

THE STATUS OF CHUM SALMON STOCKS  
OF THE WEST COAST OF VANCOUVER ISLAND,  
1934-1968  
STATISTICAL AREAS 22-27

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Erratum      Technical Report 1970-3.

Page 1 substitute 1,176,515 for 784,000 in statement  
"...for the period 1934 to 1938 the seine fleet averaged  
784,000 fish annually."

Page 28 substitute 1.07 for 0.97 in sentence "Recent returns  
of the study area stocks have been in the ratio of 0.97:1  
of adult escapement."

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## INTRODUCTION

The West Coast of Vancouver Island supported a substantial chum fishery until the mid 1900's. Catch records are not available for the seasons prior to 1934 but statistics given in Table I and Figure 1 indicate that for the period 1934 to 1938 the seine fleet averaged <sup>1,176,515</sup> ~~2,000,000~~ fish annually. Following this period of high intensity exploitation of the stocks of the area, dramatic declines are evident in both catch and escapement levels. Although a number of environmental conditions could have caused this decline, it must be concluded that overfishing was also a significant contributing factor. In 1963, total area closures began to be implemented and, since 1965, the entire West Coast has been closed to the fall net fishery in an attempt to rehabilitate the chum salmon stocks.

This report presents a summary of the early history of the fishery, and an analysis of the catch and escapement data available for Statistical Areas 22-27. Figure 2 is a map of the areas to be considered. Throughout the report the areas are referred to by either name or number.

Area 22	Nitinat
Area 23	Barkley Sound
Area 24	Clayoquot Sound
Area 25	Nootka-Esperanza
Area 26	Kyuquot Sound
Area 27	Quatsino Sound

The purpose of this presentation is to review the status of the West Coast Vancouver Island chum salmon stocks and to

TABLE 1. ANNUAL COMMERCIAL CATCH IN PIECES  
FOR THE PERIOD 1934-1969 IN AREAS 22-27

	<u>22-23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>Total</u>
1934	321,033	110,663	168,272	146,738	67,258	813,964)
1935	401,348	105,561	182,878	51,470	95,401	836,658)
1936	1,483,189	69,145	457,552	116,837	188,153	2,314,906)
1937	734,669	74,385	113,820	5,211	82,054	944,851)
1938	530,026	95,189	207,014	38,018	101,952	972,199)
1939	323,891	51,711	79,384	29,656	64,131	548,773)
1940	478,192	61,699	153,806	5,626	24,930	724,253)
1941	668,142	89,844	354,551	25,304	21,718	1,159,559)
1942	526,519	87,864	340,059	137,274	50,206	1,142,022)
1943	71,778	50,984	151,988	47,983	68,509	391,242) ***
1944	9,870	7,334	31,342	682	3,553	52,781) ***
1945	36,325	26,704	50,499	15,272	10,718	139,618)
1946	361,000	46,000	209,000	82,425	56,500	707,217)
1947	52,000	27,000	95,000	60,600	25,400	260,000)
1948	289,000	63,000	293,000	79,765	19,046	743,811)
1949	2,600	700	500	542	489	4,831)
1950	431,000	52,000	205,000	154,255	63,020	905,275)
1934-						
1950*	6,717,982	1,019,083	3,093,165	997,116	942,549	12,657,128
Av.	419,873	63,693	193,322	62,320	58,909	734,547

	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>Total</u>
1951	27,200	90,150	22,550	95,400	22,900	176,300	434,500
1952**		45,063	13,400	47,200	7,000	7,500	120,163
1953	59,900	198,750	55,850	211,800	87,250	39,300	652,850
1954	217,200	315,695	95,900	173,440	62,580	53,400	918,215
1955	7,200	114,195	21,150	58,430	5,500	14,700	221,175
1956	118,358	257,351	53,500	88,280	39,100	48,700	605,289
1957	85,328	113,697	33,600	77,700	66,500	23,850	400,675
1958	205,801	103,755	24,300	115,250	87,250	1,850	538,206
1959		76,690	37,400	77,440	93,500	15,350	300,380
1960	48,374	71,013	28,850	103,200	130,900	58,250	440,587
1961		32,976	15,250	78,900	48,300		174,426
1962		37,454	17,350	42,200	28,640		125,644
1963			8,500	55,000	14,600		78,100
1964				45,550			45,550
1965						306**	306
1966						1,100	1,100
1967						400	400
1968						2,350	2,350
1969				3,200		500	3,700
1951-							
1969	769,361	1,456,789	427,600	1,272,990	694,020	443,856	5,064,616
Av.	96,170	121,399	32,892	90,928	53,386	44,385	

\* does not include 1949

\*\* strike

\*\* Summer net catches

\*\* Purse seine catches

provide background information which may be useful to future regulation of the fishery.

Two sets of catch figures are used and are given in Table I. For the years 1934-1950 seine catch figures are available from the "Annual Report of the Department of Fisheries". Since 1951 the Economics Branch of the Department has kept statistics for each area based on a mandatory sales-slip system. The early figures are presented to show the historical trend of the fishery; the latter ones are used in combination with escapement data to provide a current assessment of the chum salmon stocks on the West Coast of Vancouver Island.

The escapement figures are estimates based on live and dead counts made by Fishery Officers of the Conservation and Protection Branch. The accuracy varies with the accessibility of each stream and visibility at time of viewing. It is considered, however, that they represent a relative measure of annual escapement.

#### EARLY HISTORY OF THE FISHERY

##### The Cannery Industry

Prior to 1930 the West Coast of Vancouver Island supported a relatively large and profitable chum salmon fishery. It began to gain importance in the overall British Columbia chum catch picture around 1900, when, as a result of

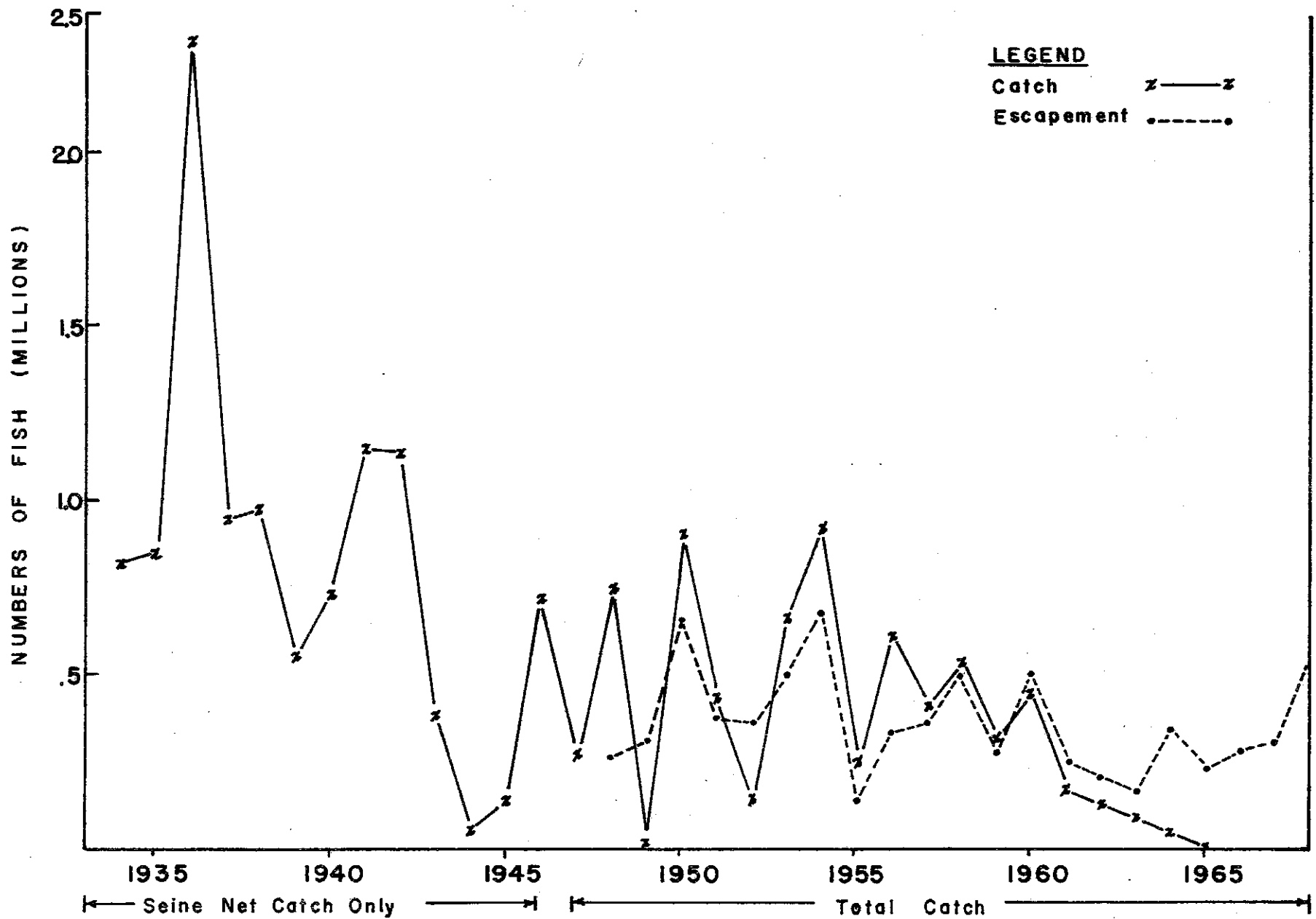
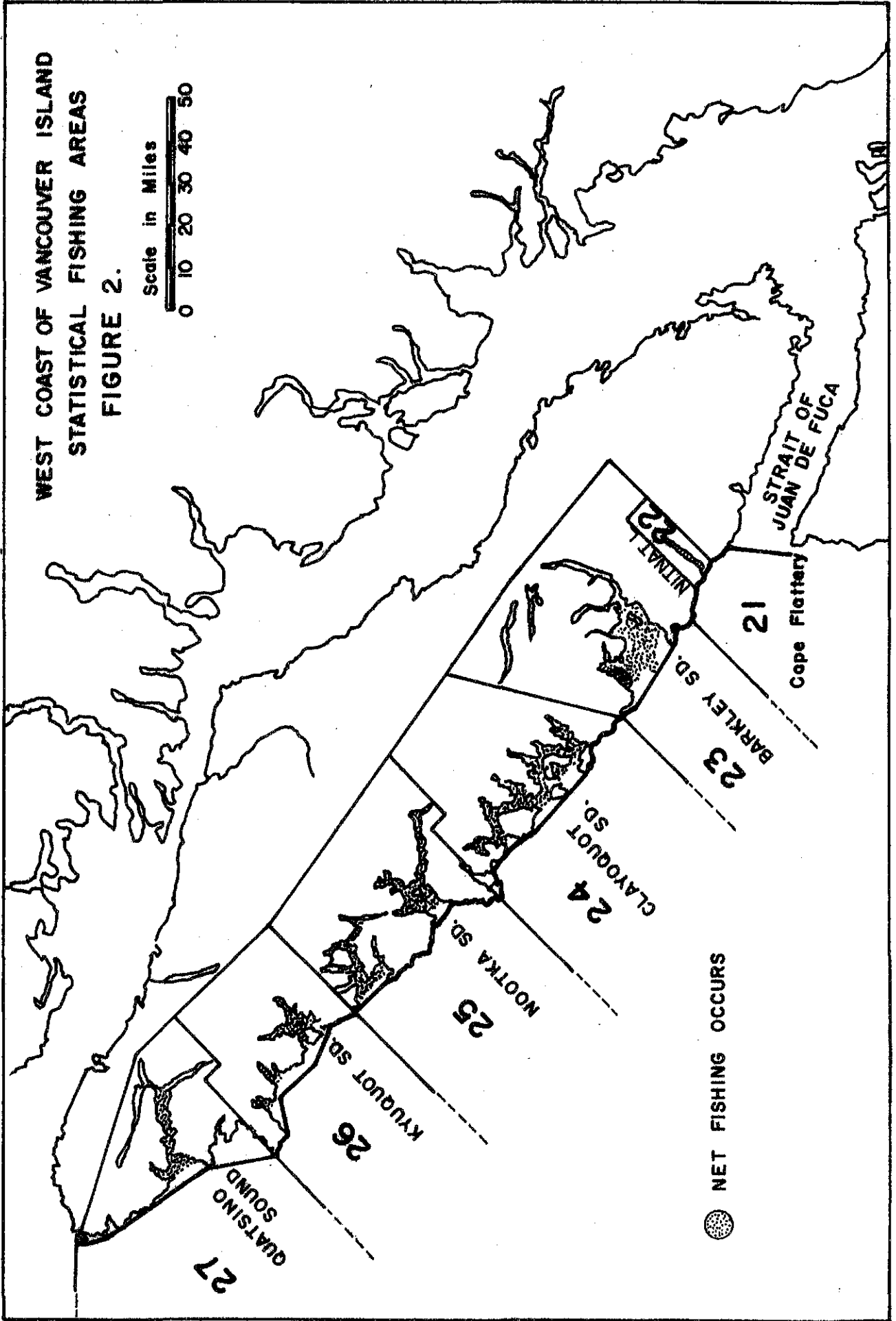


FIGURE 1. Commercial chum salmon catches and escapements in areas 22-27.

WEST COAST OF VANCOUVER ISLAND  
STATISTICAL FISHING AREAS  
FIGURE 2.

Scale in Miles



● NET FISHING OCCURS

the development and expansion of the cannery operations along the British Columbia coast, this industry established a foothold in the area. The Clayoquot Fishing and Trading Co. began operating in 1895 at the mouth of the Kennedy River in Area 24 and subsequently was joined by eight other establishments at various points along the West Coast of Vancouver Island. These canneries competed for the available catches, and most were functioning each season at the peak fall fishing periods until 1921. Although no early West Coast Vancouver Island landing figures are available, it is assumed that the increased exploitation of chum salmon in other British Columbia coastal waters, also occurred in Areas 22-27. A high British Columbia canned chum pack of 475,273 was reached in 1917 when the demand during the World War I years reached a peak.

By 1921, however, the demand for chum salmon declined and very few companies packed the species. This situation continued until the mid 1920's when the industry again increased activities in the area. During the period 1925-1929 six new canneries were opened at strategic points along the coast:

- 1925 Nitinat Packing Company
- 1925 Kildonan Co. on Barkley Sound
- 1926 Anglo-British Columbia Packing Co. Ltd.  
on Kyuquot Sound
- 1926 Gosse Corporation at Hecate  
on Nootka Island
- 1927 Canfisco on Quatsino Sound
- 1929 Millerd Co. at Port Alberni

Most of these canneries operated until the trend toward centralization of the processing operations began in the 1930's. Salmon could then be economically carried by packers to the larger canneries around Vancouver.

Exploitation Prior to 1951

The purse seine net fishery has historically been the main exploiter of the West Coast Vancouver Island chum salmon runs (Table 1). The increase in numbers and efficiency of this fleet resulted in a high level of exploitation of the runs of the whole area. By 1918 there was concern that if the trend of high catches and low escapements continued, the stocks could become exterminated. For example, in the Nitinat area alone that year two purse seiners delivered 120,000 fish each. A statement from the 1918 "Report of the Commissioner of Fisheries" declared:

"The drain on the salmon run to all Vancouver Island waters is, in the judgement of the Department, excessive, and calls for the immediate and serious attention of the fishery officials of the Dominion. The fish must be given far greater measures of protection than at present afforded them or they will cease to be of commercial importance."

The trend to increased effort, however, continued. Concern by the industry itself for the future welfare of the fishery was evident when an enquiry was held in 1919 as

a result of a request "by the fishermen of Barkley Sound and the people of the Alberni area generally, for an impartial investigation into .... the depletion of the salmon stocks".

Unsettled market conditions after World War I affected the whole fishing industry and provided a period of low exploitation of the salmon stocks. In 1921, as previously mentioned, very few canneries processed chums since there was already a carry over in the British Columbia chum pack from the previous season. By 1923, however, there was again an increase in the demand for chums. The high effort during this period was further intensified when competition for the raw product increased as a result of the removal of exclusive fishing right permits and cannery licence restrictions. Prior to 1912 the government policy had been to limit the number of canneries in an area, as well as the amount of equipment to be used. In 1912 an unlimited number of cannery licences were issued and when in 1920 a policy of unlimited fishing licences was implemented, an intensive and unprofitable competition developed.

Heavy exploitation of the chum stocks continued, and in the 1926-27 season the effort of the fleet was again increased when a smaller more efficient seine-net mesh size was introduced. Finally, severe restrictions were imposed when in 1928 the Nitinat area was closed completely to purse seine fishing. In addition, discontent and concern by both the fishermen and cannery operators about the unprofitable

and reckless competition at the time, resulted in the following proposals being made to the Government in 1929:

1. No new cannery licences be issued;
2. The coast be divided and the number of seiners allowable be stated; and
3. Limits be placed on the transportation of the raw product.

Subsequently the entire British Columbia coast was divided into 27 areas with a quota or set limit to the number of purse seiners allowed to operate in each area. If this number was exceeded then, in addition to the normal 48 hour weekly close time then in force, the Fishery Officer could extend the weekly close times by additional 24-hour periods. This measure alone led to an immediate 20 percent curtailment in fishing operations in Barkley Sound.

Poor market conditions in the early 1930's again resulted in curtailed fishing effort and intensity off Vancouver Island as it did along the rest of the British Columbia coast. This lack of incentive, coupled with strict methods to regulate and conserve the stocks which had been depleted by the earlier concentration of fishing effort during World War I, allowed a certain amount of rehabilitation to take place at a time when the runs were only "average" in strength.

The war conditions in the early 1940's again brought an increased demand for chum salmon and thus an increased effort on the West Coast of Vancouver Island. After heavy runs in 1941 and 1942, the effects of the small brood year

escapements of the late 1930's were felt and all districts were reported as being "poor" or "complete failures".

The runs were again stronger, or at least improved, by 1950. The effort at this time was relatively low, however, since there was little demand for chums as a result of a carry over of the chum pack production of 1949.

## RECENT HISTORY AND STATUS OF THE FISHERY

### Fishing Patterns and Regulations

The introduction of nylon gill-nets during the 1951-52 season and their subsequent popularity, coupled with an increased effort by the gill-net fleet necessitated the implementation of special conservation measures on the West Coast of Vancouver Island. Although a prolonged strike in the fall of 1952 provided a good escapement for the run of that year, a severe drought in the area made the rivers too low to receive the spawning population. From this period on, the area began to show the effects of the increased efficiency of the fleet and changing environmental conditions. Despite boundary movements and early closures the runs did not provide a sufficient escapement to support a fishery and, as early as 1955 recommendations were made for complete closures of certain areas such as Nootka Sound. As seen in Table 1, commercial catches began to decline consistently.

Figure 3 shows the number of fishing days allowed in each of the West Coast areas since 1953. Prior to this

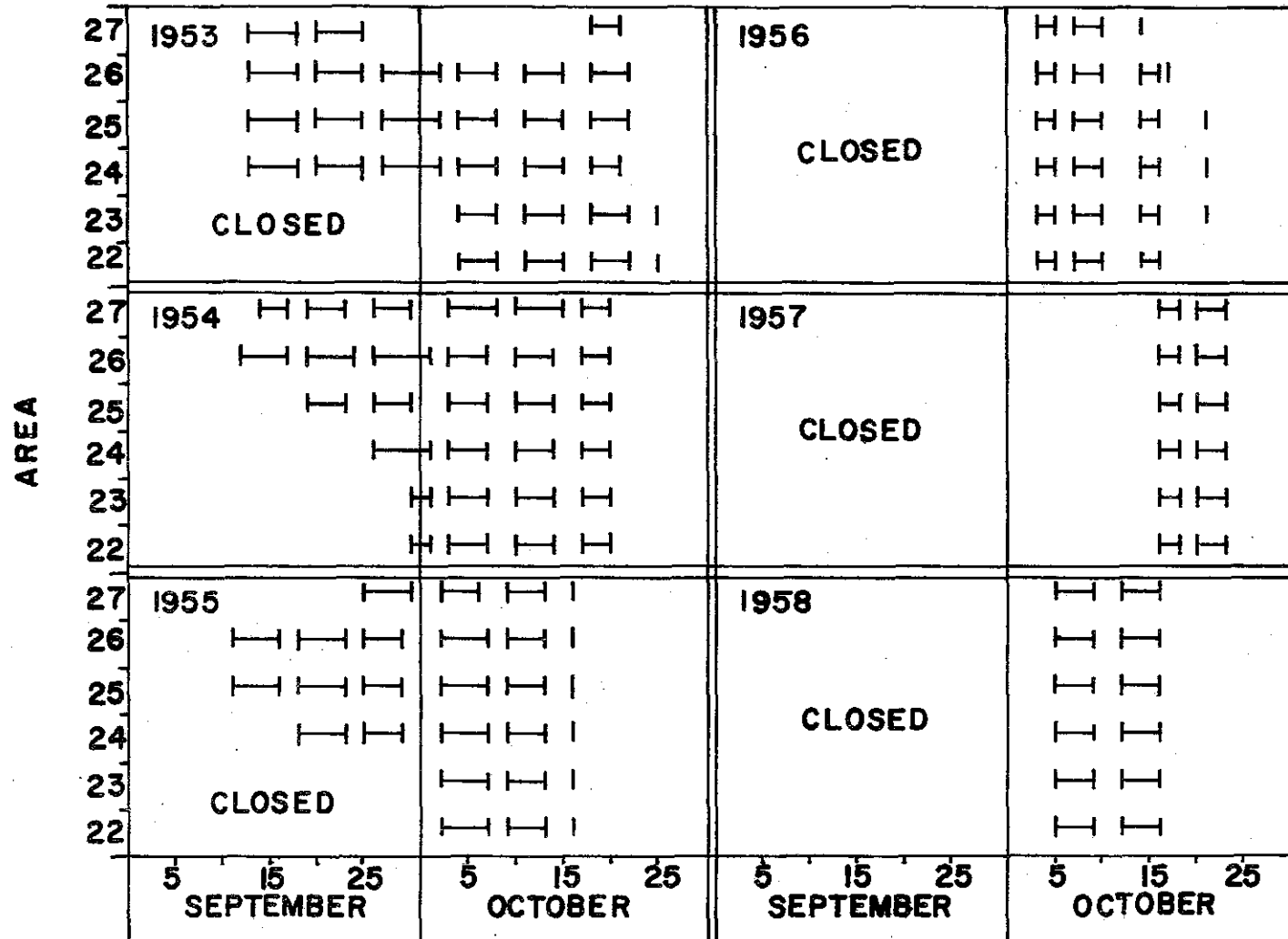


FIGURE 3. Fishing periods during September and October, 1953-64, in areas 22-27 inclusive.

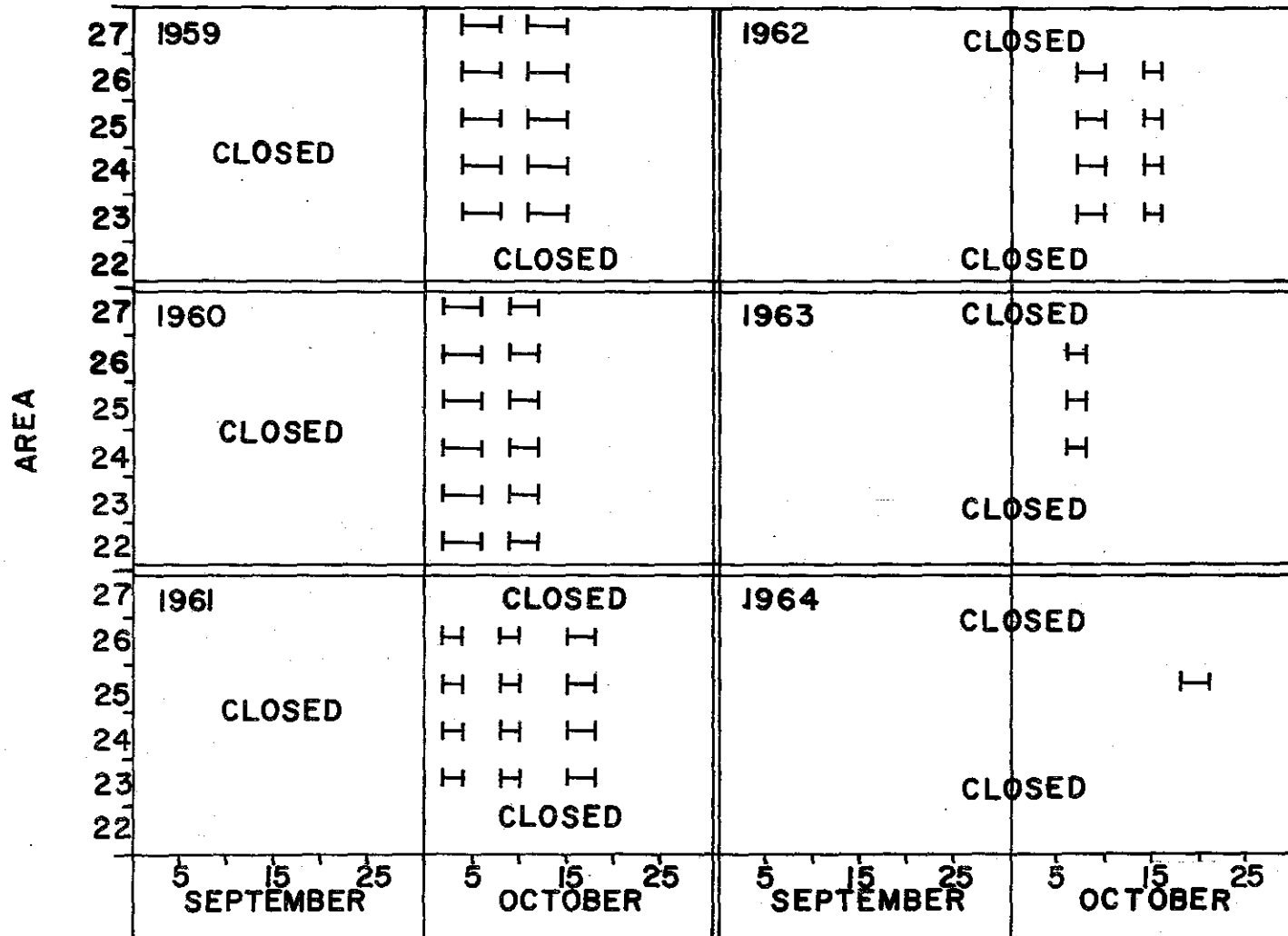


FIGURE 3. Cont.

date the general fishing pattern was a 4-day fishing week through September and October. The effort was gradually reduced as the stocks declined, until, in 1965, a complete closure was implemented in an effort to rehabilitate the runs to the Vancouver Island West Coast.

The recent fishing pattern is summarized below by area.

Area 22: Nitinat

Since 1953 the coho and early chum runs to the area have been protected by delaying the opening of the season until the first week in October. In 1953 and 1954, 12 net fishing days were permitted over a 3-week period. This time was cut to 7 fishing days for the next two years as the efficiency of the fishery increased. After a strike in early October 1957, the area was again opened for 7 days. There were two 4-day weeks in 1958. The growth of the gill net effort, coupled with the purse seine fishery, resulted in complete closure of Nitinat Lake in 1959 to protect a weak cycle. Nitinat was reopened in 1960 but has been closed since 1961.

Area 23: Barkley Sound

The Barkley Sound area had the same fishing pattern as Nitinat Lake from 1953-1958. That is, it was opened for three 4-day weeks in 1953 and 1954, seven days in 1955 and 1956, and two 4-day weeks in 1958. There were eight net fishing days in 1959 and seven in 1960 and 1961. Five

fishing days were permitted in Area 23 in 1962 but chum catches were poor. Barkley Sound has not been fished during the chum season since 1963.

Area 24: Clayoquot

The area was opened for six 4-day fishing weeks in 1953. The number of days was reduced to 16 in 1954 and 1955 when the area was closed until the fourth and third weeks of September respectively. After 1955 openings were delayed until at least the first week in October. The area was closed after seven or eight days fishing in most years for conservation of late chum salmon runs. In 1962 fishing time was reduced to five days and to four in 1963. Since then the area has been closed.

Area 25: Nootka      Area 26: Kyuquot

There were six 4-day fishing weeks in these areas in 1953 and 1955. In 1954 this time was reduced by one week in Area 25. From 1956 to 1962 both areas were closed throughout September with seven or eight net fishing days in October. There were five days fishing in 1962 and three in 1963. Kyuquot Sound has been closed since 1964. Nootka Sound was open for one week that year and has been unfished since 1965.

Area 27: Quatsino

As a result of an excessive amount of gear in the area in early September, Quatsino Sound was closed for a period in the middle of the 1953 season. Figure 3 indicates

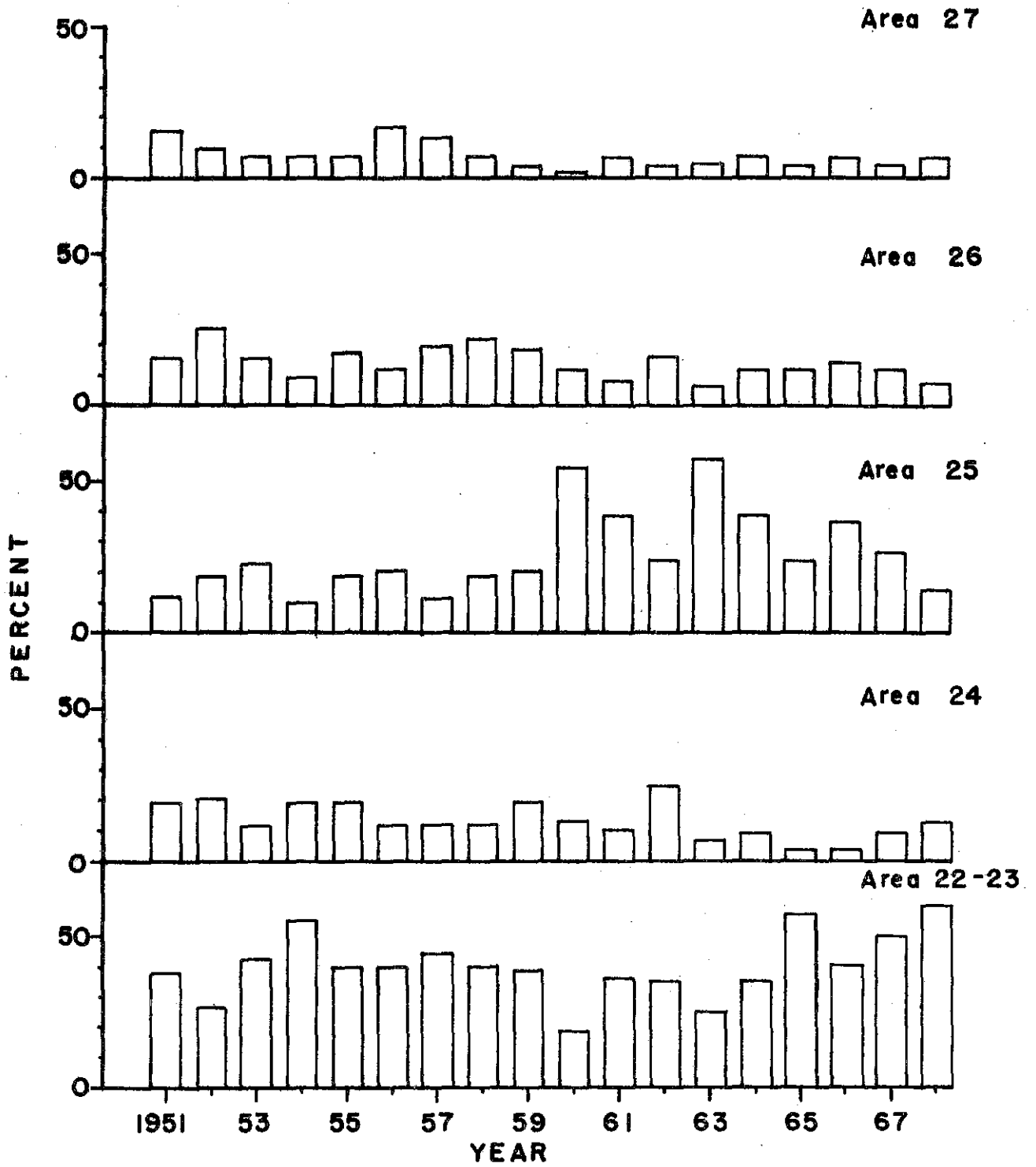
a six-week opening in 1954. The following season the area was fished for 17 days and in 1956 for six. From 1957 until it was closed to the fall net fishery in 1961 the fishing pattern was the same as that applied in Areas 24-26.

The net catches attributed to this area in Table 1 for the years 1965-1969 were made during a July - August opening of the area. The fall chum runs to Quatsino Sound were protected by closures.

#### Escapements since 1951

Chum salmon stocks on the West Coast of Vancouver Island, as in other areas, spawn in a large number of small and moderate sized coastal streams rather than in one main system. These runs are exploited in early October by the net fishery operating in waters close to the spawning grounds. As a result of the rapidly increasing efficiency of the fishing fleet during the 1950's, the already depressed stocks were subjected to a further decline in catch and escapement. In order to rehabilitate the stocks it became necessary to close the entire West Coast of Vancouver Island to the chum fishery. As illustrated in Figures 4, 5 and 6, these conservation measures have resulted in some improvement of escapement in recent years.

Escapements to individual streams are presented in Appendix A and are discussed below.



**FIGURE 4.** Annual chum salmon escapements by area to Areas 22-27, shown as percent of total west coast of Vancouver Island escapements for the years 1951-68 inclusive.

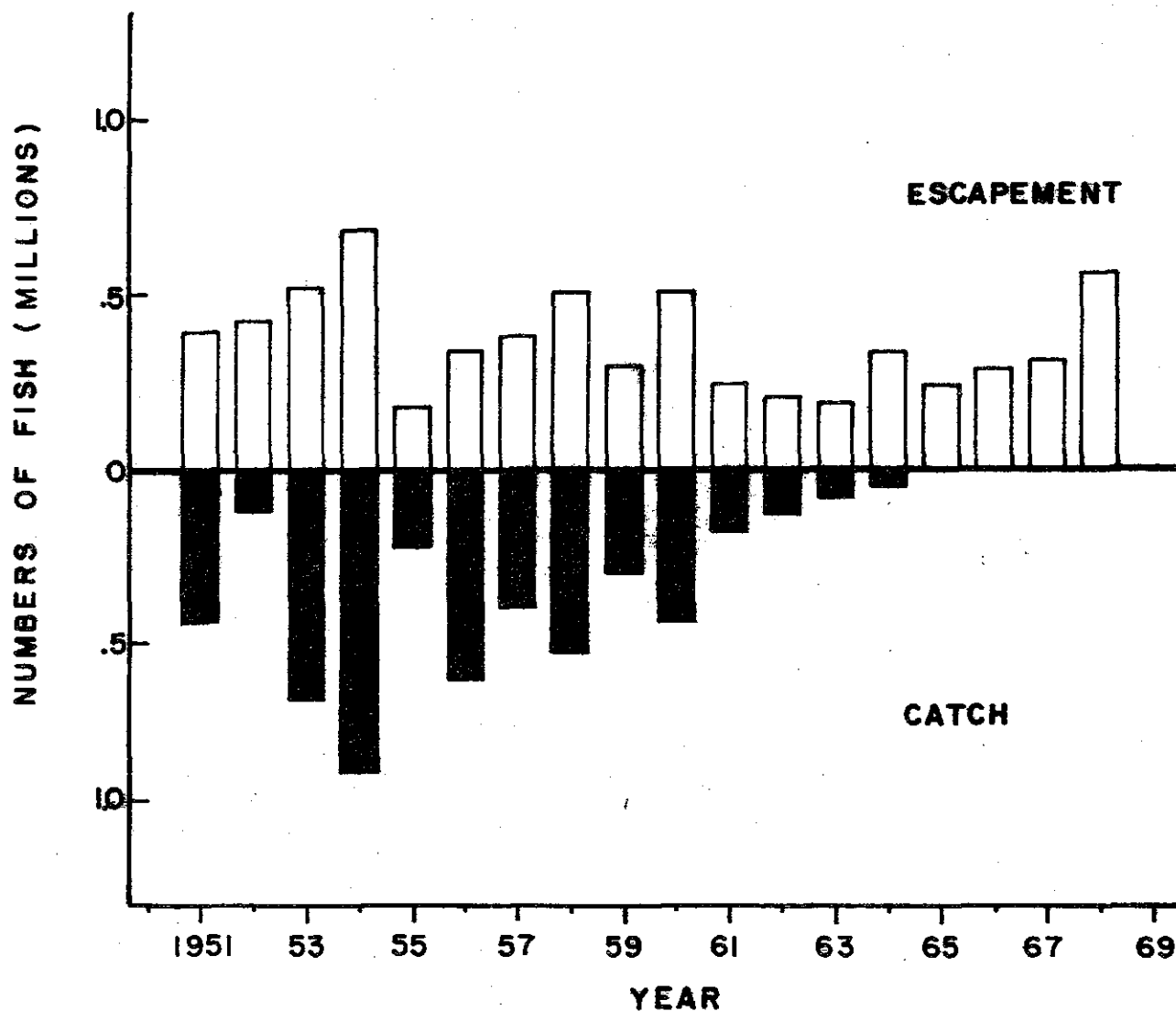
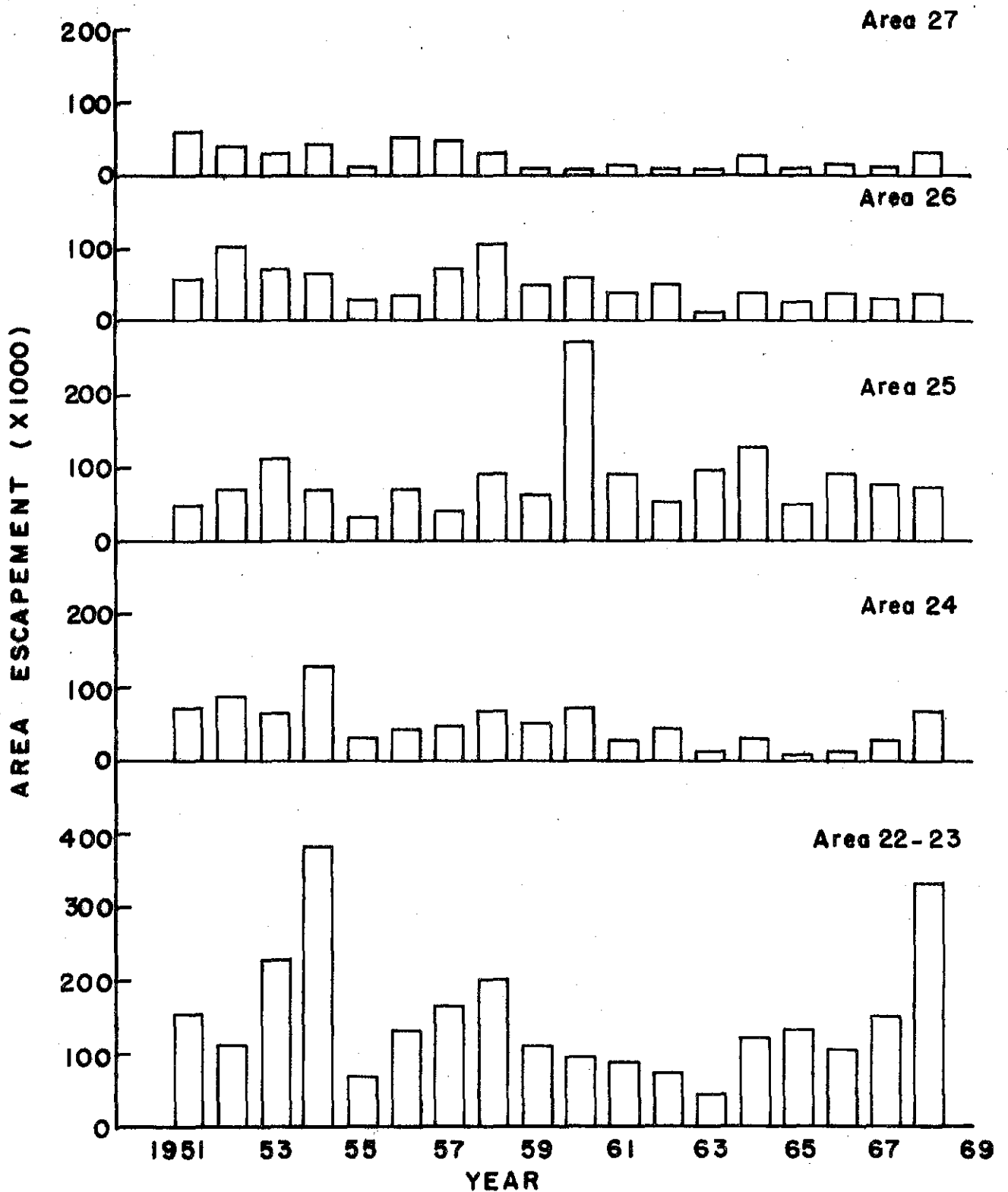


FIGURE 5. Annual catch and escapement of chum salmon to areas 22-27 for the years 1951-68 inclusive.



**FIGURE 6.** Annual area chum salmon escapements to areas 22-27 for the years 1951-68 inclusive.

Area 22-23, Nitinat-Barkley (Appendix B)

A total of 44 streams are listed in the Fishery Officer spawning ground reports as containing chum salmon. Of these streams, 12 appear to nurture the major populations and are the ones to be noted for signs of significant rehabilitation.

Nitinat River: Escapements have ranged from a low of 3500 in 1955 to a high 110,000 in 1968 with an average return of 15,000 to 35,000. The 1968 figure shows a good return from the relatively high 1964 and 1965 brood year escapements and indicates a significant level of rehabilitation. The 1969 escapement of 11,000, however, reflects the return from the low escapement reported in 1966.

Nahmint River - A high of 100,000 was recorded for this stream in 1953. Lowest recent escapement was 3500 in 1955 while the average has been in the 15,000 to 35,000 range. Recent returns of 35,000 and 75,000 show a degree of improvement and rebuilding of the stock.

Toquart River - From a high of 75,000 in 1953 escapements dropped to a low of 1500 in 1963. Relatively high escapements of 15,000 and 25,000 were reached in 1964 and 1965.

Sarita River - From a low 7500 in 1961 and 1963 the escapement to this river showed a steady increase to a high 75,000 in 1968. It had remained at a relatively steady level of 15,000 through the 1950's.

Somass River - This stream has shown little significant increase in recent years with an average 1500-3500 escapement. Highs of 7500-15,000 were reached in the early 1950's.

Cayuse Creek, Effingham River, Frederick Creek, Henderson River, Hobiton River, and Salmon River - All have shown comparatively high recent escapements of between 1500 and 7500. Effingham had an unusually high escapement of 15,000 in 1968.

Area 24, Clayoquot (Appendix B)

As shown in Figure 4 this area has contributed an average of 12.7 percent to the total Vancouver Island west coast escapement. Nine of the 20 streams listed by the Conservation and Protection Branch as containing chums appear to be the major fishery supporting streams in the area.

Tranquil Creek - Highs of 35,000 were recorded for this stream during the 1951-1954 period but fell to a low of 750 in 1965. Recent escapements of 3500-7500 have indicated a degree of recovery.

Sutton's Mill Creek and Waffa River - Low escapements of 200-400 fish were recorded for these streams in 1952 and 1965. Significant increases are evident in the 1967-1969 period when escapements in the 1500-7500 range have been maintained.

Warne Bay Creek, Hesquiat River and Cypreo River - High escapements of 7500 were recorded to all these streams in 1954 but have since averaged 1500 in Warne Bay Creek and Hesquiat River. Cypreo River has maintained a 3500-7500 escapement level. Recent escapements of 3500 in the three streams show promising recovery from the lows in 1965 and 1966.

Atleo River, Moyhea River, Megin River and Bawden Bay Creek - Highs of 15,000 were recorded for Moyhea River and Megin River in 1954 and for Bawden Bay Creek and Atleo River in 1960. Recent escapements to these streams of 1500-10,000 have shown improvement over the extreme lows of 200-400 fish estimated in 1965 and 1966. Significant increases were recorded for Atleo River particularly when an escapement of 18,500 was recorded in 1968.

Area 25, Nootka (Appendix B)

The escapement to this area has averaged 25.9 percent of the combined Area 22-27 total. Chum salmon spawn in 31 streams of which six appear to be the major contributors.

Inner Basin River - This stream reached a high escapement of 35,000 in 1960 but during the 1959-1969 period has maintained a level of 7500 to 15,000 fish.

Tahsis River - A 35,000 fish escapement was recorded in 1960. Lows of 3500 were estimated for the years 1955-1957, 1962 and 1965. Recent escapements have been in the 7500-10,000 range.

Burman River - Lowest escapement to this stream was 750 in 1959. A high of 15,000 was attained in 1952, 1956 and 1960. From 1961 to 1966, however, the escapements were relatively low and ranged from 3500 to 9000. Recent escapements indicate a slight degree of rehabilitation.

Conuma Creek - Escapements to this river have ranged from 750 in 1962 to 35,000 in 1960. Recent escapements of 6000 to 10,000 show a significant degree of rebuilding of the stock.

Zeballos River - A high escapement of 15,000 was recorded for the three-year period 1958-1960. Recent escapements in the range of 3500-8000 are comparable with those attained in the early 1950's.

Park River - A low of 750 was recorded in 1957 with a high of 15,000 in 1960. The 1966 and 1967 escapements of 10,000 and 7000 indicated a significant rebuilding trend although the 1968 figure of 3500 tended towards the previous lows.

Area 26, Kyuquot (Appendix B)

The 19 streams in this area have contributed an average 14.0 percent to the total Vancouver Island West Coast chum salmon escapement over the 18-year period under consideration. The following four streams are the major chum producers.

Tahsish River - A 15,000 escapement was reached four times during the 1950's. A low of 3500 was maintained from 1961 to 1965 but recovered to 7500 in 1966 and 1967. A very low of 750 was reported in the 1969 spawning ground report.

Chamiss River - An average escapement of 3500 has been maintained in this river throughout the 1960's. In 1968 a high of 7500 was reached, an escapement level which equalled the area average of the 1950's.

Malksope River - Escapements to this river have ranged from 750 in 1961 to 15,000 in 1952, 1958 and 1969.

Kashutl River - High escapements of 7500 were attained in 1952, 1958 and 1966. From a low in 1963 of 750 the present level of escapement is 3500.

Clanninick River - In 1958 and 1960 a comparatively high escapement of 15,000 was reached. There were 35,000 recorded in 1966. An extreme low of 400 was reached in 1963 with recent escapements in the 1000-3500 range.

Area 27, Quatsino (Appendix B)

The chum salmon escapement to this area has averaged 7.1 percent of the combined 22-27 total and is contributed by 31 streams listed in the Fishery Officer reports. Each of these streams has had maximum escapements in the 3500-7500 range although escapements as low as 25 have been recorded. Encouraging escapements were recorded for the following streams in 1968 and 1969: Cayeghle Creek, Head River, Ingersol River, Jims Creek, Sawmill Creek and Stevens Creek.

Catches since 1951

Prior to 1951 purse seine catches on the West Coast of Vancouver Island ranged between a low of 5000 pieces in 1949 when there was little effort expended, and a high of 2,315,000 in 1936. A catch between 700,000 and 1,200,000 was average.

A graph of the recorded catch and escapement for the period 1951-1968 is presented in Figure 5. As shown by this graph and indicated by the data in Table 1 and Figure 7, a trend towards lower annual catches is evident. The extreme low in 1952 is the result of a strike during the fall net fishery. As stated previously, the increasing efficiency of the fishing fleet working on an "overfished" stock necessitated the gradual reduction of allowable fishing time in an attempt to reduce the pressure on the remaining populations. The decline in both catch and escapement continued until complete closure of all areas was implemented in 1965. Commercial catches in the individual areas are discussed below and are summarized in Tables 1 and 2, and Figure 8.

TABLE 2. ANNUAL CHUM SALMON FALL NET CATCH AND PERCENT OF TOTAL  
WEST COAST OF VANCOUVER ISLAND NET CATCH IN AREAS 22-27 FOR THE YEARS  
1951-1969 INCLUSIVE

	<u>Area 22</u>	%	<u>23</u>	%	<u>24</u>	%	<u>25</u>	%	<u>26</u>	%	<u>27</u>	%	<u>TOTAL</u>
	Total		Total		Total		Total		Total		Total		
1951	27,200	6.3	90,150	20.8	22,550	5.2	95,400	22.0	22,900	5.3	176,300	40.6	434,500
1952**			45,063	37.5	13,400	11.2	47,200	39.3	7,000	5.8	7,500	6.2	120,163
1953	59,900	9.2	198,750	30.4	55,850	8.6	211,800	32.4	87,250	13.4	39,300	6.0	652,850
1954	217,200	23.7	315,695	34.4	95,900	10.4	173,440	18.9	62,580	6.9	53,400	5.8	918,215
1955	7,200	3.3	114,195	51.6	21,150	9.6	58,430	26.4	5,500	2.5	14,700	6.7	221,175
1956	118,358	19.6	257,351	42.5	53,500	8.8	88,280	14.6	39,100	6.5	48,700	8.1	605,289
1957	85,328	21.3	113,697	28.4	33,600	8.4	77,700	19.4	66,500	16.6	23,850	6.0	400,675
1958	205,801	38.2	103,755	19.3	24,300	4.5	115,250	21.4	87,250	16.2	1,850	0.3	538,206
1959			76,690	25.5	37,400	12.5	77,440	25.8	93,500	31.1	15,350	5.1	300,380
1960	48,374	11.0	71,013	16.1	28,850	6.6	103,200	23.4	130,900	29.7	58,250	13.2	440,587
1961			32,976	18.8	15,250	8.7	78,900	45.0	48,300	27.5			175,426
1962			37,454	29.8	17,350	13.8	42,200	33.6	28,640	22.8			125,644
1963					8,500	10.9	55,000	70.4	14,600	18.7			78,100
1964							45,550	100.0					45,550
1965											306*		306
1966											1,100		1,100
1967											400		400
1968											2,350		2,350
1969							3,200				500		3,700
1951-1969	769,361	15.2	1,456,789	28.8	427,600	8.4	1,272,990	25.1	694,020	13.7	443,856	8.8	5,064,616
1934-1950	7,737,065	56.0	(Areas 22 & 23)		1,019,083	7.4	3,093,165	22.4	997,116	7.2	942,549	6.8	13,788,978

\* Area 27 summer net catch 1965-1969

\*\* Strike

Area 22-23

The Nitinat - Barkley Sound fishery contributed an average 57.2 percent to the West Coast Vancouver Island seine catch from 1934 to 1950. During that period an average catch of 420,000 pieces was attained. Since 1951 the combined Area 22-23 catches has ranged from 33,000 to 533,000 and has averaged 109,000. The Nitinat Lake area has produced a catch from 7200 to 217,000 pieces and has provided an average 15.2 percent to the total study area catch. Barkley Sound averaged 121,000 pieces when the area was open and contributed 28.8 percent to the total.

Area 24

The Clayoquot district has provided an average 8.0 percent to the total Area 22-27 catch both prior to and since 1951. From 1934 to 1950, however, the catch averaged 63,700 pieces while the net figure for the last three seasons when the area was open was less than 20,000.

Area 25

From 1934 to 1950 the Nootka Sound area catch represented 26.3 percent of the Vancouver Island West Coast catch when it averaged 193,000 pieces. The area since 1951 still contributes the same percentage to the total but has recently averaged 91,000 pieces. From catches of 212,000 and 174,000 in 1953 and 1954 the numbers fell to 58,000 in 1955. From that date stringent regulation of the fishery was maintained through boundary restrictions and fishery closures. Catches between 78,000 and 115,000 were maintained through

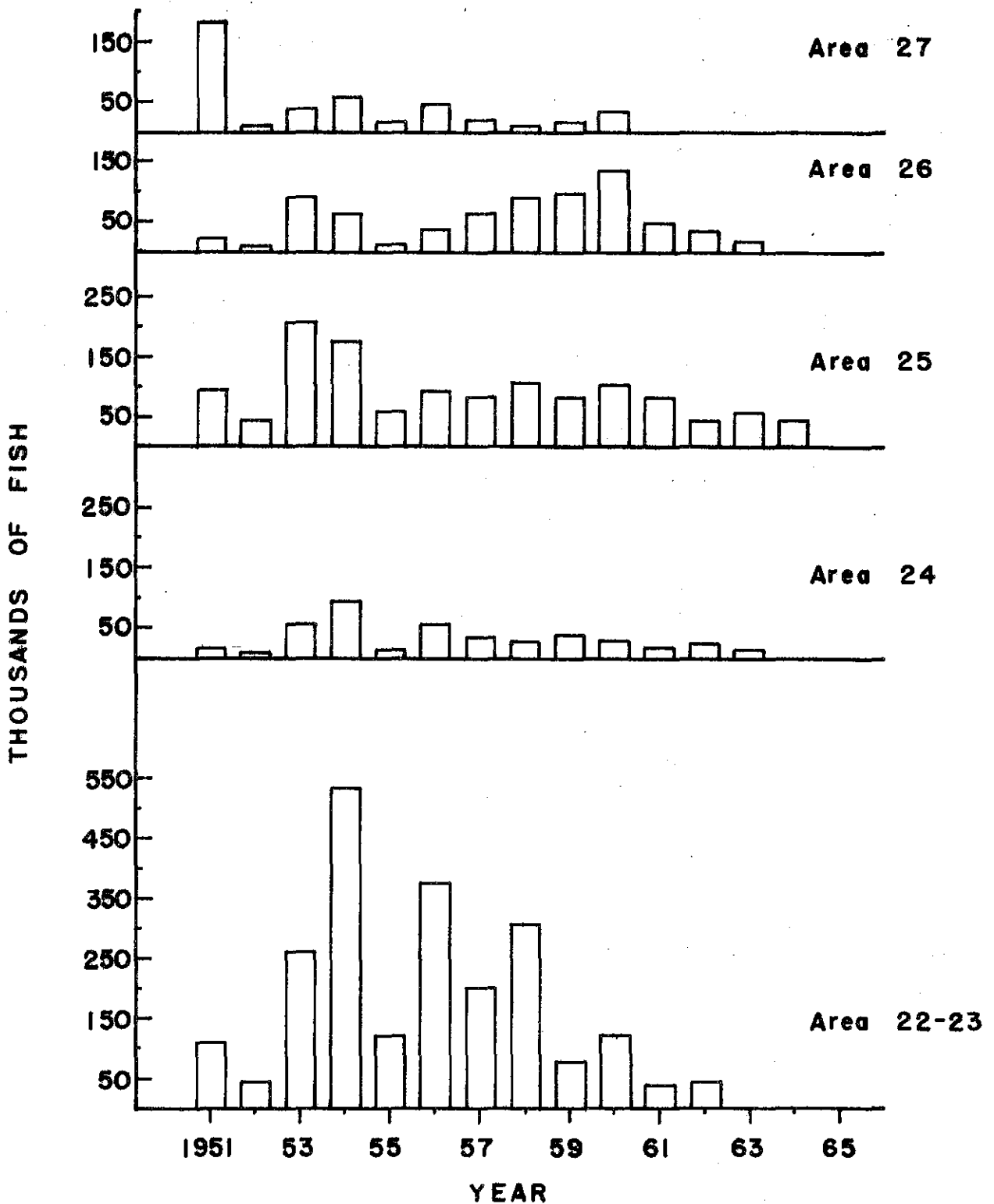
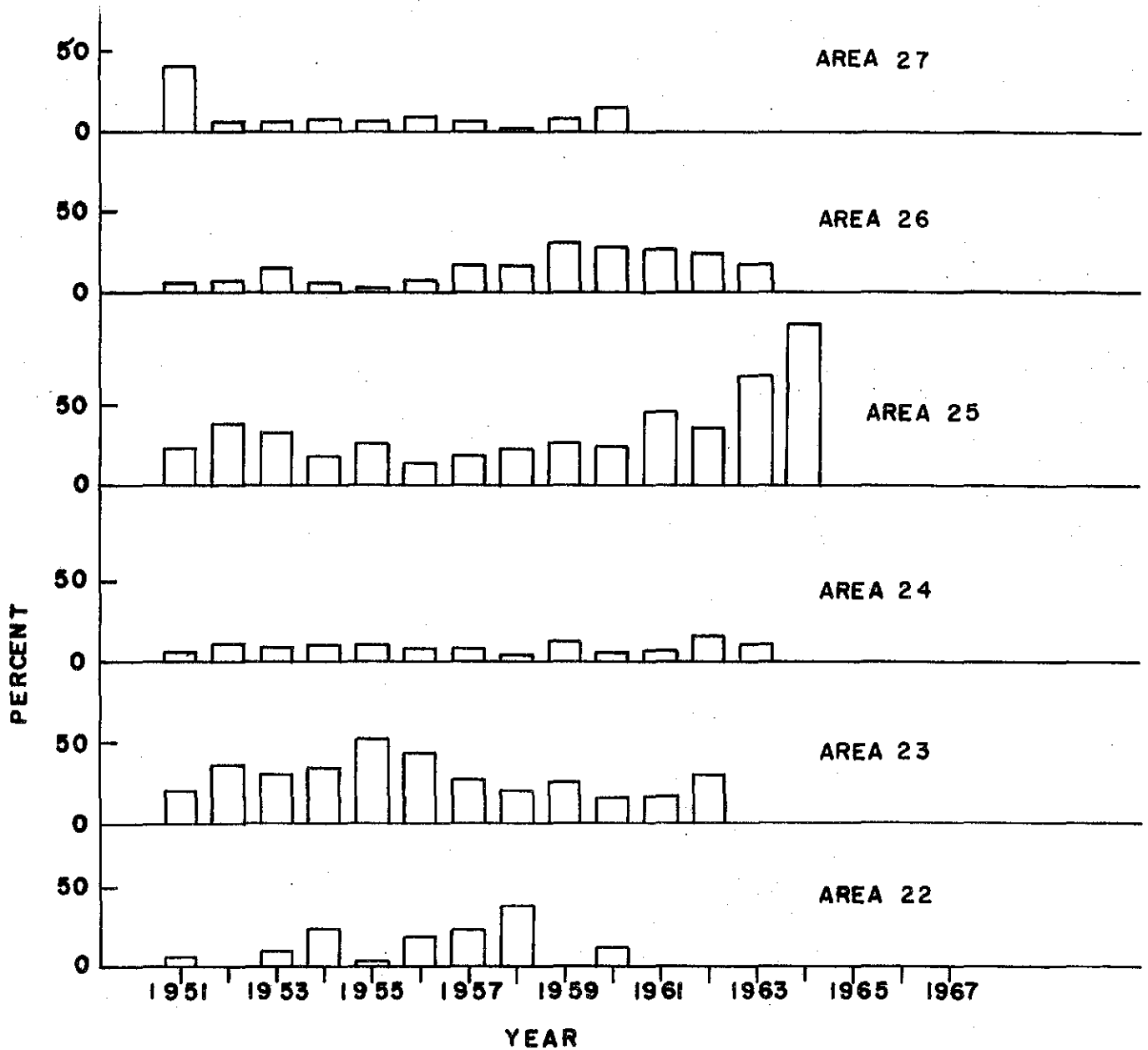


FIGURE 7. Annual area chum salmon catches in areas 22-27 for the period 1951-64 inclusive. (includes troll catch).



**FIGURE 8** Annual area chum salmon catch in Areas 22-27, shown as percent of the total west coast of Vancouver Island catch, for the years 1951-68 inclusive.

to 1961. However, low catches and small escapements for the next three years resulted in a total closure in 1965.

#### Area 26

An average of 8.5 percent of the combined 22-27 chum catch was made in the Kyuquot Sound area from 1934-1950, while for the period 1951-1963 it contributed 13.7 percent. From an early average of 62,000 pieces per year the catch has ranged from a low in 1955 of 5500 to a high of 131,000 in 1960 with a 13-year average of 53,000. Catches steadily fell from 1961 with a total of 15,000 netted in 1963 the last year the area was open to chum salmon fishing.

#### Area 27

This area has historically averaged 8.0 percent of the total study area catch. Early catches were in the 59,000 range while recent catches have averaged 44,000 pieces. Total annual figures have been from 1900 pieces in 1958 when fishing boundaries were extended and little effort exerted, to 58,000 in 1960, the last year the area was open.

#### Stock Timing

The 1953 and 1954 seasons are the only two years for which weekly catch figures are available for both September and October. The week ending catches for the years 1953, 1954 and 1956 are shown in Figure 9 as percentages of each total catch. This data is shown in an effort to indicate the timing of the chum stocks to the west coast areas. The graphs indicate that there is little difference



between the areas as all have had peak catches as early as the first week in October while most peaks occur during the week ending between the 10th and 15th of October.

Early spawning ground reports by Fishery Officers covering Areas 22-27 suggest that there are two runs to the Vancouver Island West Coast, a small run in September and a larger late run in mid-October. The recent stream reports of the Conservation and Protection Branch confirm the timing indicated by the catch data in Figure 9 and state that the duration of the runs to most of the main spawning streams (Nitinat, Tranquil, Inner Basin, Tahsis and Tahsish) is from the beginning of October to the middle of November with a peak late in October.

#### Production Level - Ratio of Return

There is little sampling data available for the West Coast of Vancouver Island and thus it is impossible to make any conclusive observations about the overall age composition of the stocks. A report by Bilton et al, 1967, however, gives age compositions of chum salmon caught in Areas 23-26 for the period 1959-1962. These are summarized in Table 3. Total annual West Coast age compositions have been determined from these data and have been applied to the 1956-1959 brood year escapements (Table 4) in order to obtain an approximate indication of the ratio of return to escapement for that period. An average 1.5:1 ratio for the four years was calculated. Average return of age 3 was 54.9 percent.

TABLE 3 AGE COMPOSITION OF WEST COAST VANCOUVER ISLAND STOCKS, 1959-62 INCLUSIVE<sup>1</sup>

Year	Age	AREA 23			AREA 24			AREA 25			AREA 26			WEST COAST COMPOSITE		
		3	4	5	3	4	5	3	4	5	3	4	5	3	4	5
1959	No.	117	153	6				252	137	5	202	154	6	571	444	19
	%	42.4	55.4	2.1				64.0	34.8	1.3	55.8	42.5	1.7	55.2	42.9	1.8
1960	No.	287	270	9	91	139	2	362	97	0	302	167	3	1042	673	14
	%	50.7	47.7	1.6	39.2	59.9	0.9	78.9	21.1		64.0	35.4	0.6	60.3	38.9	0.8
1961	No.	237	198	9	116	145	6	406	484	11	126	773	6	885	1600	32
	%	53.4	44.6	2.0	43.4	54.3	2.2	45.1	53.7	1.2	13.9	85.4	0.7	35.2	63.6	1.3
1962	No.	157	114	1	113	111	0				370	378	9	640	603	10
	%	57.7	41.9	0.3	50.4	49.6					48.9	49.9	1.2	51.0	48.1	0.8
1959-	No.	798	735	25	320	395	8	1020	718	16	1000	1472	24	3138	3320	73
1962	%	51.2	47.2	1.6	44.3	54.6	1.1	58.2	40.9	0.9	40.0	58.9	0.9	48.0	50.8	1.1

<sup>1</sup> From Bilton et al, 1967

TABLE 4. PRODUCTION OF AGE 3 AND AGE 4 CHUM SALMON FOR THE BROOD YEARS 1955-1959  
 INCLUSIVE ON THE WEST COAST OF VANCOUVER ISLAND (AREAS 22-27) AND THE JOHNSTONE  
 STRAIT STUDY AREA (AREAS 12-18, 28 AND 29).

<u>Brood Year</u>	<u>Area 22-27 Escapement</u>	<u>Return Year</u>	<u>Age 3 Number</u>	<u>Return Year</u>	<u>Age 4 Number</u>	<u>Total Return</u>	<u>% Age Return</u>	<u>West Coast Vanc. Is. Ratio Return: Escapement</u>	<u>Johnstone Strait Ratio Return: Escapement</u>
1955	169,400	1958		1959	291,336				
1956	336,600	1959	326,866	1960	371,824	698,690	46.8	2.08 : 1	2.93 : 1
1957	367,775	1960	576,375	1961	266,782	843,157	68.4	2.29 : 1	1.33 : 1
1958	503,525	1961	147,653	1962	162,832	310,485	47.6	0.61 : 1	0.25 : 1
1959	292,012	1962	172,650	1963	131,357	303,907	56.8	1.04 : 1	1.52 : 1

For the purpose of comparison the ratios of return of chum salmon to the Johnstone Strait study area (Areas 12-18, 28 and 29) are also presented for the brood years 1956-1959 in Table 4. Although the annual ratios of return to both areas are not directly comparable a degree of similarity exists and the four year average was virtually identical for both stocks.

As indicated above, the average percentage of return from the brood years 1956-1959 at age 3 was calculated to be 54.9 percent. On the basis that this percentage represents a reliable estimate of the age composition of the Vancouver Island West Coast stock the figure has been applied to escapement estimates in order to obtain an approximate measure of the ratio of brood escapements to the total returning stocks for the years 1954-1968. The ratio 55:45 (age 3:age 4) is used to calculate an effective escapement which represents the combined contribution to a stock by portions of two brood escapements. This method has been taken from a Department of Fisheries manuscript entitled "An Examination of Data Pertinent to the Management of Chum Salmon Stocks in Johnstone Strait".

Example:

The returning stock in 1955 was largely the resulting progeny of a portion of the escapements in the two years 1951 and 1952. Assuming that a stock returns in the ratio of 55:45, age 3:age 4, the effective brood escapement for the 1955 return would have been:

55% of the 1952 escapement of 415,575 = 228,566  
 45% of the 1951 escapement of 386,325 = 173,846  
 402,412

For 1955 the returning stock, as measured, totalled 390,525 and the ratio of return per unit of brood escapement was:

$$\frac{1}{402,412} = \frac{x}{390,525}$$

$$x = \frac{390,525}{402,412} = 0.97$$

or

1:0.97 (brood escapement:returning stocks)

Table 5 indicates that the return per unit of escapement has been low since 1961 (brood years 1957 and 1958) although 1968 showed a degree of rehabilitation. The data suggest that, in spite of closures in Areas 22-27 since 1961, there has not been any significant increase in the ratio of return and that poor natural survival to adult has been a prime factor in the continued depression of the Vancouver Island West Coast chum stocks.

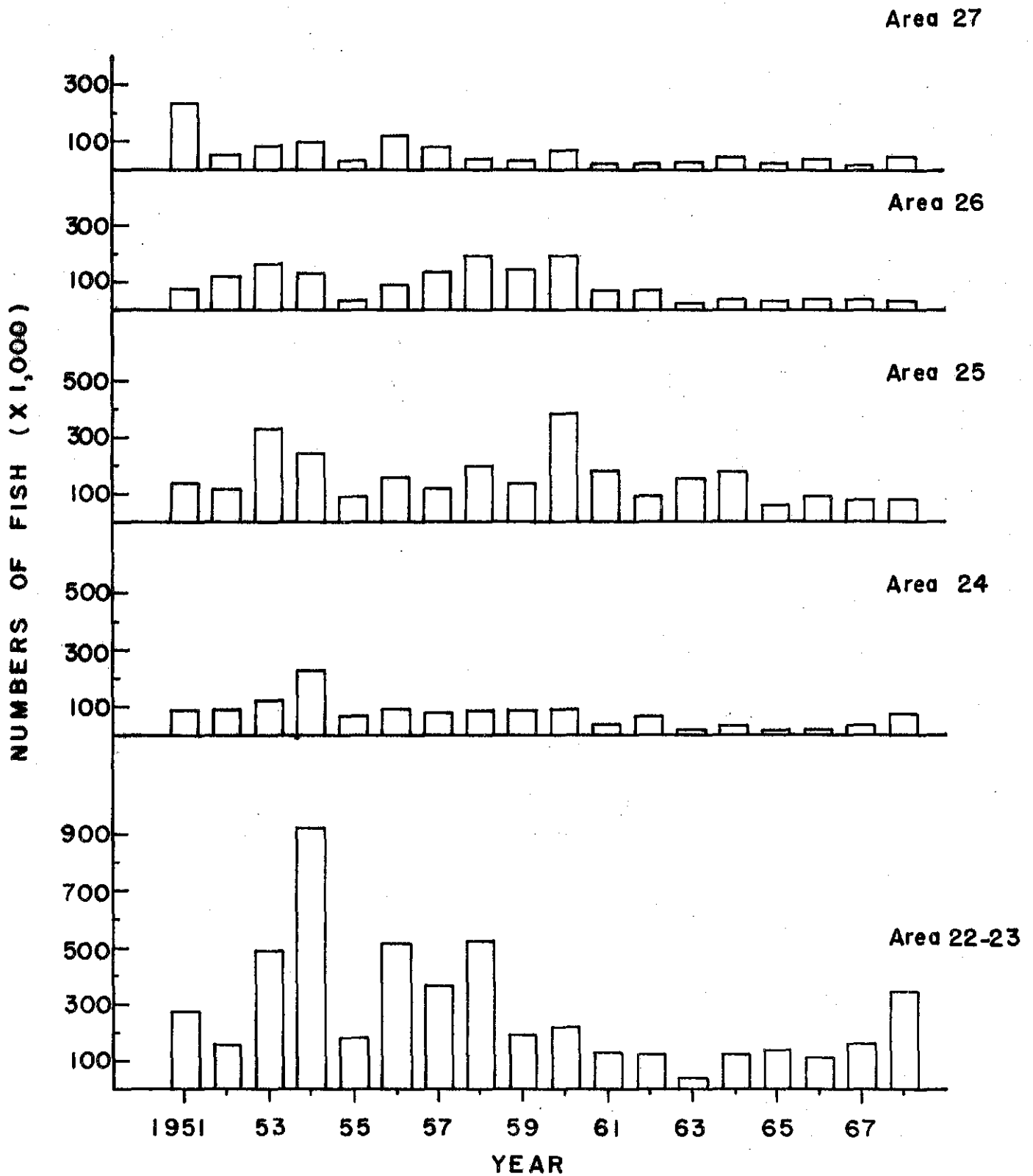
Present Assessment

Figure 10 and Table 6 show the level of abundance of the West Coast of Vancouver Island chum salmon stocks for the years 1951-1968. As has been indicated previously, the heavy exploitation of the runs to Areas 22-27, in combination with poor natural survival, has resulted in a serious decline of this species. The productivity of the spawning environment must therefore be taken into

TABLE 5. THE RATIO OF BROOD ESCAPEMENT TO THE  
TOTAL RETURNING STOCK IN AREAS 22-27 FOR THE  
YEARS 1954-1968 INCLUSIVE.

<u>Year</u>	<u>Returning Stock</u>	<u>Effective* Escapement</u>	<u>Ratio Escapement:Stock</u>
1954	1,606,596		
1955	390,525	402,412	1:0.97
1956	941,872	468,073	1:2.01
1957	768,515	606,306	1:1.27
1958	1,041,800	401,089	1:2.60
1959	592,148	261,360	1:2.27
1960	955,846	353,746	1:2.70
1961	419,468	442,438	1:0.95
1962	338,529	387,193	1:0.87
1963	253,096	414,846	1:0.61
1964	383,743	365,883	1:1.05
1965	231,241	225,968	1:1.02
1966	272,954	190,620	1:1.43
1967	304,934	263,543	1:1.16
1968	555,693	278,275	1:2.00
1969		252,807	

\* at 55% age 3, 45% age 4.



**FIGURE 10.** Total annual return of chum salmon to Areas 22-27 for the years 1951-68 inclusive (catch plus escapement).

TABLE 6. TOTAL ANNUAL CHUM SALMON STOCK AND PERCENT OF TOTAL WEST COAST OF VANCOUVER ISLAND STOCK SHOWN BY AREA IN AREAS 22-27 FOR THE YEARS 1951-68

Year	<u>AREA 22-23</u>		<u>AREA 24</u>		<u>AREA 25</u>		<u>AREA 26</u>		<u>AREA 27</u>		<u>TOTAL</u>
	<u>Stock</u>	<u>% Total</u>	<u>Stock</u>	<u>% Total</u>	<u>Stock</u>	<u>% Total</u>	<u>Stock</u>	<u>% Total</u>	<u>Stock</u>	<u>% Total</u>	
1951	263,966	32.1	92,315	11.2	144,193	17.6	84,000	10.2	237,077	28.8	821,551
1952	157,342	29.4	96,499	18.0	123,138	23.0	111,108	20.7	47,516	8.9	535,603
1953	480,437	41.3	118,505	10.2	327,760	28.2	164,681	14.1	71,481	6.1	1,163,864
1954	918,426	57.2	222,443	13.8	242,007	15.1	126,352	7.9	97,368	6.1	1,606,596
1955	187,312	48.0	51,938	13.3	90,070	23.1	35,482	9.1	25,723	6.6	390,525
1956	506,884	53.8	94,977	10.1	158,225	16.8	78,332	8.3	103,454	11.0	941,872
1957	361,259	47.0	77,198	10.0	119,371	15.5	136,219	17.7	74,468	9.7	768,515
1958	514,618	49.4	86,416	8.2	209,338	20.1	195,543	18.8	35,885	3.4	1,041,800
1959	189,342	32.0	90,616	15.3	138,675	23.4	146,438	24.7	27,177	4.6	592,148
1960	215,635	22.6	98,582	10.3	382,195	40.0	192,269	20.1	67,165	7.0	955,846
1961	122,955	29.3	40,496	9.7	173,287	41.3	68,584	16.4	14,146	3.4	419,468
1962	112,973	33.4	58,776	17.4	95,065	28.1	63,506	18.8	8,210	2.4	338,529
1963	44,788	11.7	20,052	5.2	154,633	40.3	25,112	6.5	8,511	3.4	253,096
1964	119,073	31.0	30,404	7.9	170,633	44.5	38,392	10.0	25,181	6.6	383,743
1965	132,905	57.5	8,083	3.5	55,238	23.9	27,268	11.8	7,747	3.4	231,241
1966	106,483	39.0	9,912	3.6	98,045	35.9	39,535	14.5	18,979	7.0	272,954
1967	152,957	50.1	26,891	8.8	79,357	26.0	34,791	11.4	10,938	3.6	304,934
1968	334,022	60.1	66,241	11.9	78,534	14.1	42,541	7.7	34,355	6.2	555,693

account when assessing the current condition of the stock. Observations by Fishery Officers of the Conservation and Protection Branch have indicated that logging programs in many areas have greatly altered the environment of some of the major streams such as Nitinat, Sarita and Nahmint.

Recent returns of the study area stocks have been in the ratio of <sup>1.07</sup>~~1.07~~:1 of adult escapement. The closures implemented as early as 1962 are thus maintaining the level of the stocks but have not resulted in any significant degree of rehabilitation.

It was noted in the escapement assessment of this report that there are several streams in each area on which a successful commercial fishery must depend. Some, including Nitinat in Area 22, Atleo in Area 24, Inner Basin and Tahsis in Area 25, and Tahsish in Area 26, have shown some improvement in escapement levels. Although returns to the whole study area in 1969 were low, the improved escapement levels in 1967 and 1968 offer a degree of optimism for future returns.

+ AP 10

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AREA 22-23

STREAM	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
CANOE PASS	750	1,500	200	200	200	75	75	200	200	200	75	400	75	200	750	400	1,200	1,200	200
CARNATION	750	750	1,500	1,500	400	200	1,500	1,500	400	400	200	750	200	1,500	200	1,500	1,500	1,500	3,500
CATARACT	750	200	750	200	400	200	750	1,500	750	200	200	200	200	200	200	400	400	400	400
CHEWNET																			
CHINA	400	200	75	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
COLEMAN	400	400	75	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
COCHRAN	750	400	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
COEUR D'ALENA	200	75	75	400	750	200	200	200	200	200	200	200	200	200	200	200	200	200	200
COURSE	1,500	3,500	1,500	3,500	1,500	3,500	3,500	750	400	1,500	1,500	750	400	1,500	200	750	750	400	3,500
CAYUSE	3,500	3,500	3,500	7,500	1,500	3,500	3,500	750	7,500	3,500	1,500	750	400	750	750	750	750	400	750
DUTCH HARBOUR (NW)																			
DUTCH HARBOUR (SW)																			
EFFINGHAM	1,500	750	1,500	7,500	3,500	3,500	7,500	7,500	3,500	3,500	1,500	750	750	3,500	1,500	7,500	7,500	15,000	3,500
FRANKLIN	200	400	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
FREDERICK	200	200	200	400	400	200	200	200	200	200	200	200	200	200	200	200	200	200	200
HOLFORD	750	200	750	1,500	1,500	400	750	750	400	750	750	200	200	750	750	750	750	750	3,500
HENDERSON	1,500	1,500	35,000	7,500	1,500	2,500	7,500	7,500	3,500	3,500	3,500	1,500	750	3,500	2,000	2,000	3,500	7,500	3,500
HILLIER	3,400	750	750	1,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	3,500
HOBSON	3,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	3,500	7,500	7,500	7,500	3,500	7,500	7,500	7,500	7,500	7,500	3,500
LITTLE HAGGIE																			
LUCKY	1,500	75	1,500	400	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
LOSTHIDE	75	200	75	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
MACKENZIE	75	75	750	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
MAGGIE	750	200	1,500	400	200	200	200	750	1,500	750	750	400	200	200	400	400	1,500	750	200
MERCANTILE	200	200	75	200	200	75	200	750	1,500	75	75	200	400	75	75	750	75	200	400
MINT	35,000	15,000	100,000	75,000	3,500	7,500	15,000	35,000	15,000	7,500	15,000	15,000	15,000	15,000	15,000	15,000	15,000	75,000	35,000
NITINAT	7,500	35,000	7,500	75,000	3,500	35,000	15,000	15,000	15,000	35,000	15,000	15,000	15,000	7,500	75,000	15,000	15,000	110,000	11,000
PIPESTEIN	7,500	750	1,500	1,500	400	3,500	1,500	1,500	1,500	400	750	200	200	400	400	750	400	750	750
PACHENA	1,500	200	750	1,500	400	400	400	400	400	75	400	200	200	200	200	750	1,500	750	75
PETT MOOK	400	400	200	400	200	1,500	400	750	400	200	75	400	200	200	75	400	200	750	400
SALMON	3,500	1,500	3,500	2,500	1,500	1,500	3,500	7,500	7,500	1,500	400	750	750	750	200	3,500	1,500	3,500	1,500
SANDY	750	75	75	200	200	200	400	400	400	200	200	200	200	200	200	200	200	400	75
SARITA	7,500	15,000	15,000	75,000	15,000	35,000	35,000	35,000	15,000	15,000	7,500	15,000	7,500	35,000	1,500	35,000	40,000	75,000	65,000
SECHART	750	25	400	400	200	200	200	200	200	200	200	200	200	200	200	400	200	400	400
SHUB BASIN	3,500	750	1,500	3,500	750	400	1,500	2,500	200	200	75	75	75	75	75	400	75	1,500	750
SCHASS	15,000	750	7,500	7,500	3,500	1,500	7,500	7,500	3,500	1,500	3,500	3,500	1,500	1,500	1,500	1,500	1,500	3,500	2,500
SUSSAN	3,500	3,500	3,500	7,500	7,500	3,500	3,500	3,500	3,500	1,500	1,500	1,500	1,500	1,500	1,500	400	3,500	200	750
TWO RIVERS (E)																			
TWO RIVERS (W)																			
TOQUART (M)	35,000	15,000	35,000	75,000	3,500	7,500	15,000	35,000	15,000	7,500	7,500	7,500	1,500	7,500	3,500	15,000	25,000	7,500	5,000
TOQUART (L)																			
UBERICK	3,500	1,500	3,500	7,500	3,500	1,500	1,500	1,500	3,500	1,500	1,500	3,500	3,500	1,500	750	750	750	3,500	3,500
UBERLESS INLET	400	200	3,500	7,500	3,500	75	200	750	400	75	200	200	200	75	75	75	75	1,500	7,500
VERNON BAY	200	200	200	200	75	200	75	200	75	75	200	200	200	75	200	200	75	75	750
TOTAL	151,950	112,575	257,575	388,675	66,950	134,650	169,425	212,350	116,125	99,800	93,025	76,800	45,675	126,975	132,575	127,725	152,775	337,820	182,175

AREA 24

STREAM	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
ATLEE	3,500	7,500	3,500	7,500	7,500	7,500	7,500	7,500	7,500	15,000	750	7,500	3,500	3,500	500	1,500	1,500	18,500	3,500
BANDON BAY	400	2,500	3,500	7,500	1,500	3,500	3,500	3,500	3,500	15,000	750	7,500	750	1,500	200	1,500	1,500	7,500	1,500
BEDELL	3,500	7,500	1,500	7,500	1,500	3,500	3,500	3,500	3,500	3,500	750	400	75	1,500	750	750	400	1,500	400
CECILIA	750	400	200	750	200	200	200	750	750	750	200	400	200	200	75	200	200	200	400
CYPRID	1,500	7,500	3,500	7,500	3,500	3,500	3,500	3,500	7,500	7,500	1,500	7,500	1,500	3,500	1,500	750	3,500	3,500	3,500
HESQUIAT	750	750	3,500	7,500	1,500	3,500	3,500	3,500	3,500	1,500	1,500	1,500	75	1,500	750	75	400	3,500	200
HOTSPRINGS COVE	400	1,500	750	3,500	200	400	400	400	400	200	200	200	75	200	75	400	200	1,500	3,500
ICE	3,500	200	200	400	200	200	750	3,500	1,500	3,500	750	1,500	750	750	750	400	400	3,500	1,500
INDIAN	200	750	750	1,500	200	200	400	1,500	750	750	1,500	1,500	750	1,500	750	400	750	3,500	3,500
IRVING (SYDNEY)	1,500	750	400	400	200	400	400	750	750	3,500	3,500	1,500	750	1,500	750	200	400	3,500	3,500
LOWER KENNEDY	3,500	750	400	1,500	200	200	400	750	750	200	200	200	200	400	400	400	400	400	400
MEGIN	3,500	7,500	3,500	15,000	1,500	3,500	3,500	7,500	7,500	15,000	3,500	7,500	750	3,500	400	75	3,500	10,000	3,500
MOYNA	3,500	15,000	3,500	15,000	1,500	3,500	3,500	7,500	7,500	1,500	1,500	1,500	1,500	1,500	1,500	400	200	1,500	1,500
MOSQUITO (SUTTON'S MILL)	200	200	400	1,500	200	400	750	1,500	750	1,500	400	750	400	3,500	200	1,500	1,500	2,500	1,500
RILEY'S COVE	7,500	750	200	1,500	200	75	200	200	200	75	200	200	200	200	200	200	200	200	200
TOFINO	7,500	3,500	1,500	3,500	750	200	1,500	1,500	7,500	7,500	7,500	7,500	1,500	1,500	750	1,500	750	7,500	3,500
TRAWAIL	35,000	35,000	35,000	35,000	15,000	15,000	15,000	15,000	7,500	7,500	7,500	7,500	7,500	3,500	750	3,500	3,500	7,500	3,500
WAPA	1,500	200	1,500	1,500	750	750	200	1,500	3,500	1,500	750	750	750	1,500	400	750	750	7,500	3,500
WHITEPINE	400	400	400	1,500	200	200	200	1,500	750	1,500	400	400	400	200	75	200	75	750	400
WARM BAY	400	1,500	1,500	7,500	750	1,500	1,500	1,500	1,500	3,500	400	1,500	750	3,500	400	1,500	1,500	3,500	1,500
TOTAL	71,700	89,150	65,700	133,550	37,550	48,225	50,400	68,850	60,000	84,350	25,525	48,500	14,375	33,525	8,300	10,275	28,300	85,975	33,600

AREA 25

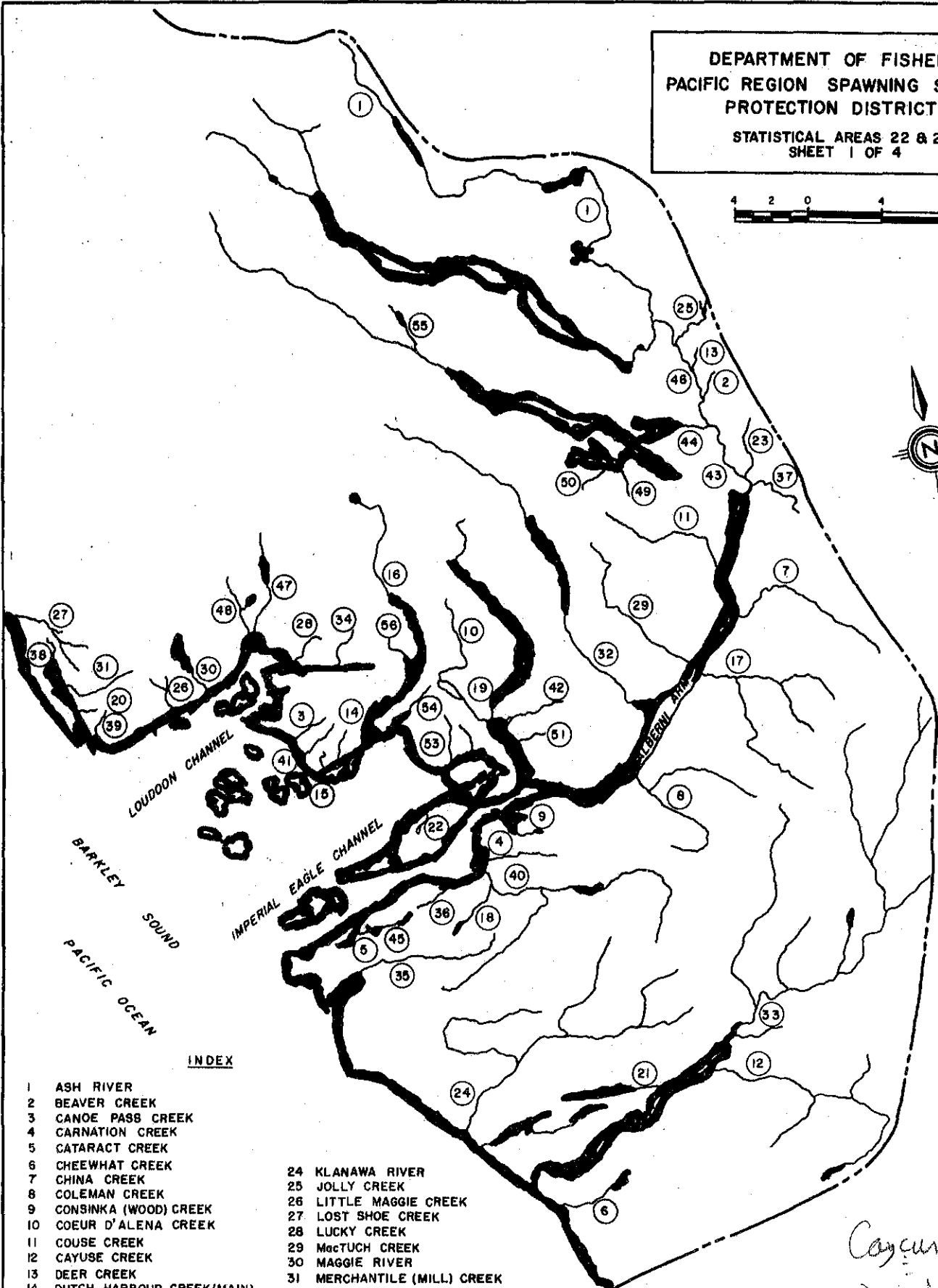
STREAM	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	19
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APPENDIX B

Maps of Statistical Areas 22-27 showing chum  
salmon spawning streams. Reproduced from  
Department of Fisheries stream catalogue

DEPARTMENT OF FISHERIES  
 PACIFIC REGION SPAWNING STREAMS  
 PROTECTION DISTRICT 4  
 STATISTICAL AREAS 22 & 23  
 SHEET 1 OF 4

4 2 0 4 8 MILES



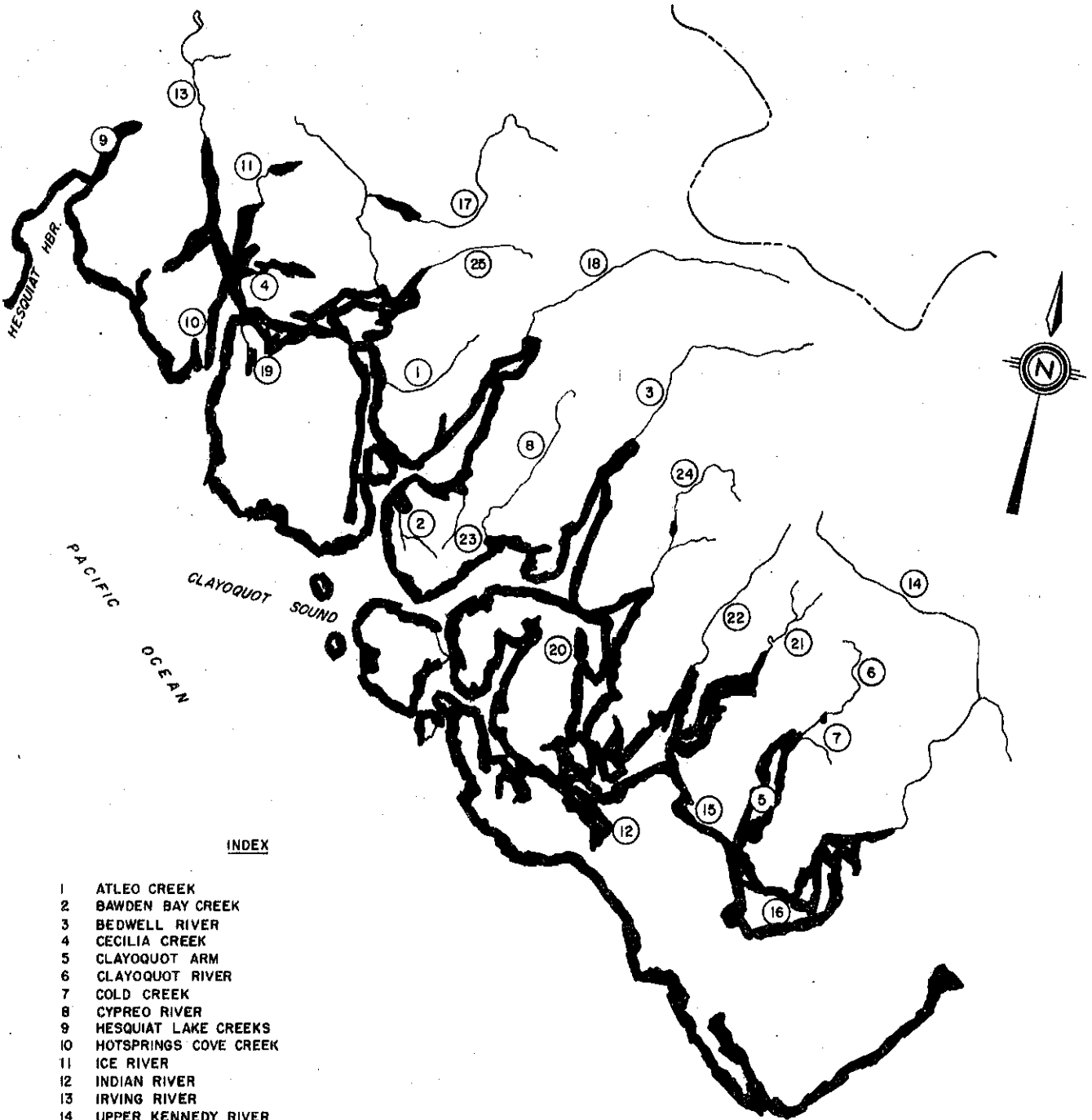
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- |                               |                             |                              |                         |
|-------------------------------|-----------------------------|------------------------------|-------------------------|
| 1 ASH RIVER                   | 24 KLANAWA RIVER            | 42 SNUG BASIN CREEK          | 52 USELESS CREEK        |
| 2 BEAVER CREEK                | 25 JOLLY CREEK              | 43 SOMASS RIVER              | 53 USELESS INLET CREEK  |
| 3 CANOE PASS CREEK            | 26 LITTLE MAGGIE CREEK      | 44 SPROAT RIVER              | 54 VERNON BAY CREEK     |
| 4 CARNATION CREEK             | 27 LOST SHOE CREEK          | 45 SUGSAW (GRAPPLER) CREEK   | 55 WEINTER CREEK        |
| 5 CATARACT CREEK              | 28 LUCKY CREEK              | 46 STAMP RIVER               | 56 WEST (WALLACE) CREEK |
| 6 CHEEWHAT CREEK              | 29 MacTUCH CREEK            | 47 TOQUART RIVER             |                         |
| 7 CHINA CREEK                 | 30 MAGGIE RIVER             | 48 TOQUART RIVER (LEFT FORK) |                         |
| 8 COLEMAN CREEK               | 31 MERCHANTILE (MILL) CREEK | 49 TWO RIVERS EAST           |                         |
| 9 CONSINKA (WOOD) CREEK       | 32 NAHMINT RIVER            | 50 TWO RIVERS WEST           |                         |
| 10 COEUR D'ALENA CREEK        | 33 MITINAT RIVER            | 51 UCHUCK (SILVER) CREEK     |                         |
| 11 COUSE CREEK                | 34 PIPESTEM CREEK           |                              |                         |
| 12 CAYUSE CREEK               | 35 PACHENA RIVER            |                              |                         |
| 13 DEER CREEK                 | 36 POETT NOOK CREEK         |                              |                         |
| 14 DUTCH HARBOUR CREEK(MAIN)  | 37 ROGER CREEK              |                              |                         |
| 15 DUTCH HARBOUR CREEK(SMALL) | 38 SALMON RIVER             |                              |                         |
| 16 EFINGHAM RIVER             | 39 SANDY CREEK              |                              |                         |
| 17 FRANKLIN RIVER             | 40 SARITA RIVER             |                              |                         |
| 18 FREDERICK CREEK            | 41 SECHART CREEK            |                              |                         |

*Cayuse  
 + D. D. D. D.*

DEPARTMENT OF FISHERIES  
 PACIFIC REGION SPAWNING STREAMS  
 PROTECTION DISTRICT 4

STATISTICAL AREA 24  
 SHEET 2 OF 4

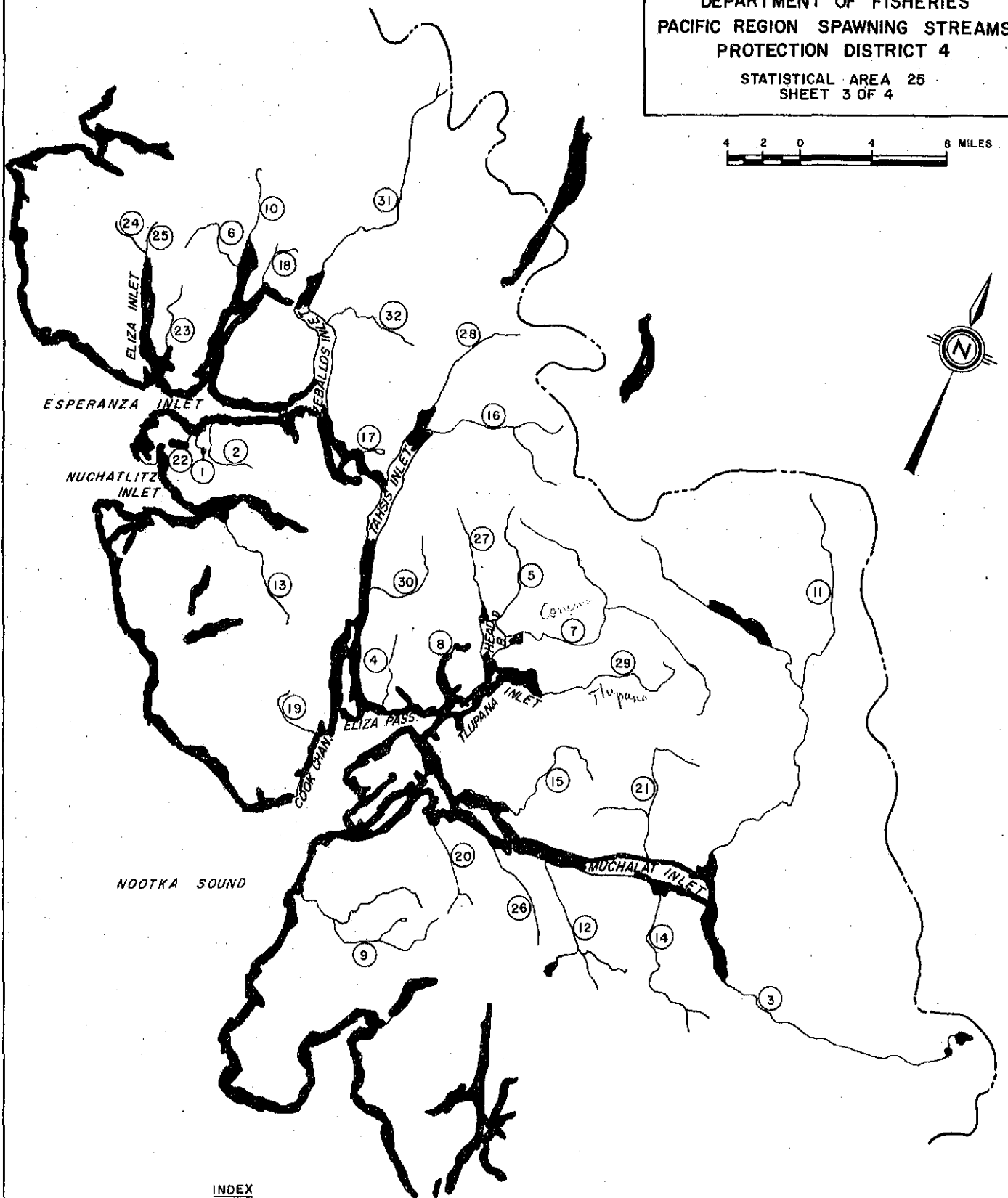
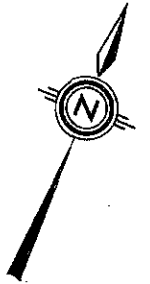
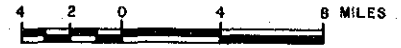


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- 1 ATLEO CREEK
- 2 BAWDEN BAY CREEK
- 3 BEDWELL RIVER
- 4 CECILIA CREEK
- 5 CLAYOQUOT ARM
- 6 CLAYOQUOT RIVER
- 7 COLD CREEK
- 8 CYPREO RIVER
- 9 HESQUIAT LAKE CREEKS
- 10 HOTSPRINGS COVE CREEK
- 11 ICE RIVER
- 12 INDIAN RIVER
- 13 IRVING RIVER
- 14 UPPER KENNEDY RIVER
- 15 LOWER KENNEDY RIVER
- 16 KENNEDY LAKE
- 17 MEGIN RIVER
- 18 MOYHEA RIVER
- 19 RILEY'S COVE CREEK
- 20 SUTTON'S MILL CREEK
- 21 TOFINO CREEK
- 22 TRANQUIL CREEK
- 23 WHITEPINE COVE CREEK
- 24 WARNE BAY CREEK
- 25 WAFFA RIVER

DEPARTMENT OF FISHERIES  
 PACIFIC REGION SPAWNING STREAMS  
 PROTECTION DISTRICT 4

STATISTICAL AREA 25  
 SHEET 3 OF 4

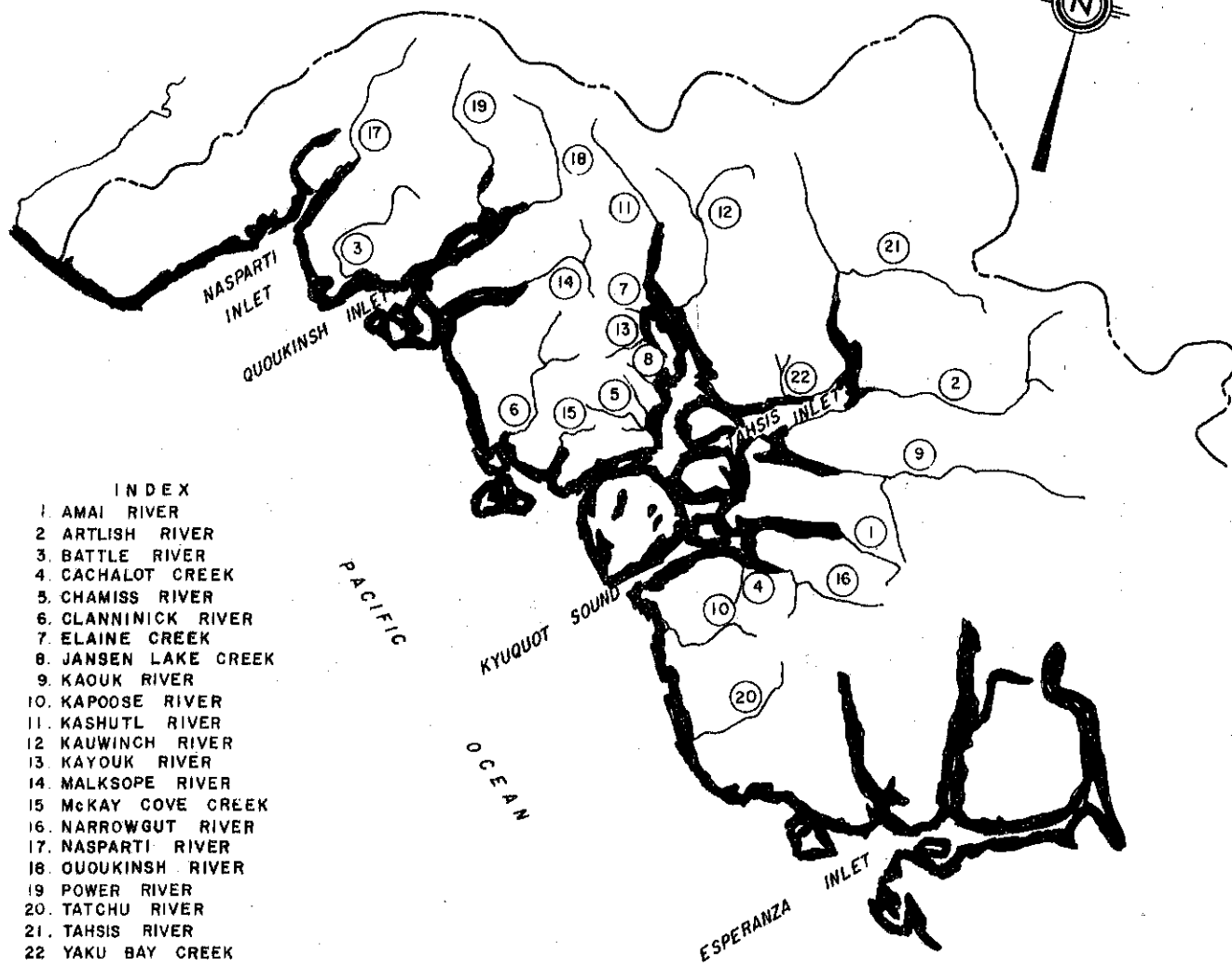


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- |                       |                                   |                            |
|-----------------------|-----------------------------------|----------------------------|
| 1 APPLE CREEK         | 12 HOUSTON RIVER                  | 23 PARK RIVER              |
| 2 BRODICK CREEK       | 13 INNER BASIN RIVER (LAURIE CR.) | 24 PORT ELIZA No 1         |
| 3 BURMAN RIVER        | 14 JACKLAH CREEK                  | 25 PORT ELIZA No 2         |
| 4 CANAL CREEK (HOISS) | 15 KLEEPTEE CREEK                 | 26 SILVERADO CREEK         |
| 5 CANTON GORGE CREEK  | 16 LEINER CREEK                   | 27 SUCWOA RIVER            |
| 6 CHUM CREEK          | 17 LORD CREEK                     | 28 TAHSIS RIVER            |
| 7 CONUMA CREEK        | 18 MAMAT CREEK                    | 29 TLUPANA RIVER           |
| 8 DESERTED CREEK      | 19 MARVINAS BAY CREEK             | 30 TAOWWIN RIVER (TSOWWIN) |
| 9 ESCALANTE RIVER     | 20 MOOYAH BAY CREEK               | 31 ZEBALLOS RIVER          |
| 10 ESPINOSA RIVER     | 21 MCCURDY CREEK                  | 32 ZEBALLOS (LITTLE) RIVER |
| 11 GOLD RIVER         | 22 OWOSSITSA CREEK                |                            |

DEPARTMENT OF FISHERIES  
 PACIFIC REGION SPAWNING STREAMS  
 PROTECTION DISTRICT 4  
 STATISTICAL AREA 26  
 SHEET 4 OF 4

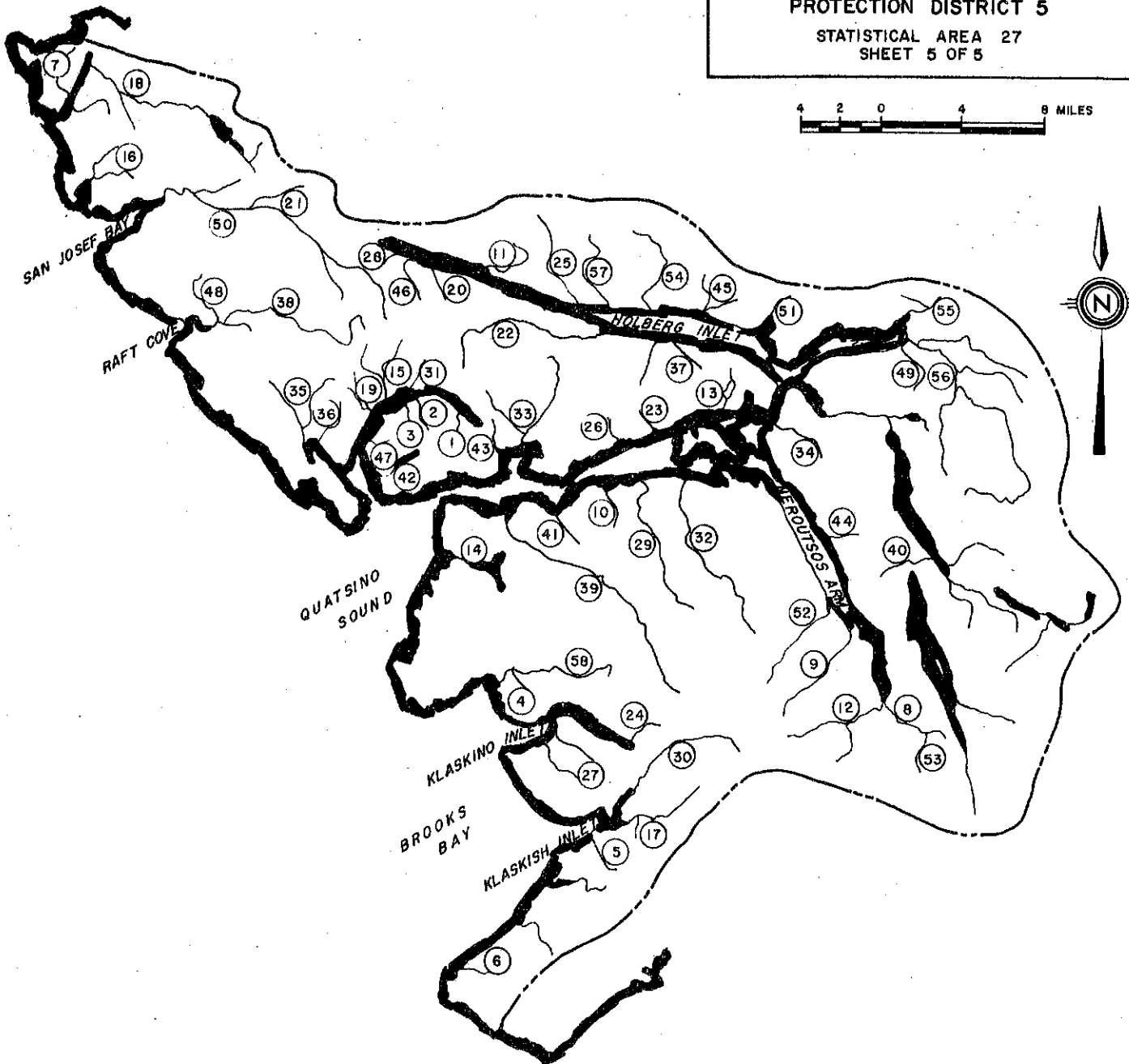
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1. AMAI RIVER
  2. ARTLISH RIVER
  3. BATTLE RIVER
  4. CACHALOT CREEK
  5. CHAMISS RIVER
  6. CLANNINICK RIVER
  7. ELAINE CREEK
  8. JANSEN LAKE CREEK
  9. KAOUK RIVER
  10. KAPOOSE RIVER
  11. KASHUTL RIVER
  12. KAUWINCH RIVER
  13. KAYOUK RIVER
  14. MALKSOPE RIVER
  15. MCKAY COVE CREEK
  16. NARROWGUT RIVER
  17. NASPARTI RIVER
  18. QUOUKINSH RIVER
  19. POWER RIVER
  20. TATCHU RIVER
  21. TAH SIS RIVER
  22. YAKU BAY CREEK

DEPARTMENT OF FISHERIES  
 PACIFIC REGION SPAWNING STREAMS  
 PROTECTION DISTRICT 5  
 STATISTICAL AREA 27  
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- |                               |                                    |                                   |
|-------------------------------|------------------------------------|-----------------------------------|
| 1. AHWHICHAOLTO CREEK (UPPER) | 21. GOODSPEED (SPRUCE) CREEK       | 41. MONKEY CREEK                  |
| 2. AHWHICHAOLTO CREEK (LOWER) | 22. HATHAWAY (HALFWAY) CREEK       | 42. MONTGOMERY CREEK              |
| 3. BEAR CREEK                 | 23. HAWISNAKWI CREEK               | 43. McNIFFE (DUCK) CREEK          |
| 4. BUCK CREEK                 | 24. HEAD (MARY) RIVER              | 44. NEQUILTPAALIS CREEK           |
| 5. CANOE CREEK                | 25. HUSHAMU (PEARSON) CREEK        | 45. NUKNIMISH (APPLE) CREEK       |
| 6. CAPE COOK CREEK            | 26. ILSTAD CREEK                   | 46. PEGATTEM (2 MILE) CREEK       |
| 7. CAPE SCOTT CREEK           | 27. JIMS CREEK                     | 47. QUASHTIN CREEK                |
| 8. CLAYGHLE CREEK             | 28. JOHNNY CREEK                   | 48. RONNING CREEK                 |
| 9. CAYUSE CREEK               | 29. KEWQUODIE (JOHNSON) RIVER      | 49. RUPERT RIVER                  |
| 10. CLEAGH RIVER              | 30. KLASKISH RIVER                 | 50. SAN JOSEF RIVER               |
| 11. CLEESKLAGH (6 MILE) CREEK | 31. KLAYINA (TENAAD) CREEK         | 51. STEPHENS (COAL HARBOUR) CREEK |
| 12. COLONIAL (MAIN) CREEK     | 32. KLOOTCHLIMMIS (INGERSOL) RIVER | 52. TEETA RIVER                   |
| 13. COLONY CREEK              | 33. KOPRINO RIVER                  | 53. UTLAH CREEK                   |
| 14. CULLEET CREEK             | 34. KWAKWESTA (SAWMILL) CREEK      | 54. WANOKANA (CRAWFORD) CREEK     |
| 15. DENAD (GAATO) CREEK       | 35. KWATLEO (BROWNING) CREEK       | 55. WASHLAWLIS (LAGOON) CREEK     |
| 16. DOMINIC CREEK             | 36. LEESON LAKE CREEK              | 56. WAUKAAS (WAUKANAS) CREEK      |
| 17. EAST CREEK                | 37. LEWIS CREEK                    | 57. YOUGHPAN (PRICE'S) CREEK      |
| 18. FISHERMAN RIVER           | 38. MACJACK CREEK                  | 58. KEITH RIVER                   |
| 19. GALATO (DEVIL CLUB) CREEK | 39. MAHATTA RIVER                  |                                   |
| 20. GLEERUP (3 MILE) CREEK    | 40. MARBLE RIVER                   |                                   |