INPFC DOCUMENT 1197

ADDITIONAL DATA ON U. S. TAGGING AND SAMPLING - 1969

by


October 15, 1969
ADDITIONAL DATA ON U. S. TAGGING AND SAMPLING - 1969

This supplementary report is issued to update the material in Document 1193 through October 10, 1969, and consists mainly of tag return information.

FINAL CATCH AND TAGGING TOTALS

The final totals of salmon and steelhead caught and tagged by subproject are given in Table 1. Species totals have been corrected on the basis of scale identification. The locations of the several subprojects are shown in Figure 1.

FORECASTING

Gulf of Alaska pink salmon

As described in Document 1193 the vessels Storm and St. Michael made 12 longline sets in the Gulf of Alaska as they were enroute to Adak (Fig. 1). Preliminary coastal catch data are now available to evaluate to what extent high seas catches were a reflection of run strength.

The sets along the coast from Vancouver Island to southeast Alaska (S1-S4 and X2-X4 Fig. 1) were made to sample pink salmon stocks destined for Washington State, British Columbia and southeast Alaska. The poor catch of pink salmon at all of these stations (total 9 in 7 sets, Table 3, Document 1193), suggested a poor run to adjacent coastal areas. On a catch per 20 skate basis, catches in 1969 varied from 0 to 6 as compared to 1 to 112 in 1967 for example. Although final figures are not yet available, the runs of pink salmon in all districts from Puget Sound to southeast Alaska were notably poor in 1969 with the exception of the Icy Straits area in the northern part of southeast Alaska where a moderate run was experienced.
Table 1. Numbers of salmon and steelhead caught and numbers tagged in 1969 by subproject

<table>
<thead>
<tr>
<th>Subproject (See Fig. 1)</th>
<th>No. of Sets</th>
<th>Species of Salmon or Trout</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Red</td>
<td>Chum</td>
<td>Pink</td>
<td>Coho</td>
<td>King</td>
<td>Sthd</td>
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<tr>
<td>Gulf of Alaska</td>
<td></td>
<td>83</td>
<td>14</td>
<td>245</td>
<td>16</td>
<td>1</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td>Longlining</td>
<td></td>
<td>53</td>
<td>20</td>
<td>169</td>
<td>24</td>
<td>0</td>
<td>266</td>
<td></td>
</tr>
<tr>
<td>June 19-25 catch (mostly mature)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tagged</td>
<td></td>
<td>83</td>
<td>14</td>
<td>245</td>
<td>16</td>
<td>1</td>
<td>359</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>53</td>
<td>20</td>
<td>169</td>
<td>24</td>
<td>0</td>
<td>266</td>
<td></td>
</tr>
<tr>
<td>Adak Area</td>
<td></td>
<td>13417</td>
<td>11027</td>
<td>188</td>
<td>110</td>
<td>40</td>
<td>2</td>
<td>24784</td>
</tr>
<tr>
<td>Indexing</td>
<td></td>
<td>2805</td>
<td>133</td>
<td>29</td>
<td>11</td>
<td>3</td>
<td>0</td>
<td>2981</td>
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<tr>
<td>Purse Seine Gear</td>
<td></td>
<td>13417</td>
<td>11027</td>
<td>188</td>
<td>110</td>
<td>40</td>
<td>2</td>
<td>24784</td>
</tr>
<tr>
<td>July 3-Aug. 12 catch (mostly immature)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>tagged</td>
<td></td>
<td>2805</td>
<td>133</td>
<td>29</td>
<td>11</td>
<td>3</td>
<td>0</td>
<td>2981</td>
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<tr>
<td>South of Alaska</td>
<td></td>
<td>11</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>19</td>
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<td>Peninsula</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Purse Seine Gear</td>
<td></td>
<td>16</td>
<td>-</td>
<td>71</td>
<td>59</td>
<td>2</td>
<td>-</td>
<td>148</td>
</tr>
<tr>
<td>June 26 and Aug. 16</td>
<td></td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>catch (mostly immature)</td>
<td></td>
<td>16</td>
<td>-</td>
<td>71</td>
<td>59</td>
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<td>-</td>
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<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
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<td>Strait of Juan de Fuca</td>
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<td>13527</td>
<td>11044</td>
<td>506</td>
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<td>45</td>
<td>3</td>
<td>25310</td>
</tr>
<tr>
<td>Purse Seine Gear</td>
<td></td>
<td>2858</td>
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<td>198</td>
<td>35</td>
<td>3</td>
<td>0</td>
<td>3247</td>
</tr>
<tr>
<td>June 17 and Sept 4-5</td>
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<td>11044</td>
<td>506</td>
<td>185</td>
<td>45</td>
<td>3</td>
<td>25310</td>
</tr>
<tr>
<td>catch (mostly immature)</td>
<td></td>
<td>2858</td>
<td>153</td>
<td>198</td>
<td>35</td>
<td>3</td>
<td>0</td>
<td>3247</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>26445</td>
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<td>362</td>
<td>59</td>
<td>8</td>
<td>39695</td>
</tr>
<tr>
<td>(All projects)</td>
<td></td>
<td>3247</td>
<td>178</td>
<td>397</td>
<td>146</td>
<td>10</td>
<td>16</td>
<td>6364</td>
</tr>
<tr>
<td>catch</td>
<td></td>
<td>13527</td>
<td>11044</td>
<td>506</td>
<td>185</td>
<td>45</td>
<td>3</td>
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<td>tagged</td>
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<td>2858</td>
<td>153</td>
<td>198</td>
<td>35</td>
<td>3</td>
<td>0</td>
<td>3247</td>
</tr>
</tbody>
</table>

Purse seine sampling of juvenile salmon June 26 and August 15.

Longline stations June 10-25
X = Storm S = St. Michael

Purse seine sampling of juvenile salmon June 17 and September 4, 5. Also site of fishguiding experiments Sept. 10-11.

Fig. 1. Locations of 1969 Field operations by the Fisheries Research Institute
The data were gathered to supplement the index fishing off southeast Alaska by the Alaska Department of Fish and Game. Details will be reported by that agency.

As described in Document 1193 the 5 sets made west of 140°W were made to examine the abundance and size of pinks destined for central Alaska (Alaska Peninsula to Prince William Sound). The catch data indicated that pinks were few but above average in size. The evidence of large fish proved correct, particularly on Kodiak Island where fish per case was about 20 compared to an average of 22-25 in recent years. The evidence of low abundance was misleading, however; Kodiak Island had a large run of over 14 million pinks and other districts of central Alaska had average runs. It seems clear that the spatial - temporal coverage of longline sets in 1969 (Fig. 1) was not adequate to obtain a reliable index of abundance.

Bristol Bay sockeye salmon

Since the preparation of Document 1193, the scales of salmon sampled at Adak have been read, and tables of the sockeye age composition have been finalized and corrected as shown in Table 2.

<table>
<thead>
<tr>
<th>Number of sets</th>
<th>Catch of immature sockeye salmon in area 8050 south of Adak Island in 1969</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.1 age</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
</tr>
<tr>
<td>Index sets only</td>
<td>78</td>
</tr>
<tr>
<td>Average Index C/set</td>
<td>138.1</td>
</tr>
</tbody>
</table>

The above figures are slightly less than the preliminary totals given in Tables 1 and 2 of Document 1193, but the evidence remains that the Bristol Bay run in 1970 should be of the same order of magnitude as in 1965. The
forecast is now being prepared for publication using all data including freshwater age composition.

The weighted mean length of the \( .1 \) age sockeye catch at Adak was 35.4 cm, which is slightly larger than the 35.1 cm preliminary unweighted figure reported in Document 1193, thus strengthening the evidence that the \( .2 \) age fish in the 1970 run to Bristol Bay should be larger than those in 1965.

Alternate methods of forecasting

The fish-leading device described in Document 1193 was tested in the Strait of Juan de Fuca on September 11. The general pattern and dimensions of the device are diagrammed in Fig. 2. It was set from the vessel Storm at 0930 hours and held in position until 1610. We observed and photographed the gear in fishing position both from the surface and from underwater. From underwater juvenile coho salmon were seen leading along the wings, and a school of mature pinks was observed and photographed, as they passed through the throat. Salmon were also observed jumping at various points within the enclosure of the wings. The principal difficulty encountered was the inability of one of the skiffs to hold its wing in a straight line. As tide rips passed through the area, the wing was drawn into a lunate shape rather than a straight line between throat and skiff. This was corrected by rigging a bridle to the throat (Fig. 2) and pulling in a counter direction with the vessel Storm. Such counter-towing might not be required if both skiffs were powerful enough. One of the skiffs was diesel powered and was able to hold its wing in a taut and straight position irrespective of tide. A mis-shapen net is undesirable because it causes variation in the width of
HIGH SEAS SALMON GUIDING DEVICE

FIGURE 2.

POWER SKIFF

THROAT
12' x 24'

WING - 275 FATHOMS

BRIDLE

FLOOR

50-FATHOMS

10 FATHOMS

POWER SKIFF
the opening between wings and thus changes the size of the column of water being sampled. The shape may also affect the leading pattern of salmon. It is unknown whether the depth of the gear was adequate to prevent fish from passing beneath the wings, but the juvenile cohos seen were within 2-3 fathoms of the surface, and the pinks that went through the throat were at a depth of 2 fathoms.

These tests accomplished the following:

1. Demonstrated that a fish-guiding device of a size comparable to our purse seine gear could be set, held for a number of hours, and retrieved under open sea conditions.

2. Showed that our basic design is satisfactory, and that salmon can be led through a throat 2 fathoms wide and 4 fathoms deep.

3. Showed that powerful sliffs are needed for different operation of the prototype model.

4. Provided practice in setting and retrieving which indicated the need for some modifications in rigging for efficiency and ease of operation. The latter would be particularly valuable in setting in heavier seas.

Future tests might show that a throat of smaller size is just as efficient, but the 2x4 fathom size was no problem to handle. Acoustic or optical counting devices should be easily adaptable to an opening of this size according to our feasibility studies to date.

TAG RETURNS

Although tag returns were still being received at the time of writing, recoveries to date have provided important new information on migrations, particularly of 0 age juvenile salmon. Returns received through
October 10 are summarized herein. Detailed release and recovery data are available in Document 1198 (IBM) which has been distributed in limited numbers to each of the participating countries.

Sockeye salmon

Tag returns in 1969 from salmon released in 1969 are illustrated in Fig. 3. The recovery south of Adak was of particular interest because it shed some light on migrations in the index fishing area south of the central Aleutians. The fish (.1 age) was tagged on July 6 at 51°21'N x 176°31'W and recovered July 19 at 50°10'N x 176°22'W, about 70 miles south of the release point. Most recoveries of immature sockeye released in this area in past years have been from the mothership fleet at widespread points west, or northwest of Adak, although a few have been from points to the south. The recovery indicates that at least some of the immature sockeye migrating past Adak do not proceed continuously westward. This may be evidence of "recirculation" of salmon in this area hypothesized by French and McAlister (in press).

The remaining 7 recoveries shown in Fig. 3 were maturing fish tagged from longline catches in the Gulf of Alaska in June and recovered in various coastal fisheries. The results are consistent with results in previous tagging in the Gulf.

Figure 4 presents recoveries of sockeye tagged as immatures in previous years. One sockeye tagged at Adak (.1 age) in 1967 was recovered in central British Columbia in 1969. Such a migration is not unprecedented, but it is rare. The immatures tagged at Adak in 1968 yielded 8 returns in the year of tagging from the mothership fleet just west of Adak, 13 from Bristol Bay, and 3 from various areas in the Gulf of Alaska in 1969. It is probable that
Fig. 3. Release and recovery data for sockeye salmon tagged and recovered in 1969.
Fig. 4. Release and Recovery data for sockeye salmon tagged in 1968 and earlier.
the mothership fleet also recovered some of these tagged fish in 1969, and 
that data will be forthcoming at the 1969 Annual Meeting. The 3 returns from 
the Gulf of Alaska coastal areas suggest that there was a high proportion of 
non-Bristol Bay fish in the Adak index samples in 1968. We have occasionally 
received one or two such Gulf of Alaska recoveries in previous years, but 
three is unprecedented, and suggests the need to make allowances for non-
Bristol Bay sockeye in our forecast procedures. The specimen recovered in 
the Copper River was unusual in that it was age 0.3 (54.5 cm) at release, and 
therefore age 0.4 (66.0 cm) at recovery.

The three returns in 1969 from .0 age juveniles tagged in 1967 were 
all from releases on July 20 north of Cape Spencer, Alaska. The results 
suggest that Fraser River sockeye must have been abundant in the area of 
tagging on that date. Additional recoveries from the juvenile sockeye tagged 
in 1967 should be received in 1970.

In addition to the above, a sockeye tagged as a juvenile in 1966 was 
recovered in 1969. It is not illustrated in Fig. 4 because of lack of space. 
It was released north of Cape Spencer on September 11, 1966 and recovered near 
Haines, Alaska in upper Lynn Canal on July 9, 1969. It had grown from 17.0 
to 64.8 cm.

**Chum salmon**

Only one chum salmon tag return has been received to date. A juvenile 
( .1 age) chum tagged near Cape Spencer (56°N) in 1968 was recovered near 
Noyes Island (55°N) in 1969. This return indicates that some chum salmon 
remain along the local coastal waters or return inshore in their second 
summer at sea. Data on maturity are not available, but it is doubtful that 
the fish was maturing in 1969, although chums occasionally do mature as 
2-year-olds (.1 age). Each year in our seining operations along the
coast of southeast Alaska we catch a few 1 age chums, but they are invariably immature.

**Pink salmon**

Returns of 5 mature pink salmon tagged during the 1969 longline operations are illustrated in Fig. 5. All were at liberty for 30 to 60 days, so the actual migrations were probably much more extensive than those shown. The migrations are consistent with those observed in previous years.

As mentioned in our 1968 report, we made a considerable effort to tag a large number of all species of juvenile salmon that year in a number of key areas and using methods and tags designed to yield an improved rate of return. The 1968 totals tagged by species and by area are given in Fig. 6 of Document 1193. Only the pink and coho salmon are expected to be recovered in 1969. To date we have received 33 pink salmon returns as illustrated in Fig. 6. The 29 returns along the southeast Alaska-northern British Columbia coast confirm evidence from previous years that pink salmon originating in these areas migrate northward along the coast during their first summer at sea. The one recovered near Noyes Island (55°N) that had been released in Dixon Entrance (54-1/2°N) was probably not an exception to the rule since the coastal destination of pinks caught at Noyes Island is frequently in northern British Columbia. The lack of returns from central and southern British Columbia and Washington State is probably a reflection of the very small runs to those areas in 1969.

The 4 tag returns from Kodiak Island are the first returns from juvenile pink salmon tagging in this area and add new information on the migrations of Kodiak pinks during their first summer at sea. These fish were passing westward south of the Alaska Peninsula as judged by direction of the set
Fig. 5. Release and recovery data for pink salmon tagged and recovered in 1969.
Fig. 6  Release and recovery data for pink salmon tagged in 1968 and recovered in 1969.
of the seine at time of tagging. Presumably other stocks were mixed with them. Returns from Kodiak Island would be most likely, however, in view of the large run to that district in 1969. These results indicate that pink salmon in the northwestern Gulf of Alaska also travel downstream in the Gulf Gyre as do those in the eastern Gulf. Thus the early ocean migration of juvenile pink salmon in the whole Gulf is a coastwise movement of a mixture of stocks that is probably more or less continuous from Cape Flattery, Washington, to Unimak Island. They apparently do not continue west of 165°W longitude because we have caught no juvenile pink salmon in our purse seining operations south of Unalaska Island, although a few sockeyes have been caught. In addition, maturing pink salmon of Gulf origin do not seem to be located west of 160°W (Neave, Ishida and Murai, 1967, Figs. 20 and 21). Thus the migrations of juvenile pink salmon of Gulf origin later in the season are still unknown. Because they are found far to the south in the open Gulf in the spring (Neave et al., 1967) they must move offshore and southward in fall and winter. The timing and locations of the offshore and southward migration need to be investigated.

The rate of return of the juvenile pink salmon was 0.6%, slightly better than the 0.5% obtained in 1968. Although this may appear minimal, it is probably the best that can be expected unless great improvements are made in methods of catching, handling, and tagging at sea. Tag recovery advertising might be improved also, but as mentioned in Document 1193, we increased our effort in this regard in 1969. There is a tendency for rates of return from some individual experiments (set, date or location) to be inexplicably high. If we were to consider only those experiments in which recoveries were obtained, the rate of return would be 0.9% (33 of 3632 tagged). If from among these we considered only the fish classified as "condition 1" at
release, the rate would be 1.0% (33/3322).

Although the numbers of returns each year have been small, the results have showed a consistent pattern of migration of juvenile pink salmon from year to year and from area to area. Furthermore, returns have usually come from the areas where abundance was relatively high in a given year—for example the returns to Kodiak Island and to Icy Straits in 1969 (Fig. 6).

A study of the lengths of the juvenile pink salmon tagged in 1968 and of those recovered in 1969 according to area of release yields further information on rates of return. As shown in Figure 7, there is a general tendency for the larger fish to be recovered. There are other factors involved, however, which probably account for the scarcity of returns from the smaller fish tagged from area W4056 and southward. Juvenile pink salmon tagged in these southern areas probably originated in streams between Puget Sound and the southern part of southeast Alaska. Since pink salmon runs in 1969 were poor in these areas, fishing effort was very light, thus decreasing the probability of recovery. This factor is most evident in the size distribution of the returns from releases in area W4058 (Fig. 7). Twenty-two of the 26 returns were from among the smaller of the two size groups (14-18 cm), which is the reverse of what might be expected considering the size distribution. The higher rate of return from the smaller-sized group probably was due to the fact that they were mainly from the Icy Straits area where the 1969 catch was relatively good and fishing intensity was normal. Fifteen of 19 returns for which recovery area was known were from Icy Straits. The remaining 4 were from the Noyes Island fishery (55°N, Fig. 6). In contrast to the above, three of the four returns from among the larger size group (19-25 cm, Fig. 7) were from Noyes Island and only one from Icy Straits. Thus most of the larger size group had apparently originated in the more southern areas where
FIG. 7. LENGTHS OF JUVENILE PINK SALMON TAGGED IN 1968 AND LENGTHS (AT RELEASE) OF RETURNS IN 1969.
abundance and fishing effort were reduced in 1969.

The timing of the different stocks of juvenile pink salmon passing northward through area W4058 is also evident in the length and tag return data. The vessel Storm operated in area W4058 during two time periods in 1968. Between July 27 and August 1 the juvenile pink salmon were mainly of the smaller size group (15 and 20 cm long). Between September 15 and 17, most fish were of the larger size (18-25 cm long). The tag returns therefore indicate that in late July and early August, the migration consisted mainly of fish originating in the Icy Straits area with a few of the early (and smaller) fish from points farther south. In mid-September, the migration was composed mainly of fish originating in the more southern production areas, with only a few of the local Icy Straits fish. Tagging in previous years has shown that juvenile pink salmon from as far south as Washington State are present in area W4058 by mid-September (Hartt, Dell, and Smith, 1969). Fish from these southern areas were probably present in 1968 among the fish in the larger-sized mode, but this was not evident in tag returns because of the low probability of recovery in the southern areas in 1969. Thus, the length data, the timing, and the tag return information can all be expected to contribute to show the progression of the various stocks of juvenile pink salmon during their early ocean migration.

The general growth features of juvenile pink salmon during their early ocean residence are also implicit in the length distribution of the fish in the geographic areas from south to north. Studies of this phenomenon are in progress.
Coho salmon

Juvenile coho salmon were tagged in 1968 at a number of points between the Strait of Juan de Fuca (48°N) and Lituya Bay, Alaska (59°N), and a few were tagged in the eastern Bering Sea and south of the Alaska Peninsula (INPFC Document 1083). Returns in 1969 (received through October 10) are illustrated in Figs. 8 and 9, and the length data at release are shown in Fig. 10. The total return through October 10 was 71 of 1796 released or 4.0% (18 in 1968 and 53 in 1969), which is above average for this species. Returns in previous years have varied from 2.3 to 4.5%.

The recovery distribution of those tagged in the more northern areas (Fig. 8) was similar to that experienced in earlier years. Recovery locations were south of release locations, indicating that the fish had migrated northward as juveniles the previous year. Fish originating in Oregon and California were prominent among returns. The actual migrations of these fish between tagging and recovery are unknown, but their route probably continued on around the periphery of the Gulf of Alaska past Kodiak Island, since tagging in previous years has shown that some juvenile cohos from Oregon reach the Kodiak Island area by September. Their migrations and timing between the Kodiak Island area and recovery location can be inferred only from winter distribution studies and from spring sampling and tagging studies which show that most cohos in offshore areas in the spring are south of 50°N. Presumably then, they move southward from the Kodiak Island area and then eastward into coastal areas of origin. It should be emphasized that the proposed migration might not apply to all cohos along the area under study. There is evidence that some remain relatively close to coastal waters as discussed below. Sampling and tagging studies are needed to identify the
Fig. 8 - Release and recovery data for 25 coho salmon recovered in 1969.

Recovered 1968 - 18/1796 = 1.0%
Recovered 1969 - 53/1796 = 3.0%
Total 71/1796 = 4.0%
Fig. 9 Release and recovery data for 28 coho salmon recovered in 1969.

Recovered 1968 - 18/1796 = 1.0%
Recovered 1969 - 53/1796 = 3.0%
Total - 71/1796 = 4.0%
FIG. 10. LENGTHS OF JUVENILE COHO SALMON TAGGED IN 1968 AND LENGTHS (AT RELEASE) OF RETURNS IN 1969.
actual distribution and migrations during fall and winter in order to complete our understanding of the whole migratory picture. Migrations of the other species could be studied at the same time, of course. In fact, migrations of the pink salmon may closely parallel those of the coho since both species spend only one winter at sea.

The recovery distribution of cohos tagged in the Strait of Juan de Fuca (Fig. 9) was more localized. The actual migrations of some of these specimens may have been extensive, however, since they were at liberty a year or more. In fact we know from Fig. 8 that some Puget Sound cohos reach Dixon Entrance during their first summer at sea. Since cohos are caught by sport fishing gear in the Strait of Juan de Fuca during all months of the year, apparently many do not migrate extensively (Haw, 1967).

The distribution of the 18 juvenile cohos tagged and recovered in 1968 will be described but not illustrated because they showed no new features of migration. Seventeen of the 18 were from releases in the Strait of Juan de Fuca, and recovery distribution was similar to that of the recoveries in 1969 (Fig. 9). Since 6 were recovered in estuaries or streams of Puget Sound, they must have been jacks. In general those recovered in the year of tagging (26-40 cm) were larger than those recovered a year later (23-31 cm) probably because early-maturing jacks are generally larger than fish which remain and mature a year later. One tagged off southeast Alaska was recovered north of the point of tagging in December on troll gear (Document 1198).

The length data of cohos tagged in 1968 (Fig. 10) indicate that juveniles in the Bering Sea (area W6555) were larger than those in other areas. This may be due to the high abundance of larval fish and euphausids in the Bering Sea as indicated by our observations of food organisms in the purse seine
gear (Hartt, Dell, and Smith, in press). Cohos in the Strait of Juan de Fuca (area W2548) were larger than those in any of the other areas of the Gulf of Alaska, whereas the pink salmon in the Strait were the smallest of all areas sampled (Fig. 7). The large size of the cohos is probably a reflection of the fact that most of them remain in the area throughout the summer and do not proceed northward as do the pinks.

Chinook salmon

The return data for chinook salmon recovered in 1969 (Fig. 11) showed no new information on migrations. The specimen tagged in 1968 near Adak and recovered on the Fairweather Ground in the northeastern Gulf of Alaska was the second tag return to show an extensive east-west migration of this species. The other was tagged south of Adak in 1956 and recovered in a tributary of the Columbia River in 1957.

Future tag returns

The improved rate of return of pink salmon tagged in 1968 and recovered in 1969 suggests that we can expect an improved return of the sockeye and chum salmon tagged in 1968, and which are due to mature in 1970 and 1971. Since we tagged record numbers of these species in 1968 in a number of key areas (Fig. 6, Document 1193), recoveries should yield much new data on migrations and rates of return. Recoveries of sockeye salmon tagged as juveniles are expected from the mothership fleet and from Bristol Bay for the first time.
Tagged 1968 - .2 age 1 return
Tagged 1968 - .1 age 8 returns (3 inside Straits of Juan de Fuca not shown)
Tagged 1967 - .1 age

Fig. 11. Release and recovery data for chinook salmon recovered in 1969.
LITERATURE CITED


