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Characterisation of the barracouta (*Thyrsites atun*) fishery in BAR 1

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EXECUTIVE SUMMARY

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Barracouta (*Thrysites atun*) catch and effort data was supplied by the Ministry of Fisheries from statutory logbooks for 1989–90 to 1999–2000. These data were used to examine trends in catch (and effort) with respect to target species, season, month, and area. The main fisheries within BAR 1 were examined in further detail.

Between 198990 and 199394, barracouta catches in BAR 1 (which includes the east coast of both the North and South Islands) ranged from 7000 to 9500 t, slightly below the TACC of 9960 t. Catches increased over the following years to reach a peak of 12 000 t in 1996–97 and have declined slightly to about 9000–10 000 tonnes in 1998-99 and 1999–2000.

From 1989–90 to 1999–2000, most of the barracouta catch in BAR 1 (85.3% to 97.9%) was caught along the east coast of the South Island. Within this area, barracouta is targeted (44.8% of the total BAR 1 catch from the area between 1989–90 and 1999–2000) and also caught as bycatch from the red cod (32%) and squid (13%) target fisheries. Between 1992–93 and 1993–94 there was a large decline in the target barracouta catch from the South Island's east coast and a corresponding increase in the catch from the squid target fishery. In the following year, the barracouta catch taken as bycatch by the red cod fishery increased and continued to a peak in 1997–98 before declining in the two subsequent years. The target barracouta catch remained relatively constant from 1994–95 to 1999–2000, at about 3000 tonnes, while the bycatch from the squid fishery fluctuated between 1000–1500 t.

Much smaller fisheries also exist in the Bay of Plenty (statistical area 009) and in Hawke Bay and south of Cape Kidnappers (statistical areas 013 and 014). In these areas barracouta is caught in the snapper, tarakihi, and gemfish fisheries as well as the target fishery.

In all areas within BAR 1, bottom trawling accounts for most of the barracouta catch. Bottom trawling caught 85–95 % of the total annual BAR 1 catch between 1989–90 and 1999–2000, the remainder taken by midwater trawling.

Most the barracouta catch in the Bay of Plenty is taken from May to September. However, off the east coast of the South Island, higher barracouta catches are taken from October through to May and then low catches from June to September. This is partially because the larger vessels leave the barracouta and red cod fisheries to fish for hoki on the West Coast of the South Island and in Cook Strait. However it may also be related to the seasonal change in abundance of barracouta.

Barracouta in BAR 1 has been dominated by smaller vessels (10–35 m), which accounted for 60–70% of the annual catch of barracouta within BAR 1. Vessels longer than 35 m were active within the Canterbury Bight/Pegasus Bay fishery and caught about 27% of the barracouta caught in the target fishery from 1989–90 to 1999–2000.

Fishers in the BAR 1 fishery were interviewed to gain their perspective on the BAR 1 fishery and the factors that affect it.

1. INTRODUCTION

Barracouta (*Thyrsites atun*) is a common species in New Zealand waters between 30 and 300 m, particularly around the South Island. They mature at 50–60 cm total length and spawning occurs mainly in late winter to late spring, depending on the area. Adults can travel long distances to spawning aggregations, which in occur near the Chatham Islands, Stewart Island, west coast South Island, and northern and central east coast South Island. Summer feeding aggregations also occur around the Snares, in the far south.

Barracouta was initially caught around New Zealand in 1968 by Japanese trawlers. The fishery peaked in 1977 at 47 000 t, and 90% of this catch was taken by Japanese and Korean vessels. The establishment of New Zealand's Exclusive Economic Zone (EEZ) in 1978 caused a reduction in the catch of barracouta by foreign vessels and caused new barracouta fisheries to be established around the Chatham Islands and on the Stewart-Snares shelf. A domestic fleet expanded and began to replace the foreign vessels. In 1984, the barracouta fishery was the third highest by weight of all finfish species in New Zealand and fifth in terms of export value (Hurst 1988). Since then, catches of foreign vessels have declined and New Zealand vessels now take most of the catch. Trawlers have taken almost all of the catch and target fisheries have developed on spawning and feeding aggregations.

BAR 1 includes the east coast of both the North and South Islands and currently has the largest landings in the country. Landings are comprised of both targeted catches and bycatch and have exceeded the TAC of 11 000 t in 1995–96, 1996–97 and 1997–98 (Annala et al. 2001).

The work summarised in this report was conducted as a requirement of objective 3 of the Ministry of Fisheries research project BAR2000/01, Stock assessment of barracouta. The specific project objective was "to complete a characterisation of the barracouta fishery in BAR 1 and determine the feasibility of deriving a relative abundance index from catch and effort data". The analysis of the catch and effort data from the BAR 1 fishery was documented by Langley & Walker (2002). This report provides summaries of the catch information from 1989–90 to 1999–2000.

2. CATCH AND EFFORT SUMMARIES

2.1 Dataset

Catch and effort data from the BAR 1 fishery were provided by the Information Management Group of the Ministry of Fisheries for the 1989–90 and 1999–2000 fishing years (Extracts 3312 and 3407). Data were provided for all records from Trawl Catch Effort and Processing Returns (TCEPR) and Catch Effort Landings Returns (CELR) where barracouta was caught and/or targeted within all statistical areas that are entirely or partly contained within BAR 1. The TCEPR format records details of individual trawls, while CELR data are aggregated by fishing day and statistical area.

2.2 Error checking

The TCEPR and CELR data were error checked separately. Any records that were identified as containing errors were marked as an error and excluded from further analyses.

For the TCEPR dataset, the following fields (field names are in *italics*) were marked as errors if:

- the *catch* was null, less than zero, or greater than 50 000 kg.
- the *duration* of the trawl was less than 0.5 hours.

For the CELR dataset, the following fields were marked as errors if:

- the *catch_weight* from the related record in the table estimated_subcatch, where *species_code* was BAR, was null, less than 40, or greater than 50 000 kg.

- the *fishing_duration* was null, less than 1, or greater than 17 hours.
- the *effort_num* field was null or less than 1, or greater than 7 trawls (for trawl records).
- the average trawl duration (*fishing_duration/effort_num*) was less than 0.5, or greater than 6 hours (where *effort_num* was not zero).

2.3 Catch summary for the whole of BAR 1

The BAR 1 Quota Management Area (QMA) includes Fisheries Management Areas (FMA) 1, 2, and 3, covering most of the east coast of North and South Islands of New Zealand (Figure 1). The annual reported catch from the BAR 1 fishery fluctuated about 7000 and 9500 t between 1989–90 and 1993–94, slightly below the TACC of 9960 t. Catches increased over the subsequent years to reach a peak of 12 000 t in 1996–97 and then declined slightly to about 9000–10 000 t from 1998–99 to 1999–2000. In 1997–98, the TACC for BAR 1 was increased to 11 000 t in line with the increased level of catch in the previous year.

From 1991–92 to 1999–2000 the total estimated catch recorded in the CELR and TCEPR systems accounted for about 90% of the total reported landed catch from the fishery (from Quota Management Returns). However, CELR and TCEPR records accounted for a smaller proportion (about 80%) of the total BAR 1 catch in the two years immediately following the introduction of the current catch and effort system in 1989–90 (Table 1 and Figure 2).

2.3.1 Fishery location

The BAR 1 fishery is concentrated mainly along the east coast of the South Island within statistical areas 18, 20–24, and 26 (south east coast, SEC). These areas collectively accounted for about 85–95% of the total annual reported BAR 1 catch between 1989–90 and 1999–2000. The annual catch from the SEC fishery was consistent with the trend in total catch from BAR 1, increasing between 1993–94 and 1996–97.

The remainder of the BAR 1 catch is taken off the central east coast of the North Island (CEC; statistical areas 11 to 16) and off the north east coast of the North Island (NEC; statistical areas 1 to 10). Total annual catch from the CEC steadily increased from about 200 t in 1989–90 to a peak of 1200 t in 1994–95 and declined to about 400 t in 1999–2000.

The NEC fishery accounted for an annual catch of 300 t between 1989–90 and 1999–2000, with the exception of higher catches, about 500–600 t, in 1991–92 and 1997–98 (Table 2).

2.3.2 Target species

Most of the BAR 1 catch is taken by the target fishery; however, the relative importance of the target fishery decreased from 1989–90 to 1999–2000, from about 70% to about 35% of the total catch (Table 3).

The target fishery was primarily conducted in the Canterbury Bight and Pegasus Bay, although some target fishing also occurred in the Bay of Plenty, off the Wairarapa Coast and around the Mernoo Bank (Figures 3 and 4). In 1989–90, there were only a limited number of trawls targeting BAR 1 beyond the Canterbury Bight/Pegasus Bay area. However, since the early 1990s, there has been an increase in the level of target fishing recorded along the Wairarapa coast and in the Bay of Plenty, although the level of target activity in both areas remained relatively low (Figures 3 and 4). The apparent increase in the number of target trawls in the Bay of Plenty since 1993–94 may, in part, be attributable to the introduction of TCEPR logbooks in QMA 1 to all trawl vessels regardless of size at that time.

Barracouta was also caught as a bycatch in many other fisheries operating within BAR 1, principally red cod (RCO), arrow squid (SQU), and, to a lesser extent jack mackerel (JMA) (Figure 5). The decline in the proportion of the total BAR 1 caught by the target barracouta fishery between 1989–90 and 1999–2000 was countered by a proportional increase in the bycatch (Table 3).

From 1989–90, the proportion of the total BAR 1 catch taken by the red cod fishery increased to reach a peak of 42.5% in 1997–98 (Table 3). This corresponded to a general increase in the total red cod catch from the RCO 3 fishery during the same period (Annala et al. 2001). The total barracouta bycatch from the red cod fishery declined in 1998–99 and 1999–2000 to about 26% of the total BAR 1 catch.

The red cod fishery in BAR 1 caught barracouta almost exclusively within the Canterbury Bight/Pegasus Bay area, with only a few trawls along the Kaikoura Coast and a small number of trawls around the Mernoo Bank (Figures 6 and 7). The density of the trawl activity from the red cod target fishery is consistent with the increasing bycatch of barracouta between 1989–90 and 1997–98 (Figure 5), and the subsequent decline in the catch level in 1998–99 and 1999–2000 (Figure 5). However, a significant proportion of the total catch from the red cod target fishery is taken by small trawl vessels that record catch and effort data in CELR format and, consequently, data from these vessels are not included in the figures presented.

From 1989–90 to 1999–2000, the bycatch of BAR 1 from the arrow squid fishery was highly variable. Annual catches were low (about 200–300 t) between 1989–90 and 1992–93, increased substantially to almost 2000 t in 1993–94 and fluctuated between 1000 and 2000 t in the subsequent years (Table 3 and Figure 5).

Within BAR 1, the arrow squid fishery caught barracouta principally off the south-eastern coast of the South Island, within the Canterbury Bight/Pegasus area, off the Catlins coast (the coast south of Otago Peninsula), and around the Mernoo Bank. Before to 1993–94, catches of barracouta were recorded almost entirely from within the Canterbury Bight/Pegasus Bay area, although the fishery expanded to the Catlins and Mernoo Bank areas in the subsequent years (Figures 8 and 9).

From 1989–90 to 1999–2000, the BAR 1 bycatch from the target jack mackerel fishery increased as a proportion of the total BAR 1 catch and in terms of the actual level of catch (Table 3). Prior to 1994–95, the BAR 1 catch from the fishery was small (less than 200 t), but steadily increased over the subsequent years to about 800 t in the most recent years.

Within BAR 1, barracouta is also caught in numerous other target fisheries that collectively account for a significant proportion (10–15%) of the total BAR 1 catch, but individually are relatively insignificant, such as target fisheries for hoki (HOK), gemfish (SKI), snapper (SNA), and tarakihi (TAR). Between 1989–90 and 1991–92, these other target fisheries accounted for an annual catch of about 800 t. In the subsequent years, the level of catch taken by these fisheries steadily increased to about 1700 t in 1994–95 and remained at about this level until 1997–98, before declining in the two subsequent years (Table 3).

2.3.3 Fishing methods

Within BAR 1, barracouta is predominantly caught by bottom trawling. This method generally accounted for about 85–95% of the total annual BAR 1 catch between 1989–90 and 1999–2000. Most of the remainder of the BAR 1 catch was taken by the midwater trawl method, which yielded annual catches of 1000–2000 t from 1992–93 to 1999–2000. The catch by this method was negligible in the three preceding years (Table 4).

2.3.4 Fishing season

There is a general seasonal trend in the annual catch from the BAR 1 fishery. Most of the catch is taken between October and May with low catches between June and September. In most years, peak catches are taken between January and May (Table 5).

2.3.5 Fishery fleet composition

The fishing fleet operating in the BAR 1 fishery is dominated by relatively small trawl vessels, ranging in length from 10 to 35 m (overall length). These vessels accounted for 60–70% of the annual catch from the BAR 1 fishery between 1989–90 and 1999–2000. Larger vessels took the remainder of the catch, although between 1989–90 and 1993–94 a declining proportion of the catch was taken by medium-sized vessels (35–60 m) while the proportion of the catch taken by large vessels (60+ m) increased. The latter vessel size class accounted for an annual catch of about 2000 t between 1993–94 and 1999–2000 (Table 6).

2.4 Catch summary for the North East Coast (NEC)

2.4.1 Fishery location

A high proportion of the barracouta caught off the North East Coast (NEC) is caught within the Bay of Plenty area, principally in statistical area 009. This statistical area generally accounted for about 20–30% of the total catch from the NEC, although in years of high catch (1991–92 and 1997–98) most of the catch was taken within 009. Most of the remainder of the catch from off the NEC was taken in statistical areas 002, 003, and 010 (Table 7).

2.4.2 Target species

The BAR 1 catch from the north-eastern North Island is principally taken by the target fishery and as a bycatch of the snapper and tarakihi fisheries. Between 1989–90 and 1991–92, the target fishery accounted for 50–60% of the total catch, although the significance of the fishery declined in the subsequent years, accounting for less than 15% of the total catch between 1994–95 and 1998–99. During this period, an increased proportion of the catch was taken by the tarakihi, gurnard, John dory, and gemfish fisheries as well as other non-target fisheries, while the level of bycatch from the snapper fishery remained relatively constant (20–30%) (Table 8).

2.4.3 Fishing methods

From 1989–90 to 1999–2000, 88% of the barracouta catch from the NEC fishery was taken by bottom trawl (Table 9). The remainder of the catch was primarily caught by pair trawl, although the proportion of the annual catch taken by this method varied between fishing years. In 1993–94 and 1999–2000, this method caught over 20% of the barracouta taken from the region (Table 9). The Danish seine method consistently accounted for a small proportion (1–2%) of the total BAR 1 catch from the area (Table 9).

2.4.4 Fishing season

In the NEC fishery, barracouta is principally caught during the winter (May to September) with only minor catches taken between December and April (Table 10). This is in contrast with the seasonal distribution of catches from the total BAR 1 fishery (see Table 5). However, there were also some large catches in October, November, February, and April in some years (Table 10).

2.5 Catch summary for the central east coast (CEC)

2.5.1 Fishery location

The barracouta fishery off the central east coast of the North Island is mainly located within Hawke Bay and south of Cape Kidnappers (statistical areas 013 and 014). The total BAR 1 catch from the CEC fishery steadily increased from 1989–90 to reach a peak in 1994–95 and declined over the subsequent years to 1999–2000. Despite the change in the magnitude of catch, the relative proportion of the catch from statistical areas 013 and 014 remained relatively constant during the entire period, at about 25% and 35% respectively (Table 11). Catches were generally low from the other statistical areas within the CEC region, with the exception of annual catches of about 200 t from 016 between 1994–95 and 1996–97 (Table 11).

2.5.2 Target species

Barracouta caught within CEC were mainly taken in the tarakihi, barracouta, and gemfish target fisheries. The relative proportion of the BAR 1 catch from the CEC fishery taken by each of these fisheries remained relatively constant from 1989–90 to 1999–2000, except for a large decline in the target fishery between 1989–90 and 1990–91. Overall, the tarakihi, barracouta, and gemfish fisheries accounted for 30%, 19%, and 16% of the total catch, respectively (Table 12).

2.5.3 Fishing methods

The barracouta catch from the CEC fishery was almost entirely taken by bottom trawl, which accounted for at least 95% of the catch in most years. The remainder of the catch was mainly taken by midwater trawls and in 1996–97 this accounted for 12.5% of the catch (Table 13).

2.5.4 Fishing season

The seasonal distribution of barracouta catches from the CEC fishery is similar to the NEC fishery with most of the catch taken in July-September and low catches from December to May. However, the seasonal distribution in catch varied between years and during 1993–94 to 1997–98, the period of peak catches from the fishery, a high proportion of the catch was also taken from October to December (Table 14).

2.6 Catch summary for the South Island east coast (SEC)

2.6.1 Fishery location

From 1989–90 to 1999–2000, most (60–70%) of the barracouta catch from the SEC fishery was taken in statistical area 022 (Table 15). The remainder of the catch was mainly taken from statistical areas 020 (15%) and, to a lesser extent, from 018 (9%), although the relative importance of the latter area declined from 1989–90 to 1992–93. The decline in the proportion of the catch from 018 was countered by an increase in catch from 024 during the same period (Table 15).

2.6.2 Target species

The SEC fishery supports a large target fishery for barracouta that accounted for about 45% of the total BAR 1 catch from the area between 1989–90 and 1999–2000. Most of remainder of the catch was

taken as a bycatch from the red cod (32%), squid (13%), and jack mackerel (5%) target fisheries (Table 16).

Between 1992–93 and 1993–94, there was a large decline in the target barracouta catch and a corresponding increase in the catch from the squid fishery. In the following year, the barracouta catch taken by the red cod fishery increased and continued to increase to a peak in 1997–98 before declining in the two next years. The target barracouta catch remained relatively constant from 1994–95 to 1999–2000, at about 3000 t, while the bycatch from the squid fishery fluctuated between 1000 and 1500 t. Catches from the jack mackerel fishery were generally low, but gradually increased to reach about 1000 t in 1999–2000.

Recent trends in the distribution of the barracouta catch from the target fishery and from the red cod and squid fisheries are described in the subsequent sections of this report.

2.6.3 Fishing methods

The bottom trawl took most of the BAR 1 catch from the SEC fishery with this method accounting for about 80–95% of the annual catch between 1989–90 and1999–2000 (Table 17). Before 1992–93, midwater trawling accounted for a minor component of the total barracouta catch (under 2%). However, from 1992–93 the proportion of the catch taken by this method increased to a peak of 39% in 1993–94. During the subsequent years, the method has accounted for 10–23% of the total catch (Table 17).

2.6.4 Fishing season

Most of the catch from the SEC fishery is taken between October and June, with very low catches taken during July to September (Table 18). However, between years there is considerable variability in the monthly distribution of catch between October and June.

2.7 Catch summary for the South Island east coast barracouta target fishery

The barracouta target fishery along the SEC is principally conducted within statistical area 022, with significant catches also taken in statistical areas 018, 020, and 024 (Table 19).

The fishery in statistical area 020 is centred on an area extending northwards through Pegasus Bay from the eastern tip of Banks Peninsula in the 30–70 m depth range. In statistical area 022, fishing is concentrated in the south Canterbury Bight off Timaru. Fishing grounds in this area extend over the shelf, although fishing is concentrated within the 30–100 m depth range. In both statistical areas, considerable target fishing also occurs along the edge of the continental shelf in the 180–350 m depth range.

Detailed positional data are available only from vessels recording catch and effort data in TCEPR format. These data indicate that between 1989–90 and 1999–2000 the barracouta target fishery became increasingly concentrated on the fishing grounds within the Canterbury Bight and along the edge of the continental shelf (Figure 10).

Most of the target barracouta catch was taken from November to April. However, there was considerable variation in the monthly catch between years and in some years large catches (over 20%) were taken in October and May (Table 20).

The SEC target barracouta fishery was dominated by small vessels (10–35 m overall length) targeting barracouta using bottom trawl gear (Table 21). This sector of the fleet accounted for 50–70% of the target SEC catch between 1989–90 and 1999–2000. The remainder of the catch was taken by medium

sized trawl vessels (35–60 m) principally using bottom trawl gear and larger vessels (60+ m) using both bottom and midwater trawl.

The relative importance of the medium trawl vessels in the target fishery generally declined over the study period and accounted for less than 10% of the target catch in the two most recent years. In contrast, a larger proportion of the catch has been taken by the larger (60+ m) vessels and since 1992–93 this sector of the fleet has accounted for about 25% of the annual target catch. For these larger vessels, there has been considerable interannual variation in the proportion of the catch taken by either bottom trawl or midwater trawl, although in most years midwater trawling was the dominant method (Table 21).

2.8 Catch summary for the South Island east coast red cod target fishery

Between 1989–90 and 1999–2000, 66% of the barracouta bycatch from the SEC red cod target fishery was taken in statistical area 022 (Table 22). The remainder of the barracouta bycatch was taken from 020 (19%) and, to a lesser extent, statistical areas 018 (7%) and 024 (8%) (Table 22). The areal distribution of catch between statistical areas was relatively constant throughout the study period, although there was a slight decline in the proportion of the catch taken in 020 and a corresponding increase in the catch from 018 and 022.

In general, the barracouta bycatch of the red cod fishery occurred in the same fishing grounds where the target barracouta fishery operated (see Section 2.7). However, there was considerable variability in the location of the barracouta bycatch between fishing years. Between 1989–90 and 1992–93 and 1997–98 to 1999–2000, a high proportion of the barracouta bycatch was taken from trawls along the edge of the continental shelf, but in the intervening years most of the barracouta bycatch was taken in Canterbury Bight or Pegasus Bay (Figure 11).

There is a strong seasonal trend in the distribution of the barracouta bycatch from the red cod target fishery, with catches increasing from October to January to reach a peak between January and April. Catches decline steadily between April and July and remain low in August–September (Table 23). However, there is considerable variation in the seasonal distribution in barracouta bycatch between years in terms of the duration of the seasonal peak in catches. For the years with the highest barracouta bycatch (1995–96 to 1997–98) peak season catches were maintained between December and May (Table 23).

The barracouta bycatch of the red cod target fishery in almost exclusively taken by small vessels (10–35 m overall length) using bottom trawl gear. Since 1993–94, these vessels accounted for at least 95% of the barracouta bycatch from the red cod fishery. Before 1993–94, medium sized trawl vessels (35–60 m) accounted for a higher proportion of the catch, although the total bycatch from the red cod fishery was considerably less during this period. In recent years, the barracouta bycatch taken by this sector of the fleet has been negligible (Table 24).

2.9 Catch summary for the South Island east coast arrow squid target fishery

Most (74%) of the barracouta bycatch from the SEC target squid fishery was taken in statistical area 022. However, over the study period, the relative proportion of the total barracouta bycatch taken in this area gradually declined from about 90% in 1989–90 to 70% in 1999–2000. The remainder of the barracouta bycatch was principally caught in statistical areas 020, 024, and 026, although the proportion of the catch taken in each area varied considerably between years (Table 25).

The barracouta bycatch from the target squid fishery was generally taken in trawls along the edge of the continental shelf off Pegasus Bay, Banks Peninsula, and Canterbury Bight (Figure 12). Between

1989–90 and 1992–93, barracouta catches were more localised off Banks Peninsula, but in subsequent years trawls were distributed from Pegasus Canyon to the southern Canterbury Bight. In 1993–94 and 1995–96, barracouta was caught as a bycatch from a significant number of trawls targeting squid in the southern part of the Canterbury Bight.

The barracouta bycatch from the arrow squid target fishery is principally taken between March and May. The seasonal distribution of barracouta bycatch may vary significantly between years and significant catches (over 15%) were also recorded in January (1999–2000), February (1998–99), and June (1990–91) (Table 26).

Most (69%) of the barracouta bycatch from the target squid fishery was taken by bottom trawl, although from 1993–94 to 1996–97 a significant proportion of the bycatch was also taken by the midwater trawls. The midwater trawl catch was almost exclusively taken by the larger (60+ m) vessels operating in the fishery (Table 27).

From 1989–90 to 1999–2000, there was considerable variability in the proportion of the barracouta bycatch taken by different sectors of the squid fleet. Between 1989–90 and 1992–93, the barracouta bycatch was principally taken by medium sized trawl vessels (35–60m), but larger (60+ m) vessels dominated the catch between 1993–94 and 1997–98. In the two most recent years, the medium sized vessels recovered dominance in the fishery. Small trawl vessels generally accounted for about 10–20% of the barracouta bycatch from the squid fishery.

3. OPERATOR INTERVIEWS

Operators in the BAR 1 fishery were interviewed to gain an understanding of their perceptions of the state of the resource and factors influencing the performance of the fishery. The data summaries in this document and the CPUE analysis by Langley & Walker (2002) provided the basis for these discussions.

Five interviews were conducted with;

- Allan Dylan from Independent Fisheries
- Tony Adamson and Cliff Eggeling from Sanford Ltd
- Gordon Kenton from Ocean Pioneer Ltd
- Robert Odey from Odey Fishing Company Ltd
- Raymond Mitchell from Mitchell Fishing Company

These interviews are summarised below, with comments from specific interviewees referred to as citations.

The interviewees represented companies that currently hold about 4600 t of the 11 000 t available TACC for BAR1. These companies operate 12 vessels ranging in length from 15 to 33 m. These vessels bottom trawl for barracouta using 80–140 ft wing trawls. Wing trawls have been used for many years in this fishery, although scotch nets were used in the 1980s (Odey).

These vessels follow reasonably similar fishing plans, fishing within the mixed fishery in the Canterbury Bight catching barracouta, red cod, elephantfish, grayboy sharks, flatfish, tarakihi, rig, and red gurnard. Some catch barracouta as bycatch to these others species (Mitchell), while others actively target barracouta. Those that target barracouta start fishing in late summer in the southern area of the Canterbury Bight, such as off Timaru (Dylan) or Oamaru (Adamson & Eggeling) and follow the barracouta north towards Banks Peninsula (Dylan) and closer to shore (Adamson & Eggleing). From June to September, the larger vessels target hoki on their spawning grounds in Cook Strait and off the west coast of the South Island (Adamson & Eggeling, Kenton, Mitchell, Odey).

Some fishers believe that they can distinguish between red cod and barracouta schools using their echo sounder (Dylan, Mitchell). The barracouta appear as streakier marks, shaped like a '^', while the red

cod appear as more solid rounded marks (Dylan, Mitchell). Other fishers do not think that anyone can distinguish reliably between red cod and barracouta on echo sounders (Adamson & Eggeling, Kenton)

There have been reduced catches of barracouta in recent years (Adamson & Eggeling, Dylan, Kenton), possibly due to the reduced market demand (Adamson & Eggeling) and this may be causing the large increase in the abundance of juvenile barracouta (Dylan). Many of the fishers interviewed believe that the abundance and distribution of barracouta is related via the abundance and distribution of their food source, krill, to sea temperatures and weather patterns (Adamson & Eggeling, Dylan, Kenton, Odey). Barracouta abundance in the Canterbury Bight appears to decline in warmer sea temperatures caused by the La Niña weather pattern, with the barracouta moving to cooler waters to the south, or into deeper waters (Adamson & Eggeling, Dylan).

Barracouta are said to be consistently found in certain areas but also can be caught in unexpected places (Mitchell), with some areas being very productive, such as one area 6 miles offshore from Timaru supplying catch for almost the entire fleet during the early 1990s (Odey).

Most adult barracouta caught are between 80 and 100 cm, but their weight varies considerably with the parasite load. Parasite-ridden barracouta are known as 'bootlaces' (Odey). Schools of small juvenile barracouta (20–30 cm in length) mostly slip through the net mesh (Odey). Barracouta schools contain distinct size classes (Adamson & Eggeling, Dylan) with larger fish being found in deeper waters (150 m on the South Island's east coast and 200–300 m on the South Island's west coast (Adamson & Eggeling). Kenton believed that only the smaller juvenile barracouta aggregate in separate schools, with larger juveniles and adults of all sizes in mixed schools of barracouta.

The location of the markets stated by the interviewee's differed. First class barracouta are sold in Japan as skin on fillets (Adamson & Eggeling) with others being sold in Australia and South Africa (Odey). Some is sold to Papua New Guinea, but this market has declined over the last few years due to the increase in their own fisheries (Kenton). It has been sold to Namibian markets as skin on fillets but is now sold as headed and gutted as it is cheaper to prepare (Dylan). About six years ago it was also made into fish fingers and processed fillets with southern blue whiting (Dylan). Damaged barracouta is sold as bait for line and pot fishers in Australia and New Zealand (Dylan, Kenton, Mitchell). Rejected barracouta is used to make fish meal (Dylan).

Market price has dropped considerably since 1994, but better prices are available for the larger barracouta, those over 70 cm in length (Table 28) (Kenton). Due to the reduced demand more barracouta is rejected and used to make fish meal, which reduces the feasibility of fishing for barracouta (Table 29) (Dylan). The barracouta fishery is now seen as a marginal fishery that is significantly dictated by market demand (Adamson & Eggeling) and would benefit greatly from more extensive marketing (Kenton).

4. DISCUSSION

Catches of barracouta have risen steadily since Japanese trawlers first took significant catches in 1967. The fishery peaked with a total of 47 000 t in 1977 (Hurst 1988). Since 1977, the catches of barracouta have ranged from about 17 820 t (in 1985–86) to 28 393 t (in 1996–97) (Annala et al. 2001). In BAR 1, catches of barracouta have fluctuated about 7 000 and 9500 t between 1989–90 and 1993–94, slightly below the TACC of 9960 t. Catches increased over the subsequent years to reach a peak of 12 000 t in 1996–97 and then declined slightly to about 9000–10 000 t from 1998–99 to 1999–2000.

The introduction of the New Zealand Exclusive Economic Zone in 1978 initially reduced the catches of barracouta and new fisheries were developed around the Chatham Islands and on the Stewart-Snares shelf. This started a shift from foreign vessels to domestic vessels in the barracouta fishery. The landings by domestic vessels increased due to importation of larger domestic trawlers under the duty-free importation scheme (1976–80) and the subsidy paid to domestic fishermen to target "less

preferred" species, such as barracouta and jack mackerel (May 1979 to August 1980 and May 1981 to March 1982) (Hurst 1988).

The east coast of the South Island provides most of the total catch of barracouta from New Zealand waters. In 1983 and 1984, 45% of the total catch for New Zealand came from the east coast of the South Island (Hurst 1988). Within BAR 1, the east coast of the South Island has provided at least 84.8% of the catch since 1989–90. Most of the catch from along this coastline comes from the Canterbury Bight (statistical area 022), which provides 42.7–72.9% of the annual catch.

Smaller fisheries for barracouta also occur within the Bay of Plenty and Hawke Bay. Since 1989–90, these fisheries have caught about 4 and 8%, respectively, of the total BAR 1 catch.

The barracouta target fishery accounts for about 45% of the total catch of barracouta within the South Island's east coast. The remainder is caught as bycatch in the red cod (32%), arrow squid (13%), and the jack mackerel (5%) fisheries. Since 1993–94, the catch from the South Island's east coast barracouta target fishery has declined, with annual catches providing less than 45% of the total catch. Before 1993–94, the target fishery in this year provided more than 65% of the total catch for this area.

The present study identified two main fisheries that account for a high proportion of the BAR 1 catch; the inshore target red cod and target barracouta trawl fisheries. These fisheries were relatively stable throughout the 1990s and were fished by a consistent group of vessels (Langley & Walker 2002). On this basis, Langley & Walker (2002) identified these two fisheries as potential candidates for a more detailed analysis of catch and effort data from BAR 1. For both fisheries, annual indices were derived using a standardised analysis of the CPUE data and CPUE is promoted as being a suitable method of monitoring trends in abundance for the stock. However, trends in the annual indices need to be considered with respect to the comments from vessel operators documented in this report. The comments made by operators in the fishery identified some key issues, principally market issues, that need to be considered in the interpretation of the CPUE indices. Consequently, it is recommended that any future analysis of CPUE data should also be augmented by discussions with vessel operators to identify any significant recent developments in the fishery.

5. ACKNOWLEDGMENTS

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Table 1: **Annual estimated catch by form type (percent of total), total QMR catch, and annual TACC for BAR 1 by fishing year for 1989–90 to 1999–2000. The total estimated catch is also recorded as a percentage of the total QMR catch. (source: MFish TCEPR and CELR data).**

	Percent of estimated catch by form type			Estimated catch as percent of		
Fishing year	CELR	TCEPR	Total estimated catch (t)	QMR catch	QMR (t)	TACC (t)
1989–90	31.7	68.3	7 401	80	9 209	9 841
1990–91	42.2	57.8	7 824	83	9 401	9 957
1991–92	39.2	60.8	6 064	90	6 733	9 957
1992–93	30.4	69.6	7 861	87	9 032	9 969
1993–94	30.7	69.3	6 392	88	7 299	9 969
1994–95	33.0	67.0	8 970	89	10 023	9 969
1995–96	28.9	71.1	10 288	91	11 252	9 969
1996–97	35.2	64.8	10 903	92	11 873	11 000
1997–98	36.7	63.3	10 609	92	11 543	11 000
1998–99	34.4	65.6	8 388	91	9 215	11 000
1999–2000	29.4	70.6	9 108	91	10 032	11 000

Table 2: **Percentage distribution of barracouta catch by fishery area (as defined by statistical areas) and fishing year within BAR 1. Source: MFish TCEPR and CELR data.**

	Fishery area				
Fishing Year	NEC (1 to 10)	CEC (11 to 16)	SEC (18, 20-24, 26)	Other	Total catch (t)
1989–90	4.4	4.1	91.4	0.1	7 403.0
1990–91	4.1	2.3	93.4	0.3	7 829.6
1991–92	8.6	7.0	84.4	0.0	6 066.5
1992–93	4.2	8.5	87.1	0.1	7 871.4
1993–94	4.7	14.1	80.6	0.5	6 394.1
1994–95	3.5	14.1	82.4	0.1	8 975.1
1995–96	3.2	10.8	86.0	0.0	10 290.9
1996–97	3.0	9.2	87.8	0.0	10 906.5
1997–98	5.6	5.3	88.9	0.1	10 623.9
1998–99	3.9	5.7	90.3	0.1	8 393.5
1999–2000	2.6	4.3	93.1	0.0	9 110.2
% of Total	4.2	7.8	87.9	0.1	

Table 3: **Percentage distribution of BAR 1 by target species barracouta BAR and fishing year (BAR barracouta, HOK hoki, JMA Jack mackerel, RCO red cod, SKI gemfish, SNA snapper, SQU arrow squid) (source: MFish TCEPR and CELR data).**

	Target species									
Fishing Year	BAR	HOK	JMA	RCO	SKI	SNA	SQU	TAR	Other	Total catch (t)
1989–90	68.8	0.9	0.2	17.6	0.8	1.4	2.6	2.0	5.8	7 403
1990–91	66.9	1.7	1.9	17.5	0.6	1.0	3.1	2.0	5.2	7 830
1991–92	61.4	0.7	0.9	18.0	2.1	1.5	5.9	3.6	6.1	6 066
1992–93	56.1	0.9	0.8	24.7	2.9	0.9	3.8	3.0	6.8	7 871
1993–94	27.8	3.2	2.3	20.3	2.6	2.0	29.0	6.0	6.6	6 394
1994–95	36.7	1.4	6.2	25.7	3.3	1.1	12.4	6.6	6.5	8 975
1995–96	30.8	1.8	3.1	34.5	1.9	1.3	15.5	5.2	5.9	10 291
1996–97	33.3	2.1	5.9	39.0	1.6	0.6	7.9	3.5	6.2	10 906
1997–98	26.0	2.0	6.5	42.5	1.9	1.4	10.3	3.3	6.1	10 624
1998–99	36.6	1.0	10.5	26.6	0.4	1.3	12.7	4.5	6.4	8 393
1999–2000	36.4	0.6	8.9	26.8	0.4	0.8	19.6	2.6	4.0	9 110
% of total	42.1	1.5	4.6	28.0	1.7	1.2	11.1	3.8	5.6	

Table 4.: **Percentage distribution of barracouta catch by fishing method and fishing year within BAR 1 (source: MFish TCEPR and CELR data).**

	Fishing method					
Fishing year	Pair bottom trawl	Bottom trawl	Danish seine	Midwater trawl	Other	Total catch (t)
1989–90	0.5	97.5	0.0	0.0	1.9	7 401
1990–91	0.3	97.4	0.1	1.4	0.8	7 824
1991–92	0.4	98.0	0.1	0.3	1.3	6 064
1992–93	0.3	88.1	0.0	10.4	1.2	7 861
1993–94	1.2	65.1	0.1	32.2	1.5	6 392
1994–95	0.4	81.3	0.0	17.2	1.0	8 970
1995–96	0.0	85.1	0.1	13.8	1.0	10 288
1996–97	0.0	83.3	0.1	16.2	0.4	10 903
1997–98	0.0	89.2	0.1	9.6	1.1	10 609
1998–99	0.0	87.0	0.1	12.6	0.3	8 388
1999–2000	0.6	77.6	0.1	21.6	0.1	9 108
% of Total	0.3	86.2	0.1	12.5	0.9	

Table 5: **Percentage distribution of barracouta catch by month and fishing year within BAR 1 (source: MFish TCEPR and CELR data).**

Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	12.5	6.6	7.5	6.7	9.7	12.6	10.7	14.1	5.3	1.9	5.2	7.0	7 401
1990–91	14.5	14.5	8.8	9.5	13.5	6.0	11.9	7.3	4.1	3.1	2.9	4.0	7 824
1991–92	5.1	8.3	9.5	13.4	14.2	15.5	11.0	6.7	3.6	1.9	3.7	7.1	6 064
1992–93	2.8	2.5	2.8	14.5	14.7	10.4	15.2	13.6	7.9	8.4	3.6	3.6	7 861
1993–94	9.4	5.8	5.2	9.7	7.1	4.6	26.3	13.4	5.9	3.9	4.4	4.5	6 392
1994–95	3.3	10.1	6.6	12.1	10.9	7.6	14.5	16.8	5.3	3.3	3.8	5.7	8 970
1995–96	4.5	9.6	9.4	11.0	10.7	18.0	14.9	10.0	4.3	3.1	2.0	2.5	10 288
1996–97	5.2	12.6	16.2	9.9	6.8	8.2	17.2	13.5	4.0	1.6	1.9	2.8	10 903
1997–98	6.0	10.9	14.0	10.4	8.4	13.0	15.7	9.3	6.3	2.1	1.9	2.0	10 609
1998–99	9.3	6.2	5.5	13.7	14.5	10.2	18.8	7.9	5.8	2.8	2.2	3.1	8 388
1999–2000	4.2	5.9	8.5	25.0	9.0	16.2	14.9	8.6	3.5	1.3	1.0	1.9	9 108
% of Total	6.8	8.7	9.0	12.4	10.7	11.3	15.5	11.1	5.1	3.0	2.8	3.8	

Table 6: **Percentage distribution of barracouta catch by vessel size (metres overall length) and fishing year within BAR 1 (source: MFish TCEPR and CELR data).**

	Vessel overall length (m)			
Fishing Year	10–35	35–60	60+	Total catch (t)
1989–90	61.8	35.2	3.0	7 400
1990–91	69.5	26.3	4.2	7 822
1991–92	83.0	13.2	3.8	6 059
1992–93	65.9	18.8	15.3	7 859
1993–94	55.6	9.3	35.1	6 388
1994–95	70.9	7.9	21.1	8 963
1995–96	70.6	12.3	17.2	10 275
1996–97	72.1	10.1	17.8	10 899
1997–98	73.0	10.3	16.7	10 607
1998–99	70.1	10.1	19.8	8 387
1999–2000	59.0	12.6	28.4	9 107
% of Total	68.5	14.6	16.9	

Table 7: Percentage distribution of barracouta catch by statistical area and fishing year within the north east coast (NEC) (source: MFish TCEPR and CELR data).

	General statistical area										
Fishing Year	1	2	3	4	5	6	7	8	9	10	Total catch (t)
1989–90	0.1	20.3	13.6	0.2	2.1	10.0	0.1	8.7	24.6	20.4	325
1990–91	0.1	7.0	50.6	0.7	2.8	1.5	0.1	5.3	25.3	6.6	318
1991–92	0.0	3.1	10.5	1.6	1.2	0.5	0.0	5.9	68.2	9.0	521
1992–93	0.1	9.7	12.5	0.8	1.8	1.1	0.2	12.8	45.4	15.8	334
1993–94	0.0	16.6	14.1	0.5	5.2	1.3	0.2	13.2	31.8	17.2	300
1994–95	0.1	19.1	13.0	0.4	5.3	1.7	0.1	10.2	28.7	21.3	311
1995–96	0.7	20.7	14.3	0.4	8.0	0.8	0.3	6.7	30.1	18.1	328
1996–97	0.2	20.2	11.9	0.6	9.4	1.7	0.5	12.9	23.7	18.9	330
1997–98	0.0	11.9	16.2	0.1	2.8	0.3	0.2	6.4	55.4	6.7	600
1998–99	0.0	5.0	12.5	0.2	3.4	1.4	0.2	16.3	47.6	13.3	324
1999–2000	0.0	32.3	13.7	1.9	7.5	0.6	1.1	12.1	24.4	6.3	234
% of Total	0.1	13.9	16.3	0.6	4.1	1.7	0.3	9.5	40.1	13.4	

Table 8: Percentage distribution of barracouta catch by target species and fishing year within the north east coast (NEC) (source: MFish TCEPR and CELR data).

	Target species										
Fishing Year	BAR	GUR	JDO	RCO	SKI	SNA	SQU	TAR	TRE	Other	Total catch (t)
1989–90	52.7	0.9	1.3	1.6	4.6	31.7	0.0	4.6	1.1	1.4	325
1990–91	59.4	1.2	1.1	1.1	1.8	25.2	0.0	7.4	1.4	1.3	318
1991–92	58.1	1.5	1.7	0.7	2.2	16.9	0.0	15.2	0.7	3.1	521
1992–93	37.8	1.5	3.3	1.8	8.2	17.8	0.0	23.7	3.6	2.3	334
1993–94	25.4	1.1	2.9	1.7	0.3	36.7	0.0	26.1	1.6	4.3	300
1994–95	12.1	2.0	4.3	1.6	3.0	26.9	0.0	39.5	3.7	7.1	311
1995–96	14.5	3.2	7.0	1.9	5.9	33.9	0.0	22.6	2.4	8.7	328
1996–97	10.9	12.0	12.8	0.3	2.9	16.2	0.0	32.2	5.9	6.8	330
1997–98	5.5	1.5	8.5	0.6	24.4	21.3	0.0	24.1	7.8	6.4	600
1998–99	11.8	2.0	9.1	0.3	2.4	29.9	0.0	24.6	14.8	5.0	324
1999–2000	24.3	2.7	7.0	0.0	0.6	27.0	0.0	19.6	17.1	1.6	234
% of total	28.4	2.6	5.4	1.0	6.5	24.9	0.0	21.6	5.1	4.5	

Table 9: Percentage distribution of barracouta catch by fishing method and fishing year within the north east coast (NEC) (source: MFish TCEPR and CELR data).

	Fishing method					
Fishing year	Pair bottom trawl	Bottom trawl	Danish seine	Midwater trawl	Other	Total catch (t)
1989–90	11.4	87.4	0.5	0.0	0.7	325
1990–91	7.7	88.7	1.8	0.0	1.8	318
1991–92	4.8	92.6	0.8	0.0	1.9	521
1992–93	6.8	90.1	0.3	0.0	2.8	334
1993–94	20.2	75.0	1.1	0.0	3.7	300
1994–95	12.6	83.0	0.7	0.0	3.8	311
1995–96	0.6	87.9	2.1	0.0	9.4	328
1996–97	0.8	88.1	3.1	0.0	7.9	330
1997–98	0.3	92.1	1.0	0.0	6.6	600
1998–99	0.3	94.0	1.6	0.1	4.0	324
1999–2000	22.6	72.4	2.1	0.0	3.0	234
% of Total	6.8	87.6	1.3	0.0	4.2	

Table 10: Percentage distribution of barracouta catch by month and fishing year within the north east coast (NEC) (source: MFish TCEPR and CELR data).

	Month												
Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	2.0	1.3	0.7	0.7	0.0	0.0	0.5	4.5	8.6	11.1	17.6	53.0	325
1990–91	1.6	1.2	0.5	0.4	38.3	5.9	2.3	2.9	8.7	7.3	8.7	22.1	318
1991–92	3.4	1.0	0.7	1.4	1.0	2.5	1.0	7.4	8.3	6.0	28.0	39.4	521
1992–93	7.4	6.4	4.6	1.5	4.8	8.0	4.4	11.8	10.4	13.9	18.2	8.6	334
1993–94	6.8	20.3	6.6	3.8	5.0	4.0	2.6	2.5	5.5	10.3	27.9	4.7	300
1994–95	5.7	5.7	6.0	9.5	4.7	2.9	3.3	6.8	8.5	17.0	21.4	8.5	311
1995–96	6.1	6.5	2.6	3.0	4.9	2.4	3.3	10.4	6.3	34.6	13.2	6.7	328
1996–97	17.8	8.2	7.6	3.3	2.5	3.5	4.3	3.0	7.2	8.1	17.9	16.8	330
1997–98	2.7	5.0	2.2	4.3	1.7	4.5	14.2	29.4	5.9	9.9	11.3	9.0	600
1998–99	4.6	8.5	9.9	2.4	1.3	3.5	5.0	19.6	5.4	14.3	17.4	8.0	324
1999–2000	12.9	11.3	4.2	6.0	3.3	9.4	6.2	2.2	3.3	8.7	7.7	24.7	234
% of Total	5.9	6.2	3.8	3.2	5.6	4.1	4.8	10.7	7.2	12.4	17.5	18.7	

Table 11: Percentage distribution of barracouta catch by statistical area and fishing year within the central east coast (CEC) (source: MFish TCEPR and CELR data).

	Statistical areas						
Fishing Year	11	12	13	14	15	16	Total catch (t)
1989–90	1.6	7.6	32.6	42.1	11.7	4.3	305
1990–91	3.4	22.9	30.5	11.5	16.8	14.9	179
1991–92	3.0	3.5	27.3	43.6	5.3	17.3	424
1992–93	2.5	2.3	31.7	40.8	8.7	13.8	673
1993–94	3.4	6.4	24.9	40.3	14.9	10.1	903
1994–95	3.4	8.5	23.4	39.4	7.5	17.8	1 262
1995–96	6.2	7.0	26.4	32.5	14.5	13.4	1 108
1996–97	5.1	5.5	24.1	38.6	4.6	22.2	999
1997–98	7.4	12.4	25.5	39.6	9.7	5.4	560
1998–99	9.3	12.0	19.3	28.2	14.6	16.7	483
1999–2000	11.5	12.6	35.2	22.0	3.9	14.8	394
% of Total	5.0	7.8	26.2	36.5	9.9	14.6	

Table 12: Percentage distribution of barracouta catch by target species and fishing year within the central east coast (CEC) (source: MFish TCEPR and CELR data).

	Target species								
Fishing Year	BAR	GUR	HOK	SKI	TAR	TRE	WAR	Other	Total catch (t)
1989–90	64.2	0.7	0.6	6.9	20.4	1.1	3.2	2.9	305
1990–91	19.2	6.9	3.7	6.1	42.0	0.7	10.8	10.6	179
1991–92	13.3	8.6	0.8	25.9	25.7	1.0	17.0	7.8	424
1992–93	30.4	10.8	1.2	18.3	18.6	3.6	12.3	4.9	673
1993–94	21.8	8.0	7.8	18.4	27.1	2.3	6.8	8.0	903
1994–95	10.2	7.4	3.0	22.9	31.0	1.9	17.3	6.4	1 262
1995–96	11.0	9.8	7.4	15.8	34.1	2.2	13.8	5.8	1 108
1996–97	18.4	12.9	10.6	15.9	21.9	0.9	14.1	5.2	999
1997–98	17.4	11.1	15.5	9.7	30.8	1.0	6.5	7.9	560
1998–99	20.6	6.3	6.1	4.6	51.2	0.5	6.6	4.0	483
1999–2000	14.1	15.3	3.8	7.7	43.1	0.4	7.5	8.1	394
% of total	18.9	9.3	6.1	15.9	30.1	1.6	11.7	6.3	

Table 13: Percentage distribution of barracouta catch by fishing method and fishing year within the central east coast (CEC) (source: MFish TCEPR and CELR data).

	Fishing method					
Fishing year	Pair bottom trawl	Bottom trawl	Danish seine	Midwater trawl	Other	Total catch (t)
1989–90	0.0	99.8	0.0	0.2	0.0	305
1990–91	0.0	99.2	0.0	0.5	0.3	179
1991–92	0.0	95.2	0.0	3.3	1.5	424
1992–93	0.0	98.0	0.0	1.3	0.7	673
1993–94	0.3	94.2	0.0	3.8	1.6	903
1994–95	0.0	93.9	0.0	5.4	0.7	1 262
1995–96	0.0	96.7	0.0	1.9	1.4	1 108
1996–97	0.0	86.7	0.0	12.5	0.8	999
1997–98	0.0	98.2	0.0	1.1	0.8	560
1998–99	0.0	95.0	0.0	3.7	1.3	483
1999–2000	0.0	99.2	0.0	0.3	0.5	394
% of Total	0.0	94.9	0.0	4.1	1.0	

Table 14: Percentage distribution of barracouta catch by month and fishing year within the central east coast (CEC) (source: MFish TCEPR and CELR data).

	Month												
Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total Catch (t)
1989–90	0.7	1.4	1.5	3.8	7.8	2.1	0.6	0.3	3.4	2.8	57.9	17.6	305
1990–91	3.4	16.0	6.7	3.8	7.7	7.1	3.8	3.9	3.2	21.0	17.6	5.7	179
1991–92	4.7	8.7	10.9	20.2	9.6	3.8	2.1	1.9	8.5	8.8	5.1	15.8	424
1992–93	3.9	3.7	5.2	12.8	6.8	6.9	2.9	3.2	4.8	19.4	14.6	15.8	673
1993–94	6.7	2.7	3.3	12.8	8.4	3.8	5.3	1.7	3.4	15.0	16.7	20.4	903
1994–95	12.0	5.4	5.0	4.3	3.6	2.9	2.5	3.1	5.1	14.9	15.8	25.3	1 262
1995–96	19.1	10.7	7.4	6.0	3.7	3.2	2.4	3.3	8.6	8.5	11.4	15.6	1 108
1996–97	15.6	10.0	7.9	6.1	5.0	3.6	3.4	4.1	3.7	8.8	11.3	20.5	999
1997–98	14.8	9.3	8.1	5.9	4.6	5.3	6.0	4.5	2.7	5.1	17.5	16.2	560
1998–99	5.8	6.3	4.8	6.8	4.2	4.7	2.5	4.0	3.2	5.2	18.3	34.2	483
1999–2000	3.3	5.8	8.1	12.5	6.0	6.3	3.1	7.3	3.9	6.2	16.3	21.4	394
% of Total	10.4	7.0	6.2	8.3	5.6	4.1	3.2	3.3	4.9	10.9	16.0	20.0	

Table 15: Percentage distribution of barracouta catch by statistical area and fishing year within the south east coast (CEC)(source: Mfish TCEPR and CELR data).

	General statistical areas							
Fishing Year	18	20	21	22	23	24	26	Total catch (t)
1989–90	15.2	18.8	0.8	62.8	0.1	1.0	1.3	6 765
1990–91	12.1	12.6	2.4	57.7	1.8	10.8	2.7	7 310
1991–92	12.7	16.4	0.2	47.2	0.0	20.3	3.1	5 119
1992–93	8.7	7.3	1.2	63.1	0.5	13.9	5.4	6 855
1993–94	9.6	14.5	2.9	65.8	0.0	5.7	1.4	5 156
1994–95	7.4	13.8	4.3	62.4	0.0	11.5	0.5	7 392
1995–96	7.6	15.1	0.7	66.7	0.3	5.2	4.3	8 852
1996–97	7.2	13.7	0.7	69.5	0.5	6.2	2.2	9 573
1997–98	7.3	23.7	0.8	58.0	0.4	4.9	4.9	9 450
1998–99	9.4	13.1	0.1	64.2	0.0	9.5	3.6	7 582
1999–2000	5.5	12.0	0.2	72.8	0.2	7.7	1.6	8 480
% of Total	9.0	14.8	1.2	63.4	0.4	8.3	2.9	

Table 16: Percentage distribution of barracouta catch by target species and fishing year within the south east coast (CEC) (source: MFish TCEPR and CELR data).

	Target species					
Fishing Year	BAR	JMA	RCO	SQU	Other	Total catch (t)
1989–90	69.7	0.2	19.2	2.8	8.1	6 767
1990–91	68.4	2.0	18.7	3.3	7.6	7 315
1991–92	65.7	1.0	21.2	7.0	5.0	5 120
1992–93	59.5	1.0	28.2	4.4	6.9	6 864
1993–94	28.6	2.8	25.1	35.9	7.6	5 157
1994–95	42.2	7.6	31.2	15.1	3.9	7 393
1995–96	33.9	3.6	40.0	18.0	4.4	8 853
1996–97	35.6	6.7	44.4	9.0	4.4	9 573
1997–98	27.8	7.1	47.7	11.6	5.8	9 452
1998–99	38.7	11.6	29.4	14.0	6.3	7 582
1999–2000	37.8	9.5	28.8	21.0	2.9	8 480
% of total	44.8	5.2	31.8	12.7	5.6	

Table 17: **Percentage distribution of barracouta catch by fishing method and fishing year within the south east coast (CEC) (source: MFish TCEPR and CELR data).**

	Fishing method					
Fishing year	Pair bottom trawl	Bottom trawl	Danish seine	Midwater trawl	Other	Total catch (t)
1989–90	0.0	97.9	0.0	0.0	2.1	6 767
1990–91	0.0	97.7	0.0	1.5	0.8	7 315
1991–92	0.0	98.7	0.0	0.0	1.2	5 120
1992–93	0.0	87.0	0.0	11.7	1.2	6 864
1993–94	0.3	59.3	0.0	39.2	1.3	5 157
1994–95	0.0	79.1	0.0	20.0	0.9	7 393
1995–96	0.0	83.5	0.0	15.9	0.6	8 853
1996–97	0.0	82.8	0.0	17.1	0.1	9 573
1997–98	0.0	88.5	0.0	10.7	0.8	9 452
1998–99	0.0	86.2	0.0	13.7	0.1	7 582
1999–2000	0.0	76.8	0.0	23.2	0.0	8 480
% of Total	0.0	85.3	0.0	13.9	0.8	

Table 18: **Percentage distribution of barracouta catch by month and fishing year within the south east coast (CEC) (source: MFish TCEPR and CELR data).**

Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	13.5	7.1	8.1	7.1	10.3	13.7	11.7	15.2	5.3	1.4	2.2	4.3	6 767
1990–91	15.3	15.1	9.2	10.0	12.6	6.0	12.5	7.7	3.9	2.5	2.2	3.0	7 315
1991–92	5.3	9.0	10.3	14.1	15.9	17.8	12.7	7.0	2.8	0.9	1.1	3.0	5 120
1992–93	2.5	2.2	2.5	15.5	15.9	10.8	16.9	14.7	8.0	7.1	1.8	2.1	6 864
1993–94	9.5	5.5	5.5	9.6	7.0	4.8	31.5	16.1	6.4	1.6	0.9	1.7	5 157
1994–95	1.7	11.1	6.9	13.5	12.4	8.6	17.0	19.6	5.2	0.7	1.1	2.2	7 393
1995–96	2.6	9.6	9.9	12.0	11.8	20.4	16.9	10.9	3.7	1.2	0.4	0.7	8 853
1996–97	3.7	13.0	17.4	10.5	7.2	8.8	19.1	14.9	3.9	0.7	0.4	0.5	9 573
1997–98	5.7	11.3	15.1	11.0	9.1	14.0	16.4	8.3	6.6	1.4	0.4	0.7	9 452
1998–99	9.8	6.1	5.4	14.6	15.7	10.9	20.4	7.7	6.0	2.2	0.6	0.9	7 582
1999–2000	4.0	5.7	8.7	26.1	9.2	16.9	15.7	8.8	3.5	0.9	0.1	0.3	8 480
% of Total	6.4	9.0	9.5	13.2	11.3	12.3	17.1	11.8	5.0	1.8	0.9	1.6	

Table 19: Percentage distribution of barracouta catch by statistical area and fishing year in the target barracouta fishery within the south east coast (CEC) (source: MFish TCEPR and CELR data).

	General statistical areas							
Fishing Year	18	20	21	22	23	24	26	Total catch (t)
1989–90	16.7	15.8	0.5	64.7	0.0	0.8	1.5	4 717
1990–91	14.8	10.3	1.2	56.9	2.4	10.9	3.4	4 997
1991–92	14.7	14.0	0.1	42.7	0.0	24.5	3.9	3 364
1992–93	7.6	3.4	0.5	60.4	0.4	19.7	8.0	4 077
1993–94	19.9	22.6	1.1	49.9	0.0	2.5	4.0	1 473
1994–95	10.4	15.0	3.3	60.3	0.1	10.2	0.8	3 123
1995–96	7.3	19.0	0.4	65.4	0.3	6.6	1.1	3 004
1996–97	9.3	17.1	0.3	65.9	1.0	3.1	3.3	3 410
1997–98	5.7	20.9	0.1	65.1	1.0	2.6	4.6	2 630
1998–99	11.1	16.6	0.1	56.3	0.0	15.2	0.6	2 931
1999–2000	7.6	6.8	0.0	72.9	0.0	11.5	1.1	3 202
% of Total	11.4	13.7	0.7	60.5	0.6	10.2	3.0	

Table 20: Percentage distribution of barracouta catch by month and fishing year in the target barracouta fishery within the south east coast (CEC) (source: MFish TCEPR and CELR data).

	Month												
Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	17.9	4.3	9.4	6.3	10.7	12.0	12.0	16.5	3.4	0.5	2.6	4.3	4 719
1990–91	17.8	19.4	9.7	9.8	13.1	4.7	11.3	6.6	3.2	0.7	1.1	2.8	5 002
1991–92	6.8	11.0	10.9	12.9	20.8	18.3	9.8	2.7	0.9	0.5	1.2	4.2	3 365
1992–93	2.1	1.4	2.1	19.0	20.1	12.6	9.2	12.1	6.7	10.4	2.2	2.3	4 085
1993–94	26.8	11.1	4.4	8.3	3.6	0.8	22.1	10.1	6.0	0.6	1.4	4.8	1 473
1994–95	1.3	17.9	6.3	12.7	1.7	4.0	20.5	21.4	8.1	0.2	2.1	3.9	3 124
1995–96	3.5	13.0	15.1	11.8	11.3	10.3	21.1	10.4	2.1	0.1	0.2	1.2	3 004
1996–97	2.6	19.5	29.5	13.0	1.7	4.1	18.6	7.7	2.7	0.0	0.0	0.6	3 410
1997–98	9.2	25.3	25.2	4.6	0.8	5.9	14.3	3.5	8.9	1.5	0.6	0.3	2 630
1998–99	13.7	4.7	1.3	10.3	12.5	15.9	21.1	6.6	11.0	1.3	0.3	1.3	2 931
1999–2000	5.1	8.2	11.4	29.0	11.4	13.8	14.9	3.1	2.4	0.3	0.1	0.3	3 202
% of Total	9.4	12.0	11.3	12.6	10.7	9.7	15.0	9.4	4.8	1.6	1.2	2.4	

Table 21: Percentage distribution of barracouta catch by fishing method, vessel size (metres overall length) and fishing year in the target barracouta fishery within the south east coast (CEC) (source: MFish TCEPR and CELR data).

Method	Bottom trawl			Midwater trawl			Other			Total catch (t)
Vessel Size (m)	10–35	35–60	60+	10–35	35–60	60+	10–35	35–60	60+	
1989–90	49.6	46.7	3.7	0.0	0.0	0.0	0.0	0.0	0.0	4 718
1990–91	66.5	28.7	3.3	0.0	0.0	1.5	0.0	0.0	0.0	5 002
1991–92	83.9	13.4	2.7	0.0	0.0	0.0	0.0	0.0	0.0	3 365
1992–93	59.0	21.0	7.6	0.0	0.0	12.4	0.0	0.0	0.0	4 085
1993–94	35.7	24.7	8.9	0.0	0.0	30.2	0.5	0.0	0.0	1 473
1994–95	66.1	12.7	8.1	0.0	0.0	12.5	0.6	0.0	0.0	3 123
1995–96	65.2	19.0	7.5	0.0	0.0	8.2	0.0	0.0	0.0	3 004
1996–97	58.4	17.5	3.4	0.0	0.6	20.0	0.1	0.0	0.0	3 410
1997–98	63.0	11.3	13.6	0.0	0.0	12.0	0.1	0.0	0.0	2 630
1998–99	78.6	3.4	10.9	0.0	0.0	7.0	0.0	0.0	0.0	2 931
1999–2000	59.2	4.8	1.5	0.0	0.0	34.5	0.0	0.0	0.0	3 202
% of Total	63.1	20.1	5.9	0.0	0.1	10.8	0.1	0.0	0.0	

Table 22: Percentage distribution of barracouta catch by statistical area and fishing year in the target red cod fishery within the south east coast (SEC) (source: MFish TCEPR and CELR data).

	General statistical areas							
Fishing Year	18	20	21	22	23	24	26	Total catch (t)
1989–90	2.8	31.3	1.8	63.4	0.0	0.7	0.0	1 301
1990–91	1.3	18.6	0.1	63.9	0.0	16.1	0.1	1 367
1991–92	3.5	23.2	0.1	56.3	0.0	16.4	0.5	1 086
1992–93	4.1	15.2	0.0	76.0	0.0	4.6	0.1	1 938
1993–94	4.9	25.5	0.0	62.8	0.0	6.6	0.2	1 295
1994–95	4.1	21.7	0.1	61.3	0.0	12.8	0.0	2 305
1995–96	8.8	18.5	0.2	66.2	0.1	5.3	1.0	3 541
1996–97	5.8	11.0	0.0	74.8	0.0	8.4	0.0	4 249
1997–98	8.8	30.9	0.1	55.8	0.1	4.1	0.3	4 508
1998–99	10.8	10.8	0.1	70.7	0.0	7.6	0.0	2 229
1999–2000	7.1	9.6	0.0	74.3	0.0	9.0	0.0	2 443
% of Total	6.5	19.1	0.2	66.4	0.0	7.6	0.2	

Table 23: Percentage distribution of barracouta catch by month and fishing year in the target red cod *fishery within the south east coast (SEC)* (source: MFish TCEPR and CELR data).

	Month												
Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	1.1	8.6	6.1	11.9	8.8	17.2	12.0	13.8	12.1	4.1	1.3	3.0	1 301
1990–91	11.7	8.1	4.3	9.7	11.9	4.3	24.5	10.8	5.2	5.2	2.4	1.7	1 368
1991–92	2.1	2.4	9.6	20.6	6.8	19.6	15.6	11.1	7.3	2.7	1.2	1.1	1 086
1992–93	1.9	3.7	3.7	9.2	10.4	7.3	33.0	18.1	9.2	1.6	1.4	0.6	1 938
1993–94	5.3	7.0	11.4	21.4	21.7	12.5	7.5	6.8	2.9	2.3	0.6	0.8	1 295
1994–95	1.9	8.6	8.0	19.2	28.3	9.4	6.4	11.8	3.7	1.2	0.2	1.2	2 305
1995–96	2.8	12.1	10.4	16.2	13.5	14.1	14.1	7.5	6.3	2.6	0.2	0.1	3 541
1996–97	5.4	11.7	14.4	11.0	14.0	11.0	15.6	12.4	2.6	1.2	0.7	0.1	4 250
1997–98	5.5	6.8	13.1	18.5	13.6	14.3	11.2	8.5	5.6	1.6	0.3	0.8	4 510
1998–99	11.8	12.2	11.9	24.5	22.7	5.5	4.6	3.7	1.7	0.7	0.4	0.2	2 229
1999–2000	6.2	6.8	11.6	10.1	13.7	20.1	6.9	13.5	8.7	1.9	0.2	0.5	2 443
% of Total	5.1	8.7	10.5	15.5	15.3	12.3	13.3	10.5	5.5	2.0	0.6	0.7	

Table 24: Percentage distribution of barracouta catch by fishing method, vessel size (metres overall length) and fishing year in the target red cod fishery within the south east coast (SEC) (source: MFish TCEPR and CELR data).

Method	Bottom trawl			Midwater trawl			Other			Total catch (t)
Vessel Size (m)	10–35	35–60	60+	10–35	35–60	60+	10–35	35–60	60+	
1989–90	85.7	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1 301
1990–91	86.4	13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1 368
1991–92	96.0	1.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	1 086
1992–93	66.8	19.1	2.1	0.0	0.0	12.0	0.0	0.0	0.0	1 938
1993–94	96.7	2.5	0.2	0.0	0.0	0.0	0.7	0.0	0.0	1 295
1994–95	97.7	1.2	1.0	0.0	0.0	0.0	0.0	0.0	0.0	2 305
1995–96	99.5	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	3 541
1996–97	99.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4 250
1997–98	95.7	2.7	0.0	0.3	0.0	1.3	0.1	0.0	0.0	4 510
1998–99	96.6	3.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	2 229
1999–2000	99.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2 443
% of Total	94.5	3.9	0.4	0.0	0.0	1.1	0.1	0.0	0.0	

Table 25: Percentage distribution of barracouta catch by statistical area and fishing year in the target arrow squid fishery within the south east coast (SEC) (source: MFish TCEPR and CELR data).

	General statistical areas							
Fishing Year	18	20	21	22	23	24	26	Total catch (t)
1989–90	0.0	3.7	0.0	92.2	1.6	2.0	0.5	189
1990–91	0.0	1.9	1.3	91.2	1.0	0.0	4.5	244
1991–92	0.0	16.7	0.1	81.8	0.2	0.0	1.1	357
1992–93	11.5	3.4	2.0	74.7	0.0	0.0	8.4	302
1993–94	0.0	3.5	0.2	89.2	0.0	7.0	0.1	1 853
1994–95	0.0	1.5	1.6	76.6	0.1	20.2	0.1	1 113
1995–96	0.0	2.4	0.9	75.8	0.0	2.4	18.5	1 596
1996–97	0.0	11.2	0.1	71.7	0.3	6.5	10.2	857
1997–98	0.0	6.8	2.8	50.9	0.1	15.6	23.8	1 093
1998–99	0.5	10.7	0.0	65.4	0.0	7.7	15.7	1 062
1999–2000	0.1	22.1	0.8	70.6	0.8	3.2	2.3	1 781
% of Total	0.4	8.4	0.9	74.2	0.2	7.3	8.6	

Table 26: Percentage distribution of barracouta catch by month and fishing year in the target arrow squid fishery within the south east coast (SEC) (source: MFish TCEPR and CELR data).

	Month												
Fishing Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total catch (t)
1989–90	0.3	3.3	0.0	2.4	7.6	40.1	14.9	24.0	6.8	0.0	0.4	0.3	189
1990–91	0.0	0.1	2.3	1.3	13.0	33.2	1.3	20.7	18.1	10.0	0.0	0.0	244
1991–92	0.0	0.0	0.0	0.0	3.4	15.6	36.0	37.6	7.0	0.4	0.0	0.0	358
1992–93	0.0	0.0	0.0	0.0	1.7	25.3	44.7	26.7	1.4	0.0	0.3	0.0	302
1993–94	0.0	0.0	0.2	1.5	0.8	3.4	60.2	27.8	6.1	0.0	0.0	0.0	1 853
1994–95	0.0	0.1	3.9	0.8	17.1	25.4	40.3	8.2	4.2	0.0	0.0	0.0	1 113
1995–96	0.1	0.0	0.1	4.9	13.5	56.8	19.0	4.7	0.8	0.0	0.1	0.1	1 596
1996–97	0.1	0.8	0.0	6.5	1.0	24.4	39.1	19.2	8.9	0.1	0.0	0.0	857
1997–98	0.0	0.6	0.0	5.4	17.7	35.3	18.6	14.5	7.9	0.0	0.0	0.0	1 093
1998–99	0.0	0.2	3.3	14.4	23.7	16.3	18.5	21.9	1.5	0.1	0.1	0.0	1 062
1999–2000	0.0	0.0	0.1	36.3	3.8	23.6	19.6	16.2	0.4	0.0	0.0	0.0	1 781
% of Total	0.0	0.2	0.9	9.9	9.6	26.1	31.0	17.6	4.2	0.3	0.1	0.0	

Table 27: Percentage distribution of barracouta catch by fishing method, vessel size (metres overall length) and fishing year in the target arrow squid fishery within the south east coast (SEC) (source: MFish TCEPR and CELR data).

Method	Bottom trawl			Midwater trawl			Other			Total catch (t)
Vessel Size (m)	1035	3560	60+	1035	3560	60+	1035	3560	60+	
1989–90	25.7	71.9	2.4	0.0	0.0	0.0	0.0	0.0	0.0	189
1990–91	1.3	89.2	5.6	0.0	0.0	3.9	0.0	0.0	0.0	244
1991–92	2.3	72.8	24.9	0.0	0.0	0.0	0.0	0.0	0.0	358
1992–93	14.0	63.3	12.7	0.0	0.0	10.0	0.0	0.0	0.0	302
1993–94	16.1	7.1	4.5	0.1	0.0	72.0	0.2	0.0	0.0	1 853
1994–95	28.5	15.9	8.8	0.0	0.0	46.8	0.0	0.0	0.0	1 113
1995–96	9.5	25.1	10.7	0.0	3.8	50.1	0.0	0.0	0.8	1 596
1996–97	17.0	23.8	24.7	0.0	0.0	34.4	0.0	0.0	0.0	857
1997–98	22.8	36.9	32.6	0.0	0.0	7.7	0.0	0.0	0.0	1 093
1998–99	18.8	51.9	25.3	0.0	0.0	4.0	0.0	0.0	0.0	1 062
1999–2000	12.3	51.8	30.9	0.0	0.0	5.0	0.0	0.0	0.0	1 781
% of Total	16.1	34.4	18.0	0.0	0.6	30.7	0.0	0.0	0.1	

Table 28: The average price received by Ocean Pioneer Ltd. for barracouta by fishing year since 199495.

Fishing Year	Average price per kilogramme ($)
1994–95	0.35
1995–96	0.35
1996–97	0.35
1997–98	0.35
1998–99	0.28
1999–2000	0.25
2000–01	0.25

Table 29: Market prices ($ per kg) received by Independent Fisheries and Mitchell Fishing Company for barracouta.

	Independent Fisheries (Dylan)	Mitchell Fishing Company (Mitchell)
First class, maximum price	0.28	0.28
First class	0.20	0.20
Bait		0.18
Reject	0.03	0.07
Deemed value	0.19	
Lease price	0.18	

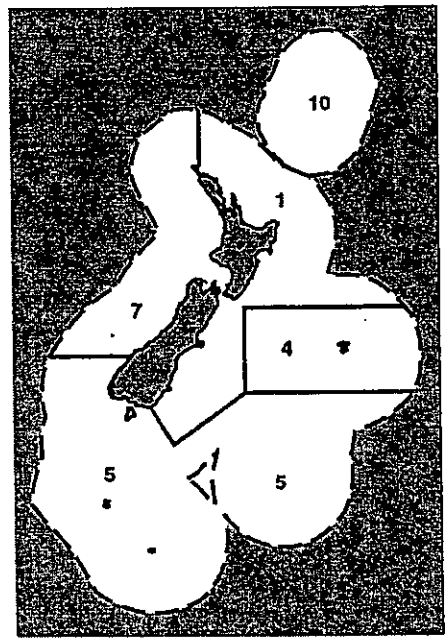

Figure 1: Map of the barracouta quota management areas (figure from Annala et al. 2001)

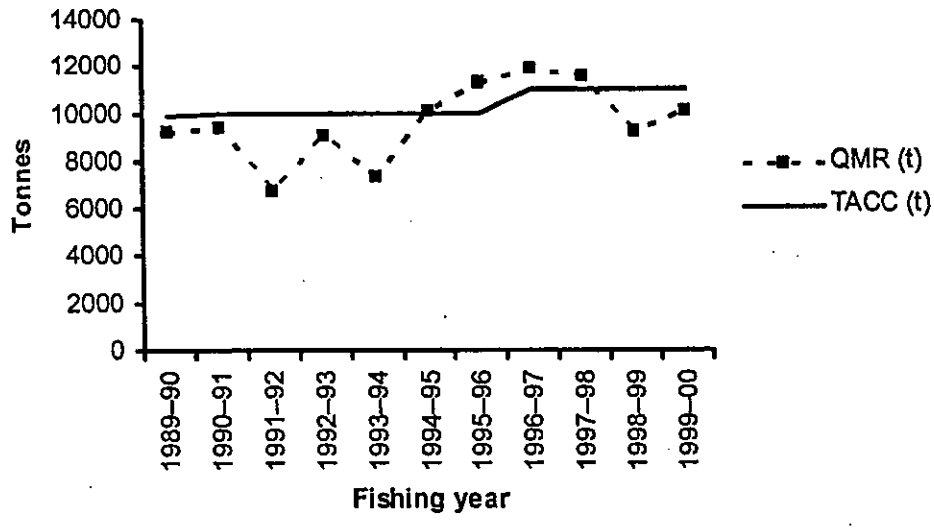

Figure 2: The total QMR catch and annual TAC by fishing year between 1989–90 and 1999–2000 for BAR 1.

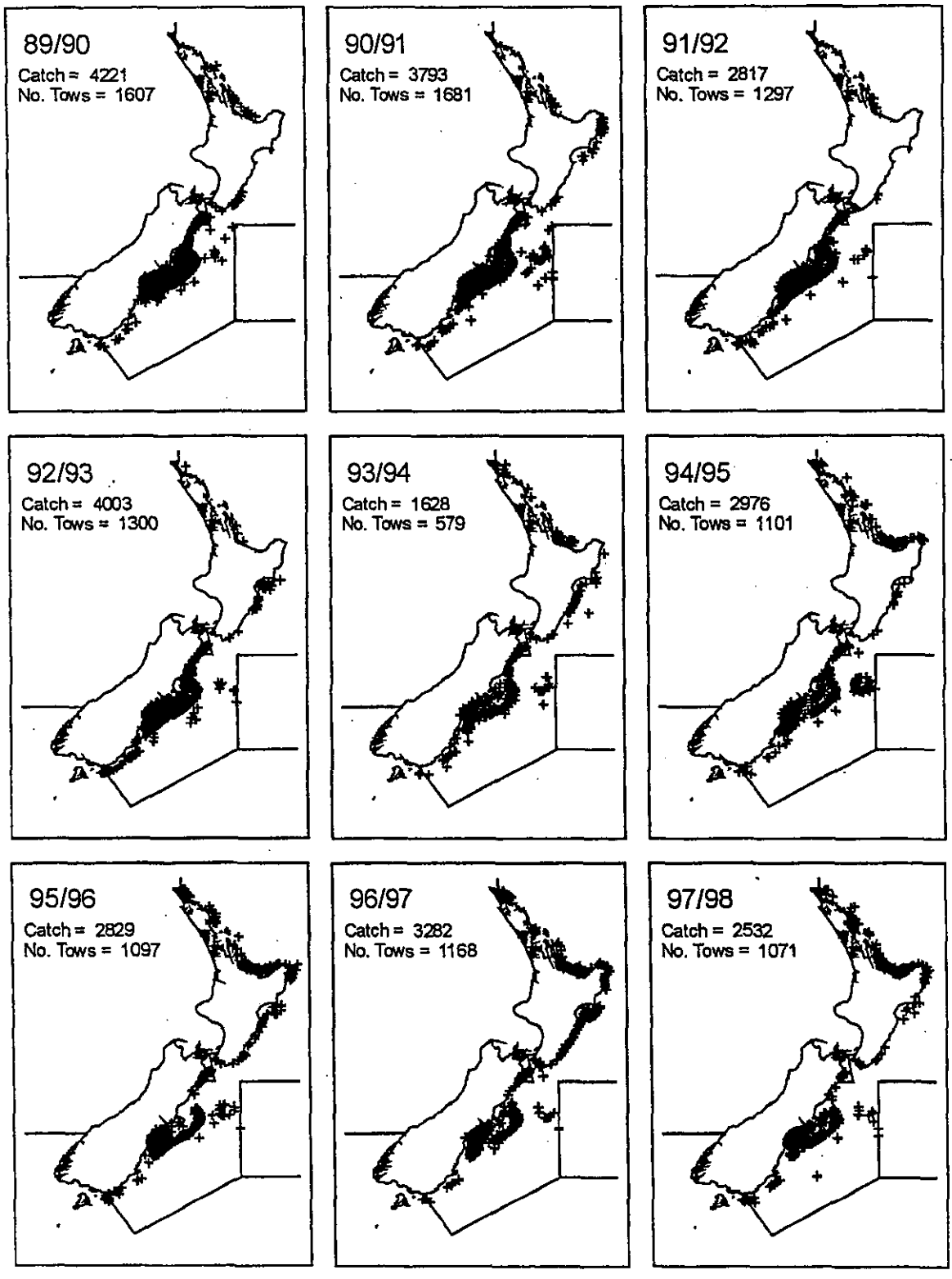

Figure 3: Location of target barracouta trawls catching barracouta in BAR 1 by fishing year for 1989–90 to 1997–98. The catch of barracouta (tonnes) and number of trawls is also presented for each year (source: MFish TCEPR data). The lines represent the barracouta stock boundaries.

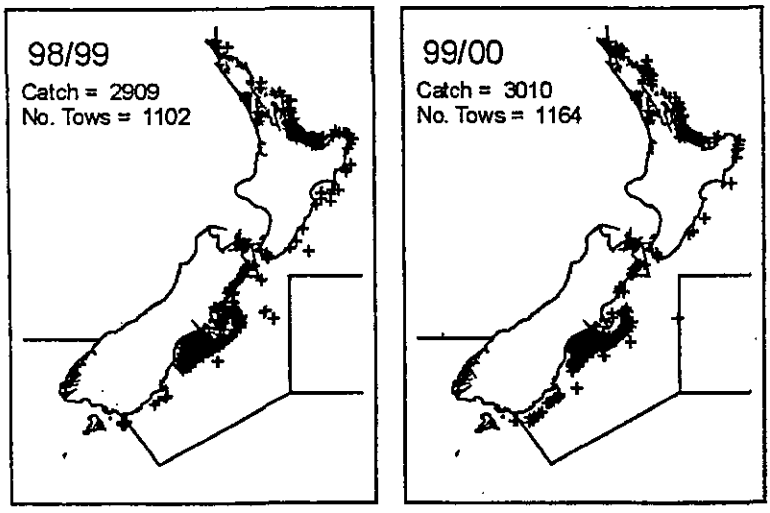

Figure 4: **Location of target barracouta trawls catching barracouta in BAR 1 by fishing year for 1998–99 to 1999–2000. The catch of barracouta (tonnes) and number of trawls is also presented for each year (source: MFish TCEPR data). The lines represent the barracouta stock boundaries.**

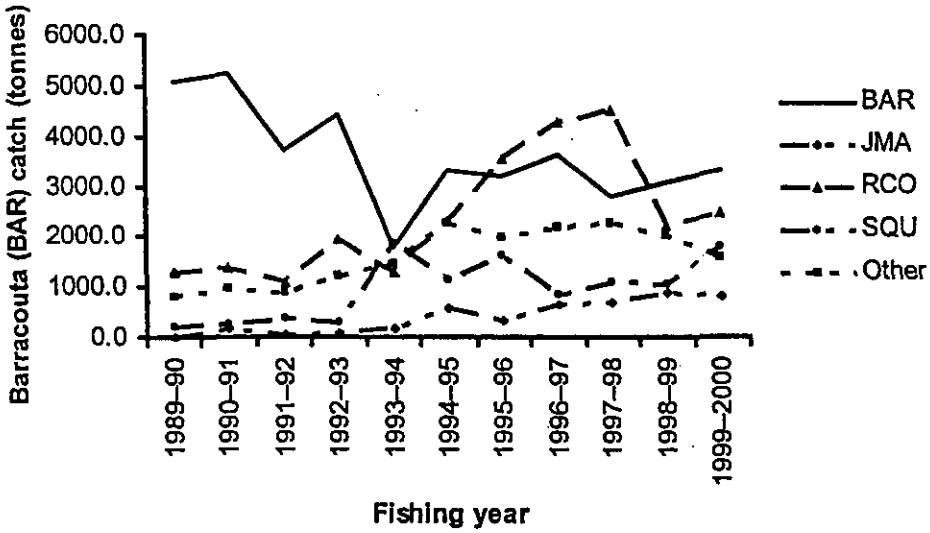

Figure 5: **The annual BAR 1 catch (in tonnes) for the barracouta (BAR), jack mackerel (JMA), red cod (RCO), arrow squid (SQU) target fisheries and other fisheries between 1989–90 and 1999–2000.**

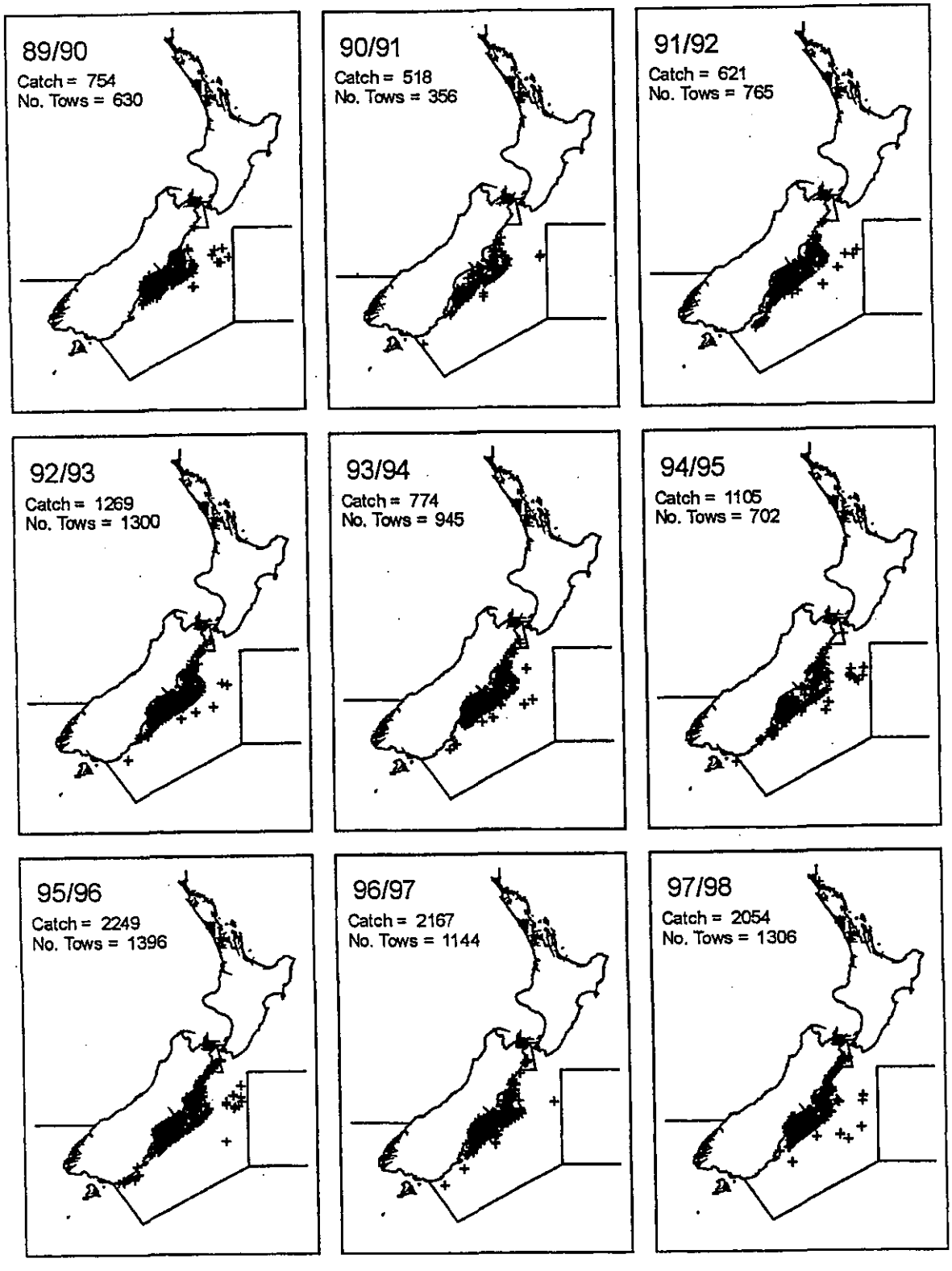

Figure 6: **Location of target red cod trawls catching barracouta in BAR 1 by fishing year for 1989–90 to 1997–98. The catch of barracouta (tonnes) and number of trawls is also presented for each year (source: MFish TCEPR data). The lines represent the barracouta stock boundaries.**

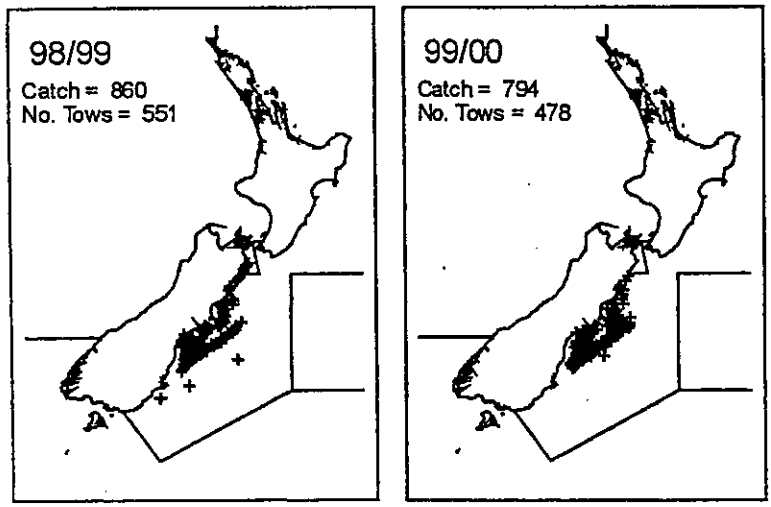

Figure 7: **Location of target red cod trawls catching barracouta in BAR 1 by fishing year for 1998–99 to 1999–2000. The catch of barracouta (tonnes) and number of trawls is also presented for each year (source: MFish TCEPR data). The lines represent the barracouta stock boundaries.**

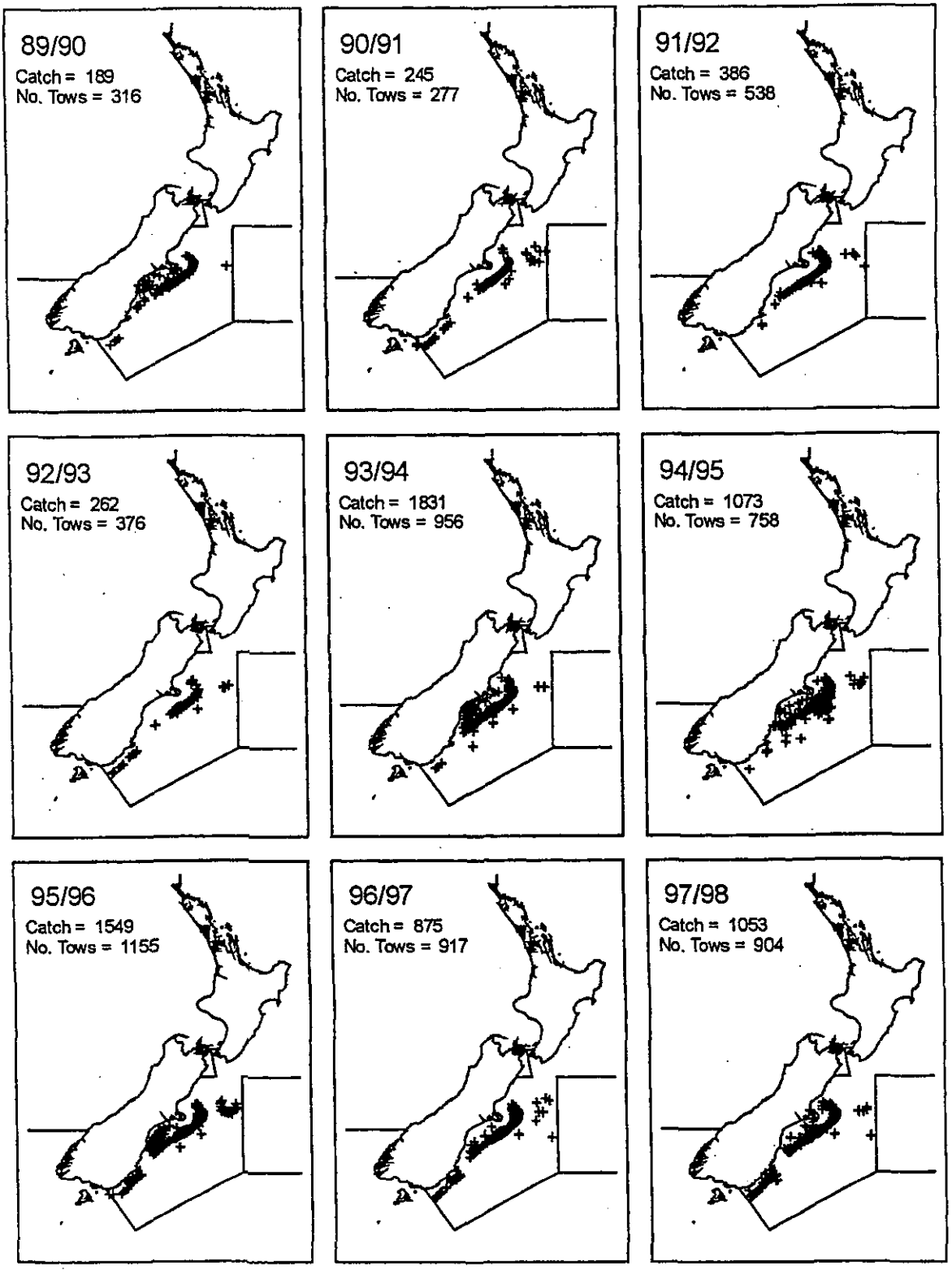

Figure 8: Location of target squid trawls catching barracouta in BAR 1 by fishing year for 1989–90 to 1997–98. The catch of barracouta (tonnes) and number of trawls is also presented for each year. Source: MFish TCEPR data. The lines represent the barracouta stock boundaries.

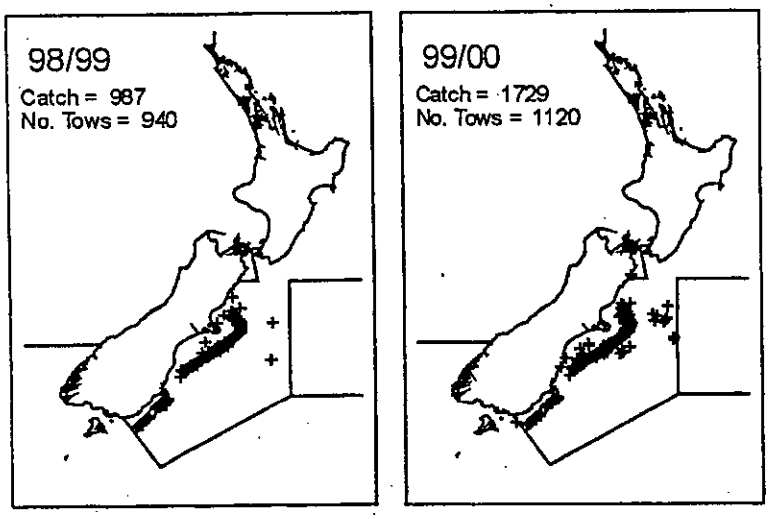

Figure 9: **Location of target squid trawls catching barracouta in BAR 1 by fishing year for 1998–99 to 1999–2000. The catch of barracouta (tonnes) and number of trawls is also presented for each year (source: MFish TCEPR data). The lines represent the barracouta stock boundaries.**

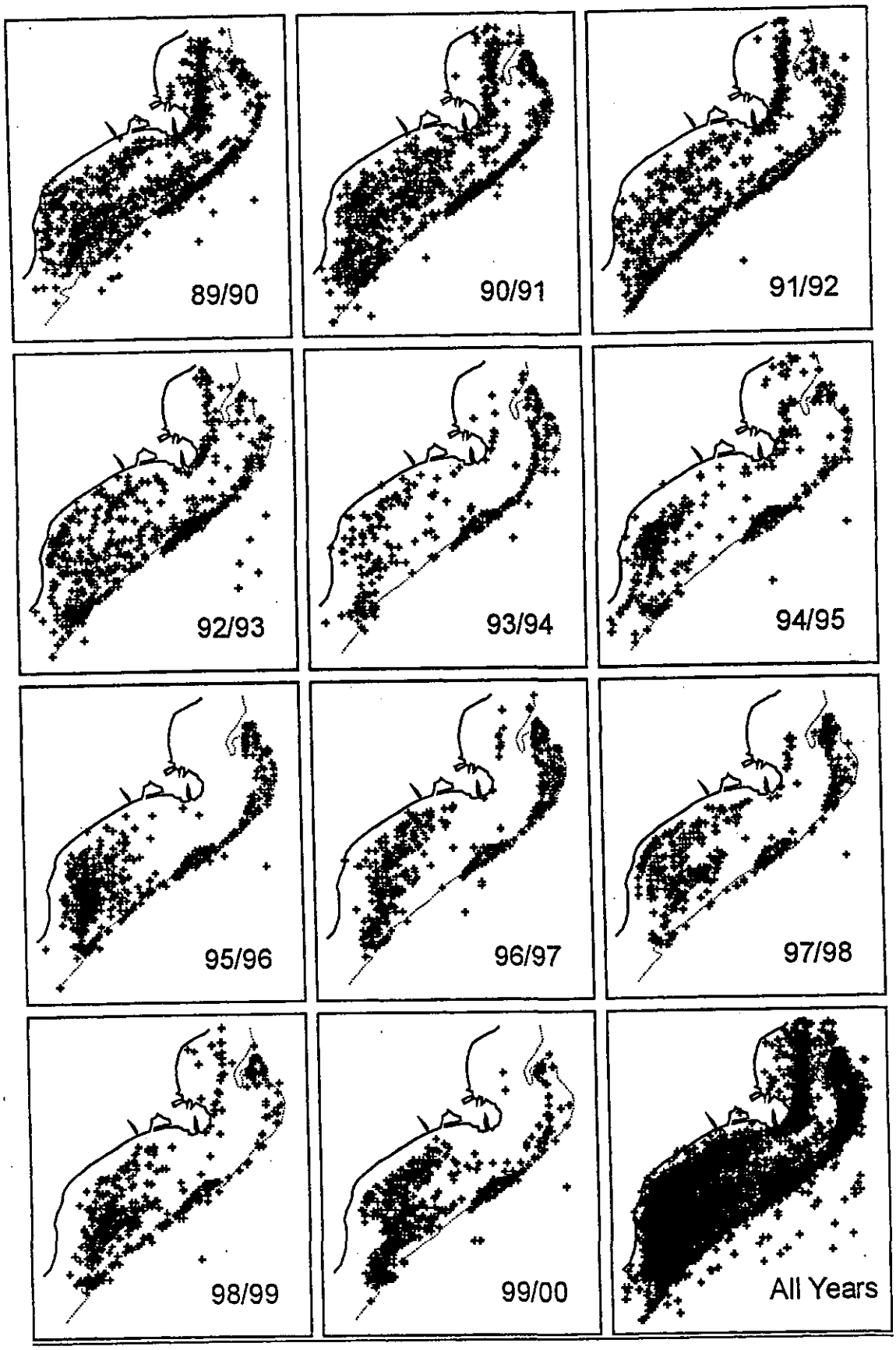

Figure 10: Location of target barracouta trawls catching barracouta in the Pegasus Bay/Canterbury Bight area by fishing year for 1989–90 to 1999–2000 (source: MFish TCEPR data). The dashed line represents the 200 m depth contour.

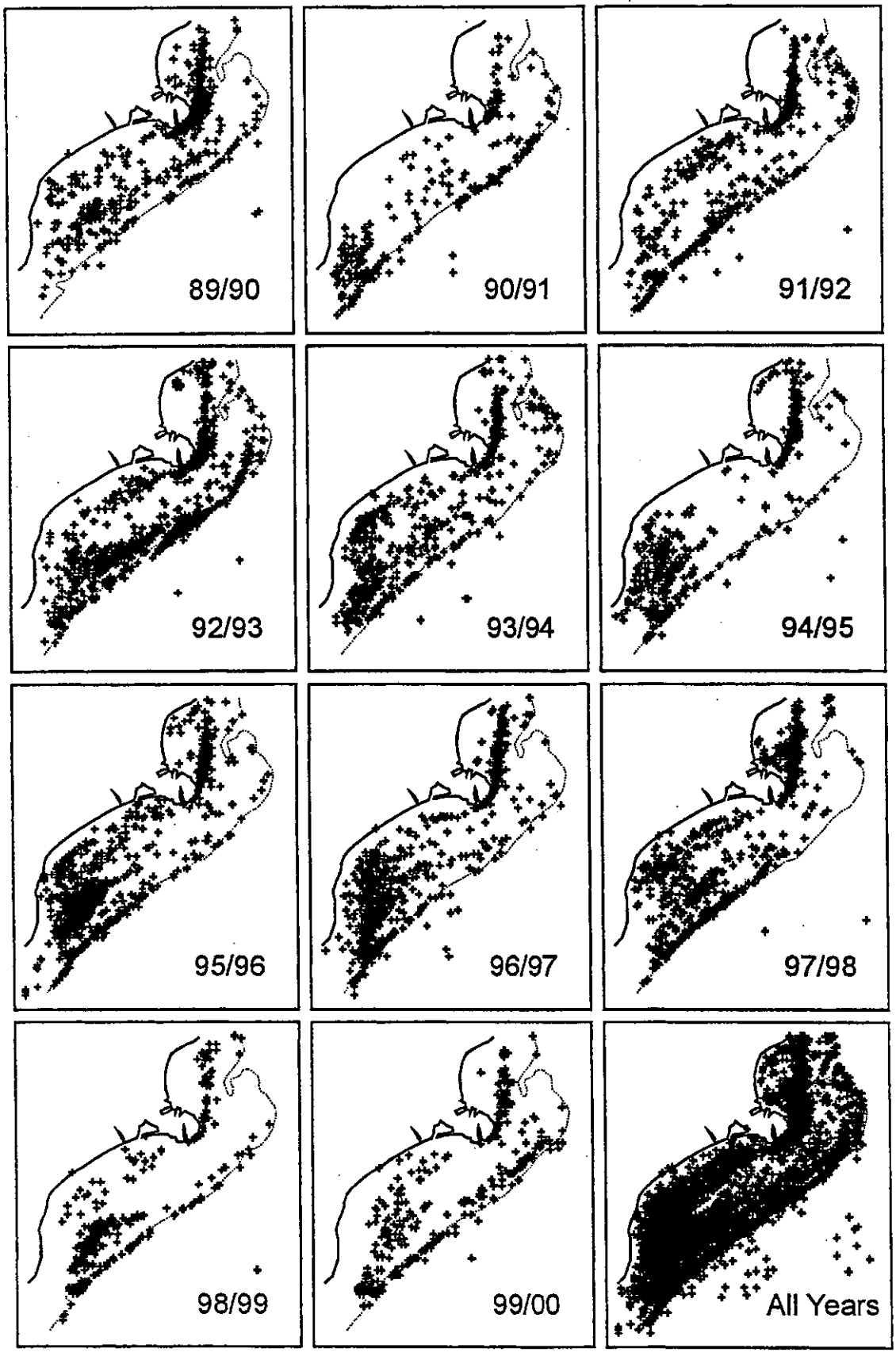

Figure 11: Location of target red cod trawls catching barracouta in the Pegasus Bay/Canterbury Bight area by fishing year for 1989–90 to 1999–2000 (source: MFish TCEPR data). The dashed line represents the 200 m depth contour.

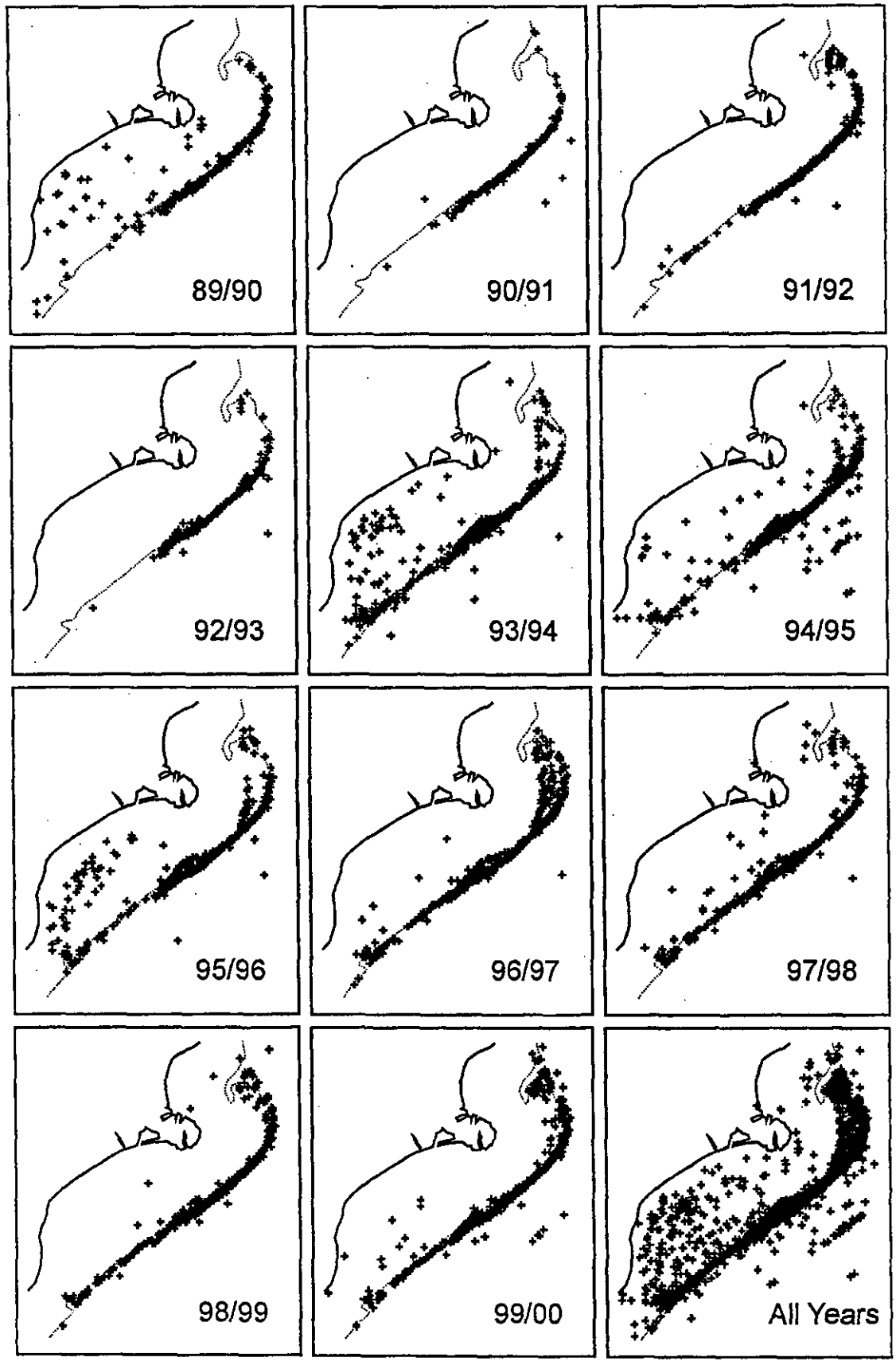

Figure 12: Location of target squid trawls catching barracouta in the Pegasus Bay/Canterbury Bight area by fishing year for 1989–90 to 1999–2000 (source: MFish TCEPR data). The dashed line represents the 200 m depth contour.