

FISHERY SITUATION REPORT 1. SOUTHERN BLUEFIN TUNA

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INTRODUCTION
SOUTH EASTERN FISHERIES COMMITTEE

The South Eastern Fisheries Committee, a committee of the Standing Committee on Fisheries of the Australian Fisheries Council, was set up in 1969 as one of three regional management and research committees.

The South Eastern Fisheries Committee co-ordinates interstate fisheries management and research activities in waters adjacent to New South Wales, Victoria, Tasmania and South Australia. In addition to its co-ordinating role, it also provides a forum for discussion in fisheries science and management, and advises management authorities on problems referred to it by member organisations.

The members of the Committee are:-

Mr. A.J. Harrison, Chairman, Tasmania
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Ms A. Russell-French, Secretary,
Department of Primary Industry

Mr. A.J. Harrison has been Chairman of the Committee since 1973.

A number of fisheries in the area are of such importance as to warrant special attention by a group of experts. These Research Groups constantly monitor the state of the fisheries and discuss current research.

FISHERY SITUATION REPORTS

To assist the Committee in its management role, the Research Groups prepare and maintain a situation report on the fishery for which they are responsible. This report outlines the present state of the fishery, its history and the management measures controlling it. In addition, it outlines the current state of knowledge on the biology of the species and the population dynamics of the exploitable stocks.

To broaden public knowledge of the fisheries of south eastern Australia, these situation reports are now being published as a series by the Committee.

A.J. HARRISON
Chairman
South Eastern Fisheries Committee

SITUATION REPORT FOR SOUTHERN BLUEFIN TUNA

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SITUATION REPORT - SOUTHERN BLUEFIN TUNA

SUMMARY

| | | |
|---|---|--------------------------|
| Annual Catch (weight) | - | 8-14,000 tonnes |
| Marketing method | - | canned |
| Weight marketed domestically | - | nearly entire catch |
| Weight exported | - | 0-2,000 tonne |
| Rank as export fishery | - | very low |
| Number of boats | - | 33-100 |
| Number of men on boats | - | estimated 200 to 300 |
| Value of boats (current replacement cost) | - | estimated 15 million \$A |
| Present status of fishery | - | fully exploited. |

1.0 Introduction

Tuna fisheries in Australia and tuna research by CSIRO date back to 1938. In the early years of the fishery, trolling was the only method used, and catches were small. Pole and live bait fishing was introduced in 1951, but it was not until 1962 that it gained popularity and catches began to increase rapidly. Purse seining was introduced in 1974, and ceased by the end of 1976, but was re-employed again in 1977 and 1978. In 1962 the Executive of CSIRO decided to make southern bluefin a major research subject and six scientists were assigned to the programme. Five years later Executive decision reduced the programme to monitoring of catch and effort. Not all of the accumulated data have been fully analysed although some tagging data have been used recently (e.g. Hynd and Lucas 1974, Murphy 1977).

1.1 Distribution

Southern bluefin are restricted to the southern hemisphere and, with the exception of the spawning ground, to the area approximately between latitude 30° and 50° S. The distribution in this region is almost circumpolar. The only known spawning ground is south of Java around latitude 10° S. For further details see Shingu (1967), Hynd (1969a).

1.2 Biology

Southern bluefin tuna are moderately large sized, long lived fish, attaining a maximum of about 225 cm in length, 200 kg in weight and possibly 20 years of age. The value of K in the von Bertalanffy growth equation is about 0.14. The estimated value of M, the instantaneous coefficient of natural mortality, is 0.2. These parameters suggest that an age of first capture of two years is close to yielding the maximum yield per recruit for Australian levels of fishing intensity (Murphy 1977).

From the spawning ground south of Java the juveniles migrate to the nearby Australian coast and spread out through southern Australian coastal waters and west towards S. Africa. By the time they are six years old practically all fish have migrated offshore into the West Wind drift waters. They spawn for the first time at about 6 or 7 years. They are relatively fecund, a fully mature female spawning 14 to 15 million eggs per year. The spawning season extends from October to March and there is probably more than one spawning peak per year. (Robins 1963); (Kikawa 1964); (Hynd 1965); (Yukinawa 1970).

2.0 The Fishery

Southern bluefin are fished mainly by Australia and Japan. The pole and live bait Australian fishery is based on pre-adults which occur over the Australian continental shelf. At about age 4 or 5, they are recruited into the Japanese longline fishery which operates on them around the Southern Ocean from 180° to the mid-Atlantic as well as the Tasman Sea and Indian Ocean. Both fisheries have expanded extensively after 1960, and fishing pressure has built up steadily since then.

2.1 Fishing Localities

The main Australian fisheries occur in S.A. and N.S.W. and are seasonal. The N.S.W. season runs from September to January in the area bounded by Sydney and Bass Strait. The S.A. season runs from December to May in the area bounded by Kangaroo Island and Streaky Bay. A fishery for 2 year old fish occurs off Albany W.A. in June-July. The largest catch was 750 tonnes in 1975. A fishery is developing off Esperance on two and three year old fish. A sporadic Victorian purse seine fishery takes place off Lakes Entrance.

The Japanese fishery takes place in the Southern Ocean between latitudes 30°S and 50°S and in the Tasman Sea. A fishery in the Indian Ocean spawning ground used to take place from September to March but has now ceased partly because the flesh of the fish is in poor condition after spawning and partly because catch rates are very low. For further details see Hynd et al (1966).

2.2 Fishing Methods

A small number of fish are still taken in the Australian fisheries by trolling but the bulk are taken by the live bait and pole method. The normal "squids" are used but sometimes the fishermen have to resort to "live bait hooks" if the fish are shy.

At least 20 species of fish are used for live bait but the preferred species are yellowtail and pilchard. A special feature of this fishery is the extensive use made of aircraft to spot surface schools of fish. Up to six light aircraft may be operating at the one time.

In 1974 and 1975, purse seining was applied in the Australian fishery resulting in a catch of circa 2,000 tonnes. Four boats were active at one stage. By the end of the 1976-77 season only one purse seiner remained. During the 1977-78 season up to four purse seiners were active but most of their catches were made on schools held at the surface by bait boats.

The Japanese conventional long line fishery uses lines up to 50 miles long bearing 2,000 hooks. They are set and hauled once a day. The line is broken up into "baskets" each of which contains five branch lines and hooks. In recent years the Japanese have developed new methods of setting and hauling the line which has decreased manpower requirements. Small amounts, 47 tonnes in 1976, are taken by Korean longliners.

2.3 Production and Income

South Eastern Australian production in tonnes and numbers of fish is given in Table 1. This does not include the catch from the W.A. fishery which one year reached 750 tonne but is usually much less than that (Table 3). The price paid to fishermen during the 1976-77 season was about \$A450 a tonne. Japanese production in tonnes and number of fish is given in Table 2.

2.4 The Market

The Australian tuna catch averages about 10,000 tonnes annually and in 1977-78 was some 10,200 tonnes. The market in Australia is estimated at 12,000 tonnes (liveweight) and is expected to grow at 5 per cent annually.

The bulk of landings is consigned direct to canneries but a significant quantity, some 1,700 tonnes in 1977-78, is exported as frozen whole tuna, nearly all going to Italy.

Small shipments of fresh and frozen bluefin have been made to Japan for the "sashimi" market, including 117 tonnes of frozen bluefin in 1977.

Although overseas markets have been generally unsettled in 1978, demand for tuna in Italy has been good and an average unit value of \$780 per tonne was received for Australian tuna.

The domestic market is generally strong but because of the unsettled trading overseas prices to fishermen are not expected to rise this season by as much as in previous years.

3.0 Management

Apart from an occasional refusal by canneries to buy fish under 5 kilo weight, there were no restrictions in the Australian fishery until 1975. At that time it was decreed that no more purse seiners would be licensed and in 1976 it was decided to limit the live bait vessels to the existing fleet.

The Japanese Longline Fisheries Association has excluded Japanese vessels from fishing in four specified areas for certain months of the year on a voluntary basis to reduce the proportion of small fish in the catch and to protect the spawning population. Japanese scientists estimate the present spawning stock to be approximately 1/10 of the virgin stock. Nevertheless there is no indication of reduced recruitment i.e. no decrease in catch or of catch/unit effort in the Australian Fishery.

4.0 Research and Development

Most Australian scientific research has been performed by CSIRO. Development of the Australian fishery has been almost exclusively by industry. The single exception is isotherm mapping which has assisted in the prediction of localised fishing areas within the recognised fishing grounds, and has helped extend the recognised fishing grounds.

This programme is based upon the behavioural responses of bluefin to surface water temperatures and frontal zones. Maps of surface isotherms are prepared using an infrared radiometer and are then distributed to the fishermen and fish spotters who use them to direct their searching efforts to favourable areas. (For further information see Hynd 1968, 1969b). CSIRO curtailed this program during 1976, and it has been subsequently carried out on a reduced scale by a joint CSIRO-Industry venture.

5.0 Prospects

All evidence points to the fact that the stock is fully exploited. Any increase in catch by Australian fishermen would reduce the Japanese catch. Any significant increase in the Japanese catches might reduce the Australian catch, especially if they fish in zones in which small fish are available.

TABLE 1
AUSTRALIAN PRODUCTION OF SOUTHERN BLUEFIN TUNA

| Season | Catch | | Numbers |
|-------------|-------|-------------|---------|
| | Tonne | Total tonne | |
| N.S.W. 1962 | 1,382 | 4,972 | 108,000 |
| S.A. 1963 | 3,590 | | 233,000 |
| N.S.W. 1963 | 2,610 | 8,118 | 199,000 |
| S.A. 1964 | 5,508 | | 394,000 |
| N.S.W. 1964 | 2,274 | 7,042 | 277,000 |
| S.A. 1965 | 4,768 | | 290,000 |
| N.S.W. 1965 | 2,355 | 8,348 | 187,000 |
| S.A. 1966 | 5,993 | | 425,000 |
| N.S.W. 1966 | 2,144 | 5,570 | 168,000 |
| S.A. 1967 | 3,426 | | 244,000 |
| N.S.W. 1967 | 3,728 | 6,673 | 389,000 |
| S.A. 1968 | 2,945 | | 257,000 |
| N.S.W. 1968 | 5,436 | 8,557 | 677,000 |
| S.A. 1969 | 3,121 | | 500,000 |
| N.S.W. 1969 | 6,338 | 7,643 | 666,000 |
| S.A. 1970 | 1,892 | | 321,000 |
| N.S.W. 1970 | 3,612 | 6,429 | 472,000 |
| S.A. 1971 | 2,817 | | 327,000 |

| Season | Catch | | Numbers |
|-------------|-------|-------------|-----------|
| | Tonne | Total tonne | |
| N.S.W. 1971 | 5,034 | 9,409 | 446,000 |
| S.A. 1972 | 4,375 | | 404,000 |
| N.S.W. 1972 | 6,135 | 12,971 | 376,000 |
| S.A. 1973 | 6,836 | | 501,000 |
| N.S.W. 1973 | 1,811 | 9,510 | 76,000 |
| S.A. 1974 | 7,699 | | 750,000 |
| N.S.W. 1974 | 5,186 | 10,028 | 570,000 |
| S.A. 1975 | 4,842 | | 599,000 |
| N.S.W. 1975 | 2,465 | 9,403 | 240,000 |
| S.A. 1976 | 6,938 | | 865,500 |
| N.S.W. 1976 | 308 | 8,957 | 32,000 |
| S.A. 1977 | 8,649 | | 1,160,000 |
| N.S.W. 1977 | 4,314 | 9,748 | 234,259 |
| VIC. 1978 | 500 | | 27,592 |
| S.A. 1978 | 4,934 | | 742,394 |

TABLE 2

JAPANESE CATCH OF S.B.T. FINANCIAL YEAR TO 1974-75
CALENDAR YEAR FROM 1974 ON

| Season | Catch | |
|---------|--------|-----------|
| | Tonnes | Numbers |
| 1955-56 | 6,095 | 80,000 |
| 1956-57 | 12,190 | 210,000 |
| 1957-58 | 19,301 | 370,000 |
| 1958-59 | 27,428 | 480,000 |
| 1959-60 | 69,079 | 1,260,000 |
| 1960-61 | 74,158 | 1,210,000 |
| 1961-62 | 53,841 | 830,000 |
| 1962-63 | 47,730 | 790,000 |
| 1963-64 | 51,809 | 970,000 |
| 1964-65 | 40,634 | 770,000 |
| 1965-66 | 31,492 | 600,000 |
| 1966-67 | 38,603 | 770,000 |
| 1967-68 | 54,857 | 940,000 |
| 1968-69 | 36,571 | 700,000 |
| 1969-70 | 48,761 | 940,000 |
| 1970-71 | 34,539 | 630,000 |
| 1971-72 | 33,523 | 610,000 |
| 1972-73 | 42,666 | 940,000 |
| 1973-74 | 26,412 | 640,000 |
| 1974-75 | 22,247 | 690,100 |
| 1974 | 29,500 | 673,000 |
| 1975 | 21,400 | 441,000 |
| 1976 | 23,771 | 634,100 |

TABLE 3

WESTERN AUSTRALIAN S.B.F. TUNA CATCH FROM CANNERY RECEIVALS

| <u>Year</u> | <u>Tonnes</u> | <u>Numbers (000)</u> |
|-------------|---------------|----------------------|
| 1969 | 299 | 69 |
| 1970 | 708 | 189 |
| 1971 | 600 | 121 |
| 1972 | 758 | 129 |
| 1973 | 310 | 64 |
| 1974 | 321 | 65 |
| 1975 | 743 | 129 |
| 1976 | 289 | 56 |
| 1977 | 943 | 208 |

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