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SUMMARY OF U.S.S.R-U.S. COOPERATIVE HIGH SEAS
SALMONID TAGGING OPERATIONS IN 1984

by

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SUMMARY OF U.S.S.R.-U.S. COOPERATIVE HIGH SEAS
SALMONID TAGGING OPERATIONS IN 1984

INTRODUCTION

The United States and the U.S.S.R. cooperated in 1984 in a high seas salmonid sampling and tagging program very similar to that conducted in 1983 (Harris 1983; Harris et al., in press). Plans for the 1984 program were presented to the United States by the U.S.S.R.'s Pacific Scientific Research Institute of Fisheries and Oceanography (TINRO) during the 11-20 April 1984 U.S.S.R.-U.S. bilateral meeting on assessment of commercial fish stocks in the North Pacific Ocean. The plans called for purse seine sampling in late April through late July in the same two regions surveyed in 1983 (viz., 42° - 50° N and 175° E- 180° in the North Pacific and 53° - 58° N and 175° E- 180° in the Bering Sea). The major objectives were the same as in 1983: 1) experimental fishing with high seas purse seine gear; 2) salmon tagging in (or near) the area of the high seas fishery; 3) collection of data on spatial and biological structure of the populations; 4) collection of data for the differentiation of stocks; and 5) collection of data on salmon growth and feeding, and on carrying capacity and meteorological conditions in the study area. The plans also included participation by U.S. scientists for the entire survey, which was to consist of three cruises separated by port calls at Dutch Harbor, Alaska.

The plans were reviewed during the bilateral meeting. The United States suggested that the research area in the North Pacific be extended northward to 51° N to permit sampling in an area of generally

high salmonid abundance just south of the Aleutian Islands. Also, the United States indicated intention to place scientists on board for the last two cruises.

VESSEL, GEAR AND METHODS

The 54.8 m medium freezer trawler (SMRT) NPS Nemirov served as the research vessel, as in 1983. The vessel carried the same 910 m purse seine used in 1983, and the methods of setting and retrieval were virtually the same as used in 1983 (Harris 1983).

The methods of processing salmonid catches and of tagging were also the same as used in 1983, with one exception. Most of the tags (all letter series "J" tags) applied were attached to the fish by a pin passing through the dorsal musculature. TINRO requested the United States to provide plastic "cinch-ups" and applicators (as used in recent years in Japanese tagging operations) to permit experiments comparing the effectiveness of the two methods of application. These were provided to the Nemirov at the time of the first Dutch Harbor port call in mid-July, but they were not used until close to the end of the survey.

As discussed below, the United States was not represented in the scientific party until the last (third) cruise, but during the first two cruises TINRO kindly collected an extra series of scale samples which were provided to the United States along with all detailed catch, oceanographic and biological data. Scales provided to the United States were collected from the INPFC-preferred area of the fish's body.

RESULTS

The realized sampling program is summarized in Table 1. Although original plans were to begin sampling in late April, vessel departure from Vladivostok was delayed and sampling commenced on 30 May. The first Dutch Harbor port call was scheduled for 12 June, when I was to have boarded to serve as participating U.S. scientist during the second cruise. However, a mechanical problem that occurred in transit to Dutch Harbor precluded the port call and the vessel, after making repairs and by mutual agreement, returned to the North Pacific study area to continue work. The first actual port call was 15 to 17 July, when U.S. representative Mr. Mark Higuera boarded the Nemirov. I met the vessel at Dutch Harbor during the last port call (15 to 17 August) and discussed with the scientific party the cruise results and recommendations for 1985.

Table 2 presents basic salmonid catch and tag release data for each seine set made in 1984. These data are preliminary, as some species identifications may be changed following completion of examination of scale samples and coordination of analysis with TINRO scientists. Similarly, the discussion below on age and maturity composition of the catches is also preliminary, based on initial scale readings and fish-length criteria for maturity stage.

The first cruise resulted in 20 sets south of 48°N . Catches were very small, averaging only 4.9 salmonids per set (set N-1 is excluded from the calculation as it was deemed ineffective). Chum, sockeye, and

pink salmon constituted nearly all of the catch from this area. Chum salmon were a nearly even mixture of immature and maturing fish (i.e., fish 50 cm fork length or larger considered to be maturing), and the immature fish were all age .2 or older. The sockeye salmon were considered to be all immature (less than 54 cm fork length), 17.2% of which were age .1 and the remainder age .2 or older. Surface temperatures ranged from 5.2°C to 6.6°C, and averaged 6.2°C.

During the second cruise, 16 sets were made in the area 48°-51°N in a 5-day period, and 16 sets were made in the Bering Sea area 54°40'-58°N. Catches in the North Pacific region continued to be small, averaging only 7.2 salmonids per set, and consisted almost entirely of sockeye and chum salmon. The chum salmon consisted of 82.1% immatures, which included nearly equal numbers of age .1 and of age .2 and older fish. The sockeye were mostly age .2 and older immatures (80.7%). Water temperatures in the North Pacific sector during the second cruise averaged 6.6°C, considerably higher than encountered in the same general area slightly earlier in 1983. Sampling in the Bering Sea area in the second cruise yielded an average of 4.6 fish per set, consisting entirely of chum and sockeye salmon, except for a total of 3 pink and 1 chinook salmon. The chum salmon were an even mixture of maturing and immature fish, and the sockeye were all immature.

Generally calmer weather in the Bering Sea in midsummer permitted 48 seine sets during the last cruise, in the area 53°-58°N. The mean catch was 10.5 fish per set, consisting mostly of chum (72.9%), sockeye (13.7%), and chinook salmon (12.7%). The chum salmon were mostly

immature (93.4%), and 74.0% of the catch of immature chum consisted of age .1 fish. The great majority of the sockeye salmon were also immature. The chinook salmon, most of which were caught in the last 10 days of the survey close to 58°N, consisted of 70.2% age .1 fish. Surface temperatures in the Bering Sea area ranged from 7.0°C to 9.6°C, and averaged 8.5°C.

A comparison of these basic results with those from 1983 is warranted, as there are some interesting similarities and differences. The catches of pink salmon in the North Pacific area this year were much lower than in 1983, which is probably due to the generally lower abundance of predominantly Asian pinks in the central North Pacific Ocean in even-numbered years. The total absence of coho salmon in the 1984 catches is not easily explained. No coho were caught in 1983 either, but surface temperatures in the North Pacific area sampled in 1983 were exceptionally cold, which may have affected coho distribution (Harris 1983). Also in 1983, virtually no age .1 chum salmon were caught in the North Pacific area, which was an unusual result also thought to be due to temperature conditions. In 1984, however, temperatures were more typical and age .1 chum occurred in the catches (although they did not predominate as in 1980 and 1982 U.S. sampling). The lack of coho in 1984, therefore, is not likely due to temperature conditions, but rather perhaps to the patchiness of coho distribution (Harris et al. 1983) relative to the sampling effort. It is also possible that the TINRO seine has low catchability for coho, although there are no characteristics of the seine that would suggest such selectivity.

Tag releases in 1984 are presented in detail in Table 2 and are summarized by region and month in Table 3. A total of 666 salmonids was tagged and released this year, compared to 1,438 in 1983. Much of the difference is attributable to the greatly reduced catches and tag releases of pink salmon in 1984.

RECOMMENDATION FOR 1985 AND FUTURE YEARS

TINRO tentatively plans to continue high seas salmonid tagging in 1985, and it is expected that the United States will again be invited to participate in the program. At the U.S.S.R-U.S. bilateral meeting in April and also following the 1984 program, several recommendations were made for continued cooperative work next year. First, a 2-vessel operation was recommended to improve sampling coverage of the large study area. TINRO suggested that one of the vessels should be provided by the United States if funding becomes available. Secondly, the TINRO purse seine should be repaired and modified to have a longer bunt, less web in the bunt, and a deeper mid-section. The United States suggested that the method of seining should be modified to permit open-tow sets instead of the exclusively round-haul sets as made in 1983 and 1984.

LITERATURE CITED

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

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Harris, C. K., K. W. Myers, C. M. Knudsen, R. V. Walker, N. D. Davis, W. G. Meyer, and R. L. Burgner. (In press). Monitoring migrations and origins of salmonids at sea - 1983. Int. N. Pac. Fish. Comm., Ann. Rep. for 1983.

Table 1. General cruise schedule of TINRO research vessel
NPS Nemirov, 1984.

| Dates | Location | Activity | Number of seine sets |
|---------------------|-----------------------------|--|-------------------------|
| 30 May - 9 June | North Pacific study area | Sampling | 20 |
| 10 - 29 June | Aleutian Is. area | Mechanical repair; travel | |
| 30 June - 4 July | North Pacific study area | Sampling | 16 |
| 7 - 14 July | Bering Sea study area | Sampling | 16 |
| 15 - 19 July | Aleutian Is. area | Travel; Dutch Harbor port call; U.S. participant embarks | |
| 20 July - 10 August | Bering Sea study area | Sampling | 48 |
| 11 - 17 August | Aleutian Is. area | Travel; Dutch Harbor port call; U.S. par- ticipant disembarks; post-cruise discus- sion of results; and data and sample exchange | |

Table 2. Salmonid catches and tag releases by seine set, U.S.S.R.-U.S. cooperative high seas salmonid research on NPS Nemirov, 1984.

| SET NO. | DATE | LOCATION | | SURF. T.(C) | SALMONID CATCH | | | | | | | TAG RELEASES | | | | | | TAG SERIAL NUMBERS | | |
|------------------|------|----------|---------------|-------------|----------------|------|------|------|------|------|-------|--------------|------|------|------|------|------|--------------------|-----------|--|
| | | N LAT | E LONG | | RED | CHUM | PINK | COHO | KING | STHD | TOTAL | RED | CHUM | PINK | COHO | KING | STHD | | TOTAL | |
| N- | 1 | 5/30 | 45-13, 175-52 | 6.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 2 | 5/31 | 44-25, 176-13 | 6.6 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | J501 | |
| N- | 3 | 5/31 | 44-24, 176-29 | 6.6 | 0 | 8 | 9 | 0 | 0 | 0 | 17 | 0 | 7 | 6 | 0 | 0 | 0 | 13 | J502-J514 | |
| N- | 4 | 6/01 | 44-29, 179-11 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 5 | 6/01 | 44-34, 177-13 | 6.6 | 1 | 1 | 2 | 0 | 1 | 0 | 5 | 0 | 1 | 2 | 0 | 1 | 0 | 4 | J515-J518 | |
| N- | 6 | 6/04 | 45-39, 176-53 | 6.2 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | J519-J521 | |
| N- | 7 | 6/04 | 45-50, 176-56 | 5.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 8 | 6/04 | 45-55, 176-45 | 6.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 9 | 6/04 | 46-00, 176-50 | 6.0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | J522 | |
| N- | 10 | 6/06 | 46-41, 175-38 | 5.2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | J523 | |
| N- | 11 | 6/06 | 46-47, 176-00 | 5.3 | 3 | 1 | 2 | 0 | 0 | 0 | 6 | 3 | 1 | 2 | 0 | 0 | 0 | 6 | J524-J529 | |
| N- | 12 | 6/06 | 46-46, 177-24 | 5.7 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | J530-J535 | |
| N- | 13 | 6/07 | 46-24, 178-04 | 6.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 14 | 6/07 | 46-40, 178-01 | 6.3 | 4 | 4 | 3 | 0 | 0 | 0 | 11 | 4 | 4 | 2 | 0 | 0 | 0 | 10 | J536-J545 | |
| N- | 15 | 6/07 | 46-42, 177-60 | - | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | J546 | |
| N- | 16 | 6/08 | 47-11, 179-03 | - | 7 | 3 | 1 | 0 | 0 | 0 | 11 | 5 | 3 | 1 | 0 | 0 | 0 | 9 | J547-J555 | |
| N- | 17 | 6/08 | 47-10, 179-12 | 6.6 | 2 | 3 | 0 | 0 | 0 | 0 | 5 | 2 | 3 | 0 | 0 | 0 | 0 | 5 | J556-J560 | |
| N- | 18 | 6/08 | 47-21, 178-53 | 6.6 | 2 | 9 | 0 | 0 | 0 | 0 | 11 | 2 | 9 | 0 | 0 | 0 | 0 | 11 | J561-J571 | |
| N- | 19 | 6/08 | 47-21, 178-49 | 6.4 | 8 | 3 | 0 | 0 | 0 | 0 | 11 | 8 | 3 | 0 | 0 | 0 | 0 | 11 | J572-J582 | |
| N- | 20 | 6/09 | 47-42, 179-48 | 6.6 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | J583-J585 | |
| CRUISE 1 TOTALS: | | | | | | 32 | 34 | 25 | 0 | 1 | 1 | 93 | 29 | 33 | 21 | 0 | 1 | 1 | 85 | |
| N- | 21 | 6/30 | 48-17, 178-38 | 6.2 | 0 | 4 | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | J586-J588 | |
| N- | 22 | 7/01 | 48-29, 177-23 | 6.6 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | J589 | |
| N- | 23 | 7/01 | 48-42, 177-20 | 6.5 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | J590-J592 | |
| N- | 24 | 7/01 | 48-53, 177-18 | 6.6 | 0 | 12 | 0 | 0 | 0 | 0 | 12 | 0 | 12 | 0 | 0 | 0 | 0 | 12 | J593-J604 | |
| N- | 25 | 7/01 | 48-57, 177-19 | 6.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 26 | 7/02 | 49-00, 175-43 | 6.5 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 27 | 7/02 | 49-06, 175-43 | 6.6 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 28 | 7/02 | 49-15, 175-44 | 6.8 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | J605-J609 | |
| N- | 29 | 7/02 | 49-27, 175-45 | 6.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 30 | 7/03 | 49-27, 177-34 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| N- | 31 | 7/03 | 49-40, 177-35 | 6.3 | 4 | 8 | 1 | 0 | 0 | 0 | 13 | 4 | 8 | 1 | 0 | 0 | 0 | 13 | J610-J622 | |
| N- | 32 | 7/03 | 49-48, 177-40 | 6.5 | 63 | 2 | 0 | 0 | 0 | 0 | 65 | 52 | 1 | 0 | 0 | 0 | 0 | 53 | J623-J675 | |
| N- | 33 | 7/03 | 49-49, 177-47 | 6.6 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

| SET NO. | DATE | LOCATION | | SURF. T.(C) | SALMONID CATCH | | | | | | | TAG RELEASES | | | | | | TAG SERIAL NUMBERS | | |
|------------------|------|----------|--------|-------------|----------------|------|------|------|------|------|-------|--------------|------|------|------|------|------|--------------------|-----------|--|
| | | N LAT | E LONG | | RED | CHUM | PINK | COHO | KING | STHD | TOTAL | RED | CHUM | PINK | COHO | KING | STHD | TOTAL | | |
| N- 34 | 7/04 | 50-12, | 179-14 | 7.0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | J676-J678 | |
| N- 35 | 7/04 | 50-23, | 178-52 | 6.8 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | J679 | |
| N- 36 | 7/04 | 50-36, | 179-16 | 7.4 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 4 | J680-J683 | | |
| N- 37 | 7/07 | 55-55, | 175-10 | 6.1 | 3 | 2 | 1 | 0 | 0 | 0 | 6 | 0 | 2 | 1 | 0 | 0 | 3 | J684-J686 | | |
| N- 38 | 7/07 | 55-50, | 175-10 | 6.0 | 0 | 7 | 0 | 0 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 0 | 7 | J687-J693 | | |
| N- 39 | 7/07 | 55-46, | 175-11 | 6.0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| N- 40 | 7/07 | 55-40, | 175-11 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| N- 41 | 7/07 | 55-29, | 175-08 | 7.0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | J694 | | |
| N- 42 | 7/08 | 55-48, | 174-04 | 6.6 | 0 | 3 | 1 | 0 | 0 | 0 | 4 | 0 | 3 | 1 | 0 | 0 | 4 | J695-J698 | | |
| N- 43 | 7/08 | 55-57, | 174-24 | 6.6 | 0 | 5 | 1 | 0 | 0 | 0 | 6 | 0 | 5 | 1 | 0 | 0 | 6 | J699-J704 | | |
| N- 44 | 7/08 | 55-57, | 174-33 | 6.5 | 2 | 5 | 0 | 0 | 0 | 0 | 7 | 2 | 5 | 0 | 0 | 0 | 7 | J705-J711 | | |
| N- 45 | 7/09 | 57-24, | 175-00 | 6.0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 2 | J712-J713 | | |
| N- 46 | 7/09 | 57-35, | 175-03 | 6.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| N- 47 | 7/09 | 56-48, | 175-23 | 6.3 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | J714 | | |
| N- 48 | 7/10 | 55-54, | 175-23 | 6.8 | 3 | 4 | 0 | 0 | 0 | 0 | 7 | 3 | 3 | 0 | 0 | 0 | 6 | J715-J720 | | |
| N- 49 | 7/10 | 55-44, | 175-39 | 8.0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | J721 | | |
| N- 50 | 7/13 | 54-41, | 178-52 | 6.5 | 7 | 8 | 0 | 0 | 0 | 0 | 15 | 1 | 8 | 0 | 0 | 0 | 9 | J722-J730 | | |
| N- 51 | 7/14 | 54-47, | 178-49 | 7.0 | 2 | 10 | 0 | 0 | 0 | 0 | 12 | 2 | 9 | 0 | 0 | 0 | 11 | J731-J741 | | |
| N- 52 | 7/14 | 54-49, | 178-44 | 7.0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 2 | J742-J743 | | |
| CRUISE 2 TOTALS: | | | | | 93 | 89 | 4 | 0 | 1 | 1 | 188 | 71 | 81 | 4 | 0 | 1 | 1 | 158 | | |
| N- 53 | 7/20 | 54-17, | 179-57 | 8.0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | J744 | | |
| N- 54 | 7/20 | 54-18, | 179-45 | 7.0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 1 | J745 | | |
| N- 55 | 7/21 | 54-01, | 179-56 | 7.8 | 0 | 4 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | 4 | J746-J749 | | |
| N- 56 | 7/21 | 53-41, | 179-59 | 8.0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 4 | 0 | 0 | 0 | 4 | J750-J753 | | |
| N- 57 | 7/21 | 53-29, | 179-58 | 8.2 | 3 | 3 | 0 | 0 | 0 | 0 | 6 | 3 | 3 | 0 | 0 | 0 | 6 | J754-J759 | | |
| N- 58 | 7/23 | 53-04, | 177-57 | 7.8 | 2 | 3 | 0 | 0 | 0 | 0 | 5 | 2 | 3 | 0 | 0 | 0 | 5 | J760-J764 | | |
| N- 59 | 7/23 | 53-18, | 178-01 | 7.8 | 3 | 7 | 0 | 0 | 0 | 0 | 10 | 3 | 7 | 0 | 0 | 0 | 10 | J765-J774 | | |
| N- 60 | 7/23 | 53-36, | 178-02 | 7.9 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | J775-J776 | | |
| N- 61 | 7/23 | 53-48, | 178-08 | 8.0 | 2 | 4 | 0 | 0 | 0 | 0 | 6 | 1 | 3 | 0 | 0 | 0 | 4 | J777-J780 | | |
| N- 62 | 7/24 | 53-07, | 175-57 | 8.0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | J781-J782 | | |
| N- 63 | 7/24 | 53-23, | 176-00 | 8.0 | 2 | 14 | 0 | 0 | 0 | 0 | 16 | 2 | 14 | 0 | 0 | 0 | 16 | J783-J798 | | |
| N- 64 | 7/24 | 53-28, | 176-56 | 8.4 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 3 | J799-J801 | | |
| N- 65 | 7/25 | 53-59, | 175-07 | 8.8 | 4 | 18 | 0 | 0 | 0 | 0 | 22 | 3 | 18 | 0 | 0 | 0 | 21 | J802-J822 | | |
| N- 66 | 7/25 | 54-15, | 175-12 | 9.4 | 2 | 7 | 0 | 0 | 0 | 0 | 9 | 2 | 7 | 0 | 0 | 0 | 9 | J823-J831 | | |
| N- 67 | 7/25 | 54-36, | 175-20 | 9.4 | 0 | 8 | 0 | 0 | 1 | 0 | 9 | 0 | 8 | 0 | 0 | 1 | 9 | J832-J840 | | |
| N- 68 | 7/25 | 54-45, | 175-19 | 8.8 | 4 | 9 | 0 | 0 | 0 | 0 | 13 | 2 | 6 | 0 | 0 | 0 | 8 | J841-J848 | | |
| N- 69 | 7/26 | 54-58, | 176-47 | 8.7 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | J849 | | |
| N- 70 | 7/26 | 54-35, | 176-31 | 9.6 | 1 | 18 | 0 | 0 | 1 | 0 | 20 | 1 | 18 | 0 | 0 | 1 | 20 | J850-J869 | | |
| N- 71 | 7/27 | 54-37, | 177-30 | 8.8 | 2 | 16 | 0 | 0 | 0 | 0 | 18 | 2 | 10 | 0 | 0 | 0 | 12 | J870-J885 | | |

Table 2. Continued.

| SET NO. | DATE | LOCATION | | SURF. T. (C) | SALMONID CATCH | | | | | | | TAG RELEASES | | | | | | TAG SERIAL NUMBERS | | |
|--------------------|------|----------|--------|--------------|----------------|------|------|------|------|------|-------|--------------|------|------|------|------|------|--------------------|------------------------------|--|
| | | N LAT | E LONG | | RED | CHUM | PINK | COHO | KING | STHD | TOTAL | RED | CHUM | PINK | COHO | KING | STHD | | TOTAL | |
| N- 72 | 7/27 | 54-47, | 177-28 | 9.1 | 2 | 6 | 0 | 0 | 0 | 0 | 8 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | J874, J875, J879, J880, J886 | |
| N- 73 | 7/27 | 55-00, | 177-50 | 8.8 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | J887-J888 | |
| N- 74 | 7/30 | 57-59, | 179-57 | 8.5 | 0 | 5 | 0 | 0 | 5 | 0 | 10 | 0 | 4 | 0 | 0 | 3 | 0 | 7 | J889-J895 | |
| N- 75 | 7/30 | 57-59, | 179-42 | 8.5 | 1 | 2 | 0 | 0 | 2 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | J896-J897 | |
| N- 76 | 7/31 | 57-40, | 177-09 | 8.1 | 0 | 11 | 0 | 0 | 1 | 0 | 12 | 0 | 11 | 0 | 0 | 1 | 0 | 12 | J898-J909 | |
| N- 77 | 7/31 | 57-47, | 177-13 | 8.1 | 0 | 9 | 0 | 0 | 3 | 0 | 12 | 0 | 9 | 0 | 0 | 3 | 0 | 12 | J910-J921 | |
| N- 78 | 7/31 | 57-50, | 177-12 | 8.0 | 0 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | J922-J923 | |
| N- 79 | 8/03 | 57-51, | 175-48 | 8.5 | 1 | 3 | 0 | 0 | 2 | 0 | 6 | 1 | 2 | 0 | 0 | 1 | 0 | 4 | J924-J927 | |
| N- 80 | 8/03 | 57-51, | 175-57 | 8.5 | 2 | 15 | 0 | 0 | 0 | 0 | 17 | 1 | 13 | 0 | 0 | 0 | 0 | 14 | J928-J941 | |
| N- 81 | 8/03 | 57-53, | 176-17 | 8.7 | 2 | 12 | 0 | 0 | 1 | 0 | 15 | 1 | 12 | 0 | 0 | 0 | 0 | 13 | J942-J954 | |
| N- 82 | 8/03 | 57-54, | 176-26 | 8.7 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | J955 | |
| N- 83 | 8/04 | 57-53, | 179-06 | 8.6 | 1 | 17 | 0 | 0 | 3 | 0 | 21 | 1 | 17 | 0 | 0 | 2 | 0 | 20 | J956-J975 | |
| N- 84 | 8/04 | 57-59, | 178-29 | 8.5 | 2 | 5 | 0 | 0 | 0 | 0 | 7 | 2 | 5 | 0 | 0 | 0 | 0 | 7 | J976-J982 | |
| N- 85 | 8/04 | 57-57, | 177-59 | 8.4 | 2 | 5 | 0 | 0 | 0 | 0 | 7 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | J983-J988 | |
| N- 86 | 8/05 | 57-14, | 175-33 | 8.2 | 1 | 6 | 0 | 0 | 0 | 0 | 7 | 0 | 6 | 0 | 0 | 0 | 0 | 6 | J989-J994 | |
| N- 87 | 8/05 | 57-14, | 175-33 | 8.2 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | J995-J999 | |
| N- 88 | 8/05 | 57-18, | 175-57 | 8.5 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | M000-M001 | |
| N- 89 | 8/06 | 57-18, | 179-58 | 8.7 | 4 | 4 | 0 | 0 | 7 | 0 | 15 | 3 | 3 | 0 | 0 | 5 | 0 | 11 | M002-M012 | |
| N- 90 | 8/06 | 57-33, | 179-58 | - | 6 | 19 | 1 | 0 | 11 | 0 | 37 | 4 | 16 | 1 | 0 | 5 | 0 | 26 | M013-M038 | |
| N- 91 | 8/06 | 57-33, | 179-59 | 8.9 | 2 | 11 | 0 | 0 | 5 | 0 | 18 | 2 | 10 | 0 | 0 | 5 | 0 | 17 | M039-M055 | |
| N- 92 | 8/07 | 57-45, | 178-43 | 8.6 | 0 | 21 | 0 | 0 | 1 | 0 | 22 | 0 | 20 | 0 | 0 | 1 | 0 | 21 | M056-M076 | |
| N- 93 | 8/07 | 57-40, | 179-34 | 8.9 | 2 | 21 | 0 | 0 | 10 | 0 | 33 | 2 | 19 | 0 | 0 | 8 | 0 | 29 | M077-M106 ^{2/} | |
| N- 94 | 8/07 | 57-26, | 179-52 | 9.0 | 2 | 8 | 0 | 0 | 0 | 0 | 10 | 1 | 6 | 0 | 0 | 0 | 0 | 7 | M107-M113 | |
| N- 95 | 8/08 | 57-21, | 179-49 | 8.8 | 2 | 9 | 0 | 0 | 3 | 0 | 14 | 2 | 9 | 0 | 0 | 2 | 0 | 13 | M114-M126 | |
| N- 96 | 8/08 | 57-25, | 179-47 | 8.9 | 5 | 5 | 0 | 0 | 2 | 0 | 12 | 5 | 3 | 0 | 0 | 1 | 0 | 9 | M127-M135 | |
| N- 97 | 8/08 | 57-12, | 179-00 | 9.0 | 0 | 3 | 1 | 0 | 0 | 0 | 4 | 0 | 3 | 1 | 0 | 0 | 0 | 4 | M136-M139 | |
| N- 98 | 8/09 | 57-42, | 177-32 | 9.1 | 2 | 17 | 0 | 0 | 5 | 0 | 24 | 2 | 9 | 0 | 0 | 3 | 0 | 14 | M140-M152, M086 | |
| N- 99 | 8/10 | 56-13, | 176-54 | 9.0 | 1 | 16 | 0 | 0 | 0 | 0 | 17 | 1 | 13 | 0 | 0 | 0 | 0 | 14 | M153-M166 | |
| N-100 | 8/10 | 56-24, | 177-48 | 9.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CRUISE 3 TOTALS: | | | | | 69 | 366 | 3 | 0 | 64 | 0 | 502 | 55 | 323 | 3 | 0 | 42 | 0 | 423 | | |
| ALL-SEASON TOTALS: | | | | | 194 | 489 | 32 | 0 | 66 | 2 | 783 | 155 | 437 | 28 | 0 | 44 | 2 | 666 | | |

^{1/} Tags J874, J875, J879, and J880 in this series were not used in set N-71; they were used in set N-72.

^{2/} Tag M086 in this series was not used in set N-93; it was used in set N-98.

Table 3. Total tag releases in U.S.S.R-U.S. cooperative high seas salmonid research cooperations in 1984, by various sectors of the North Pacific Ocean and Bering Sea.

| Region | Month | Species | | | | | Total | |
|------------------------------|--------|---------|------|------|------|---------|-------|-----|
| | | Sockeye | Chum | Pink | Coho | Chinook | | |
| North Pacific, S. of 46°N | May | 0 | 7 | 6 | 0 | 0 | 1 | 14 |
| | June | 3 | 1 | 2 | 0 | 1 | 0 | 7 |
| | Total | 3 | 8 | 8 | 0 | 1 | 1 | 21 |
| North Pacific, 46° - 51°N | June | 26 | 28 | 13 | 0 | 0 | 0 | 67 |
| | July | 63 | 30 | 1 | 0 | 0 | 1 | 95 |
| | Total | 89 | 58 | 14 | 0 | 0 | 1 | 162 |
| Bering Sea, 53° - 58°N | July | 34 | 192 | 4 | 0 | 10 | 0 | 240 |
| | August | 29 | 179 | 2 | 0 | 33 | 0 | 243 |
| | Total | 63 | 371 | 6 | 0 | 43 | 0 | 483 |
| All regions | May | 0 | 7 | 6 | 0 | 0 | 1 | 14 |
| | June | 29 | 29 | 15 | 0 | 1 | 0 | 74 |
| | July | 97 | 222 | 5 | 0 | 10 | 1 | 335 |
| | August | 29 | 179 | 2 | 0 | 33 | 0 | 243 |
| | Total | 155 | 437 | 28 | 0 | 44 | 2 | 666 |

