THE BIOLOGICAL BOARD OF CANADA
UNDER THE CONTROL OF
THE HON. THE MINISTER OF FISHERIES

BULLETIN No. XLI

PACIFIC SALMON MIGRATION: THE TAGGING OF THE SPRING SALMON IN BRITISH COLUMBIA IN 1929 AND 1930

BY
ANDREW L. PRITCHARD
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INTRODUCTION

From 1925 until 1930, spring salmon (*Oncorhynchus tschawytscha*) were tagged in various areas, the locations of which covered in a general way the entire coastal waters of British Columbia. During 1925 and 1926 operations were confined to the areas off Barkley sound on the west coast of Vancouver island, and in the vicinity of Hippa island off the west coast of the Queen Charlotte group. In 1927 the work was extended to the districts near Quatsino and Kyuquot on the west coast of Vancouver island and to Deep bay on the east coast. In the year 1928 further experiments were carried out at other points on the east coast of Vancouver island. The results have been fully recorded in the following publications:

Williamson, H. Chas., Pacific salmon migration: report on the tagging operations in 1925. Contr. Canad. Biol. Fish, N.S., vol. 3, no. 9, 1927.

Williamson, H. Chas., Pacific salmon migration: report on the tagging operations in 1926, with additional returns from the operations of 1925. Contr. Canad. Biol. Fish., N.S., vol. 4, no. 29, 1929.

Mottley, Chas. McC., Pacific salmon migration: report on the study of the scales of the spring salmon tagged in 1926 and 1927 off the west coast of Vancouver island. Contr. Canad. Biol. Fish., N.S., vol. 4, no. 30, 1929.

Williamson, H. Chas. and W. A. Clemens, Pacific salmon migration: the tagging operations at Quatsino and Kyuquot in 1927, with additional returns from the operations of 1925 and 1926. Biol. Board Can. Bull. 26, 1932.

Clemens, W. A., Pacific salmon migration: the tagging of spring salmon on the east coast of Vancouver island in 1927 and 1928 with notes on the incidental tagging of other fish. Biol. Board Can. Bull. 27, 1932.

During 1929 and 1930, numerous areas, most of which were situated in northern British Columbia, were investigated. The present paper includes a discussion of the returns from these last two years, and since it concludes the recording of detailed data on the tagging of the species up to the present time, it also contains a general summary of all the work.

Since the method of tagging troll-caught fish has been treated at some length in other papers of this series, it seems unnecessary to discuss it again here. The success which has been attained has been due largely to the excellent co-operation which has been received from the fishermen themselves and others connected with the fishing industry in various capacities. To these men and to the officials of the Dominion Department of Fisheries, sincere thanks are extended.

TAGGING BASES

In table I are given the locations of the tagging bases, the numbers tagged, and the numbers and percentages of those tagged which were later returned. Each location is discussed separately in greater detail in the context which follows. Complete data for all recoveries are given in tables IV to IX at the end of this bulletin. In these the returns are recorded as closely as possible in accordance with their geographical situation from north to south. If several fish from the same tagging area were taken in another district, the data are listed according to the lengths of the periods of liberty, and, if these are the same, in order of the serial tag numbers.

TABLE I.—Condensed record for the tagging of spring salmon in British Columbia in 1929 and 1930

District of tagging	Year	Number tagged	Number returned	Per cent. returned
Queen Charlotte island areas				
West coast	1929	375	41	10.9
	1930	179	24	13.4
North coast	1929	445	63	14.2
	1930	662	97	14.7
Inshore areas in northern British Columbia				
Hecate strait off Stephens, Porcher and Banks is	1930	182	15	8.2
Milbank and Fitzhugh sd	1930	302	16	5.3
Areas in southern British Columbia				
Northeast coast of Vancouver is	1930	436	28	6.4

QUEEN CHARLOTTE ISLAND AREAS

Three taggers worked in the Queen Charlotte area in 1929. In 1930 two chartered vessels visited the islands at irregular intervals. Fortunately the runs of spring salmon usually occur on the west coast before that on the north coast begins, so that it was possible in the same year to obtain data from both regions.

WEST COAST

The following is a list of the numbers tagged in the separate localities on the west coast in May and at intervals throughout June, July and August, during the two years:

	1929	1930
La Perouse rocks	177	38
Frederick is	2	12
Port Louis	..	13
Hippa is	8	1
Rennell sd	188	115

Recoveries have amounted to 41 (10.9 per cent.) from 1929 and 24 (13.4 per cent.) from 1930. Detail is presented in table IV, and graphically shown in figure 1.

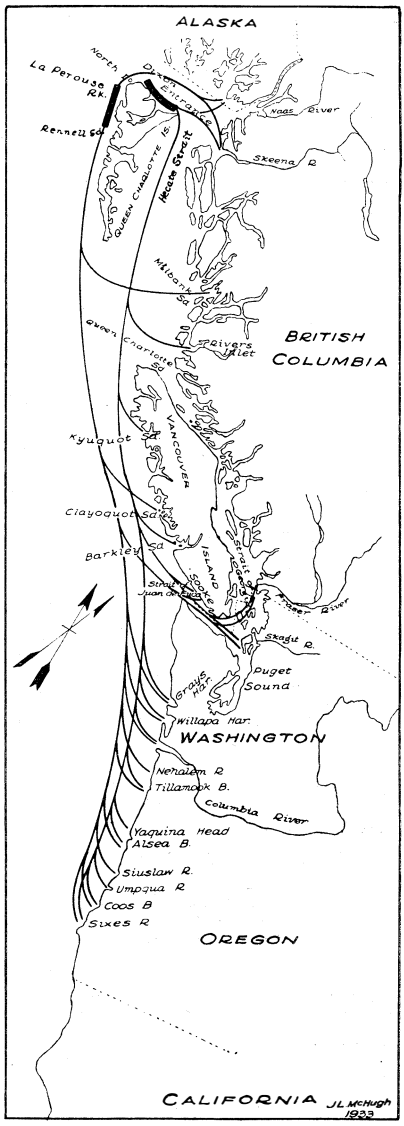

FIGURE 1. Distribution of recaptured spring salmon tagged on the west and north coasts of the Queen Charlotte islands in 1929 and 1930.

In order to give a general picture of distribution and to allow for more easy and direct comparison, the following summary has been compiled.

	1929 Tagging		1930 Tagging	
	Number	Percentage of return	Number	Percentage of return
Alaska			1	4.2
North coast, Queen Charlotte is.	2	4.9		
Skeena r.	4	9.8	1	4.2
Milbank sd			1	4.2
West coast, Vancouver is.	2	4.9		
Strait of Juan de Fuca, British Columbia waters	3	7.3		
Fraser r.	7	17.1	4	16.7
Strait of Georgia and Puget sd., United States waters	9	21.9	4	16.7
Coast of Washington	1	2.4	1	4.2
Columbia r.	7	17.1	10	41.6
Coast of Oregon	6	14.6	2	8.3

As far as location is concerned there is a great similarity in the distribution of returns from the tagging on the west coast of the Queen Charlotte islands in the two years, 1929 and 1930. In 1930, however, the recoveries in United States waters constituted 70.8 per cent. of the total as opposed to 56.0 per cent. in 1929. This change might be almost wholly accounted for by the increased number of recaptures from the Columbia river in the later year.

A detailed analysis of the tagging and recaptures for the west coast for the two years under discussion has indicated what might be considered a justifiable explanation for the increase in the percentage for the Columbia river in 1930. In 1929 the numbers tagged at La Perouse rocks, the most northerly locality, constituted 47.2 per cent. of the total, and in 1930, 21.2 per cent. On the other hand, the numbers tagged at Rennell sound, the most southerly locality, made up 50.1 and 64.2 per cent. respectively. That there may be a difference in the distribution of recaptures from these two areas is illustrated by the recovery data for each in 1929, given in the following table.

	La Perouse rocks		Rennell sound	
	Number	Percentage of return	Number	Percentage of return
North coast, Queen Charlotte is.	1	5.0	1	5.3
Skeena r.	1	5.0	3	15.8
West coast, Vancouver is.			2	10.5
Strait of Juan de Fuca, British Columbia waters	2	10.0	1	5.3
Fraser r.	5	25.0	2	10.5
Gulf of Georgia and Puget sd., United States waters	6	30.0	1	5.3
Coast of Washington	1	5.0		
Columbia r.	1	5.0	6	31.5
Coast of Oregon	3	15.0	3	15.8

Apparently more spring salmon from the southern locality, Rennell sound, reach the Columbia river. If such is the case, it would be expected that in 1930 when a larger number were tagged in Rennell sound and few at La Perouse rocks the Columbia river percentage would be higher than in 1929 when the numbers tagged in both areas were almost equal.

NORTH COAST

For many years it has been recognized that an exceptionally good spring salmon fishery exists at certain seasons on the northern coast of the Queen Charlotte islands. This centres mainly at North (Langara) island but is carried on to a smaller extent along the whole coast.

Since the main run in this area occurs after the peak of that on the west coast has been passed, a splendid opportunity was afforded to do some tagging in the hope that data of interest concerning the migrations might result.

The following list has been prepared to show the numbers tagged in each district on the northern coast throughout the two years, 1929 and 1930.

	1929	1930
North (Langara) is.	403	472
Pillar bay	...	60
Shag rock	25	41
Virago sd.	...	18
Massett flats	15	25
Off Tow hill	...	44
Off Rose spit	2	2

Recoveries from the various programmes totalled 63 (14.2 per cent.) from 1929, and 97 (14.7 per cent.) from 1930. The complete data are given in table V and illustrated in figure 1.

	1929 Tagging		1930 Tagging	
	Number	Percentage of return	Number	Percentage of return
Alaska	1	1.6	1	1.0
North coast, Queen Charlotte is.	2	3.2	5	5.2
Stephens is.			1	1.0
Skeena r.	5	7.9	3	3.1
Burke chan.			2	2.1
Rivers in.	1	1.6	2	2.1
West coast, Vancouver is.	1	1.6	5	5.2
Strait of Juan de Fuca, British Columbia waters	2	3.2	3	3.1
Fraser r.	19	30.2	16	16.5
Gulf of Georgia, British Columbia waters			1	1.0
Gulf of Georgia and Puget sd., United States waters	10	15.9	10	10.3
Coast of Washington	4	6.3	4	4.1
Columbia r.	15	23.8	27	27.8
Coast of Oregon	2	3.2	15	15.5
Miscellaneous	1	1.6	2	2.1

Qualitatively the distribution of returns for the two years shown in the summary is essentially similar. The greatest changes in quantity were exhibited in the decrease in the Fraser river recoveries from 30.2 per cent. in 1929 to 16.5 in 1930, and the increase in those from the coast of Oregon from 3.2 to 14.4. In spite of the addition of such new Canadian areas as Stephens island, Burke channel and the strait of Georgia, the total Canadian percentage for 1930 is slightly smaller, viz. 39.3 as compared with 47.7. The data illustrate that the recoveries from one year's tagging can not be assumed to be a detailed pattern of those from any succeeding year.

As a result of handling large numbers of the fish taken in the area, fishermen maintain that they are definitely not of the same "race" as those which frequent the western coast of the same island. This conclusion was reached mainly on the basis of size which may be a misleading criterion. In this connection, however, the estimated weights made at the time of tagging are of interest. The summary below gives the numbers and percentages of fish in each ten pound weight group in the commercial catches of the two areas under discussion for the years 1929 and 1930.

Weight groups (lb.)	West coast, Queen Charlotte is.		North coast, Queen Charlotte is. (North is.)	
	1929	1930	1929	1930
		Numbers		
1- 9	14	4	24	24
10-19	58	59	142	274
20-29	140	36	176	131
30-39	102	12	53	40
40-49	31	4	8	3
50-59	16			
60-69	4			
		Percentages		
1- 9	3.8	3.5	6.0	5.0
10-19	16.1	51.3	35.2	58.1
20-29	38.5	31.3	43.7	27.8
30-39	27.8	10.4	13.2	8.5
40-49	8.3	3.5	1.9	.6
50-59	4.4			
60-69	1.1			

It is apparent that there are changes in the weight frequency distribution of spring salmon in a given area in different years. For the same year, however, there is a larger percentage of North island fish in the groups up to nineteen pounds and a smaller percentage in those over thirty pounds. In no case were any taken in this area over forty-nine pounds in weight while on the west coast individuals as heavy as sixty-eight pounds were captured.

The fate of tag number 12414 is of interest. This was affixed on July 31, 1929, at North island and discovered on a fish in a market in Boston, Massachussetts, on November 1 of the same year. While this record shows that tags may be overlooked even when the fish is handled for the fresh market, it is encouraging to know that the identification mark was so firmly attached that it did not break loose during the processing.

INSHORE AREAS OF NORTHERN BRITISH COLUMBIA

Hecate Strait off Stephens, Porcher and Banks Island

A good fishery for spring salmon exists in the channels among the inner islands in the northern part of the province, especially at the northern end of Banks island and around Stephens island in Hecate strait. Since the destinations of these fish have always been the subject of speculation, it was felt that the plan for the general survey of the migration routes for salmon should include this area. Accordingly in April, May, July, August and September, 1930, a tagging programme was carried out. The following is a list of the numbers of tags affixed:

Hecate st. off Stephens is	124
Bell pass	1
Porcher is. (cape George, Edye pass., Chearnley pass.)	17
Banks is. (northern end, Bonilla is., Northwest rocks, White rock)	40
Wright sd. (Gribell is., Promise is.)	5
Campania sound area	3
Laredo sound area	1

Since no returns have been forthcoming from the last three areas, the numbers tagged therein have not been included in the figure for the total number tagged.

Recoveries have numbered 15 or 8.2 per cent. of those tagged. Detail is given in table VI and shown graphically in figure 2.

The following summary has been compiled from the data in table VI:

	Number	Percentage of return
Alaska	1	6.7
Nass r.	1	6.7
Rivers in.	1	6.7
West coast, Vancouver is.	2	13.3
Howe sd.	1	6.7
Fraser r.	1	6.7
Puget sd., United States waters	1	6.7
Coast of Washington	1	6.7
Columbia r.	6	40.0

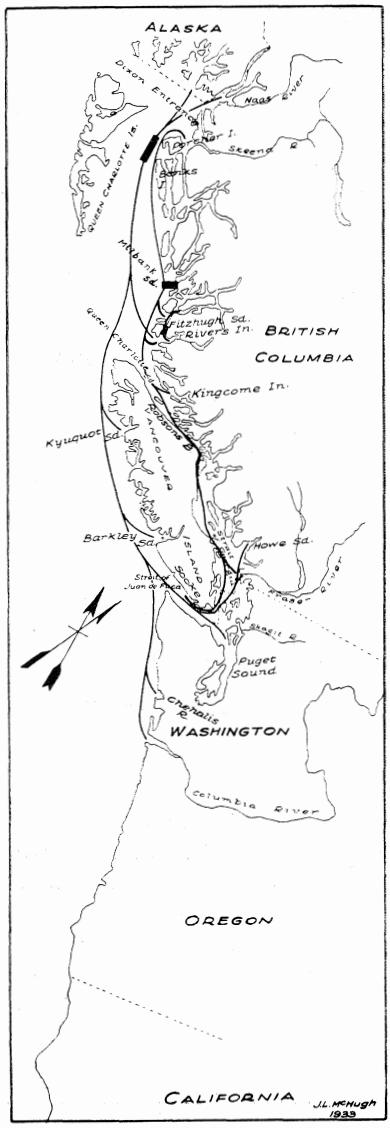

FIGURE 2. Distribution of recaptured spring salmon tagged in Hecate strait off Stephens, Porcher and Banks islands and in Milbank and Fitzhugh sounds in 1930.

The distribution of returns differs from any reported thus far in that there is a more widespread range throughout Canadian waters. The fish taken in United States and Alaska, however, still constitute 60.1 per cent. of the total. It is interesting that only one fish was taken in the Nass river and none in the Skeena. Evidently these springs were captured too far south and too close inshore to be proceeding in large numbers to either of these rivers.

The recoveries on the west coast of Vancouver island indicate that springs from the northern inshore areas may choose the outside route in the southern part of the province when going to their destination farther down the coast.

Milbank and Fitzhugh Sounds Area

The lack of definite knowledge concerning the spring salmon taken in the commercial catches in this vicinity led to the decision of having one boat in 1930 confine its operations as closely as possible to the region. In June, July and August, 207 fish were tagged in the main part of the sound, chiefly near St. Johns harbour, and 95 off the Koeye river and Hakai channel in Fitzhugh sound. Sixteen or 5.3 per cent. have been recovered as shown in table VII, and illustrated in figure 2.

A brief summary is given below:

	Number	Percentage of return
Skeena r.	1	6.2
Fitzhugh sd.	2	12.5
Rivers in.	4	25.0
Kingcome in.	1	6.2
Johnstone st.	1	6.2
Strait of Juan de Fuca, British Columbia waters.	1	6.2
Fraser r.	4	25.0
Columbia r.	2	12.5

In this case only 12.5 per cent. of the recoveries were made in United States waters. The others were spread in Canadian territory from the Skeena river in the north to the Fraser in the south. In the latter and Rivers inlet eight or 50 per cent. of the recaptures were made. This distribution suggests that if a run of spring salmon is found inside the outer islands, Vancouver and the Queen Charlottes, and near the mainland, the fish in such a run are probably bound for more or less local streams and in most cases will make shorter and less complicated migrations down the coast than would the springs travelling outside.

AREAS IN SOUTHERN BRITISH COLUMBIA

Northeast Coast of Vancouver Island

Until 1930 the area around Hardy bay and on the northeastern coast of Vancouver island was given only passing notice in so far as spring salmon were concerned, but the numbers handled were not sufficient on which to base any

conclusions. In 1930, however, during April, May and June, 436 springs were tagged. Of these, 23 were caught along the shore from Hope island to cape Scott, and 413 in the vicinity of Hardy bay. Recoveries have amounted to 28 or 6.4 per cent. (Table VIII and figure 3.)

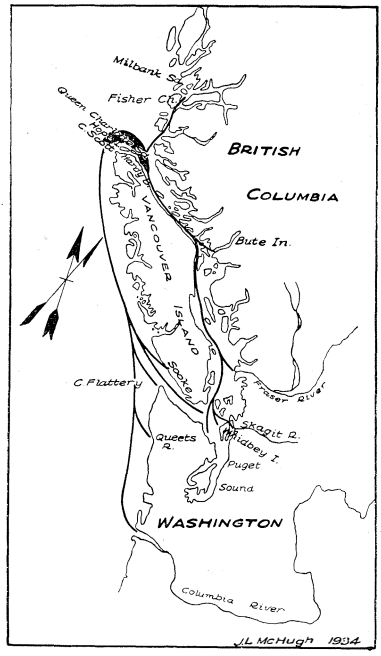

FIGURE 3. Distribution of recaptured spring salmon tagged on the northeast coast of Vancouver island in 1930.

	Number	Percentage of return
Fisher chan	1	3.6
Northeast coast of Vancouver is	3	10.7
Bute in	2	7.1
Strait of Juan de Fuca, British Columbia waters	2	7.1
Cape Flattery	1	3.6
Puget sd	14	50.0
Coast of Washington	1	3.6
Columbia r	4	14.3

These returns are striking in comparison with the two areas last discussed in that 71.5 per cent. were from United States waters. None were received from the Fraser river. An analysis of the United States recoveries shows that with the exception of six, all were taken in the Puget sound area. This bears out the assumption made previously that the springs which get this far inshore are probably bound for rivers along the mainland inside and will not go out again around the west coast to the rivers on the coasts of Washington and Oregon.

MISCELLANEOUS RETURNS

The numbers tagged in the isolated areas have been so small and the returns so few that no conclusions are warranted. They are merely recorded for completeness in table IX.

GENERAL DISCUSSION OF RESULTS

Since this is the final report on the distribution of returns in the spring salmon tagging which has been carried on in British Columbia up to the present time, it is felt that a certain degree of recapitulation may not be amiss in order that broad general conclusions may be derived from the work. For that reason table II has been prepared.

TABLE II.—Percentage of returns from the Fraser river, Columbia river,, all Canadian waters and the United States waters (exclusive of Alaska)

Area of tagging	Year	Number tagged	Per cent. return	Percentage of returns			
				Fraser river	Columbia river	Canadian waters	U.S. waters (except Alaska)
North coast, Queen Charlotte is.	1929	445	14.2	30.2	23.8	47.7	49.2
" "	1930	662	14.7	16.5	27.8	39.3	57.7
Hecate st.....	1930	182	8.2	6.7	40.0	40.1	53.4
West coast, Queen Charlotte is.	1925	274	13.5	10.8	27.0	29.7	70.3
" "	1929	375	10.9	17.1	17.1	44.0	56.0
" "	1930	179	13.4	16.7	41.6	25.1	70.8
Milbank and Fitzhugh sd.....	1930	302	5.3	25.0	12.5	87.5	12.5
Vancouver is.							
Hardy bay....	1930	436	6.4	....	14.3	28.5	71.5
Quatsino sd....	1927	54	14.8	....	50.0	12.5	87.5
Kyuquot sd....	1927	517	15.5	1.3	60.0	7.5	90.0
Barkley sd. ...	1925	1125	10.9	4.9	60.2	17.1	82.1
" "	1926	1353	13.5	6.6	59.6	16.4	81.4

It is evident from a study of table II that as the tagging bases move northward the recoveries in the United States waters become fewer, those from the west coast of Vancouver island averaging approximately eighty-five per cent., from the west coast of the Queen Charlotte islands approximately sixty-six per cent., and from the north coast of the latter together with Hecate strait, fifty-three per cent. Coincident with this change the recoveries from Alaska increase from none for the west coast of Vancouver island to as high as four and two per

cent. for the west and north coasts of the Queen Charlotte group respectively. Such a condition indicates that the individuals which constitute the commercial spring salmon fishery of British Columbia have come inshore to the spawning rivers from the north and west. It is suggested that if tagging were carried on for this species in Alaskan waters, it would be discovered that the runs in this area were constituted mainly of fish which were bound for Canadian spawning rivers.

An examination of returns in years successive to that of tagging is of some interest. These are given for all areas in table III.

TABLE III.—Comparative summary of the returns of spring salmon

	Year	Number tagged	Number returned	Per cent. return	Percentage of return			
					1st year	2nd year	3rd year	4th year
North coast, Queen Charlotte is.								
North is.	1929	403	63	15	84	14	2	0
North is.	1930	472	67	14	93	7	0	0
Hecate st.	1930	182	15	8	87	13	0	0
West coast, Queen Charlotte is.								
La Perouse rocks.	1929	177	20	11	100	0	0	0
Seal in.	1929	188	19	10	84	16	0	0
Seal in.	1930	115	16	14	87	13	0	0
Milbank and Fitzhugh sd.	1930	302	16	5	100	0	0	0
Vancouver is.								
Hardy bay	1930	436	28	6	93	0	7	0
Quatsino sd.	1927	54	8	15	88	12	0	0
Kyuquot sd.	1927	517	80	16	86	11	0	3
Barkley sd.	1925	1125	123	11	61	35	3	1
Barkley sd.	1926	1353	183	14	77	18	4	1

Williamson and Clemens (1932) have stated that "if the returns have a relation to maturity of the fish, then a considerably higher percentage of mature fish, that is, fish which will spawn that season, are being caught on the Quatsino and Kyuquot banks than on the Barkley sound banks." The additional data obtained from later experiments in the northern regions, and grouped with theirs above, show that in respect of returns in years succeeding that of tagging, the localities in the northern part of the province are most like Quatsino and Kyuquot. The return of a fish in the third year after tagging from the North island programme may be an evidence of a greater degree of immaturity in that run. No district which was investigated, however, showed as many immature fish as the Barkley sound banks.

GENERAL DISCUSSION OF SPRING SALMON MIGRATION

This paper completes the series of reports presenting the data which have been accumulated from the experiments in the tagging of spring salmon in the waters off the coast of British Columbia over a period of six years, 1925 to 1930 inclusive. The opportunity is taken, therefore, to depict the general movements of these fish as revealed by these studies as well as by incidental information gained during the course of the many investigations on Pacific salmon.

After leaving the spawning areas in fresh water as fry, fingerlings or yearlings, the young spring salmon drop downstream, and eventually reach the salt water at the mouths of the various rivers in which they have been developed. Passing to the open-Pacific off the coasts of the outer islands, they shift in a northwesterly direction, on what Mottley (1929) has termed a "feeding" migration, or "dispersal" movement.

The young from the coastal rivers of Washington, Oregon, and California, but in particular the Columbia, disperse along the American and British Columbia coasts. Individuals from the Fraser and other streams flowing into the strait of Georgia and Puget sound, may pass to the open ocean either by way of the southern route through the strait of Juan de Fuca, or by way of the northern through Discovery passage and Johnstone strait. On the other hand, there is some reason to believe that a few individuals may remain in the strait of Georgia and complete their life history there, since Clemens (1932) shows that the recoveries from the tagging of small springs in this area, were made chiefly in rivers tributary to it and to Puget sound. The young emanating from the rivers in northern British Columbia presumably reach the open sea through Queen Charlotte sound and Dixon entrance, but it is to be expected that some of those from the most northern rivers, Nass and Skeena, may follow the Alaskan coast closely before dispersing to the outside waters.

If these immature fish dispersing northward were mingling extensively with the southward moving mature individuals, which being moderately close inshore form the basis of the commercial fishery, it would be expected that numbers would be taken in the fishery operations and, when tagged, would be recaptured northward of the tagging base. Since it is very uncommon to capture a spring salmon north of the place where it was tagged, either the fishery is very selective for mature springs or the immature fish move at such a distance offshore as to be beyond the range of operation of the fleet. The numbers of comparatively small salmon which have been caught on the standard trolling gear in all the tagging operations would tend to discount the former explanation and support the latter.

Many of the details given for this early "migration" are conjecture, but the facts of the general trend seem to be established by convincing circumstantial evidence. Such a northwesterly movement must have taken place before a southeasterly migration of mature fish could occur. In regard to the latter the tagging operations have been productive of concrete and indisputable evidence.

Apparently at some time in their life history, the spring salmon, influenced by some indeterminate factor, such as the onset of maturity, strike in from the

northwest toward the coast and pass southward. From this migration the runs for the various spawning areas break away. Those for the Skeena and the Nass apparently go through Dixon entrance. Those for the central coast of British Columbia, and part of the run for the strait of Georgia, the Fraser, and Puget sound pass through Queen Charlotte sound. To these latter are added individuals which break away from the main migration farther southward and come around the southern end of Vancouver island through the strait of Juan de Fuca. Spring salmon which spawn in the smaller coastwise streams situated along the route traversed by the general migration merely turn in as the "parent" stream is reached.

The results show that at Barkley sound, the most southern tagging base, there is a group of spring salmon composed of individuals bound chiefly for the large Columbia river, but also of some bound for the smaller rivers on the coasts of Washington, Oregon, and California, as well as to Puget sound and the Fraser.

From the repeated mention of the larger rivers in the above discussion, it can easily be seen that a study of migration must give cognizance to the peculiar habit of the species in selecting these larger rivers in which to spawn. The runs to these large streams, of course, dominate the fishery throughout the areas in which they are travelling, but the domination may be masked to some extent by runs to smaller coastwise areas. It is not unreasonable to suppose that those young spring salmon which leave the most southern rivers, will not travel as far north on their "feeding" migration as those from the most northern rivers before the urge comes upon them to turn and seek the "parent" spawning area. If such is the case, one would expect to discover that somewhere off the northern coast, the Columbia river's contribution would become almost negligible while that for the Fraser and the more northern rivers would be increasing. In other words, the area in which the run of spring salmon from any river dominates the fishery will have a northern limit. Such a condition is indicated by the returns for the west and north coasts of the Queen Charlotte islands in 1929. For Rennell sound which is almost in the middle of the west coast, the returns from the Columbia constituted about thirty-one per cent. of the total, while those from the Fraser made up about ten. From the north coast in the same year, the Columbia percentage dropped to twenty-four while that for the Fraser increased to thirty. When it is recalled that the returns from the Columbia for the tagging operations on the west coast of Vancouver island averaged fifty-seven per cent., it becomes apparent that the Columbia river's effect on the commercial fishery is lessening as one proceeds northward. At North island that of the Fraser has superseded it. These facts indicate that if tagging were carried out off the coast of Alaska, the spheres of influence of the Nass, Skeena, and other northern rivers might be discovered.

It is only to be expected that what might be termed inshore tagging would result in less extensive or more local distribution of the migrants. Thus from the Milbank sound operations, it was determined that fifty per cent. of the returns were taken in Burke channel and Rivers inlet, while from the Hardy bay

programme sixty-four per cent. of the recoveries were made in areas inside Vancouver island bordering on the strait of Georgia and Puget sound.

Such is the general picture of spring salmon migration in the waters off the coast of British Columbia as portrayed by tagging operations. Further work may clarify many of the features such as the percentage contribution which a river makes at a given point and time and may define more clearly the detail of the local inshore movements. It is not probable, however, that the idea of a general northwesterly migration of young fish and the southeasterly return of the adults, here sketched, will be materially altered.

TABLE IV.—Returns from the tagging of spring salmon on the west coast of the Queen Charlotte islands during 1929 and 1930

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
11650	June 22/29	July 13/29	21	22	12	La Perouse rocks	Coho pt., North is.
11580	" 21	" 16	25	25	25	" "	Point Lambeth, Skeena r.
11686	" 25	Aug. 19 (app.)	55 (app.)	30	15	" "	Sooke.
11602	" 21	Aug. 15 (app.)	55 (app.)	24	17	" "	Otter pt., Sooke district.
11601	" 21	Aug. 15	55	12	..	" "	Fraser r.
11656	" 22	Sept. ..	70 (app.)	17	15	" "	Main r., Fraser r.
†11600	" 21	July 30	39	12	..	" "	Below Eburne bridge, Fraser r.
11623	" 22	Aug. 1	40	18	12	" "	Opp. Steveston, Fraser r.
11603	" 21	July 31	40	24	15½	" "	Ewen's cannery, Fraser r.
11578	" 21	" 9	18	32	..	" "	Trap, North shore, Wash., U.S.A.
11579	" 21	Aug. 3	43	26	..	" "	Henry is., San Juan is., U.S.A.
13047	" 6	July 7	31	22	15	" "	Village pt., West side Lummi is., U.S.A.
11561	" 20	" 22	32	30	..	" "	West shore Lummi is., U.S.A.
11649	" 22	Aug. 10	49	20	..	" "	Trap, Lummi is., U.S.A.
11883	" 23	" 22	60	38	35	4 mi. off Beresford bay.	Point Roberts, U.S.A.
11613	" 22	Sept. 6	76	27	18	La Perouse rocks.	Naselle r., Willipa hbr., Wash., U.S.A.
13043	" 6	Aug. 1	56	30	..	" "	Lower Columbia r., U.S.A.
11688	" 25	Sept. 10	77	28	19	" "	Nehalem r., Ore., U.S.A.
11570	" 21	Aug. 22	62	33	24	" "	Tillamook bay, Ore., U.S.A.
11575	" 21	" 25	65	23	25	" "	Sixes r., Ore., U.S.A.
11524	" 13	" 9	57	10	8	2 mi. W. of Frederick is.	East point Roberts trap, U.S.A.
11531	" 15	July 14	29	37	22	Off west end of Hippa is.	Kanaka bay, Wash., U.S.A
11428	May 14	June 20	37	30	..	Middle of Rennell sd.	North is., Queen Charlotte is.
11455	" 28	" 18	21	40	35	Off Seal in.	Off Hayesport cannery, Skeena r.
13004	" 20	Apr. 23/30	338	35	24	Off Seal pt.	Skeena r.
12506	Aug. 6	July 23	351	60	..	Seal point breaker.	Bar opp. Carlyle cannery, Skeena r.
11421	May 12	Aug. 10/29 (app.)	90 (app.)	25	22	Off Tartoo, Rennell sd.	Tofino, Vancouver is.

†Returned as a sockeye.

TABLE IV (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
11441	May 19/29	June 19/29 (app.)	31 (app.)	30	21	Cartwright pt.	Near Ucluelet.
11496	June 5	Aug. 19 (app.)	75 (app.)	24	20	Off Seal in.	Sooke.
11529	" 15	Oct. 3 (app.)	110 (app.)	24	18	Seal pt.	Imperial cannery, Steveston, Fraser r.
11458	May 28	July 1	34	30	22	Off Seal in.	Near Port Hammond, Fraser r.
11439	" 18	Aug. 7	81	40	..	Cartwright pt.	Sekiu, Wash., U.S.A.
11443	" 19	July 2	44	25	29	" "	Near Puget is., Wash., U.S.A.
11510	June 6	June 17/30	376	27	25	Off Seal in.	Opp. Chinook, Wash., U.S.A.
11474	" 3	Aug. /29	58 (app.)	28	..	" " "	Columbia r., U.S.A.
11465	May 31	....	..	..	..	Middle of Rennell sd.	Astoria, Ore., U.S.A.
11457	" 29	June 23 (app.)	25 (app.)	45	30	Seal pt.	6 mi. inside mouth Columbia r., U.S.A.
12037	June 2	July 25	53	33	20½	" "	12 mi. above Astoria, Columbia r., U.S.A.
11456	May 28	Dec. 5 (app.)	191 (app.)	28	..	Off Seal in.	Alsea r., Ore., U.S.A.
11489	June 4	Sept. 11	99	30	24	" " "	Siuslaw r., Ore., U.S.A.
11495	" 5	Aug. 31	87	28	23	" " "	Coos bay, Ore., U.S.A.
13242	" 26/30	July 17/30	21	14	12	3 mi. W. of La Perouse rocks.	Canoe pass, Fraser r.
18248	" 26	" 25	29	24	30	Frederick is.	Whidby is., near Admiralty bay, Wash., U.S.A.
18252	" 26	Aug. 1 (app.)	36 (app.)	28	..	" "	Mouth of Columbia r., U.S.A.
18253	" 26	Oct. 19	115	28	25½	" "	Mouth of Sixes r., Ore., U.S.A.
18183	" 15	July 8	23	20	28	Port Louis.	Near Aberdeen cannery, Skeena r.
18181	" 14	" 22	38	36	..	" "	North arm, Fraser r.
18174	" 14	Aug. 9	56	26	29½	" "	Taylor sands, opp. Astoria, Ore., U.S.A.
18170	" 14	" 7 (app.)	54 (app.)	26	21 (dressed)	Hippa is.	St. Johns hbr., Milbank sd.
12976	" 1	Aug. 22	82	17	..	Between Seal and Tartoo in.	Larch bay, south end of Baranof is., Alaska.
18168	" 12	" 8	57	7	9	Seal in.	Cottonwood pt., Fraser r.
12946	May 31	" 18	79	15	..	East of Seal in.	Cottonwood drift, Fraser r.
13127	June 5	July 18 (app.)	43 (app.)	18	10	Between Seal and Tartoo in.	West Beach, Whidby is. Wash., U.S.A.

TABLE IV (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
13109	June 4/30	Aug. 16/30 (app.)	73 (app.)	12	15¼	Between Seal and Tartoo in.	Cannery, South Bellingham, Wash., U.S.A.
13110	June 4	July 23	49	14	14	Off Seal in.	West Point Roberts, Wash., U.S.A.
12993	" 2	Mar. 21/31	292	16	13½	" " "	Off entrance to Grays hbr., Wash., U.S.A.
12933	May 30	July 24/30	55	27	21	E. of Seal in.	Mouth of Columbia r., U.S.A.
18154	June 7	Aug. 19	73	20	..	Seal in.	do.
12970	" 1	" 22	82	24	21	Between Tartoo and Seal in.	Taylor sands, north of Astoria, Ore., U.S.A.
12995	" 2	June 11/31	374	27	20	Off Seal in.	Booth sands, off Astoria, Ore., U.S.A.
13129	" 6	Aug. 15/30	70	23	22	Between Seal and Tartoo in.	Opp. Tongue pt., Columbia r., U.S.A.
12951	May 31	" 8	69	32	20½	E. of Seal in.	Celilo, Ore., U.S.A.
12956	" 31	Sept. 1/30 (app.)	93 (app.)	13	12	Mouth of Tartoo in.	Celilo falls, Ore., U.S.A.
12943	" 31	July 29	59	14	10	E. of Seal in.	South of 40 mile bank, near Columbia r., Ore., U.S.A.
12992	June 2	Oct. 16 (app.)	136 (app.)	27	25	Off Seal in.	Alsea r., Ore., U.S.A.

TABLE V.—Returns from spring salmon tagged on the north coast of the Queen Charlotte islands in 1929 and 1930

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
12568	Aug. 16/29	Sept. 26/29	41	23	..	McPherson pt., North is.	Port Walter, Alaska.
11768	July 2	July 2	..	17	..	½ mi. off Egeria bay, North is.	Picked up dead in same place.
14136	" 23	" 24	1	18	15 (dressed)	North is.	Off Coho pt., North is.
11522	June 12	June 23	11	30	..	" "	Skeena r.
11946	" 12	July 3	21	38	35	Andrews pt., North is.	" "
11799	July 3	" 16	13	29	19	1 mi. off Egeria bay, North is.	Point Mowich, Skeena r.
11765	" 2	" 26	24	25	25	½ mi. off Egeria bay, North is.	Near Port Essington, Skeena r.
11789	" 3	Aug. 29	57	22	50	1 mi. NE. of Egeria bay, North is.	Bear lake dr. into Skeena about 140 mi. N. of Hazelton.
11957	June 14	July 19	45	20	..	Off Dibrell bay, North is.	Kildala pt., Rivers in.
14113	July 22	June 23/30	336	18	17	North is.	4 mi. south of Lennard is.
14123	" 22	Aug. 15/29 (app.)	24 (app.)	12	12	North is.	Coal cr., Sooke dist.
12299	" 24	Aug. 27	34	27	18	Andrews pt., North is.	Sooke.
14116	" 22	" 15	24	21	..	North is.	Fraser r.
14146	" 23	" 27	35	37	45	" "	" "
12317	" 26	Sept. 12	48	3	..	½ mi. off Egeria bay, North is.	" "
12442	Aug. 2	July 15/30 (app.)	347 (app.)	29	16	Coho pt., North is.	" "
†14120	July 22	Aug. /30	374 (app.)	20	..	North is.	Mouth of Fraser r.
12295	" 24	Aug. 17/29	24	28	23	Andrews pt., North is.	Sunbury, Fraser r.
12195	" 15	" 19	45	23	15	do.	" " "
13077	" 10	" 6	27	15	10½	Egeria bay, North is.	Fraser r., at the Sandheads.
12202	" 15	" 16	32	29	..	North is.	Near Deas is., Fraser r.
12242	" 19	Sept. 1 (app.)	44 (app.)	6	22	Egeria bay, North is.	Main r., Fraser r.
12208	" 17	Sept. 1 (app.)	46 (app.)	25	..	Andrews pt., North is.	" " "
12334	" 28	Nov. 2 (app.)	87 (app.)	3	20	Coho pt., North is.	" " "
12292	" 24	Sept. 25	63	15	14	Andrews pt., North is.	Woodwards slough.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
12296	July 24/29	Aug. 24/29	31	27	20	Andrews pt., North is.	Near Ewens Cannery, Fraser r.
12356	" 29	" 26	28	17	14	North is.	Opp. New Vestminster, Fraser r.
11817	June 12	" 8	57	20	15	" "	Near Port Mann, Fraser r.
14158	July 23	" 18	26	18	..	" "	Near Langley, Fraser r.
12251	" 21	" 18	28	28	..	1 mi. N. of Egeria bay, North is.	Opp. Langley, Fraser r.
12261	" 22	Sept. 12	52	25	..	½ mi. off Egeria bay, North is.	Near Agassiz, Fraser r.
11968	June 15	Aug. 9	55	20	16	East of Parry pass., North is.	Dungeness trap, Wash. U.S.A.
12290	July 24	" 26	33	29	19	Andrews pt., North is.	Sande pt., Wash., U.S.A.
11544	June 17	July 7	20	20	..	East end of North is.	Kuaka bay trap, Wash. U.S.A.
12248	July 20	Aug. 9	20	29	20	1 mi. off Egeria bay, North is.	Village point trap, west coast of Lummi is., U.S.A.
11937	June 11	July 7	26	22	..	Off Explorer bay, North is.	Kanaka bay, Wash., U.S.A.
11972	" 15	Aug. 24	70	22	..	Off Dibrell bay, North is.	Birch pt., Wash., U.S.A.
11742	July 6	July 16/30	375	15	..	Andrews pt., North is.	Lummi is. trap, Wash., U.S.A.
14207	" 27	Aug. 17/29	21	14	15	North is.	Point Roberts, Wash., U.S.A.
13096	" 14	" 9	26	28	22	Andrews pt., North is.	do.
11700	June 30	" 5	36	15	8	Northwest of North is.	do.
12229	July 19	Sept. 29 (app.)	72 (app.)	27	25	1 mi. off Egeria bay, North is.	Chenois creek chan., Wash., U.S.A.
14170	" 24	Oct. 8	76	14	7	North is.	East branch Satsop r. Wash., U.S.A.
13063	" 9	Aug. 8	30	28	19	Coho pt., North is.	Willipa hbr., Wash., U.S.A.
14151	" 23	Sept. 28 (app.)	67 (app.)	10	12	North is.	Mouth of south fork, Nasel r., U.S.A.
11695	June 29	June 1/30 (app.)	337 (app.)	20	28	North end of North is.	Mouth of Columbia r., U.S.A.
12205	July 17	/31	..	30	..	Andrews pt., North is.	Columbia r., U.S.A.
12320	" 26	Aug. 25/29	30	30	..	Coho pt., North is.	Lower Columbia r., U.S.A.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
12342	July 28/29	May 10/30	286	26	14	Coho pt., North is.	Columbia r., at Puget is. U.S.A.
14077	" 21	Sept. 12/29 (app.)	53 (app.)	23	..	North is.	Warrenton, Columbia r., U.S.A.
11928	June 9	July 19	40	18	..	Andrews pt., North is.	Altoona, Wash., U.S.A.
14099	July 21	Feb. 21/30	215	19	29	North is.	Point Ellis, Columbia r., U.S.A.
14078	July 21	Aug. 25/29	35	14	10	North is.	Near 12 mi. buoy, inside mouth of Columbia r., U.S.A.
14227	" 29	June 1/30 (app.)	305 (app.)	9	8¼	Northeast of Rose spit.	Columbia r., 20 mi. from mouth, U.S.A.
12243	" 19	Aug. 8	385	30	33	1 mi. off Egeria bay, North is.	Vandusen sands, opp. Astoria, U.S.A.
12322	" 26	Sept. 27/29 (app.)	63 (app.)	28	25	North is.	Columbia r., above Astoria U.S.A.
14104	" 22	Sept. 19	59	24	..	" "	Mouth of Kalama r., trib. Columbia r., U.S.A.
14208	" 27	Oct. 1 (app.)	66 (app.)	18	..	" "	Celilo falls, Columbia r. U.S.A.
14124	" 22	Feb. 18/30 (app.)	211 (app.)	20	16	" "	do.
11697	June 30	Aug. 2/29	33	10	14	NW. of North is.	From Sunset Fish Co., Wheeler, Ore., U.S.A.
14064	July 20	Oct. 1 (app.)	73 (app.)	10	5½	North is.	Trib. Wilson r., Tillamook bay, Ore., U.S.A.
12443	Aug. 2			36	..	Coho pt., North is.	South Coos r., Ore., U.S.A.
12414	July 31			10	..	do.	Fish received in Boston, Mass. on Nov. 1, 1929.
13413	July 7/30			16	..	½ mi. E. of Egeria bay, North is.	Trap, Kanaganut is., Alaska.
18074	May 23	May 23/30	..	32	32	Andrews pt., North is.	Andrews pt., North is.
13268	June 28	July 11	13	17	19	½ mi. E. of Egeria bay, North is.	Off Egeria bay, North is.
18116	May 28	" 2 (app.)	35 (app.)	15	..	Andrews pt., North is.	North is.
18748	July 21	July 15 (app.)	..	19	..	Between Coho and Andrews pt., North is.	Outside Massett in., Q.C. is.
18334	June 21	June 3	..	17	16	do	Skeena r.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
18107	May 26/30	June 23/30	28	26	18½ (dressed)	Andrews pt., North is.	Skeena r.
18122	" 28	Sept. 2	97	16	4½	do.	Outlet Bear lake, trib. Skeena r.
13448	July 8	" 8 (app.)	62 (app.)	10	..	Coho pt., North is.	Rivers in.
18129	May 29	Aug. 4	67	18	..	Between Coho and Andrews pt., North is.	Head of Rivers in.
18308	June 30	Oct. 1	93	16	23	do.	Sarita bay, Barclay sd.
18855	July 24	June 15 (app.)	..	20	..	do.	Swiftsure banks.
13581	" 19	Aug. 11	23	18	14	Coho pt., North is.	Sooke.
18279	June 28	July 24	26	22	20	Between Coho and Andrews pt., North is.	Otter point trap, Sooke.
18105	May 26	Aug. 8	74	10	22	Andrews pt., North is.	Sooke.
13768	July 30	" 27	28	20	12	1 mi. E. of Egeria bay, North is.	Gulf of Georgia.
13514	" 14	" 19	36	22	18	Andrews pt., North is.	Vicinity of Steveston, Fraser r.
18287	June 28	" 15	48	38	37	Between Coho and Andrews pt., North is.	Steveston, Fraser r.
13179	" 22	Sept. 15	85	11	11	½ mi. E. of Egeria bay, North is.	Fraser r., near Steveston.
18735	July 21	Aug. 27	37	22	20	Between Coho and Andrews pt., North is.	Canoe pass, Fraser r.
18332	June 21	July 31	40	18	17	do.	Fraser r., at Ladner.
13767	July 30	Sept. 1	33	11	9	1 mi. E. of Egeria bay, North is.	Fraser r., near Ewen's cannery.
18124	May 29	" 2	96	16	12	Between Coho and Andrews pt., North is.	Fraser r., at Hammond.
18148	June 5	Aug. 18	74	14	30	Off Andrews pt., North is.	Fraser r., at Agassiz.
18314	" 20	" 12	53	18	..	do.	Salmon banks of Puget sd.
18866	July 24	" 16 (app.)	23 (app.)	24	12¾	Between Coho and Andrews pt., North is.	West beach.
18230	June 25	Summer/30	..	14	..	do.	Traps, Lummi is., U.S.A.
18120	May 28		..	18	..	Andrews pt., North is.	do.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
18651	July 15/30		..	24	..	Between Coho and Andrews pt., North is.	Traps, Lummi is., U.S.A.
13711	" 26	July 6/30	..	18	..	Andrews pt., North is.	Traps, point Roberts, U.S.A.
18384	June 24	Aug. 16 (app.)	53 (app.)	18	11½	Between Coho and Andrews pt., North is.	Boundary bay.
13701	July 25	Sept. 20	57	19	..	Andrews pt., North is.	Chehalis r., Grays hbr., U.S.A.
13676	" 24	Oct. 16	84	15	13	do.	Humptulip r., Grays hbr., U.S.A.
13634	" 23	Aug. 26 (app.)	34 (app.)	12	10	do.	Southbend, U.S.A.
13592	" 21	Aug. 15	25	8	14	McPherson pt., North is.	Warren Packing Co. trap, Columbia r.?
12919	May 26	Sept. 16	113	14	15	½ mi. E. of Egeria bay, North is.	Columbia r.
13772	July 30	Aug. 23	24	19	..	1 mi. E. of Egeria bay, North is.	Mouth of Columbia r.
18876	" 25	" 19	25	5	5	Between Coho and Andrews pt., North is.	" " " "
13631	" 23	" 22	30	15	..	Andrews pt., North is.	" " " "
13638	" 23	" 23	31	18	15	do.	Lower Columbia r.
13627	July 22	Aug. 23	32	14	..	Andrews pt., North is.	Mouth of Columbia r., U.S.A.
18080	May 24	June 26	33	21	27	do.	Columbia r., U.S.A.
18752	July 21	Aug. 23	33	22	..	Between Coho and Andrews pt., North is.	Mouth of Columbia r., U.S.A.
13604	" 21	Sept. 3 (app.)	44 (app.)	17	..	Egeria bay, North is.	do.
13164	June 21	Sept. 3 (app.)	74 (app.)	16	..	½ mi. E. of Egeria bay, North is.	do.
13716	July 27	June 1/31 (app.)	309 (app.)	16	..	Andrews pt., North is.	Columbia r., U.S.A.
13610	July 22	...../31	..	25	..	do.	" "
13605	" 21	...../31	..	12	..	Egeria bay, North is.	" "
18933	" 29	Sept. 14/30	47	15	15	Between Coho and Andrews pt., North is.	Green is., Columbia r., U.S.A.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
18910	July 27/30	July 16/30	..	26	22	Between Coho and Andrews pt., North is.	Off point Ellis, Ore., U.S.A.
13706	" 26	Aug. 25	30	22	..	do.	Astoria, Ore., U.S.A.
18759	" 21	" 21	31	23	..	Between Coho and Andrews pt., North is.	" "
13439	" 8	" 23	46	14	..	Andrews pt., North is.	" "
13697	" 25	" 22	28	13	12	do.	Taylor sands, 2 mi. N. of Astoria, Ore., U.S.A.
18070	May 22	July 1 (app.)	40 (app.)	16	..	North is.	Vandusen sands, opp. Astoria, Ore., U.S.A.
13690	July 25	June 16/31	326	34	23	Andrews pt., North is.	Prairie chan., above Astoria, Ore., U.S.A.
13677	" 24	Sept. 27/30 (app.)	65 (app.)	3	..	do.	15 mi. from mouth Nehalem r., Ore., U.S.A.
13470	" 10	Sept. 20	72	11	14	do.	Nehalem r., Ore., U.S.A.
18289	June 28	Oct. 3	97	22	27	Between Coho and Andrews pt., North is.	Siletz r. bar, Ore., U.S.A.
18780	July 22	Sept. 27 (app.)	67 (app.)	16	10½	do.	Off Yaquina bay, Ore., U.S.A.
13170	June 21	Oct. 28	129	17	..	1½ mi. E. of Egeria bay, North is.	Elk r., trib. of Yaquina r., Ore., U.S.A.
18067	May 22	Sept. 26 (app.)	127 (app.)	22	..	North is.	Alsea bay, near Waldport, Ore., U.S.A.
13614	July 22	July 11/31 (app.)	354 (app.)	16	15	Andrews pt., North is.	Winchester, Umpqua r., Ore., U.S.A.
18290	June 28	Oct. 8/30	102	17	12	Between Coho and Andrews pt., North is.	Sixes r., Ore., U.S.A.
18348	" 21	" 10	111	17	15	do.	Mouth of Sixes r., Ore., U.S.A.
18087	May 24	Aug. 1 (app.)	69 (app.)	11	..	Andrews pt., North is.	
18068	" 22	" 1 (app.)	71 (app.)	13	..	North is.	
13484	July 11	July 18	7	22	17½ (dressed)	½ mi. NE. Pillar bay.	North is.
18533	" 6	Aug. 26 (app.)	51 (app.)	30	20	Pillar bay.	8 mi. SE. of Lennard is. Light, near Tofino, B.C.
13420	" 7	Sept. 6	61	11	..	1 mi. N. Pillar bay.	B.C. bar, Fraser r.

TABLE V (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
18531	July 6/30	Aug. 18/30	43	16	10	Pillar bay	B.C. drift, Fraser r.
13338	" 3	" 27	55	28	29	½ mi. N. of Pillar bay.	Between Steveston and Woodwards Landing, Fraser r.
13482	" 11	" 15	35	18	..	½ mi. NE. of Pillar bay.	Cisco, Fraser r.
18543	" 7	" 4	28	20	18	Pillar bay.	Mouth of Columbia r.
18538	" 6	" 3	28	30	21	" "	" " " "
18608	" 11	" 20 (app.)	40 (app.)	15	28	" "	Opp. Astoria, inside mouth of Columbia r.
13535	" 15	Nov. 1	109	10	..	1 mi. NE. of Pillar bay.	Elk r., trib. of Yaquina r., Ore., U.S.A.
13474	" 11	Oct. 4 (app.)	85 (app.)	18	..	½ mi. NE. of Pillar bay.	Hall's slough, trib. of Tillamook bay, Ore.,
13345	" 3	Oct. 9	98	13	..	½ mi. N. of Pillar bay.	Bandon, Ore., U.S.A.
13324	" 2	July 28	26	19	..	Shag rock.	East side of point Roberts.
18525	" 6	Aug. 1 (app.)	26 (app.)	15	..	" "	Mouth of Columbia r.
13304	" 2	Aug. 6	35	8	..	" "	" " " "
18136	May 29	Oct. 10	134	27	..	" "	Tillamook bay, Ore., U.S.A.
18299	June 28	July 27	29	25	..	Virago sound.	Burke chan.
18962	July 30	Oct. 2 (app.)	64 (app.)	35	..	Off cape Edenshaw.	Quinault r., Wash., U.S.A.
18008	May 19	Sept. 1	105	19	25	Massett flats.	Fraser r., at Cottonwood.
18009	" 19	Aug. 3	76	26	6½	" "	Ewen's drift, Fraser r.
12911	" 24	July 9	46	9	9 (dressed)	5 mi. N. of Weah pt.	Squaderee camp.
18004	" 18	June 25	38	11	..	Off Tow hill	Burke chan.
12868	" 18	July 30	73	10	9½ (dressed)	15 mi. W. of Tow hill.	2 mi. SW. of Lookout is., Kyuquot district.
12905	" 19	Aug. 15	88	20	18 (dressed)	20 mi. W. of Tow hill.	Off Ucluelet, Vanc. is.
12907	" 19	" 1 (app.)	74 (app.)	20	14	22 mi. W. of Tow hill.	Fraser r. near Ewen's cannery.
12900	" 19	Sept. 9	113	17	..	18 mi. SW. of Tow hill.	Ewen's drift, Fraser r.
12895	" 18	July 18	61	17	10	15 mi. SW. of Tow hill.	West beach trap., U.S.A.
12883	May 18	Aug. 17	91	15	..	15 mi. SW. of Tow hill.	Cherry pt., Wash., U.S.A.
12863	" 18	" 25	99	20	28	15 mi. W. of Tow hill.	Tillamook bay, Ore.,
12897	" 18	Sept. 23/31	493	14	10	15 mi. SW. of Tow hill.	4 mi. N. of Yaquina head lighthouse, Ore.,

TABLE VI.—Returns from spring salmon tagged in the Stephens island area during 1930

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at recapture (lb.)	Locality of tagging	Locality of recapture
12774	May 5/30	Aug. 5/30	92	13	..	15 mi. W. of Stephens is.	Ship is., Cleveland pen., Alaska.
12818	" 10	May 15	5	35	18	W. of Stephens is.	Graveyard pt., Nass r.
12833	" 12	July 25	74	16	15	16 mi. W. of Stephens is.	Head of Rivers in.
12769	" 5	" 28	84	12	12 (dressed)	15 mi. W. of Stephens is.	8 mi. SW. of Lookout is., Kyuquot dist.
12749	Apr. 28	July 3	66	13	20	7 mi. S. of Stephens is.	Gower pt., Howe sd.
12839	May 12	Sept. 26	137	10	11	16 mi. W. of Stephens is.	Chehalis r., Wash., U.S.A.
12744	Apr. 27	...../31	..	8	..	10 mi. S. of Stephens is.	Columbia r., Ore., U.S.A.
13931	Aug. 11	...../31	..	13	..	18 mi. SW. of Stephens is.	" "
12802	May 8	July 1/31	419	6	15	16 mi. W. of Stephens is.	Fitzpatrick sand, Columbia r., Ore., U.S.A.
12819	" 10	Sept. 13/30	126	6	13	do.	Cowlitz r., trib. Columbia r.
12836	" 12	" 17	128	12	18	do.	Celilo falls, Ore., U.S.A.
12829	" 10	" 21/31	499	3	5½	do.	" "
16162	Aug. 10/30	" 19/30	40	22	15 (dressed)	Between north end of Banks and Bonilla is.	Alberni canal, near Alberni, Vancouver is.
16161	" 10	" 10	31	16	13	do.	Mouth of Fraser r., near Steveston.
16047	" 8	Aug. 27	19	30	..	do.	Puget sd., salmon banks.

TABLE VII.—Returns from spring salmon tagged in the Milbank and Fitzhugh sounds area during 1930

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
19042	July 12/30	Aug. 28/30	47	21	40	St. Johns hbr.	Moricetown, Skeena r.
17934	" 3	June 28 (app.)	..	16	18	" " "	Fitzhugh sd.
19400	Aug. 4	Sept. 16	43	10	10	" " "	Near head of Rivers in.
*19335	" 2	Aug. 20 (app.)	18 (app.)	8	..	" " "	Rivers in.
19294	July 30	Aug. 13	14	50	56	" " "	Robsons bight, Johnstone st.
17928	" 3	" 7	35	15	..	" " "	Charles cr., Kingcome in.
19114	" 16	" 4	19	31	30	" " "	Sooke.
†19038	" 12	" 1	20	18	8	" " "	Mouth of Fraser r.
19311	" 31	" 26	26	30	20	" " "	Near Ewen's cannery, Fraser r.
17899	" 2	Sept. 18	78	24	19½	Cape Swain	Fraser r., opp. New Westminster.
19359	Aug. 2	.....	..	3	..	St. Johns hbr.	Cheam view on Fraser r., N. of Hope.
19040	July 12	Aug. 24	43	23	..	" " "	Mouth of Columbia r.
19029	" 9	" 25	47	16	11	" " "	" " " "
*19808	Aug. 26	Sept. 28 (app.)	33 (app.)	3	..	Koeye district	Fitzhugh sd. or Burke chan.
*19523	" 19	Aug. 20 (app.)	1 (app.)	6	..	Hakai chan.	Rivers in.
*19843	" 27	Sept. 29 (app.)	33 (app.)	4	..	Koeye district	" "

†Returned as a sockeye.
*Returned as a coho.

TABLE VIII.—Returns from the tagging of spring salmon on the northeast coast of Vancouver island during 1929 and 1930

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
15003	June 26/29	Oct. 15/29	111	12	11	Bates pass.	Between Celtic cannery and Inner light, North arm, Fraser r.
15109	July 6	Aug. 11	36	14	25	" "	Birch point trap, Birch bay, Wash., U.S.A.
10476	Apr. 16/30	June 10/30	55	14	13	Bates pass., outside Hope is.	Hardy bay.
10498	" 23	July 14	82	15	..	Between Hope is. and cape Scott.	Trap, north end of West beach, Whidby is., Wash., U.S.A.
17783	June 25	Sept. 2	69	5	8	Hardy bay.	Bates pass.
10883	May 14	Aug. 7	85	7½	7½	" "	" "
10494	Apr. 21	July 1	71	4	6	" "	Port John, Fisher chan.
17732	June 16	Aug. 7	52	20	15	" "	Bute in.
*17787	" 25	" 28	64	5	8	" "	Bute in. side of Arran r., Stewart is.
10914	May 15	July 2	48	15	..	" "	Sooke traps.
17580	June 3	Aug. 6	64	5	15	" "	Sooke.
10975	May 19	July 5	47	14	9	" "	Cape Flattery.
17616	June 4	May 25	..	9	14	" "	Trap, Booth Fish., Dungeness, Wash., U.S.A.
10814	May 5	June 10	36	9	12	" "	do.
10996	" 21	" 27	37	12	11	" "	Inside Deception pass, U.S.A.
17785	June 25	Aug. 8	44	15	13	" "	Deception pass, U.S.A.
10948	May 19	July 24	66	12	10	" "	" " "
10806	" 5	Aug. 5	92	10	8	" "	Deception pass trap between Skagit bay and Rosario st., U.S.A.
17718	June 16	July 21	35	8	..	" "	West shore of Whidby is., U.S.A.
10903	May 15	June 25	41	15	17	" "	West coast of Whidby is. between Deception pass and Point Partridge, U.S.A.
17542	June 1	Aug. 8 (app.)	68 (app.)	15	14	" "	Trap, West beach, Whidby is., U.S.A.
17544	" 1	June 16	15	22	17	" "	Skagit r., Wash., U.S. A.
17774	" 24	Aug. 15	52	10	..	" "	" " " "
17557	" 2	July 28	56	12	12	" "	" " " "
17602	" 3	Aug. 21 (app.)	79 (app.)	4	..	" "	Skagit r. near Burlington Wash., U.S.A.

*Returned as a coho.

TABLE VIII (continued)

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
10939	May 18/30	July 24/30	67	23	..	" "	Lower Queets r., Wash., U.S.A.
10854	" 12	Sept. 19	130	20	19	" "	Columbia r., U.S.A.
10499	Apr. 23	" 3 (app.)	133 (app.)	27	..	No.2 bank, between Hope is. and cape Scott.	Mouth of Columbia r., U.S.A.
17729	June 16	June 28/32	742	1½	7	Hardy bay.	Taylor sands, Columbia r., 3 mi. from Astoria, Ore., U.S.A.
10893	May 15	July 23/30	69	7	7¾	" "	Columbia r., at Rainier, U.S.A.

TABLE IX.—Returns from miscellaneous spring salmon tagging during 1929

Tag no.	Date tagged	Date of recapture	Period of liberty (days)	Weight at tagging (lb.)	Weight at re-capture (lb.)	Locality of tagging	Locality of recapture
10799	July 7/29	Aug. 7/29	31	19	12	Off Gosling rocks, near Goose is.	Skeena r.
10688	June 27	Sept. 6 (app.)	71 (app.)	7	7	Off Quatsino sd., Vancouver is.	Near Alert bay.
10537	May 22	July 22	61	10	..	Off Kyuquot, Vancouver is.	Trap, Cypress is., Wash., U.S.A.
10512	" 18	June 26	39	12	7½	Little bank, 15 mi. off Kyuquot.	Meadow point trap, Wash., U.S.A.
10528	" 20	June 11	22	13	33½	do.	Columbia r., U.S.A.
10555	" 31	July 12	42	18	15	West rocks off Kyuquot, Vancouver is.	Columbia r., near St. Helens, Ore., U.S.A.
10583	June 3	June 26/31	753	25	20	do.	Between Columbia r., and Shoal-water bay, Ore., U.S.A.
10543	May 26	" 26	761	30	18	do.	do.