located on the foredeck, and cables run forward to a large davit on the starboard side just aft of the bow structure. The seine is set from the stern and is retrieved by two 7 Kw power blocks, one overhanging from the starboard side just forward of the seine deck, and the other suspended directly over the seine deck. The vessel is accompanied by a 106 hp skiff, which is used only to tow the Nemirov during seine pursing and retrieval.

The seine was purportedly built after plans of FRI's seines sent in 1979, but there were some significant departures from the FRI design. The TINRO seine was 910 m long and hung about 102 m deep in the water. The body web was 88 mm stretched measure capron, and the 27-m long bunt web was 28 mm stretched measure capron. Leadline was a 1-cm dia. shank chain lashed to a 1.25-cm twisted line. All web-web and web-line lacings were very tight, instead of loose lacings as used in most U.S. salmon seine gear. Hanging ratio for web (i.e., "shrinkage") was 20 percent throughout all of the bunt and all but the near 9.1 m of the body, as compared to 25 percent throughout all of FRI's seines.

All seine sets were round hauls since the seine skiff was not used to tow the bunt end of the seine. Sets were made so the Nemirov was downwind from the seine after deployment. Retrieval and pursing commenced immediately after full deployment; about 20 percent of the seine was retrieved by the time it was fully pursed. Setting required about 5-7 minutes, and pursing and retrieval usually lasted about 1-1/2 hrs. The Sargan sonar gear, used in conjunction with some sets, did not seem

to indicate salmon concentrations, so all sets were made at random locations.

Fish were dipnetted from the bunt and placed in a canvas live tank supplied with fresh seawater. In the first 12 sets the bunt collapsed immediately after retrieval, which caused excessive scale loss in virtually the entire catches. A method was soon devised to keep the bunt more open, and scale loss in subsequent sets was comparable to that experienced in FRI operations.

Catch processing was nearly identical to that in U.S. salmon research, except that fork length was usually recorded to the nearest 1 cm (instead of to nearest 0.5 cm), and fish not suitable for tagging were sampled for length, scale, body weight, sex determination, and stomach contents. TINRO scientists collected scales from the area just below the middle or posterior half of the dorsal fin, about 1/3 to 1/2 of the way toward the lateral line. U.S. scientists also took scale(s) from each fish tagged or examined, from the standard INPFC-preferred area of the body. During the third cruise, when no U.S. personnel were on the vessel, TINRO scientists took data and scale samples (from the INPFC-preferred area) for the United States.

RESULTS

The sampling program was divided into three cruises, separated by port calls to Dutch Harbor, Alaska (Table 1). The general plan was to sample mostly south of 46°N in the first cruise, sample for about three weeks in the North Pacific north of 46°N and for about one week in the

Bering Sea in the second cruise, and to sample entirely in the Bering Sea north of 55°N in the last cruise.

Detailed salmonid catch and tag release data are presented, by individual seine set, in Table 2. In subsequent discussion of catch results some reference will be made to age groups of sockeye, chum and chinook salmon, but age determinations at present are based on fish length, as scale samples have not yet been examined.

Sampling in the first cruise was limited to only 10 sets, due to a late departure and generally poor weather in the last two weeks of May. A total of 217 salmon was caught, from which 189 fish were tagged and released. Virtually all of these tagged fish, however, were in very poor condition due to excessive scale loss. Seven of the 10 sets occurred south of 46°N . The majority of the catches consisted of pink salmon. Sockeye appeared to be more abundant south of 46°N than was the case in 1982 (when only three sockeye were caught south of 46°N in 14 seine sets in late May and early June; see Harris 1982). The sockeye were likely all immature age .1 and .2, as the range in lengths was 26 to 47 cm. Chum salmon were predominantly immature age .2 or older, although some of the larger fish in the length range 41 to 60 cm may have been maturing. No coho were caught in the first cruise.

Improved weather and more time in the study area permitted 43 sets in the second cruise, in which 851 salmonids were caught and 805 were tagged. Sampling in the North Pacific consisted of 26 sets, between approximately 47°N and 50°N . Pink salmon were considerably more abun-

dant than sockeye and chum salmon combined. Only two chum salmon were less than 40 cm in length, indicating a very low abundance of age .1 fish in the area. This result contrasts greatly with the usual appearance of large numbers of age .1 chum in the general area by late June, as seen in 1980 and 1982 U.S. operations (Harris et al. 1980; Harris 1982). Another surprising result was that no coho were caught in the North Pacific by the end of June. Definite "patches" of coho were encountered in 1980 and 1982 in the same general area by late June, and sporadic catches occurred earlier. Sampling in the Bering Sea during the second cruise consisted of 17 sets, between 28 June and 4 July, and between 53°N and 55°10'N. Salmon abundance was markedly lower in the Bering Sea area sampled than in the North Pacific. Average catch declined from 28.7 fish/set in the North Pacific (i.e., during the second cruise) to 6.1 fish/set north of 53°N. Pink salmon were in less relative abundance in the Bering Sea; they accounted for a (weighted) mean of 48.1% of the catch, whereas in the North Pacific area sampled in the second cruise they made up 71.5% of the catch.

The third cruise, in which no U.S. scientists participated, resulted in 47 sets in the area 55°30'N to 58°N, in the period 10 July to 31 July. Pink salmon were in low relative abundance; average catch of pinks was only 0.3 fish/set as compared to 8.4 chum/set, 0.9 chinook/set, and 0.8 sockeye/set. No coho were caught in the third cruise. Catches of chinook salmon in the second and third cruises in the Bering Sea increased steadily to the north: 0.0 fish/set in the area 53°-53°59'N, 0.2 fish/set 54°-54°59'N, 0.2 fish/set 55°-55°59'N, 0.7

fish/set 56° - $56^{\circ}59'$ N, and 1.0 fish/set 57° - 58° N. The intention was to target on chinook salmon in the third cruise to maximize tag releases of the species, and for this reason most of the sampling occurred north of 57° N. Chinook salmon captured in the third cruise ranged in length from 31.5 to 74 cm, and most of the fish were immature age .1 (i.e., most fish were under 40 cm).

Surface water temperatures were notably colder in 1983 than those measured in 1980 and 1982, although a strict comparison is not possible because of the different time/area allocation of sampling effort in the three years. The mean temperature in area E7546 in mid-June 1983 was 4.8° C, compared to 6.0° C in the same area and period in 1982. Temperatures in 1983 increased very little while the Nemirov sampled northward in mid- and late June. A warm tongue of water was encountered very close to the Aleutian Islands, however, during transit to Dutch Harbor at the end of both the first and second cruises. Temperatures in the Bering Sea were generally higher than those in the North Pacific area sampled during late June and early July (5.9° C in the Bering Sea and 5.3° C in the North Pacific). These colder-than-typical temperatures in the North Pacific may explain in part the higher occurrence of sockeye salmon in areas E7542 and E7544, compared to the distribution of the species observed in 1982 sampling. Temperature conditions may also explain in part the null and low catches of coho and age .1 chum salmon, respectively.

Detailed tag release data are summarized in Table 3. A total of 1,438 salmonids was tagged, 162 south of 46° N, 727 between 46° N and

50°N, and 549 in the Bering Sea. Pink salmon predominated in the releases in the North Pacific Ocean, and chum salmon comprised the great majority of the tagged fish in the Bering Sea.

POST-CRUISE DISCUSSION OF RESULTS AND RECOMMENDATIONS

I met with the Nemirov scientists and crew after completion of the third cruise to discuss results, recommendations for future sampling, and other topics pertinent to U.S.-U.S.S.R. cooperative research on salmon. TINRO scientists gave the United States full co-proprietorship of the 1983 data, even for the third cruise during which there was no U.S. representative on board. TINRO intends another tagging program in 1984, for which plans will be jointly made by TINRO and U.S. scientists. TINRO scientists, the captain of the Nemirov, and I will all recommend that two vessels be used in 1984, one to sample in the North Pacific Ocean and the other to work simultaneously in the Bering Sea.

LITERATURE CITED

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- Harris, Colin K. 1982. Summary of United States high seas salmon tagging operations in 1982. (Document submitted to 1982 annual meeting of the INPFC, Tokyo, Japan, November 1982.) 18 pp. Fisheries Research Institute, University of Washington, Seattle.

Table 1. General cruise schedule of TINRO research vessel
NPS Nemirov, 1983.

Date(s)	Location	Activity	Number seine sets
12 May	Leave Nakhodka		
13-17 May	Southern Kuril Islands	Prepared seine and other equipment	
18 May	Depart for study area		
22 May - 1 June	Study area, south of 47°N	Sampling	10*
7-8 June	Dutch Harbor	Port call	
12 June- 4 July	Study area, 46°-50°N and 53°-55°N	Sampling	43
7-8 July	Dutch Harbor	Port call; U.S. scientists disembark	
10-31 July	Study area, 55°-58°N	Sampling	47
3-5 August	Dutch Harbor	Port call, post-cruise discussion of results and recommendations for future work	

*The first set, done mainly to test gear, was made west of 175°E, the western boundary of the study area.

Table 2. Salmonid catches and tag releases by seine set, U.S.-U.S.S.R. cooperative high seas salmonid research on NPS Nemirov, 1983.

SET NO.	DATE	LOCATION		SURF. T. (C)	SALMONID CATCH							TAG RELEASES							TAG SERIAL NOS.*
		LAT.	LONG.		RED	CHUM	PINK	COMO	KING	STLMD	TOTAL	RED	CHUM	PINK	COMO	KING	STLMD	TOTAL	
M- 1	5/22	43-42N,	171-23E	7.0	5	0	22	0	1	0	28	2	0	20	0	1	0	23	1092-1076
M- 2	5/26	43-12N,	177-47E	6.4	0	2	4	0	0	0	6	0	2	4	0	0	6	1077-1083	
M- 3	5/26	43-23N,	177-33E	6.5	1	13	1	0	0	0	15	1	0	0	0	0	1	1084	
M- 4	5/27	44-23N,	176-24E	7.1	5	1	0	0	0	0	6	3	1	0	0	0	4	1085-1088	
M- 5	5/27	44-31N,	176-26E	5.8	13	3	12	0	0	0	28	13	3	12	0	0	28	1089-1117	
M- 6	5/31	45-47N,	178-33E	4.9	7	13	49	0	2	0	71	7	12	48	0	1	68	1118-1185	
M- 7	5/31	45-48N,	178-34E	4.8	9	8	16	0	0	0	33	8	8	16	0	0	32	1186-1217	
M- 8	6/ 1	46-32N,	179-00E	4.6	0	1	11	0	0	0	12	0	1	11	0	0	12	1218-1229	
M- 9	6/ 1	46-32N,	178-59E	4.7	2	0	3	0	0	0	5	2	0	3	0	0	5	1230-1234	
M- 10	6/ 1	46-21N,	179-07E	4.7	0	10	3	0	0	0	13	0	10	0	0	0	10	1235-1244	
CRUISE 1 TOTALS:					42	51	121	0	3	0	217	36	37	114	0	2	0	189	
M- 11	6/12	46-49N,	176-37E	4.7	4	1	4	0	0	0	9	4	1	3	0	0	8	1245-1252	
M- 12	6/12	46-51N,	176-56E	4.8	4	9	12	0	0	0	25	3	9	9	0	0	21	1253-1273	
M- 13	6/15	47-06N,	179-00E	4.8	0	0	0	0	0	0	0	0	0	0	0	0	0		
M- 14	6/15	47-02N,	178-43E	4.8	13	6	10	0	0	0	29	12	6	9	0	0	27	1274-1300	
M- 15	6/16	46-57N,	178-39E	4.9	3	4	8	0	0	1	16	2	1	7	0	0	11	1301-1311	
M- 16	6/16	46-58N,	178-21E	4.9	2	2	2	0	0	0	6	2	2	2	0	0	6	1312-1317	
M- 17	6/19	48-13N,	179-38E	4.7	6	5	8	0	0	0	19	6	5	8	0	0	19	1318-1336	
M- 18	6/19	48-18N,	179-40E	4.7	6	3	32	0	0	0	41	6	2	29	0	0	37	1337-1373	
M- 19	6/19	48-24N,	179-38E	4.8	4	3	22	0	1	0	30	4	3	20	0	1	28	1374-1401	
M- 20	6/20	49-22N,	176-30E	4.7	6	5	39	0	0	0	50	4	5	28	0	0	37	1402-1438	
M- 21	6/20	49-28N,	176-31E	4.8	1	4	14	0	0	0	19	1	4	14	0	0	19	1439-1457	
M- 22	6/20	49-19N,	176-35E	4.8	3	9	78	0	0	0	90	3	9	77	0	0	89	1458-1546	
M- 23	6/21	48-37N,	177-35E	4.9	3	4	14	0	0	0	21	3	4	14	0	0	21	1547-1567	
M- 24	6/21	48-36N,	177-19E	5.2	2	2	52	0	0	0	56	2	2	51	0	0	55	1568-1622	
M- 25	6/21	48-37N,	177-19E	5.8	1	2	8	0	0	0	11	1	2	8	0	0	11	1623-1633	
M- 26	6/21	48-34N,	177-28E	5.3	0	3	2	0	0	0	5	0	2	2	0	0	4	1634-1637	
M- 27	6/24	48-20N,	179-01E	4.9	1	13	10	0	0	0	24	1	13	10	0	0	24	1638-1661	
M- 28	6/24	48-31N,	179-06E	5.2	0	1	0	0	0	0	1	0	1	0	0	0	1	1662	
M- 29	6/25	49-47N,	179-36E	5.1	2	3	2	0	0	0	7	2	3	2	0	0	7	1663-1669	
M- 30	6/25	49-58N,	179-16E	5.3	3	13	6	0	0	0	22	3	13	6	0	0	22	1670-1691	
M- 31	6/25	49-50N,	178-45E	5.2	0	9	22	0	0	0	31	0	8	17	0	0	25	1692-1716	
M- 32	6/26	49-54N,	177-49E	4.9	1	4	18	0	0	0	23	1	4	18	0	0	23	1717-1739	
M- 33	6/26	49-56N,	177-24E	5.1	3	4	45	0	0	0	52	2	4	45	0	0	51	1740-1790	
M- 34	6/27	49-54N,	175-39E	5.4	8	2	23	0	0	0	33	8	2	23	0	0	33	1791-1823	
M- 35	6/27	49-57N,	175-16E	5.7	15	2	25	0	0	0	42	15	2	24	0	0	41	1824-1865	
M- 36	6/27	49-58N,	175-09E	6.1	4	3	78	0	0	0	85	4	3	73	0	0	80	1866-1945	
M- 37	6/28	53-08N,	175-06E	5.9	1	2	0	0	0	0	3	1	2	0	0	0	3	1946-1948	
M- 38	6/28	53-13N,	175-31E	5.9	0	5	10	0	0	0	15	0	5	10	0	0	15	1949-1963	
M- 39	6/29	53-24N,	177-27E	5.5	1	2	10	0	0	0	13	1	2	10	0	0	13	1964-1976	
M- 40	6/29	53-23N,	177-51E	5.6	2	2	6	0	0	0	10	2	2	6	0	0	10	1977-1986	
M- 41	6/29	53-29N,	178-14E	5.8	1	0	0	0	0	0	1	1	0	0	0	0	1	1987	
M- 42	6/30	53-09N,	179-28E	5.5	0	3	7	0	0	0	10	0	3	7	0	0	10	1988-1997	
M- 43	6/30	53-09N,	179-51E	5.5	0	0	5	0	0	0	5	0	0	5	0	0	5	1998-1999, J000-J002	

Table 2 - cont'd.

SET NO.	DATE	LOCATION		SURF. T. (C)	SALMONID CATCH							TAG RELEASES							TAG SERIAL NOS.*			
		LAT.	LONG.		RED	CHUM	PINK	COHO	KING	STLMD	TOTAL	RED	CHUM	PINK	COHO	KING	STLMD	TOTAL				
N- 44	6/30	53-23N	179-47E	5.8	0	0	3	0	0	0	3	0	0	3	0	0	3	0	0	0	3	J003-J005
N- 45	7/ 1	54-08N	179-17E	5.7	0	11	1	0	1	0	13	0	11	1	0	1	0	1	0	13	J006-J018	
N- 46	7/ 1	54-22N	179-33E	5.7	1	0	1	0	0	0	2	1	0	1	0	0	0	0	2	J019-J020		
N- 47	7/ 1	54-32N	178-53E	6.3	0	0	4	0	0	0	4	0	0	4	0	0	0	0	4	J021-J024		
N- 48	7/ 2	54-30N	176-50E	5.9	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	J025		
N- 49	7/ 2	55-10N	175-37E	6.8	1	1	0	0	0	0	2	1	1	0	0	0	0	0	2	J026-J027		
N- 50	7/ 3	54-02N	175-30E	6.3	1	15	1	0	0	0	17	1	15	1	0	0	0	0	17	J028-J044		
N- 51	7/ 3	54-01N	176-10E	6.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
N- 52	7/ 3	53-41N	176-15E	6.3	0	2	1	0	0	0	3	0	2	1	0	0	0	0	3	J045-J047		
N- 53	7/ 4	53-44N	178-56E	6.2	0	2	0	0	0	0	2	0	3	0	0	0	0	0	3	J048-J050		
CRUISE 2 TOTALS:					103	161	584	0	2	1	851	97	156	549	0	2	1	805				
N- 54	7/10	55-30N	179-47E	7.2	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	J053		
N- 55	7/10	55-34N	179-18E	7.7	0	6	1	0	0	7	7	0	6	1	0	0	0	7	J054-J060			
N- 56	7/11	55-54N	177-44E	7.5	0	0	0	0	1	0	1	0	0	0	0	1	0	1	J061			
N- 57	7/11	55-57N	177-27E	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
N- 58	7/11	56-07N	175-16E	7.1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	J062			
N- 59	7/12	57-48N	175-27E	7.2	0	1	1	0	1	3	3	0	1	1	0	1	0	3	J063-J065			
N- 60	7/12	57-50N	176-15E	7.6	0	8	1	0	0	9	0	7	1	0	0	0	0	8	J066-J073			
N- 61	7/12	57-52N	176-58E	7.8	0	0	2	0	0	2	0	0	2	0	0	0	0	2	J074-J075			
N- 62	7/13	57-52N	177-44E	7.8	0	1	1	0	5	7	0	1	1	0	5	0	0	7	J076-J082			
N- 63	7/13	57-52N	178-22E	8.0	0	0	2	0	2	4	0	0	2	0	2	0	0	4	J083-J086			
N- 64	7/13	57-50N	179-09E	8.6	0	3	1	0	6	10	0	3	1	0	6	0	10	J087-J096				
N- 65	7/17	57-21N	179-20E	7.7	0	0	0	0	3	3	0	0	0	0	3	0	3	J097-J099				
N- 66	7/17	57-34N	179-39E	8.3	0	27	0	0	0	27	0	23	0	0	0	0	23	J101-J123				
N- 67	7/18	57-43N	179-49E	8.0	1	2	1	0	0	4	1	2	1	0	0	0	4	J124-J127				
N- 68	7/18	57-48N	179-49E	8.5	1	26	0	0	1	28	1	23	0	0	1	0	25	J128-J152				
N- 69	7/18	57-50N	179-56E	8.4	1	6	1	0	0	8	1	6	1	0	0	0	8	J153-J160				
N- 70	7/18	57-54N	179-59E	7.7	1	0	0	0	1	2	1	0	0	0	1	0	2	J161-J162				
N- 71	7/21	57-11N	178-14E	7.7	0	10	0	0	0	10	0	10	0	0	0	0	10	J163-J172				
N- 72	7/21	57-05N	178-24E	7.8	0	27	0	0	0	27	0	24	0	0	0	0	24	J173-J196				
N- 73	7/22	57-11N	178-32E	7.8	0	2	0	0	1	3	0	2	0	0	1	0	3	J197-J199				
N- 74	7/22	57-20N	178-43E	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0					
N- 75	7/22	57-23N	179-17E	8.3	1	4	0	0	3	8	0	3	0	0	0	0	3	J200-J202				
N- 76	7/23	57-26N	179-19E	8.2	0	8	0	0	1	9	0	7	0	0	1	0	8	J203-J210				
N- 77	7/23	57-08N	179-27E	8.2	0	8	0	0	0	8	0	6	0	0	0	0	6	J211-J216				
N- 78	7/23	57-07N	179-28E	8.3	0	8	0	0	1	9	0	8	0	0	0	0	8	J217-J224				
N- 79	7/23	56-59N	179-28E	8.3	0	10	0	0	2	12	0	10	0	0	2	0	12	J225-J236				
N- 80	7/27	57-05N	176-53E	8.3	1	11	0	0	0	12	1	11	0	0	0	0	12	J237-J248				
N- 81	7/27	57-10N	176-46E	8.5	4	32	0	0	0	36	4	30	0	0	0	0	34	J249-J282				
N- 82	7/27	57-12N	176-33E	8.5	0	10	0	0	0	10	0	8	0	0	0	0	8	J283-J290				
N- 83	7/27	57-13N	176-29E	8.5	3	5	0	0	0	8	2	3	0	0	0	0	5	J291-J295				
N- 84	7/28	56-54N	176-40E	8.3	0	1	0	0	0	1	0	1	0	0	0	0	1	J296				
N- 85	7/28	57-06N	176-11E	8.4	1	20	0	0	1	22	1	20	0	0	1	0	22	J297-J318				
N- 86	7/28	57-06N	176-10E	8.4	2	8	0	0	0	10	2	8	0	0	0	0	10	J319-J328				
N- 87	7/29	57-11N	176-09E	8.6	1	7	0	0	0	8	0	4	0	0	0	0	4	J329-J332				
N- 88	7/29	57-17N	175-47E	8.9	0	7	0	0	0	7	0	7	0	0	0	0	7	J333-J339				
N- 89	7/29	57-27N	175-19E	9.0	1	10	0	0	1	12	1	10	0	0	0	0	11	J340-J350				
N- 90	7/29	57-26N	175-17E	8.9	2	13	0	0	1	16	2	13	0	0	1	0	16	J351-J366				

Table 2 - cont'd.

SET NO.	DATE	LOCATION		SURF. T.(C)	SALMONID CATCH							TAG RELEASES							TAG SERIAL NOS.*
		LAT.	LONG.		RED	CHUM	PINK	COHO	KING	STLMD	TOTAL	RED	CHUM	PINK	COHO	KING	STLMD	TOTAL	
N- 91	7/30	57-34N,	175-19E	9.1	0	10	0	0	1	0	11	0	10	0	0	1	0	11	J367-J377
N- 92	7/30	57-34N,	175-21E	8.9	1	10	0	0	1	0	12	1	10	0	0	1	0	12	J378-J389
N- 93	7/30	57-36N,	175-19E	8.8	1	8	0	0	1	0	10	1	8	0	0	1	0	10	J390-J399
N- 94	7/30	57-36N,	175-17E	8.9	0	12	0	0	0	0	12	0	12	0	0	0	0	12	J400-J411
N- 95	7/30	57-40N,	175-24E	9.0	1	13	0	0	0	0	14	0	13	0	0	0	0	13	J412-J424
N- 96	7/31	57-55N,	179-40E	9.1	6	18	0	0	0	0	24	5	16	0	0	0	0	21	J425-J445
N- 97	7/31	57-54N,	179-53E	8.8	2	6	0	0	1	0	9	2	6	0	0	0	0	8	J446-J453
N- 98	7/31	57-55N,	179-58E	9.0	2	21	0	0	2	0	25	1	20	0	0	1	0	22	J454-J475
N- 99	7/31	57-55N,	179-57E	9.0	3	7	0	0	3	0	13	1	7	0	0	2	0	10	J476-J485
N-100	7/31	58-00N,	179-58E	9.1	0	10	0	0	4	0	14	0	9	0	0	3	0	12	J486-J497
CRUISE 3 TOTALS:					36	396	13	0	44	0	489	28	368	13	0	35	0	444	
ALL-SFASOM TOTALS:					181	608	718	0	49	1	1557	161	561	676	0	39	1	1438	

*Unused tags in above series:

Set	Tag(s)
N-1	I-055, I-062
N-2	I-078
N-5	I-099
N-35	I-831

Table 3. Total tag releases in U.S.-U.S.S.R. cooperative high seas salmonid research operations in 1983, by various sectors of the North Pacific Ocean and Bering Sea.

Region ¹	Month	Species					Total	
		Sockeye	Chum	Pink	Coho	Chinook		Steelhead
North Pacific, S. of 46°N	May	34	26	100	0	2	0	162
	June	0	0	0	0	0	0	0
	July	0	0	0	0	0	0	0
	Total	34	26	100	0	2	0	162
North Pacific, 46°-50°N	May	0	0	0	0	0	0	0
	June	91	121	513	0	1	1	727
	July	0	0	0	0	0	0	0
	Total	91	121	513	0	1	1	727
Bering Sea 53°-58°N	May	0	0	0	0	0	0	0
	June	5	14	41	0	0	0	60
	July	31	400	22	0	36	0	489
	Total	36	414	63	0	36	0	549
All regions	May	34	26	100	0	2	0	162
	June	96	135	554	0	1	1	787
	July	31	400	22	0	36	0	489
	Total	161	561	676	0	39	1	1,438

¹All tagging was done in the corridor 175°E-180°, except for one set at 171°23'E, in which 2 sockeye, 20 pink, and 1 chinook salmon were tagged.