

THE AUSTRALIAN SALMON FISHERY OF WESTERN AUSTRALIA

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W.A.

INTRODUCTION

Distributed through many official files, but not readily available in convenient form, is much valuable information concerning the West Australian salmon fishery since its inception. It was for the purpose of putting together all that scattered information that the present paper was prepared. It is not the work of one person, but the facts and figures here presented have been culled from numerous sources. Mr. E. J. Brownfield, A.F.I.A., the clerk-in-charge of the W.A. Fisheries Department, collated the historical facts and got together the material dealing with administration and management. Mr. B. K. Bowen, B.Sc., the statistical officer of the Department, prepared the graph and statistical tables. Mr. W. B. Malcolm, B.Sc., a research officer of the Division of Fisheries, Commonwealth Scientific and Industrial Research Organization, provided the scientific data, wrote the appreciation of the salmon fishery and, assisted by Mr. L. G. Smith, the technical officer of the Department, compiled the table of releases and recoveries of tagged salmon. Their assistance has been invaluable and is gratefully acknowledged.

HISTORICAL

Before 1944 there was no organised fishery for Australian salmon in Western Australia, and the average annual production scarcely reached 50,000 lb. However, in 1939, with the onset of World War II and the added need for increased supplies of foodstuffs of all kinds, the Department set in train a fact-finding survey to assess the salmon resources and to determine the localities of greatest abundance. In 1940 J. A. Tubb, M.Sc., a research officer of the Fisheries Section of the Council for Scientific and Industrial Research, as it was then known, was sent to Western Australia to assist in the survey. In those days the roads along the south coast, where they did exist, were largely untrafficable, there was no cannery to process the salmon, and transport facilities were almost non-existent.

Although it was appreciated that salmon could undoubtedly be taken in sufficiently large quantities to make canning an economical proposition, Tubb's report was not such as to arouse any enthusiasm departmentally or among fishermen and investors.

In 1943 the demand for canned fish by the armed forces became more and more pressing, and arrangements were made for small parcels of salmon to be secured by the Department and handed to Vincent Gardiner, of the Ocean Canning Co., of Belmont, which had recently been established for the canning of Perth herring, for experimental canning. A pack acceptable to the Defence Foodstuffs Administration was soon achieved; the next step was to organise the catching of salmon for Ocean Canning Co.

In the same year a small salmon fishery was commenced independently at the 12-Mile, Hopetoun, by Mr. Edward Young. Working almost single-handed, Young under very great difficulties caught salmon and trucked it in ice to the metropolitan area, where the bulk of the catch was sold to a wholesale fishmonger. Very soon a syndicate known as Hopetoun Freezers, of which Young was a partner, was established at Hopetoun, and the new capital introduced was used to instal proper refrigeration facilities, fishing gear and transport vehicles.

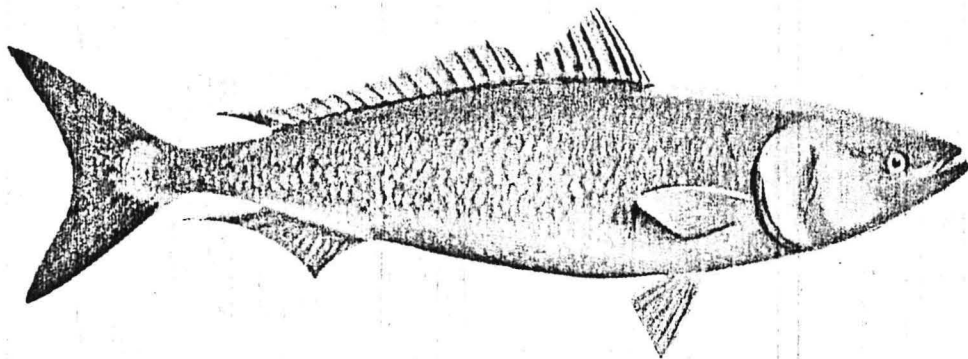
This then was the early history of one of Western Australia's more important fisheries. From these beginnings salmon fishing has spread over the whole of the south coast from Esperance to Windy Harbour, and on the south-west coast from the Leeuwin to Mandurah, and five canneries to deal with the catch have been erected at Perth, Hopetoun, Albany, Esperance, and Busselton.

THE FISH

The first point in relation to the Australian salmon (Arripis trutta) which must be cleared up is that the fish is not a true salmon at all. Structurally it is almost as far removed from the true salmon as any fish can be. Possibly some superficial resemblance to the English salmon induced the earliest colonists to give the fish the vernacular name of salmon - whatever the reason the name has stuck.

The Australian salmon has an exceedingly wide

AUSTRALIAN SALMON



(Arripis trutta)

distribution, extending from New Zealand and along the whole of the southern coastline of Australia (including Tasmania) to Western Australia. The stock is divided into two main groups, each possibly deserving species ranking (Gilbert P. Whitley takes the view that the western group is entitled to sub-species status at least, and proposes the name Arripis trutta esper). The eastern group comprises the salmon of New Zealand (Maori "kahawai") and of Lord Howe and Norfolk Islands, and that of New South Wales and eastern Tasmania. The western group embraces the salmon of South Australia and Western Australia as well as that of western Tasmania.

In Western Australia two distinct phases of the fish are in evidence - the immature "salmon trout", which still bear the "parr marks" of adolescence and rarely exceed 15 or 16 inches in length yet are never very small, and the mature salmon, which attain a weight of 18 lb. or more. The "trout" usually inhabit the estuaries, whereas the mature fish are rarely, if ever, taken in estuarine waters.

The mature fish, while it seems reasonable to assume that a large offshore population exists - large schools have been seen many miles at sea - have an inshore schooling habit, and it is during the schooling period that the fishery operates. A further noteworthy feature is that salmon schools "lie up" at favoured resorts during parts of each year, especially in the non-spawning season, for several years on end. Then suddenly, and for no apparent reason, schools which have lain up in an area for a number of years will desert their old haunts and move to an entirely new section of the coast.

This habit of changing regular haunts is shown most strikingly in the Hopetoun area. Until 1948, when the salmon catch of Western Australia reached an all-time high, the 12-Mile fishery at Hopetoun produced half the total annual catch of the State. The fishery lasted for approximately six months of the year on the non-spawning stock. School after school of salmon moved in each year behind the 12-Mile reef, offering ideal fishing conditions, but in 1949 the number of schools entering tapered off and they have been virtually absent ever since. When the Hopetoun fishery was at its peak, numerous schools were present throughout the area from Hopetoun to east of Esperance, although in most cases, with the exception of the 12-Mile reef, they were largely

inaccessible to fishermen. It can be stated generally that from 1945 to 1948 the main inshore schooling area was the Hopetoun-Esperance region, but with the falling off in the number of schools in that region during 1949 more fish were seen in the Warriups area than previously. It now appears as if there has been a general shift of the inshore schooling area to the Warriups. Whereas Hopetoun provided ideal netting conditions the Warriups lying up area is practically inaccessible to netting.

A somewhat similar change occurred in the salmon fishery of Hamelin Bay and Boranup, in the south-westernmost corner of the State. There for several seasons there were regular visitations by large schools of salmon, and an important fishery was developed. However, during the past year or two practically no fish have come into these areas, but instead have concentrated in Geographe Bay, just around the corner from Cape Naturaliste.

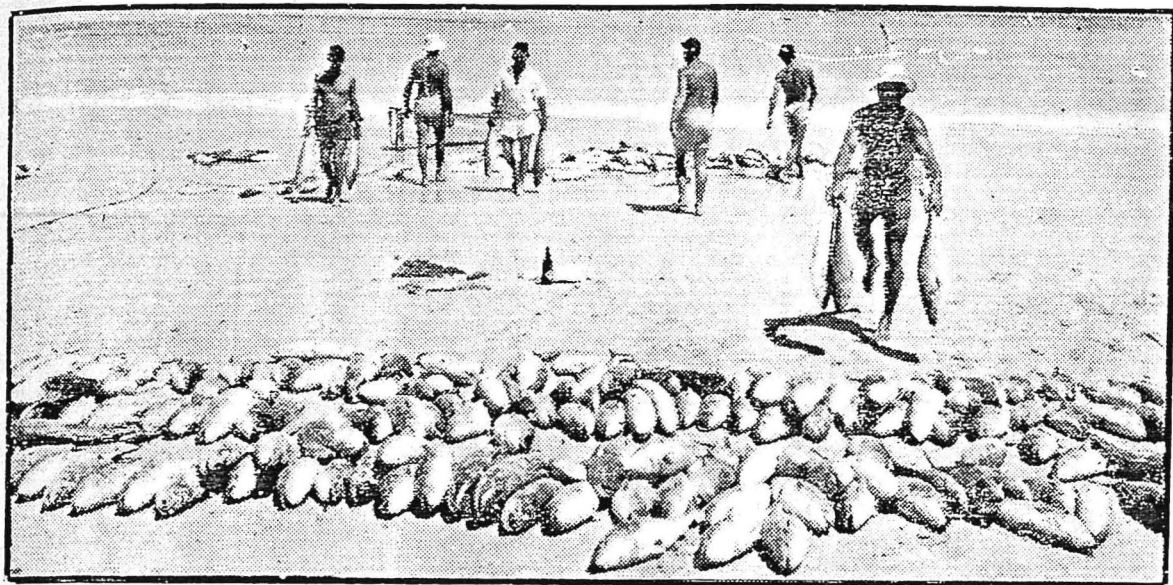
The failure of schools to show up at once-regular resorts has been attributed by many as due to net-shyness. It is not conceivable that a number of schools will shift to an entirely new area because of any such factor. Moreover, aerial survey data indicate that individual schools, or groups of schools, will move to a new locality even when they have not been harassed by net-fishing operations. It seems evident, that is generally speaking, that the changing of locality is one aspect of the behaviour pattern of the fish, although in some cases it could possibly be due to continual molestation by net-fishermen.

At odd times only are salmon met with in any abundance farther north than Fremantle, although in 1942 there were relatively large occurrences at Geraldton, and in November, 1952, an exceptionally large school was in the Cockburn Sound area for upwards of a fortnight. It later moved north and early in December was located from the air just south of the Moore River.

THE HOPETOUN FISHERY

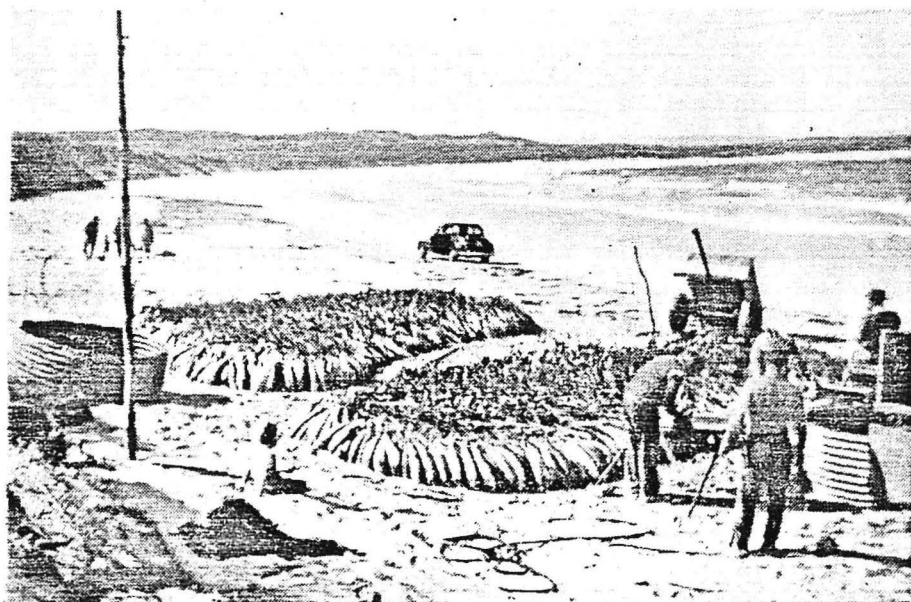
The most striking features of the 12-Mile fishery were the ease with which salmon were taken and the continuity of the supply. The scene of operations was 17 miles east of Hopetoun, or roughly 12 miles in

SALMON FISHING IN W.A.



Part of a catch of nearly four tons of salmon made at Leighton Beach (about two miles north of Fremantle) by John Alver and crew on November 22, 1952

[Block courtesy "Daily News"]



A catch of 20 tons of salmon made at William Bay ("Parry's Inlet") by L. J. Smith and W. H. Pinniger and crew in late March, 1952

[Photo H. Properjohn]

a direct line, hence the name "12-Mile Beach", by which the locality is known. The 12-Mile, as it is usually called, consists of a half-mile stretch of ocean beach some 50 yards in width sloping upwards to a line of sand dunes from fifty to a hundred feet in height. Parallel to the beach runs a flat limestone reef protruding three feet or so at low tide and almost meeting the shore at each extremity where the beach curves seaward. The channel entrance occurs at the eastern extremity of the reef and leads into a large enclosed area of water. The natural pen formed by the reef is a mere 150 yards at its central and widest part while throughout the bottom is of clean sand and the average depth about 5 feet. Salmon entered this pen with each tide and slowly worked their way along its entire length. The dunes provided an excellent vantage point for fishermen from which to observe the fish and to enable them to decide when and where to shoot their nets.

The 12-Mile is the westerly continuation of two similar sheltered areas known as the 14-Mile and the 13-Mile. A gap in the reef occurs at the junction of the 12-Mile and the 13-Mile, and provides a point of entry for schools of salmon to each area. Many broken reef and sand shoal situations occur in both the 13-Mile and the 14-Mile making seine-netting very much more difficult than in the 12-Mile. Each of the three areas is of approximately the same length.

Anecdotal evidence shows that the 12-Mile had been a well-known reservoir of salmon since the turn of the century, and had been a favourite fishing spot of local residents, particularly during the heyday of mining in the Ravensthorpe and Kundip districts. Large quantities of salmon, it is said, were in earlier years obtained by miners by means of explosives.

OTHER SOUTH COAST FISHERIES

Today the most important salmon fishery is that at Cheyne Beach, which lies some 40 miles east of Albany. Here, as at Dillon Bay and Bremer Bay, farther east again, and at Torbay, William Bay (known locally as Parry's Inlet) and Foul Bay (referred to locally as Peaceful Bay), which lie to the west of Albany, the fish are caught in the surf zone, which is at times a somewhat hazardous proceeding. Here there is no sheltering reef or smooth water, and in rough weather, for which the south coast is noted, it

is quite common for the boats running the nets around the fish to be swamped and the occupants compelled to swim ashore.

On all the south coast beaches the fishermen look for two runs - the "down run" in late summer when the fish are on their westerly spawning migration, and the "back run", when they are returning east to their "lying up" haunts after spawning. Not always do the fish visit each beach on both the "down" and "back" runs - very often they miss beaches on one or both of the runs, and the fishermen are left lamenting.

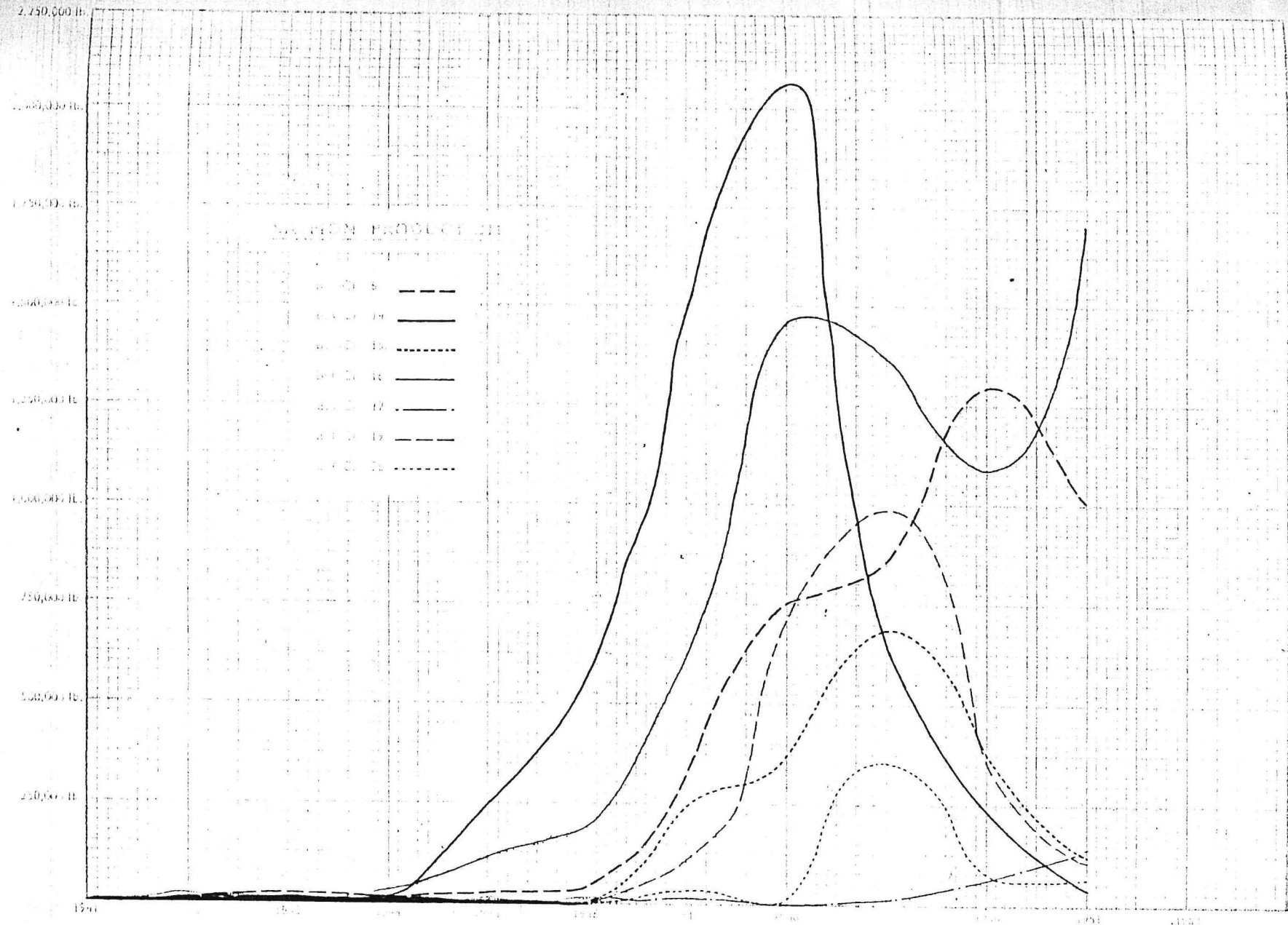
HAMELIN BAY, BORANUP AND THE SOUTH-WEST

Hamelin Bay Beach and Boranup both form part of the foreshore of Hamelin Bay, just north of Cape Leeuwin. The Hamelin Bay fishery is not an easy one, as the surf area contains numerous rocks and gutters, and usually in winter, when the fishery was at its peak, exceptionally heavy seas roll in rendering fishing most difficult. But if Hamelin Bay is difficult, Boranup is positively dangerous in bad weather, and several "close shaves" have been experienced.

The only other worthwhile fisheries in the south-west are in Geographe Bay at places like Bunker's Bay and Eagle Bay. There, in waters sheltered by a shallow sand bar, fishing is relatively comfortable.

FISHING, HANDLING AND TRANSPORTING

The netting method employed in the salmon fisheries is common to all areas, but slight variations do occur. There are differences too in the method of handling the catch and of other aspects of the whole operation of catching and transporting. Before fish can be caught they must approach to within a relatively short distance of the shore, usually in or adjacent to the surf zone. The approach of a school is noted by an observer or "spotter", following which the team assembles at the most suitable point on the beach. The boat with net aboard has already been prepared for the expected operation. Usually two men man the boat and row rapidly in a semi-circle and surround the fish with the net, which is allowed to run freely from the stern as they progress. Hauling lines attached to one end of the net have been retained on the beach at the point



of the dinghy's departure, and similar lines at the opposite end of the net are brought ashore when the dinghy is beached some distance from the point of departure. All hands then haul on the two sets of lines and the net with the fish encircled is slowly hauled inshore.

The observer or spotter (there may be more than one) has his vantage point high on a close-by sand dune and on observing the approach of salmon, and at the appropriate moment, signals to the team. Fires are sometimes used as signals, while at "Parry's Inlet" an electric bell system is employed. The observer system releases all but one or two men from duty, thus allowing proper rest and regular meals to be taken by the remainder.

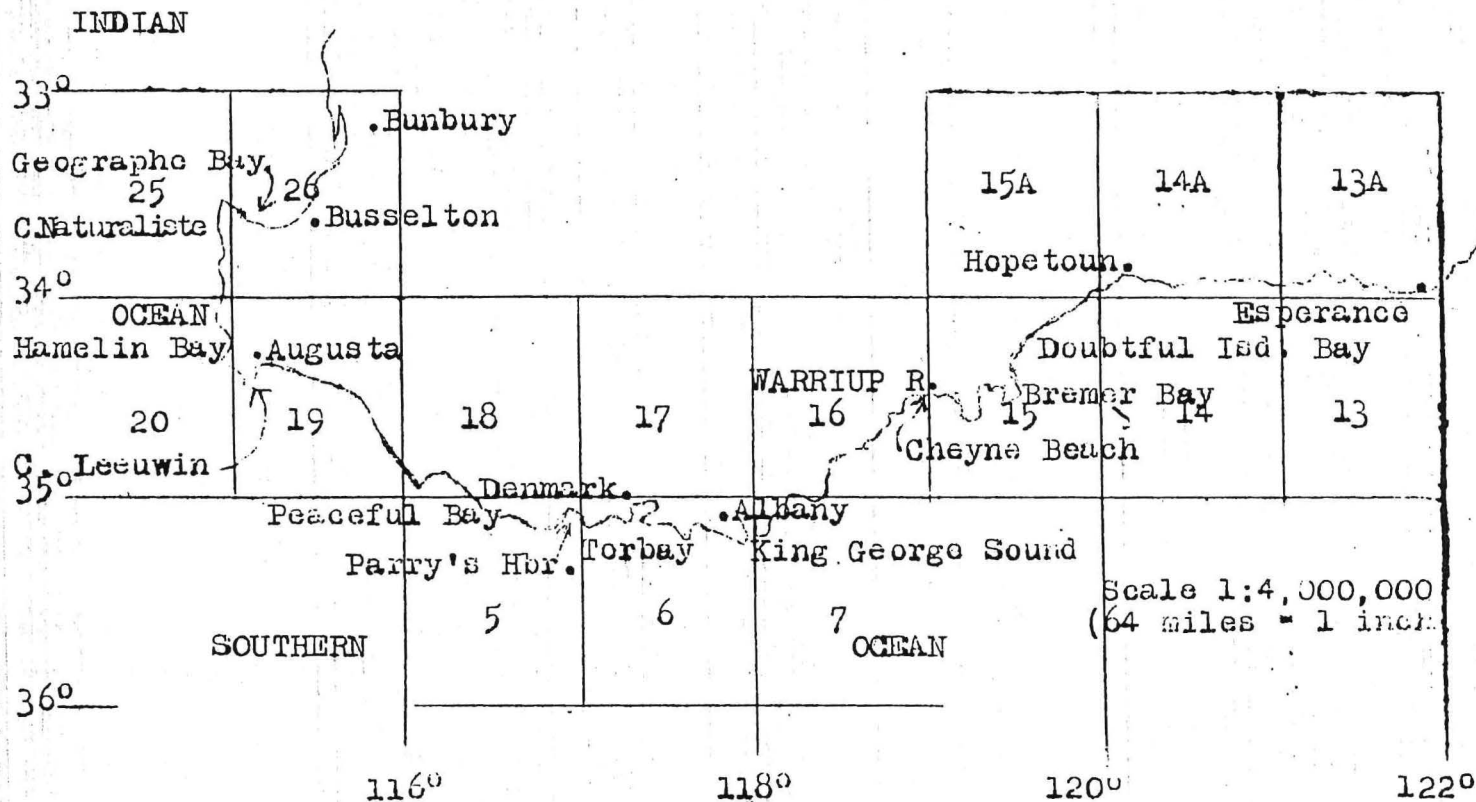
A modern touch in the observation of salmon was employed by D. S. Hunt in 1948 by the use of a Gypsy Moth plane in the Esperance region. Here, a mobile team in radio communication with the plane, on being informed of salmon occurring at any point on the nearby coast, sped across country in an ex-army tank. This vehicle conveyed boat, net and men to the beach and returned to base with the catch in addition to the original load.

The dinghies used are usually about sixteen feet in length. A typical salmon net measures some four hundred yards in length and is of very strong construction. Early in the history of the fishery war-caused shortages necessitated the use of flax camouflage netting to a large extent, the only sort readily available. Nowadays the meshes of about 4" are comprised of hemp. According to the conditions normally met with on a given beach, the net will contain either a pocket or a balloon bunt of 3" mesh. The latter is in use at Cheyne Beach where calm water and very big catches are not uncommon. The former is used at "Parry's Inlet" and at other beaches where heavy surf is experienced. The depth of a net at the pocket or bunt is usually about thirty feet, thus enabling a large quantity of fish to be taken at each haul, although usually the water depth does not exceed two fathoms where the net is run. With these types of net single hauls of up to 30 tons have been made.

Teams may consist of any number of men but probably ten is the average number. Twenty-four men

MAP OF PART OF SOUTH-WEST AND SOUTH COASTS OF WESTERN AUSTRALIA
 showing principal fisheries for Australian salmon

(Note: The numbered squares correspond with the "blocks" used in the
 W.A. Fisheries Department's statistical system)



in one team operated at the 12-Mile under Chipperfield and Andre at one time, but this was exceptional. Members of a team are employed in hauling the net, and in the subsequent handling of the fish. These are stunned with billets of wood as they thrash around in the net at the water's edge and are then thrown on to the beach. The fish next have their throats cut causing them to bleed freely, following which they are stacked head down. Heading and gutting then proceeds and may take many hours according to the size of the catch. This operation has precedence and continues without stopping until the last fish is done. By this means the risk of deterioration is reduced to a minimum. Even though darkness may descend, this operation proceeds under artificial light from pressure lamps, searchlights, or what other form of illumination is available. Washing of the fish next follows. Nature has at one or two places provided almost ideal facilities for this purpose, as at Peaceful Bay where a spring provides a freshwater pool on the beach at a spot convenient to the usual hauling ground. The washed carcasses are then transported by motor vehicle to the cannery.

Easy access to most salmon beaches has been provided either naturally or by man-made roads and tracks but this was not possible at the 12-Mile and 13-Mile at Hopetoun. Here the dunes rise steeply from the beach to heights between fifty and one hundred feet. Laborious and back-breaking work was entailed in carrying cleaned salmon from the beach to the motor trucks waiting behind the dunes. In 1945 it was decided to fillet the fish on the beach and thus lighten this arduous task. A pack-pony was used and this animal, its saddle bags loaded with fillets (and helped from behind by the men), took the burden from the shoulders of the team. This method was found to be slow and finally the problem was overcome by installing at the dune top a motor truck with a winch which hauled on a steel cable a box-like trolley running on iron rails. In contrast to this access by motor truck to and along the beach itself is possible at Bremer Bay, Cheyne Beach and William Bay, thus saving much labour in the packing and transport of the fish.

The final operation is to clean, dry and make the net ready for another haul. This may proceed concurrently with other jobs, such as heading and gutting, or packing for transport, depending on the number of hands available. Net drying racks have been

- erected at some places, e.g., Cheyne Beach. Perhaps a convenient outcrop of smooth rounded granite may provide a suitable place to lay out a net. Such does occur at William Bay and Green's Pool. Another feature, employed at William Bay, is a huge barrel-framed windlass about 8 feet in diameter mounted between uprights. On this arrangement the net is wound and can be as conveniently unwound and folded ready for use.

The techniques and gear described have been evolved for beach fisheries, and are quite adequate, but there will be modifications and refinements as time goes on. If however the salmon depart from their normal observed habit of remaining in shallower situations and instead move out to deeper water, the present methods will be useless, and fresh means of taking the fish at sea will need to be developed. So far any departure from normal behaviour by the fish has been hopefully considered of a temporary nature, but perhaps it may pay to be wise before and not after the event.

PRODUCTION AND UTILISATION

Salmon from the 12-Mile found a ready sale in the wartime-depleted shops in Perth during 1944/45. Smoked fillets of salmon from Hopetoun were also on sale at this time. Catch figures for 1944 totalled 3,503 fish averaging $7\frac{1}{2}$ lb. headed and gutted and represented 9 months' actual fishing.

The canning of salmon was first commenced at Belmont by the Ocean Canning Co. in February, 1945, and its supplies were drawn largely from the syndicate "Hopetoun Freezers" operating at the 12-Mile. The success of the fishery attracted others and in November of the same year D. S. Hunt established a team in the area. Smoking operations did not last long, and nowadays the whole of the catch is canned.

The following table shows the quantity of canned salmon produced in Western Australia since 1944. Fish have been canned under different forms and cans of varying sizes have been used, but for a clearer understanding of the situation the production figures given here have been reduced to terms of 1-lb. cans -

| <u>Year</u> | <u>Dozen Cans</u> |
|-------------|-------------------|
| 1944 | 120 |
| 1945 | 24,998 |
| 1946 | 52,288 |
| 1947 | 143,776 |
| 1948 | 218,979 |
| 1949 | 212,623 |
| 1950 | 145,482 |
| 1951 | 155,326 |
| 1952 | 154,012 |
| Total: | <u>1,107,604</u> |

The production table on the next page shows the total quantity of salmon caught in this State since 1945. The block numbers in column 1 correspond with those shown on the map at page 36. The catch during each year from 1941 to 1944, which has not been dissected, was as follows -

| <u>Year</u> | <u>lb.</u> |
|-------------|----------------|
| 1941 | 54,888 |
| 1942 | 45,350 |
| 1943 | 43,851 |
| 1944 | 105,401 |
| Total: | <u>249,490</u> |

A clearer picture of production may perhaps be obtained from a study of the graph facing page 34.

TABLE SHOWING PRODUCTION OF AUSTRALIAN SALMON IN WESTERN AUSTRALIA, 1945-1952

| Where caught | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952* | Totals |
|---------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| Block No. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. | lb. |
| 5 | 224 | 272 | .. | 115,173 | 158,421 | 199,218 | 183,472 | .. | 656,780 |
| 6 | 29,714 | 37,338 | 297,796 | 765,347 | 818,154 | 1,282,624 | 1,035,576 | 614,785 | 4,881,334 |
| 7 | .. | 1,806 | .. | .. | .. | .. | 2,023 | .. | 3,829 |
| 12 | .. | .. | .. | 4,642 | 330 | .. | .. | .. | 4,972 |
| 13 | .. | .. | 110 | 518 | .. | .. | .. | .. | 628 |
| 14 | 258,605 | 580,524 | 1,507,560 | 2,134,701 | 680,626 | 272,054 | 38,893 | 21,303 | 5,487,266 |
| 15 | .. | 9,648 | 258,813 | 356,913 | 702,653 | 416,929 | 123,218 | 538,212 | 2,406,386 |
| 16 | 107,961 | 171,445 | 638,358 | 1,438,389 | 1,326,056 | 1,086,209 | 1,711,625 | 1,446,916 | 7,926,959 |
| 17 | 7,708 | 1,045 | 298 | 316 | 370 | 261 | 130,983 | 34,156 | 175,137 |
| 18 | 40 | .. | 1,940 | 4,300 | .. | .. | .. | .. | 6,280 |
| 19 | 11,641 | 318 | 115,802 | 731,563 | 944,167 | 244,099 | 123,571 | 204,801 | 2,375,962 |
| 25 | .. | .. | 4,180 | 100 | 115 | .. | .. | .. | 4,395 |
| 26 | 789 | 13,834 | 34,298 | 7,279 | 314,874 | 61,468 | 58,607 | .. | 491,149 |
| 27 | 1,348 | 148 | 12 | .. | .. | .. | .. | .. | 1,508 |
| 28 | .. | 42 | .. | .. | .. | .. | .. | .. | 42 |
| 29 | 246 | 24,148 | 696 | 41 | .. | .. | .. | .. | 25,131 |
| 36 | .. | 7,977 | .. | .. | .. | .. | 3,360 | .. | 11,337 |
| 39 | 124 | .. | .. | .. | .. | .. | .. | .. | 124 |
| TOTALS | 418,400 | 848,545 | 2,859,863 | 5,559,282 | 4,945,766 | 3,562,862 | 3,404,328 | 2,860,173 | 24,459,219 |

*The 1952 figures are subject to final check. One or two returns are still outstanding, and in respect of the area concerned the catch has been estimated. There will be no great variation between the actual figures and those given here.

ADMINISTRATION AND MANAGEMENT

After D. S. Hunt established a team at Hopetoun, certain difficulties arose in relation to the rights of the respective teams to fish the area, the determination of priority in netting, and other factors. It soon became evident that the 12-Mile could not carry more than one team, and the two teams joined forces. At the same time the combination was not a really happy one, and the rapprochement was more in the nature of an armed truce.

However, the unique nature of the fishery and its vulnerability to unorderly fishing, as well as continued argument and strife between fishing teams, necessitated a conference of all interested parties being held. That same month Mr. E. Young, having broken away from the Hopetoun Freezers Syndicate, commenced canning salmon in a rather primitive way on the Jerdacuttup River between Hopetoun and the 12-Mile, and wanted fish. This gave rise to a dispute on the question of disposal of the catch, which was then in the hands of the Hopetoun Freezers Syndicate, which to all intents and purposes controlled the fishing team. Indicative of the degree to which the demand for fish had grown were the following stated requirements of the various interests -

| | |
|---------------------|--------------------|
| Young's Cannery ... | 50 tons per annum. |
| Fish smokers ... | 78 " " " |
| Perth Cannery ... | 600 " " " |

The conference took place with the approval of the Minister at the Fisheries Department, Perth, on August 14, 1946, and was attended by all interested parties, fishermen, processors, freezer-operators, in addition to departmental officers. The questions submitted at the Conference as requiring immediate answers were -

- (1) What are the weekly requirements of salmon?
- (2) What is the productive capacity of the 12-Mile?
- (3) What is the best method of controlling the catching operations and distribution of the catch?

Although the view was held by some that a beach controller appointed by the Government was desirable, it was finally decided by the parties themselves what catching methods should be adopted, what prices were to be paid and the method of disposal of the catch during the season then current. In the light of subsequent events and the later development of the salmon fishery, this conference was most significant. The shape of things to come began to show itself in that the management problems confronting the Department today were then faintly evident.

An important amendment to Section 17 of the Fisheries Act which was effected in 1946, gave power to the Department to endorse fishermen's licenses with conditions designed to assist in the management and control of any fishery. Thus by endorsement of licenses the numbers of fishermen operating at the 12-Mile could be and were in fact kept down to a figure considered to be sufficient to work the fishery efficiently and economically.

The year 1947 opened with considerable planning for the future development of the industry. An additional canning factory was under construction at Albany for D.S. Hunt, steps were being taken to organise the Hopetoun fishermen as a Co-operative Society, the Jerdacuttup cannery was to be removed to Hopetoun and, more important still, the whole of the south coast from Hopetoun to west of Denmark was becoming alive to the possibilities of the industry. Governmental approval was secured for the appointment of a full-time fisheries inspector to be stationed at Hopetoun. The first step taken was the holding of a conference at the Fisheries Department, Perth, on January 31, 1947, at which the policy of the Government concerning the 12-Mile fishery was announced. This comprised -

- (1) Exclusive salmon fishing rights for the proposed Fishermen's Co-operative in the 12-Mile and 13-Mile;
- (2) Disposal of fish in certain fixed proportions between Hopetoun and Perth canneries;
- (3) The appointment of an inspector to supervise fishing operations and catch disposal.

Protests against items (1) and (2) were lodged by the principals of the Hopetoun and Albany canneries and the matter referred to the Government. The Solicitor-General ruled that Section 17(3)(e) of the Fisheries Act as amended in 1946 did not include power to impose conditions to control the disposal of fishermen's catches. Several conferences were held by both the Fisheries Department and the Department of Industrial Development in an endeavour to secure agreement between the canners. This was finally achieved in June, 1947, on the basis that of the total Hopetoun catch two-fifths were to be allocated to Ocean Canning Co. (Perth) and the balance divided between Hopetoun and Albany canneries in the proportions determined by themselves. Although the Fishermen's Co-operative was registered, it did not function as such and catching arrangements were placed in the hands of one team with George Andre as Manager. Throughout the discussions and conferences it had been recognised by all parties, including departmental officers, that one team only could satisfactorily handle fishing operations, and that impairment of the fishery might, and loss of production certainly would occur if fishing in the 12-Mile became competitive.

Departmental supervision of the fishery and of catching operations was established by the appointment of Inspector H. J. Murray to the Hopetoun district on July 2, 1947. Mr. Murray also watched and reported on allocations of supplies to canneries, and while minor complaints were heard from time to time, fishing operations ran reasonably smoothly thenceforward.

The 12-Mile has always been considered the most important fishing area at Hopetoun and negotiations, arguments, conferences and decisions have all centred on that fishery. Thus the final agreement reached in 1947, and the exclusion of fishermen other than those in the 12-Mile team, was in respect of the 12-Mile only. Fishing was carried on in the 13-Mile by another party, but in practice it was found that each team at times needed the help of the other. This co-operation was in course of time established on a mutually satisfactory basis.

Great expansion in the salmon industry occurred in 1947 as a result of increased demand for fish occasioned by the establishment of additional canneries

and the awareness of the public concerning a new fish product. Places such as Bremer Bay, Cape Riche, Cheyne Beach and Torbay produced many tons of salmon, and fish were taken also in King George Sound. In 1948 further beaches were opened up for salmon and a harvest of 5½ million pounds of salmon rewarded the fishermen's efforts that year. From Doubtful Island Bay to Boat Harbour west of Denmark almost every fishable beach was occupied, while at Hopetoun the 12-Mile and 13-Mile contributed a total of over 2 million pounds, and in order to prevent fishing operations interfering with the free ingress of salmon into the 12-Mile and 13-Mile, a proclamation was issued prohibiting net-fishing at "The Gap" (the local name for the break in the reef) between the hours of noon of each day and 3 a.m. of the next day following. This had effect from December, 1948.

Competition for supplies had by 1948 become exceedingly keen between the canneries. Various tactics were employed by all parties and included price rises and bonuses for the fishermen, whose desires were predominant with the canneries. Another cannery was established at Esperance by D. S. Hunt. On the south-west coast, salmon fishing had begun in 1947 at Hamelin Bay, all catches being transported by road to Ocean Canning Co. at Perth. Considerable success resulted from fishing during the 1947 and 1948 seasons in that area, and a new cannery was erected at Busselton by V. Gardiner, of the Ocean Canning Co.

The Hamelin Bay area provided also a problem similar to that which arose at Hopetoun - too many fishermen in too small an area. This problem was to become that of most moment on practically all salmon beaches as time went on and remains a problem today. This is however a problem to which, if the fishermen desire it solved, they will have to find a solution themselves. This new departmental attitude is the result of an expression of Government policy given in a Cabinet decision of June, 1950. An application had been made by K. V. Smith, a professional fisherman, to fish in the 12-Mile and 13-Mile at Hopetoun. The Minister placed two alternatives before Cabinet -

- (1) To permit any licensed fisherman to fish wheresoever he pleases;
- (2) To permit only specified licensed fishermen to fish in a defined area.

The Government decided in favour of the first alternative, and the endorsement of salmon fishermen's licenses ceased.

The introduction of a team into the 12-Mile by Smith led to immediate conflict between the newcomers and the established fishermen, and culminated in a Supreme Court claim and counter-claim. The Chief Justice, who heard the claims, gave a verdict against Smith who was ordered to pay damages and costs to Chipperfield and Andre, the leaders of the resident team. Smith left the area in August, 1950.

At other beaches too there have been problems - clashes of personality, recrimination, spoiling tactics, and many methods of overcoming the problems have been tried. Some have suggested control of beaches by Fishermen's Associations, but these bodies are not powerful enough to discipline their own members even, let alone non-members. Some have suggested the allocation of beaches by ballot - others the rotation of hauls. All have been considered - some tried and failed. Regulation 13 under the Fisheries Act has of course some bearing on the matter, determining as it does the rights of priority between net-fishermen working in the same locality. This regulation has stood for a number of years without being invoked, but it is now found that in its application to present conditions it has many shortcomings, particularly as far as salmon fishing is concerned. It has accordingly been re-drafted and is now under consideration by the Crown Law Department.

INVESTIGATIONAL WORK

Originally, as already indicated, salmon investigations in Western Australia were in the hands of J. A. Tubb. Later the work was taken over by the late W. S. Fairbridge, M.Sc. It is now being carried out by W. B. Malcolm, B.Sc. The Fisheries Department, through its technical officer (L. G. Smith) and departmental inspectors, performs much ancillary field work.

During the past two years salmon investigations have been concentrated on the western group. The life history of the fish has not yet been worked out, although it is reasonable to assume that the salmon of South Australia, are the same as those of Western Australia, and that these are not two distinct populations. Detailed examination of the structure of both have failed to show any difference between the fish of both areas, and the

assumption is even more reasonable as South Australian waters contain the younger age-groups, which are absent from Western Australian waters. A fair working hypothesis is that a considerable quantity of the large Western Australian salmon spend their early life in South Australian waters. This assumption admits a complication in that two distinct populations could exist without showing any visible structural variations. One test is to show, by tagging, whether the younger South Australian salmon do migrate into Western Australian waters.

During 1952 considerable field work was undertaken in South Australia and Tasmania towards this end. Approximately 3,000 salmon were internally tagged and released. If a single population of salmon exists it is to be expected that some of these tags will be recovered from Western Australian waters during the next few years.

The tables at pages 47 and 48 provide details of tagging operations and recoveries in Western Australia in recent years.

CONCLUSIONS

Considering the spawning migration of the salmon there has been little variation in the catch taken on this "run" since 1948, when the development of the fishery more or less reached its peak. Taking any individual beach fished during the run, large fluctuations have often occurred in the catch from year to year. But if we consider that the salmon moving along the beaches only represent portion of the fish moving out to sea, then although the normal spawning migration takes place, the number of schools breaking off and moving inshore at each beach could not be expected to be constant year after year.

Summing up it may be said that catch taken on normal spawning migration has been constant since 1948 and that the fall in the Western Australian catch can be attributed to the failure of the Hopetoun fishery brought about by a shift of the inshore schooling area from the Hopetoun-Esperance area to the Warriups-Cheyne Beach area during the non-spawning season.

There certainly does not appear to be any evidence of over-fishing in the generally accepted sense of the term. It is true that fluctuations in the ready availability of fish occur from year to year, but this is true also of the eastern States, and in the same way as the fishery is still carried on there on violently fluctuating stocks, so can it reasonably be expected that the Western Australian fishery will continue indefinitely, with good and bad seasons.

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SUMMARY OF WESTERN AUSTRALIAN SALMON TAGGING EXPERIMENTS,
1945-1952

| Year | Place of Release | Tag Type | No. Re-based | No. Re-covered | Recovery Remarks |
|------|------------------|-----------|--------------|----------------|---|
| 1945 | Hopetoun | Operculum | 47 | 8 | Local recoveries |
| 1946 | Hopetoun | " | 250 | 56 | Local recoveries |
| | Cheyne Beach | " | 15 | - | |
| 1947 | Pasley Island | " | 1 | - | |
| | Bremer Bay | " | 11 | - | |
| | Ceduna (S.A.) | " | 1 | - | |
| | Hopetoun | " | 52 | 1 | Local recovery |
| 1948 | Cheyne Beach | " | 62 | 19 | Local recoveries |
| | Hopetoun | " | 212 | 69 | One good movement - Bremer Bay |
| 1949 | Cheyne Beach | " | 52 | 5 | Two good movements - Hopetoun & Esperance |
| | Parry's Inlet | " | 75 | 9 | Two good movements - Dillon Bay & Albany |
| | Hamelin Bay | " | 122 | 4 | Two good movements - Chatham Island and Hopetoun |
| | Boat Harbour | " | 74 | 1 | Cheyne Beach |
| | Esperance | " | 108 | 1 | Local recovery |
| | " | Petersen | 10 | - | |
| 1950 | Cape Riche | Operculum | 64 | 9 | All good movements - Peaceful Bay (2), Cheyne Beach (7) |
| | " | Petersen | 1 | - | |
| | Parry's Inlet | Operculum | 132 | 19 | Two good movements - Hopetoun, Albany |
| | " | Petersen | 206 | 15 | One good movement - Albany |
| | Nannerup | Internal | 50 | 3 | Two good movements - Cheyne Beach & Dunsbrough |
| | Cheyne Beach | " | 171 | 82 | Six good movements - Hamelin Bay, Torbay (2) Nannerup, Peaceful Bay (2) |
| | " | Operculum | 142 | 62 | Five good movements - Hamelin Bay, Torbay, Peaceful Bay, Cape Riche |
| | Hamelin Bay | Internal | 18 | - | |
| | " | Operculum | 1 | - | |
| | Parry's Inlet | Internal | 51 | 5 | Two good movements - Hamelin Bay and Boranup |
| | " | Operculum | 86 | 4 | Two good movements - Nornalup & Cheyne Beach |
| 1952 | Cheyne Beach | " | 11 | 2 | Local recoveries |

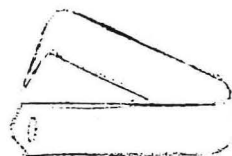
SUMMARY OF TAG RECOVERIES

| Tag Type | Releases | Recoveries | % Recovery |
|-----------|----------|------------|------------|
| Internal | 290 | 90 | 31% |
| Operculum | 1,518 | 267 | 17.6% |
| Petersen | 217 | 15 | 6.9% |
| TOTAL: | 2,025 | 372 | 18.4% |

NOTE: The internal tag used is a white plastic disc which has obverse a serial number and a request to the finder to return to C.S.I.R.O. Division of Fisheries, and reverse a notification of the reward payable. The following drawing is of the exact size used for salmon -



The operculum tag is a serial-numbered metal strap which is clamped on the operculum or gill-cover of the fish. The drawing shows its exact size.



The Petersen tag consists of two serially-numbered plastic buttons connected with a silver wire passed through the back or caudal peduncle of the fish. One of the buttons is coloured and the other transparent. The drawing is the actual size used -

