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in OEO 1, OEO 3A, OEO 4, and OEO 6
from the 1977–78 to the 2004–05 fishing years

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**Description of the black oreo and smooth oreo fisheries in
OEO 1, OEO 3A, OEO 4, and OEO 6 from the 1977–78 to the
2004–05 fishing years**

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EXECUTIVE SUMMARY

Coburn, R.P.; McMillan, P.J. (2006). Descriptions of the black oreo and smooth oreo fisheries in OEO 1, OEO 3A, OEO 4, and OEO 6 from the 1977–78 to the 2004–05 fishing years.

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Descriptions of black oreo and smooth oreo fisheries are presented with data from the 1977–78 to 2004–05 fishing years. The analyses summarise Ministry of Fisheries commercial tow-by-tow estimated catch data. All tows used in the analyses either targeted or caught unspecified oreo (OEO), black oreo (BOE), or smooth oreo (SSO). A mix of different target species was used (OEO, SSO, or BOE) in several fisheries, and oreos were also caught as a bycatch of orange roughy target fishing in OEO 1, OEO 6, and OEO 4. Inferring trends in oreo target catch rate is therefore difficult.

A summary of results for oreo fisheries with at least one year where reported annual estimated catch was more than about 1000 t from 1977–78 to 2004–05 is provided below. The fisheries are ordered from large to small, based on the average annual estimated catch from the three most recent years (2002–03 to 2004–05).

Fishery	Largest annual catch (t) (FY)	Annual catch trends over time	Average recent annual catch (t)	Unstandardised average recent catch rate (t/tow)
(a) Black oreo				
Pukaki Rise	3 200 (80–81) 1 900 (97–98)	Declined. Fishing resumed in 1994–95. Fluctuated.	1 500	2.8
OEO 3A	15 400 (80–81)	Declined, then about 3000 t for 17 years, then declined.	1 100	7.7
OEO 4	5 000 (80–81)	Declined.	900	–
Southland	2 100 (83–84)	Fluctuated. Overall declined.	300	3.4
Puysegur	1 800 (91–92)	Declined due to fishery closure.	100	–
Snares	2 300 (92–93)	Declined.	less than 100	–
(b) Smooth oreo				
OEO 4	7 600 (87–88)	Remained constant.	5 100	10.4
Bounty Plateau	1 900 (04–05)	Fluctuated, recently increased.	1 500	6.3
Pukaki Rise	2 300 (00–01)	Fluctuated.	1 400	2.5
OEO 3A	5 900 (87–88)	Declined.	1 000	5.1
Southland	4 200 (85–86)	Fluctuated, then declined.	900	3.6
Macquarie Ridge	1 300 (01–02)	Fluctuated, then declined.	800	3.1
Puysegur	1 000 (93–94)	Declined due to fishery closure.	100	–

–, too few target tows to estimate a catch rate, or the recent fishery is small (100 t or less). Recent is 2002–03 to 2004–05

1. BACKGROUND

Smooth oreo (*Pseudocyttus maculatus*) and black oreo (*Allocyttus niger*) have been commercially fished in New Zealand waters since 1972, making this probably the longest-established New Zealand deepwater fishery. The largest oreo fishery is on the South Chatham Rise, but other areas with substantial oreo catch occur throughout the New Zealand Exclusive Economic Zone (EEZ) as a result of target oreo fishing or as bycatch in orange roughy fisheries. This report summarises commercial oreo catch data for the main oreo fisheries around New Zealand. This work was undertaken by NIWA as part of the Ministry of Fisheries Project OEO2005/02 (oreo stock assessment).

2. OBJECTIVE

Project OEO200502 had five objectives, but only objective 1 is the subject of this report.

1. To update the descriptive analysis of the commercial catch and effort data for black oreo and smooth oreo from selected fisheries with the inclusion of data up to the end of the 2004/05 fishing year. These fisheries include OEO 1, OEO 3A, OEO 4 and OEO 6.

3. METHODS

Descriptive analyses of oreo catch and effort were updated from those reported by Coburn et al. (2005) by including new data from the 2004–05 fishing year and revised data from the 2003–04 fishing year for OEO 1, OEO 3A, OEO 4, and OEO 6. The oreo management areas are shown in Figure 1.

Analyses focused on the fisheries in OEO 1 and OEO 6 because of the development of new fisheries in these areas and because there is no or little research information available for these fisheries. In contrast, the oreo fisheries on the Chatham Rise in OEO 3A and OEO 4 have been the subject of research and stock assessment for a number of years. Within each management area, regions of fishing activity were characterised as “fisheries” and were analysed separately. This was done to simplify the analysis and does not imply biological stocks. For OEO 1 these fisheries are Southland, Puysegur, Snares, Wairarapa, and the remainder of OEO 1 north of 45° S. Fisheries in OEO 6 are Auckland Island hills, Bounty Plateau, Pukaki Rise (which now includes the east plus the west), and Macquarie Ridge. These fisheries are shown in Figure 2. Fisheries within OEO 3A and OEO 4 were not identified because these areas were the subject of previous separate unstandardised and standardised CPUE analyses (Coburn et al. 1999, 2001a, 2001b, 2006, Doonan et al. 1995, 2003, 2004, Hicks et al. 2002).

3.1 Data sources

Commercial tow-by-tow estimated catch data (TCEPR) for all tows that targeted or caught unspecified oreo, black oreo, or smooth oreo were requested from the Ministry of Fisheries (MFish) and were transferred and loaded into an Empress database at NIWA, Greta Point. Data from small vessels not completing tow-by-tow catch returns (CELR) were not included in this analysis.

All catches in this report are expressed in tonnes (t) and catch per unit of effort (CPUE) in tonnes per tow. All years are fishing years (1 October to 30 September).

The data used in this study contain some errors, e.g., in Figure 2 some tow positions are on land or in water too shallow or too deep to have been oreo tows. The erroneous data were not considered in the analyses as only data within the area defined for each fishery were analysed.

3.2 Standard data analysis

For each fishery within OEO 1 and OEO 6, and for OEO 3A and OEO 4 separately, a standard set of analyses is presented. Results for each fishery are presented in tables and figures, and in a summary.

In the figures the patterns of oreo fishing over time in the EEZ were analysed by summing the number of trawls that caught or targeted oreos, the catches of black oreo, and the catches of smooth oreo from each 0.4 x 0.4 degree cell. The number of tows-per-cell were plotted as a circle at the centre of each cell where the circle area was proportional to the number of tows. All tows from 1977–78 to 2004–05 (with a threshold value of 10 tows per cell) were summed to provide a picture of fishing over the extent of the known fishery. Tows from the last three fishing years, 2002–03 to 2004–05, with a threshold value of 5 tows per cell, were also analysed to provide an indication of recent activity. The cumulative catches of black oreo and smooth oreo per cell were plotted separately as a circle at the centre of each cell where the circle area was proportional to the tonnes caught. All tows from 1977–78 to 2004–05 (with a threshold value of 40 t per cell) were summed to provide a picture of catches over the extent of the known fishery. Catches from the last three fishing years, 2002–03 to 2004–05, with a threshold value of 5 t per cell, were also analysed to provide an indication of recent activity.

The tables contain the following.

- 1) The percentage of combined oreo (smooth oreo, SSO; black oreo, BOE; and smooth oreo plus black oreo plus spiky oreo, OEO) catch by nation by fishing year. Nation is the registered nationality of the vessel(s) catching or targeting oreos.
- 2) The percentage of combined oreo catch by vessel tonnage class by fishing year, and the number of main fishing vessels (the least number of vessels to account for at least 98% of the catch).
- 3) The number of tows where combined oreo was caught, the number of tows where oreos were targeted, and percentage of tows by target species for all tows targeting or catching oreos, by fishing year.
- 4) The catch of unspecified oreo, smooth oreo, and black oreo.
- 5) Mean catch rates. The CPUE (target catch per tow) and number of target tows by species and fishing year. OEO target catch per tow is the sum of all oreo (OEO, SSO, and BOE) catch from tows where OEO was the nominated target species divided by the number of tows targeting OEO. The “OEO all” target CPUE is the sum of all OEO, BOE and SSO catch from tows where OEO, BOE or SSO was the target divided by the number of tows targeting OEO, BOE, or SSO.

Trends in fleet composition, vessel tonnage, target species, catch, and catch rate are reported for each fishery within OEO 1 and OEO 6, and for OEO 3A and OEO 4.

In the tables, catches under 0.5 t were rounded to zero. Zero also included tows with no recorded catch. Catch rates under 0.1 t per tow were rounded to zero. Zero t per tow also included tows with no recorded catch. The first fishing year listed in each table was the year in which recorded annual total catch was 1 t or more. The number of vessels fishing per year was not recorded if there were fewer than four vessels, to avoid any issue of data confidentiality.

3.3 Summary plots

Mean annual estimated catch and the mean annual unstandardised CPUE of black oreo and smooth oreo separately from each fishery are shown for the last three fishing years (2002–03 to 2004–05). Recent trends in total catch and catch distribution for the main oreo fisheries were examined in more detail. These fisheries were selected because the catch of black oreo or smooth oreo was relatively large, i.e., averaged about 1000 t per annum for the last three fishing years. The analyses are presented for black oreo then smooth oreo, with each fishery ranked in order of decreasing total catch

in the last three fishing years. For black oreo the fisheries included Pukaki Rise and OEO 3A (minus catches from Southland). For smooth oreo the fisheries included OEO 4, Bounty Plateau, Pukaki Rise, and OEO 3A (minus catches from Southland). A series of plots for each fishery present the estimated catch history, the distribution of relative accumulated catch from a 10 fishing year (reference) period following the introduction of GPS (1992–93 to 2001–02) and the relative accumulated catch from the last three fishing years (2002–03 to 2004–05). The relative accumulated catch plots are intended to enable comparison of the distribution of catch between the two time periods for each fishery only, i.e., not between different fisheries.

4. RESULTS

4.1 Standard data analysis

The plot of the number of trawls that caught or targeted oreos for all fishing years (1977–78 to 2004–05) shows that most of the trawls were in OEO 3A, OEO 4, Southland, Pukaki Rise, Puysegur, Macquarie Ridge, Snares, Wairarapa, Bounty Plateau, and Auckland Island hills (Figure 2). The distribution of trawls for the last three fishing years (2002–03 to 2004–05) has a similar overall pattern, but the highest density of effort shifted from OEO 3A to OEO 4 east of Chatham Island (Figure 3). Relatively more effort went into Pukaki Rise and Bounty Plateau in recent years.

The plot of black oreo catches from 1977–78 to 2004–05 showed the importance of OEO 3A, with smaller contributions from OEO 4, Pukaki Rise, Southland, Puysegur, and Snares (Figure 4). The Pukaki Rise fishery displaced OEO 3A as the largest black oreo fishery in the last three fishing years (Figure 5).

Smooth oreo catches from 1977–78 to 2004–05 showed the importance of OEO 4, OEO 3A, and to a lesser extent Southland, with smaller contributions from other areas (Figure 6). In the last three years OEO 4 was the most important followed by Bounty Plateau, Pukaki Rise, OEO 3A, Southland, and Macquarie Ridge (Figure 7).

Comparison of the plots of the number of trawls that caught or targeted oreos (see Figures 2 and 3) with the plots of catches of black oreo and smooth oreo (Figures 4–7) shows that although there were substantial numbers of trawls in areas such as Wairarapa, the Kaikoura coast, and the north and northeast slopes of the Chatham Rise, catches of oreos from those areas were relatively trivial. The exceptions were the Graveyard hill complex near 180° on the north Chatham Rise and the Wairarapa where there were some substantial catches of smooth oreo.

Estimated catch from tow-by-tow data averaged 81% of reported landed catch for OEO 1, 83% for OEO 3A, 91% for OEO 4, and 91% for OEO 6, over the last 10 fishing years (1995–96 to 2004–05) (Tables 1 and 2). Total reported landings of oreos (black oreo and smooth oreo combined) and TACs for OEO 1, OEO 6, OEO 3A, and OEO 4 are given in Tables 3 and 4.

4.1.1 OEO 1 – Southland

Area

The Southland fishery is contained in a polygon that has a northernmost point at 44° 41.3' S, 170° 51.0' E and a southernmost point at 47° 38.1' S, 170° 20.9' E (see Figure 2). This fishery includes part of OEO 3A due to fishing extending north past the OEO 1-OEO 3A boundary line at 46° S.

Nation

The Southland area was fished solely by foreign licensed and joint venture vessels before 1986–87, when New Zealand vessels started fishing. Soviet vessels took most of the catch from 1977–78 to 1987–88. New Zealand catch then increased and dominated from 1991–92 on (Table 5).

Vessels

Changes in catch by vessel tonnage reflected the change from large Soviet vessels (over 2000 t) at the beginning of the fishery to small and medium New Zealand vessels later on. Ten or more vessels caught oreos in seven fishing years (Table 6).

Target species

The main target species was unspecified oreo, but a small percentage of oreo was caught by tows that targeted orange roughy (a high of 13% in 1988–89). The target species switched from mainly black oreo to mainly smooth oreo in 1987–88. Unspecified oreo was the main target from 1993–94 on, except for 1999–2000 (smooth oreo) (Table 7). The number of target tows dropped by about one-third from 2001–02 to 2004–05.

Catch and catch rate

Catches of black oreo fluctuated throughout the time series with a peak of 2106 t in 1983–84. Smooth oreo made up the largest proportion of oreo catch since 1985–86, except in 1996–97 when the black oreo catch was larger. Total catch of smooth oreo fluctuated and peaked at 4244 t in 1985–86. Catches of both black oreo and smooth oreo declined in the last four years (Table 8).

Black oreo catch rates from 1983–84 to 1986–87, when black oreo was the main target species, showed a downward trend. The remaining black oreo catch history has insufficient target tows to comment on long-term trends in CPUE. A relatively unbroken series of target tows for smooth oreo from 1984–85 on shows a fluctuating target catch rate, although the last 10 fishing years had low values compared with earlier fishing years. Target catch rate of unspecified oreo and all oreo from 1991–92 onward also fluctuated, but generally trended downward (Table 9). The number of all oreo target tows declined from 750 in 2001–02 to 173 in 2004–05.

Summary

This is primarily a target oreo fishery on flat bottom and dropoffs along the east continental slope of the South Island from Timaru to Long Point on ground characterised by undersea canyons. It is the largest of the oreo fisheries in OEO 1 with data from 7971 tows, but catch has been close to the OEO 1 TACC in only 2 of the past 19 years. Peak catch was 5302 t in 1985–86. Catches fluctuated from 1986–87 to 2001–02 but have declined in the last three years. Catch rates of smooth oreo were mostly higher in the mid 1980s and early 1990s than in recent fishing years, but the number of target oreo tows also declined substantially in the last four years. Catch rates of black oreo declined in the mid 1980s, but there are too few target tows to analyse for other times.

This is the main oreo fishery in OEO 1.

4.1.2 OEO 1 – Puysegur

Area

This fishery is contained between 46° 25.2' S, 47° 30.5' S, 164° 46.0' E, and 166° 29.5' E (see Figure 2).

Nation

Fishing between 1989–90 and 2002–03 was carried out only by New Zealand vessels with vessels from Japan before that and mainly from Ukraine in 2003–04 and 2004–05 (Table 10).

Vessels

Most of the catch was from vessels under 2000 t (Table 11).

Target species

Oreos were largely a bycatch of the orange roughy fishery from 1989–90 to 1996–97, except in 1990–91 when tows catching oreos mainly targeted black oreo and unspecified oreo. The fishery for orange roughy was closed in 1997–98 (Table 12).

Catch and catch rate

Catches of black oreo were higher than those for smooth oreo up to 1992–93, but smooth oreo predominated for all subsequent years except the last two. Peak oreo catch was in 1991–92 (Table 13). Catch per tow data from targeted tows are available only for a few years, from few tows, and are variable (Table 14).

Summary

This fishery occurred on the hills and slopes of the Puysegur Bank until it was closed in 1997–98. Oreos were caught at first as the main bycatch of the orange roughy fishery. The first reported target fishing for orange roughy was in 1989–90. Oreo catch switched from mainly black oreo to mainly smooth oreo after 1992–93. Catch dropped to 19 t in the 1997–98 fishing year as a result of a voluntary closure of the orange roughy fishery, but climbed to 322 t in 1999–2000. Oreo target catch rates were variable, and were low for smooth oreo compared to other smooth oreo fisheries. There were catches of 271 and 221 t in the last two years in spite of the voluntary closure of the fishery.

4.1.3 OEO 1 – Snares

Area

This fishery is contained between 47° 41.9' S, 48° 24.6' S, 164° 29.1' E, and 165° 42.5' W (see Figure 2).

Nation

This fishery was carried out almost entirely by New Zealand vessels until 2003–04 when Ukrainian vessels started fishing (Table 15).

Vessels

Most of the catch was from vessels under 2000 t (Table 16).

Target species

Oreos were caught mainly as a bycatch of orange roughy target fishing in early years, but this switched in later years to oreos. Unspecified oreo and smooth oreo were the main target in 10 of the 15 years, including the last 9 (Table 17).

Catch and catch rate

Black oreo was the main oreo species reported caught in the first eight years, with smooth oreo predominant in most other years (Table 18). Catch peaked in 1992–93 at 2298 t of black oreo and 720 t of smooth oreo, but catches from the last 11 fishing years were much lower with only 4 t recorded in 2003–04 and 28 t in 2004–05. The practice of recording unspecified oreo as target species for most of the series resulted in insufficient data to infer long-term trends in target CPUE for black oreo and smooth oreo (Table 19).

Summary

This is a hill fishery for orange roughy and oreos west of the Snares Islands. The fishery was started in 1990–91 by New Zealand vessels and is closely associated with the Puysegur fishery. Initially, most oreos were caught as a bycatch of orange roughy fishing, with a large black oreo catch, but there was a switch to mainly target fishing for oreos in the last nine fishing years. Black oreo catch peaked at 2298 t in 1992–93. This fishery has declined with very few target tows and almost zero catches in the last two years. There are insufficient data to infer trends in target CPUE for black oreo and smooth oreo.

4.1.4 OEO 1 – Wairarapa

Area

This fishery is contained within the polygon defined by 41° 17.4' S, 175° 18.4' E; 42° 4.7' S, 175° 20.4' E; 42° 3.2' S, 176° 38.1' E; 41° 26.6' S, 177° 49.7' E; 40° 43.5' S, 177° 57.9' E; 40° 24.9' S, 176° 15.6' E (see Figure 2).

Nation

Soviet and Japanese vessels landed all the catch in the first three fishing years of the fishery, but from 1983–84 on all the catch was by New Zealand vessels (Table 20).

Vessels

Most of the catch was from New Zealand vessels under 1000 t (Table 21).

Target species

Oreos were caught mainly during target fishing for orange roughy, and also for OEO and SSO after 1995–96 (Table 22).

Catch and catch rate

Smooth oreo was the main species caught, with annual catches less than 200 t from 1980–81 to 1999–2000 (Table 23). Smooth oreo catch jumped to 813 t in 2000–01, then fell with catches of less than 100 t in each of the last two years. Before 1999–2000, catch rates for OEO and SSO were low, less than 3 t per tow, but increased substantially in 1999–2000 (Table 24).

Summary

This is probably a rough-bottom fishery on plateaus and undulating bottom. Oreo was taken mainly as a bycatch to orange roughy target fishing, but there was some target fishing for OEO and SSO from 1995–96 on. The main catch was smooth oreo and less than 200 t per year was taken from 1980–81 to 1999–2000, but this increased to 813 t in 2000–01, then declined to less than 100 t in each of the last two years. Catch in this area is unlikely to be constrained by the OEO 1 TACC.

4.1.5 OEO 1 – North of 45° S, excluding Wairarapa

Area

This area comprises the remainder of oreo management area OEO 1 north of 45° S (see Figure 2).

Nation

This fishery was carried out by vessels of various nationalities from 1977–78 to 1983–84, and predominantly by New Zealand vessels thereafter (Table 25).

Vessels

A mix of vessel sizes was used throughout the fishery (Table 26).

Target species

Oreos were caught mainly during target fishing for orange roughy and other species. The highest number of oreo target tows in this series (190) was in 1996–97 (Table 27).

Catch and catch rate

Smooth oreo was the main oreo species caught, with a peak catch of 693 t in 1996–97 (Table 28). There are insufficient oreo target catch data to derive long-term trends in target CPUE (Table 29).

Summary

This area is a catch-all for any other oreo fishing outside the main OEO 1 fisheries defined above. Oreo was caught over a wide area, mainly as a bycatch of orange roughy fishing on the west coasts of

the North and South Islands, the Challenger Plateau, and the east coast of the North Island. A fishery developed within this area, concentrating on deep hills on the abyssal plain north of the mid Chatham Rise, but this is not reported in detail due to the commercial sensitivity of these data. Some unspecified oreo and smooth oreo target fishing by New Zealand vessels started from 1995–96 onwards. There were very small catches (14 and 16 t) in the last two years. Insufficient data are available to characterise separate fisheries within this area, or to infer trends in CPUE for black oreo and smooth oreo.

4.1.6 OEO 6 – Auckland Island hills

Area

This fishery lies north of the Auckland Islands between 49° 25.9' S, 51° 37.5' S, 164° 11.3' E, and 167° 11.9' E (see Figure 2).

Nation

There was limited Soviet fishing in 1981–82 and 1985–86. New Zealand vessels fished on seamounts from 1990–91 onwards (Table 30).

Vessels

This fishery included a variety of vessel sizes. The maximum number of vessels was six in 1996–97 (Table 31).

Target species

The early Soviet fishing targeted smooth oreo and black oreo. SSO and OEO were the main target species in 1992–93, 1994–95, and 1999–2000. In other years oreo was mostly caught as a bycatch of orange roughy target fishing, except for the last three years when OEO was the main target. There were only eight target tows in 2004–05 (Table 32).

Catch and catch rate

Catches of black oreo were small or zero. Catches of smooth oreo were in the hundreds of tonnes from 1992–93 onwards, with a peak of 658 t in 1998–99, but catches declined from 2001–02 onward (Table 33). There are insufficient data to derive long-term trends in CPUE (Table 34).

Summary

This is a target hill fishery for smooth oreo and orange roughy and was carried out mainly by New Zealand vessels from 1992–93 on. The highest smooth oreo catch was 658 t in 1998–99. Both effort (eight target tows) and catch (42 t SSO) were low in 2004–05. There were insufficient target catch rate data to derive long-term trends in CPUE. It is unclear if the decline in this fishery is due to reduced catch rate or fishing operation changes.

4.1.7 OEO 6 – Bounty Plateau

Area

This fishery lies between 46° 29.3' S, 47° 60.0' S, 176° 23.8' E, and 178° 8.4' W (see Figure 2).

Nation

Soviet vessels undertook some trawling in the early and mid 1980s, but New Zealand vessels reported virtually all the catch from 1990–91 onward (Table 35).

Vessels

Most vessels fishing in this area were over 1000 t, except from 1995–96 to 1997–98 when vessels under 1000 t predominated. The maximum number of vessels was eight in 1998–99 (Table 36).

Target species

Soviet vessels targeted black oreo and smooth oreo, in 1980–81 and 1983–84. New Zealand vessels targeted mainly smooth oreo and unspecified oreo, but there was some targeting of orange roughy from 1994–95 on (Table 37).

Catch and catch rate

The Soviet catch in 1983–84 was 628 t of black oreo and 525 t of smooth oreo (Table 38). New Zealand catches of smooth oreo increased in recent fishing years due to exploratory fishing in OEO 6, but little black oreo was reported caught. The highest catch of smooth oreo and increased numbers of target tows for smooth oreo and unspecified oreo were reported in the last year (2004–05). From 1994–95 onwards, target CPUE, for smooth oreo and unspecified oreo were variable, but were moderately high in the last few years (Table 39).

Summary

This flat bottom and dropoff target oreo fishery along the north slope of the Bounty Plateau was fished infrequently by foreign vessels in early years, with increased New Zealand effort and a peak total oreo catch of 1945 t in 2004–05. Moderate levels of target CPUE for smooth oreo and unspecified oreo were observed in the last eight years. The increased catch and effort in the last year appears to be a result of reduced catch and effort in other OEO 6 fisheries, i.e., Auckland Island hills, Macquarie Ridge.

4.1.8 OEO 6 – Pukaki Rise

Area

This fishery lies within a polygon with corners at: 46° 26.1' S, 174° 59.2' E; 48° 31.8' S, 176° 60.0' E; 50° 59.6' S, 176° 60.0' E; 50° 59.6' S, 172° 58.4' E; 49° 0.1' S, 168° 58.0' E (see Figure 2).

Nation

This fishery involved mainly Soviet vessels from 1978–79 to 1983–84 and New Zealand vessels from 1988–89 on (Table 40).

Vessels

Large Soviet vessels (over 2000 t) were used in the early years and medium sized New Zealand vessels (up to 2000 t) in later years (Table 41).

Target species

Oreos were caught by Soviet vessels that mostly targeted black oreo from 1980–81 to 1983–84 and by New Zealand vessels that targeted orange roughy in 1995–96 and 1996–97, then switched to unspecified oreo or smooth oreo (Table 42).

Catch and catch rate

There were two years of substantial catch of black oreo (1980–81 and 1981–82) by Soviet vessels but catches declined to zero by 1986–87 (Table 43). Substantial catches of black oreo and smooth oreo were reported by New Zealand vessels from 1995–96 on. Catch of smooth oreo peaked at 2309 t in 2000–01 and has since declined. Catch of black oreo peaked in 1997–98 at 1920 t and has been variable since then (939–1557 t). Smooth oreo target CPUE was variable from 1995–96 on. There were large numbers of target tows in 1999–2000, 2000–01, and 2004–05. Black oreo target CPUE was relatively stable from 1997–98 to 2004–05. The all oreo target CPUE declined between 1995–96 and 2004–05 (Table 44).

Summary

This flat bottom and dropoff target oreo fishery along the northeast slope of the Pukaki Rise was fished by Soviet vessels from 1978–79 to 1985–86, mainly catching black oreo. Peak black oreo catch was 3144 t in 1980–81. Substantial New Zealand fishing began in 1995–96. The target species was orange roughy in 1995–96 and 1996–97, then switched to OEO or SSO. The fishery for smooth oreo

appears to have peaked at 2309 t in 2000–01. The fishery for black oreo appears to have peaked at 1920 t in 1997–98. Smooth oreo target CPUE was variable from 1995–96 onward but the all oreo CPUE declined in that time.

4.1.9 OEO 6 – Macquarie Ridge

Area

This fishery is contained between 48° 59.2' S, 162° 57.7' E; 51° 17.5' S, 160° 48.5' E; 52° 34.1' S, 162° 31.5' E; 48° 59.2' S, 165° 44.5' E, (see Figure 2).

Nation

Fishing was almost entirely by New Zealand vessels (Table 45).

Vessels

Mainly medium sized (1000–2000 t) vessels (Table 46).

Target species

There were few (under 50 per year) target tows before 1996–97. From 1996–97 on, the main target was OEO or SSO with some (2–21%) orange roughly target tows (Table 47).

Catch and catch rate

Substantial catches of smooth oreo were made from 1996–97, peaking at 1253 t in 2001–02, but then declined to 431 t in 2004–05 (Table 48). Target CPUE for unspecified oreo, all oreo, and smooth oreo was variable. Effort declined slightly in the last three years (Table 49).

Summary

This is a New Zealand fishery on hills and dropoffs. It developed from 1996–97 on, peaked at 1253 t of smooth oreo in 2001–02, and subsequently declined. The decline in this fishery appears to be due to the reduced catch and catch rates.

4.1.10 OEO 3A and OEO 4 – South Chatham Rise

Area

The OEO 3A fishery covers the Chatham Rise west of 176° E, excluding the part of OEO 3A that falls within the Southland fishery. The OEO 4 fishery is on the Chatham Rise east of 176° E (see Figure 2).

Nation

The OEO 3A fishery was dominated by Soviet vessels up to 1986–87, and then by New Zealand vessels (Table 50). The OEO 4 fishery was predominantly Soviet up to 1984–85 and New Zealand thereafter (Table 51).

Vessels

Soviet vessels in OEO 3A and OEO 4 were mainly large (over 2000 t) and New Zealand vessels a mix of small (under 1000 t) and medium sized (under 2000 t). There were up to 26 vessels p.a. in OEO 3A in the early years, but this dropped to 12–15 in the last three years. In OEO 4 there were up to 20 vessels p.a. in early years but 11–13 in the last three years (Tables 52 and 53).

Target species

Catches of oreo in OEO 3A were mainly taken by Soviet vessels that initially targeted unspecified oreo, then black oreo, then black oreo and smooth oreo. Catches of oreo were taken by New Zealand vessels that targeted smooth oreo initially, then unspecified oreo and smooth oreo. From 1998–99 to 2000–01 there was an increase in the proportion of black oreo target fishing (and a decrease in the

smooth oreo target fishing) because of a voluntary catch limit of 1300 t of smooth oreo introduced in 1998–99. Throughout the time there was a moderate amount of target fishing for other species (probably mainly hoki) with about one-third of the target tows in 2002–03 and 2003–04, and for orange roughy with about one-quarter of tows in the last three years (Table 54). In OEO 4, catches of oreo taken by Soviet vessels initially targeted unspecified oreo, then black oreo, smooth oreo, and increasingly orange roughy. Catches of oreo by New Zealand vessels mostly targeted orange roughy (Table 55).

Catch and catch rate

In OEO 3A, black oreo dominated catches from 1979–80 to 1983–84, reflecting the Soviet preference for that species. Smooth oreo predominated in all but four of the fishing years from 1984–85 to 1997–98. In the seven years from 1998–99 to 2004–05 the catch of smooth oreo was lower because of the catch limit for that species (Table 56). In OEO 4, black oreo catches were predominant only from 1978–79 to 1980–81, with smooth oreo then predominant. Smooth oreo catches decreased in 2001–02 and 2002–03, because the TACC was reduced but the TACC was restored to the previous level in 2003–04 and catches increased again (Table 57).

Target catch per tow for black oreo in OEO 3A declined over the first 10 years (1979–80 to 1988–89), but fluctuated in later fishing years and were relatively high in the last four years (2001–02 to 2004–05). Smooth oreo catch per tow declined from 1979–80 to 1996–97 then stabilised (Table 58). Target catch per tow for black oreo in OEO 4 from 1978–79 to 1988–89 fluctuated, and since that time there were very few target tows. Target catch per tow for smooth oreo declined in the early years (1979–80 to 1990–91), but fluctuated in later years was high (10–12 t/tow) in the last four years (Table 59).

Summary

This fishery is a flat bottom, dropoff, and hill fishery with target oreo fishing predominating at the west end of the south Chatham Rise (OEO 3A), and oreo bycatch to orange roughy fishing at the east end (OEO 4). It is the largest (reported oreo catch of 14 832 t in OEO 3A and 10 269 t in OEO 4 in 1980–81) and longest-established (from 1972 to the present) deepwater fishery in the EEZ. It was dominated by Soviet vessels in the early years, but is now almost entirely fished by New Zealand vessels. The OEO 3A TACC was reduced in five steps from 10 106 t in 1995–96 to 3255 t in 2003–04 due to stock assessment results. The OEO 3A catch failed to reach the TACC in 1994–95 and 1995–96 but was close to the TACC in the remaining years. The OEO 4 catch was close to the TACC in most years since 1983–84. In 2001–02 and 2002–03 the TACC was reduced as a result of stock assessment results, but a later more optimistic assessment saw the TACC restored to the previous level in 2003–04.

4.2 Summary plots

The mean annual estimated catch of black oreo and smooth oreo for each fishery in the last three fishing years (2002–03 to 2004–05) are shown in Figure 8. There were only two black oreo fisheries over 1000 t per annum: Pukaki Rise (1500 t) and OEO 3A (1300 t). Smooth oreo fisheries close to or more than 1000 t per annum ranked from large to small included: OEO 4 (5100 t), Bounty Plateau (1500 t), Pukaki Rise (1400 t), and OEO 3A (1000 t). Catches from Southland and Macquarie Ridge slipped below the 1000 t threshold but were included in the previous analysis (Coburn et al., 2006), while catches from Bounty Plateau increased.

Mean annual unstandardised catch rates (t/tow) for each of the fisheries in the last three fishing years (2002–03 to 2004–05) are shown in Figure 9. For black oreo, OEO 3A had the highest catch rates followed by Southland, then Pukaki Rise. For smooth oreo the catch rates in OEO 4 (10.4 t/tow) were much higher than those of any of the other fisheries, and ranked large to small: Bounty Plateau, OEO 3A, Southland, Wairarapa, Macquarie Ridge, and Pukaki Rise.

Black oreo

The largest fishery in the last three years was Pukaki Rise (Figure 10). The fishery operated in the early to mid 1980s but then was not fished again until the mid 1990s. The distribution of catches suggest that less was taken in the south and more in the middle of the area in the last three fishing years compared to the post-GPS period (Figures 11 and 12). The second largest fishery was OEO 3A (Figure 13). This was formerly the largest fishery in the EEZ, i.e., 15 400 t reported in 1980–81, and is the longest established (before 1977–78). Catches declined steeply in the mid 1980s then fluctuated through until the late 1990s when catch limits were reduced. The distribution of catches from this fishery in the post-GPS period (1992–93 to 2001–02) and for the last three fishing years (2002–03 to 2004–05) appeared very similar (Figure 14).

Smooth oreo

OEO 4 is the largest and longest-established of the smooth oreo fisheries, with a build up of catches in the 1980s followed by relatively steady levels (Figure 15). Catches were made on seamounts and on undulating ground. Comparison of the distribution of catches suggests little change between the post-GPS period and the last three fishing years (Figures 16 and 17).

The Bounty Plateau smooth oreo fishery is a relatively recent fishery with the highest catch in the last fishing year (Figure 18). Comparison of the catch distributions suggested more catches in the north in deeper water spread over a larger area in the last three fishing years compared to the post-GPS period (Figure 19).

The Pukaki Rise smooth oreo fishery had some small catches in the mid 1980s but the modern fishery started in the mid 1990s. Catches peaked in 2000–01 (2309 t) and have subsequently declined (Figure 20). The distribution of catches suggested that less was taken in the south and more in the middle of the area in the last three fishing years compared to the post-GPS period (Figures 21 and 22).

The OEO 3A (minus the catches from Southland) smooth oreo fishery is one of the longest-established fisheries with large catches in the early and late 1980s to early 1990s. Catches subsequently declined and were further constrained by reduced catch limits since 1999–2000 (Figure 23). Comparison of the catch distributions suggested slightly less catch in the east of the area in the last three fishing years compared to the post-GPS period (Figure 24).

5. ACKNOWLEDGMENTS

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Table 1: Total reported oreo catch (t) for oreo management areas OEO 1 and OEO 6, total estimated oreo catch (t) from the tow-by-tow database, and percentage data captured in tow-by-tow database.

Fishing year	OEO 1 total oreo catch		OEO 6 total oreo catch		% of tow-by-tow data	
	Reported	Tow by tow	Reported	Tow by tow	OEO 1	OEO 6
1978–79*	2 808	2 818	17	3	100	–
1979–80*	143	130	18	20	91	–
1980–81*	467	480	283	0	103	0
1981–82*	21	1	4 380	3 221	–	74
1982–83*	162	15	765	1 929	9	252
1983–83#	39	0	354	436	–	123
1983–84†	3 241	3 424	3 568	3 092	106	87
1984–85†	1 480	1 747	2 044	1 853	118	91
1985–86†	5 390	5 724	126	126	106	100
1986–87†	532	296	0	0	56	–
1987–88†	1 193	1 047	197	249	88	126
1988–89†	432	266	0	0	62	–
1989–90†	2 069	1 628	0	0	79	–
1990–91†	4 563	3 373	288	304	74	106
1991–92†	4 156	3 292	33	17	79	–
1992–93†	5 739	5 404	815	599	94	74
1993–94†	4 910	4 395	983	872	90	89
1994–95†	1 483	1 137	2 528	2 232	77	88
1995–96†	4 783	3 824	4 435	3 823	80	86
1996–97†	5 181	4 168	5 645	5 188	81	92
1997–98†	2 681	2 518	5 222	4 819	94	92
1998–99†	4 102	3 537	5 287	4 726	84	88
1999–00†	3 711	3 215	5 914	5 392	87	91
2000–01†	4 852	3 257	5 932	5 320	67	90
2001–02†	4 197	3 442	5 737	5 453	82	95
2002–03†	3 034	2 301	6 115	5 634	76	92
2003–04†	1 703	1 342	5 811	5 316	79	91
2004–05†	1 025	764	5 744	5 466	75	95

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2004–05. *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

Table 2: Total reported oreo catch (t) for oreo management areas OEO 3A and OEO 4, total estimated oreo catch (t) from tow by-tow-data and percentage data captured in tow-by-tow data.

Fishing year	OEO 3A total oreo catch		OEO 4 total oreo catch		Percentage captured in tow by tow data	
	Reported	Tow by tow	Reported	Tow by tow	OEO 3A	OEO 4
1978–79*	1 366	1 360	8 041	8 150	100	101
1979–80*	10 958	8	680	652	0	96
1980–81*	14 832	15 076	10 269	5 057	102	49
1981–82*	12 750	21 497	9 296	8 625	169	93
1982–83#	8 576	6 494	3 927	7 217	76	184
1983–83†	4 409	9 163	3 209	6 041	208	188
1983–84†	9 190	9 099	6 104	6 158	99	101
1984–85†	8 284	6 755	6 390	6 420	82	100
1985–86†	5 331	4 721	5 883	5 826	89	99
1986–87†	7 222	7 099	6 830	6 813	98	100
1987–88†	9 049	8 938	8 674	8 539	99	98
1988–89†	10 191	8 586	8 447	7 524	84	89
1989–90†	9 286	7 857	7 348	5 804	85	79
1990–91†	9 827	8 743	6 936	6 114	89	88
1991–92†	10 072	9 407	7 457	6 493	93	87
1992–93†	9 290	8 504	7 976	6 241	92	78
1993–94†	9 106	9 039	8 319	6 869	99	83
1994–95†	6 600	6 175	7 680	6 488	94	84
1995–96†	7 786	7 690	6 806	5 834	99	86
1996–97†	6 991	7 086	6 962	6 135	101	88
1997–98†	6 336	5 709	7 010	6 373	90	91
1998–99†	5 763	5 319	6 931	6 502	92	94
1999–00†	5 859	3 985	7 034	6 522	68	93
2000–01†	4 577	3 729	7 358	6 854	81	93
2001–02†	3 923	3 180	4 864	4 379	81	90
2002–03†	3 070	2 172	5 402	4 979	71	92
2003–04†	2 856	1 993	6 735	6 331	70	94
2004–05†	3 061	2 313	7 390	6 871	76	93

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2004–05. *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

Table 3: Total reported landings (t) for all oreo species for oreo management areas OEO 1 and OEO 6 from 1978–79 to 2004–05 and TACs (t) from 1986–87 to 2004–05.

Fishing year	OEO 1		OEO 6	
	Landings	TAC	Landings	TAC
1978–79*	2 808	–	17	–
1979–80*	143	–	18	–
1980–81*	467	–	283	–
1981–82*	21	–	4 380	–
1982–83*	162	–	765	–
1983–83#	39	–	354	–
1983–84†	3 241	–	3 568	–
1984–85†	1 480	–	2 044	–
1985–86†	5 390	–	126	–
1986–87†	532	4 000	0	3 000
1987–88†	1 193	4 000	197	3 000
1988–89†	432	4 233	7	3 000
1989–90†	2 069	5 033	0	3 000
1990–91†	4 563	5 033	288	3 000
1991–92†	4 156	5 033	33	3 000
1992–93†	5 739	6 044	815	3 000
1993–94†	4 910	6 044	983	3 000
1994–95†	1 483	6 044	2 528	3 000
1995–96†	4 783	6 044	4 435	3 000
1996–97†	5 181	6 044	5 645	6 000
1997–98†	2 681	6 044	5 222	6 000
1998–99†	4 102	5 033	5 287	6 000
1999–00†	3 711	5 033	5 914	6 000
2000–01†	4 852	5 033	5 932	6 000
2001–02†	4 197	5 033	5 737	6 000
2002–03†	3 034	5 033	6 115	6 000
2003–04†	1 703	5 033	5 811	6 000
2004–05†	1 025	5 033	5 744	6 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2004–05. *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

Table 4: Total reported landings (t) for all oreo species for OEO 3A and OEO 4 from 1978–79 to 2004–05 and TACs (t) from 1982–83 to 2004–05.

Fishing year	OEO 3A		OEO 4	
	Landings	TAC	Landings	TAC
1978–79*	1 366	–	8 041	–
1979–80*	10 958	–	680	–
1980–81*	14 832	–	10 269	–
1981–82*	12 750	–	9 296	–
1982–83*	8 576	10 000	3 927	6 750
1983–83#	4 409	#	3 209	#
1983–84†	9 190	10 000	6 104	6 750
1984–85†	8 284	10 000	6 390	6 750
1985–86†	5 331	10 000	5 883	6 750
1986–87†	7 222	10 000	6 830	6 750
1987–88†	9 049	10 000	8 674	7 000
1988–89†	10 191	10 000	8 447	7 000
1989–90†	9 286	10 106	7 348	7 000
1990–91†	9 827	10 106	6 936	7 000
1991–92†	10 072	10 106	7 457	7 000
1992–93†	9 290	10 106	7 976	7 000
1993–94†	9 106	10 106	8 319	7 000
1994–95†	6 600	10 106	7 680	7 000
1995–96†	7 786	10 106	6 806	7 000
1996–97†	6 991	6 600	6 962	7 000
1997–98†	6 336	6 600	7 010	7 000
1998–99†	5 763	6 600	6 931	7 000
1999–00†	5 859	5 900	7 034	7 000
2000–01†	4 577	4 400	7 358	7 000
2001–02†	3 923	4 095	4 864	5 460
2002–03†	3 070	3 255	5 402	5 460
2003–04†	2 856	3 255	6 735	7 000
2004–05†	3 061	3 255	7 390	7 000

Reported data source: FSU from 1977–78 to 1987–88; QMS/ITD from 1988–89 to 2004–05. *, 1 April to 31 March; #, 1 April to 30 September; †, 1 October to 30 September.

Table 5: Southland. Percentage of oreo catch (combined) by nation and fishing year. NZ, New Zealand; JAP, Japan; KOR, Korea;; UN, unknown nationality; NOR, Norway; RUS, Soviet Union/Russia; UKR, Ukraine. Catches under 0.5 t were rounded to zero. Zero also included tows with no recorded catch.

	UN	NZ	JAP	KOR	NOR	RUS	UKR
1977-78	31	0	0	0	0	69	0
1978-79	0	0	0	0	0	100	0
1979-80	0	0	0	0	0	100	0
1980-81	0	0	0	0	0	100	0
1981-82	0	0	100	0	0	0	0
1982-83	0	0	0	0	0	0	0
1983-84	0	0	0	5	0	95	0
1984-85	0	0	6	47	0	47	0
1985-86	0	0	4	22	0	74	0
1986-87	0	17	0	35	0	48	0
1987-88	0	36	19	4	0	41	0
1988-89	0	81	0	19	0	0	0
1989-90	0	42	0	10	49	0	0
1990-91	0	58	0	7	35	0	0
1991-92	0	100	0	0	0	0	0
1992-93	0	100	0	0	0	0	0
1993-94	0	100	0	0	0	0	0
1994-95	0	84	0	16	0	0	0
1995-96	0	77	0	22	0	0	0
1996-97	0	84	0	16	0	0	0
1997-98	0	88	0	12	0	0	0
1998-99	0	100	0	0	0	0	0
1999-00	0	75	0	25	0	0	0
2000-01	0	99	0	1	0	0	0
2001-02	0	100	0	0	0	0	0
2002-03	0	100	0	0	0	0	0
2003-04	0	100	0	0	0	0	0
2004-05	0	92	0	0	0	0	8

Table 6: Southland. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels or where combined catch was less than 1 t.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977-78	7	0	0	93	8
1978-79	0	0	0	100	–
1979-80	0	0	0	100	–
1980-81	0	100	0	0	–
1981-82	0	0	0	100	–
1982-83	0	0	0	0	–
1983-84	0	5	0	95	8
1984-85	0	47	6	47	9
1985-86	0	22	4	74	11
1986-87	0	52	0	48	7
1987-88	0	14	26	60	6
1988-89	0	74	26	0	5
1989-90	0	98	2	0	7
1990-91	0	55	45	0	6
1991-92	0	94	5	0	13
1992-93	0	84	15	0	14
1993-94	0	51	49	0	9
1994-95	0	79	21	0	6
1995-96	0	64	36	0	15
1996-97	0	94	6	0	12
1997-98	0	84	16	0	13
1998-99	0	83	15	2	12
1999-00	0	55	45	0	8
2000-01	0	8	92	0	8
2001-02	0	26	74	0	7
2002-03	0	12	88	0	6
2003-04	0	25	75	0	6
2004-05	0	34	58	8	6

Table 7: Southland. Number of tows where oreos were caught (n.total), the number of oreo target tows (n.target) and percentage of tows by target species for all tows catching oreos, by fishing year. OEO, unspecified oreo; SSO, smooth oreo; BOE, black oreo; ORH, orange roughly; Other, other species. Catch rates under 0.1 t per tow were rounded to zero. Zero t per tow also included tows with no recorded catch.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977–78	406	314	77	0	0	0	23
1978–79	29	28	0	0	97	0	3
1979–80	86	85	84	3	12	0	1
1980–81	1	0	0	0	0	0	100
1981–82	1	0	0	0	0	0	100
1982–83	1	1	0	0	100	0	0
1983–84	502	498	0	55	45	0	1
1984–85	244	241	0	36	62	0	1
1985–86	800	797	6	71	23	0	0
1986–87	101	101	0	43	57	0	0
1987–88	226	220	0	85	12	0	3
1988–89	31	27	10	55	23	13	0
1989–90	164	161	6	92	0	0	2
1990–91	156	150	16	79	1	0	4
1991–92	474	466	34	61	3	1	0
1992–93	356	336	29	64	1	5	0
1993–94	226	209	61	23	9	6	1
1994–95	172	163	85	7	3	4	1
1995–96	341	317	64	14	14	7	0
1996–97	535	531	51	39	10	0	1
1997–98	263	249	59	34	1	5	1
1998–99	410	404	60	31	7	0	1
1999–00	496	460	31	58	3	0	7
2000–01	399	393	73	19	7	1	1
2001–02	760	750	64	29	5	0	1
2002–03	566	563	83	12	4	0	1
2003–04	338	334	66	19	14	0	1
2004–05	173	173	62	32	6	0	0

Table 8: Southland. Catch of unspecified oreo (OEO), smooth oreo (SSO), and black oreo (BOE) by fishing year.

	Catch (t)		
	OEO	SSO	BOE
1977-78	2 747	0	0
1978-79	0	13	113
1979-80	410	1	67
1980-81	0	0	0
1981-82	0	0	0
1982-83	0	0	0
1983-84	0	1 268	2 106
1984-85	0	883	1 004
1985-86	0	4 244	1 058
1986-87	0	156	148
1987-88	0	915	138
1988-89	0	196	69
1989-90	0	586	187
1990-91	1	661	389
1991-92	150	3 454	1 182
1992-93	234	860	238
1993-94	43	632	228
1994-95	5	456	389
1995-96	113	1 087	744
1996-97	23	610	1 625
1997-98	10	663	251
1998-99	1	1 050	404
1999-00	0	978	440
2000-01	0	1 773	152
2001-02	10	2 235	518
2002-03	1	1 659	491
2003-04	6	741	343
2004-05	0	405	80

Table 9: Southland. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. All OEO is the sum of all OEO, BOE, and SSO catch from tows where OEO, BOE or SSO was the target divided by the sum of the number of tows targeting OEO, BOE, or SSO. See Table 7 for other abbreviations. —, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1977–78	6.59	314	—	0	—	0	6.59	314
1978–79	—	0	—	0	3.91	28	4.39	28
1979–80	6.59	72	0.19	3	0.20	10	5.61	85
1980–81	—	0	—	0	—	0	—	0
1981–82	—	0	—	0	—	0	—	0
1982–83	—	0	—	0	0	1	0	1
1983–84	—	0	3.37	274	5.69	224	6.75	498
1984–85	—	0	6.71	89	5.47	152	7.81	241
1985–86	3.68	51	6.83	566	3.48	180	6.65	797
1986–87	—	0	1.74	43	2.26	58	3.02	101
1987–88	—	0	4.57	192	2.39	28	4.76	220
1988–89	0.12	3	7.51	17	7.09	7	7.32	27
1989–90	8.61	10	3.85	151	—	0	4.80	161
1990–91	10.02	25	4.98	124	0	1	6.99	150
1991–92	9.27	163	8.97	291	4.27	12	10.17	466
1992–93	4.69	105	2.69	229	4.28	2	3.66	336
1993–94	4.94	138	2.07	51	1.69	20	4.16	209
1994–95	5.54	146	1.22	12	1.40	5	5.20	163
1995–96	6.57	219	2.13	49	5.36	49	5.87	317
1996–97	4.25	273	1.61	206	4.24	52	4.24	531
1997–98	3.32	156	2.59	90	4.67	3	3.32	249
1998–99	3.59	248	2.57	129	1.20	27	3.57	404
1999–00	2.84	155	2.36	289	1.08	16	2.98	460
2000–01	5.76	290	1.71	76	2.25	27	4.86	393
2001–02	3.69	489	2.48	221	2.57	40	3.65	750
2002–03	3.57	469	4.95	70	3.31	24	3.81	563
2003–04	2.98	223	2.67	65	3.91	46	3.25	334
2004–05	2.66	107	2.84	55	1.75	11	2.80	173

Table 10: Puysegur. Percentage oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.

	NZJAP	UKR	
1983–84	0	100	0
1984–85	0	0	0
1985–86	0	100	0
1986–87	0	100	0
1987–88	0	0	0
1988–89	0	0	0
1989–90	100	0	0
1990–91	100	0	0
1991–92	100	0	0
1992–93	100	0	0
1993–94	100	0	0
1994–95	100	0	0
1995–96	100	0	0
1996–97	100	0	0
1997–98	100	0	0
1998–99	100	0	0
1999–00	100	0	0
2000–01	100	0	0
2001–02	100	0	0
2002–03	100	0	0
2003–04	0	0	100
2004–05	13	0	87

Table 11: Puysegur. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1983–84	0	0	0	100	–
1984–85	0	0	0	0	0
1985–86	0	0	100	0	–
1986–87	100	0	0	0	–
1987–88	0	0	0	0	0
1988–89	0	0	0	0	0
1989–90	0	0	100	0	–
1990–91	0	1	99	0	–
1991–92	0	45	55	0	12
1992–93	0	67	16	18	12
1993–94	0	14	61	25	6
1994–95	0	13	87	0	–
1995–96	0	53	47	0	6
1996–97	0	19	81	0	5
1997–98	0	100	0	0	–
1998–99	0	99	0	1	–
1999–00	0	100	0	0	–
2000–01	0	99	1	0	–
2001–02	0	0	0	100	–
2002–03	0	0	100	0	–
2003–04	0	0	0	100	–
2004–05	0	0	13	87	–

Table 12: Puysegur. Number of tows where oreos were caught, number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1983-84	3	0	0	0	0	0	100
1984-85	0	0	0	0	0	0	0
1985-86	1	0	0	0	0	0	100
1986-87	4	0	0	0	0	0	100
1987-88	0	0	0	0	0	0	0
1988-89	0	0	0	0	0	0	0
1989-90	70	6	0	9	0	91	0
1990-91	231	159	24	10	35	31	0
1991-92	535	54	0	8	1	90	0
1992-93	464	143	15	9	7	69	0
1993-94	472	20	4	1	0	96	0
1994-95	123	48	39	0	0	61	0
1995-96	209	51	21	4	0	75	0
1996-97	132	43	33	0	0	67	0
1997-98	4	4	100	0	0	0	0
1998-99	12	11	92	0	0	0	8
1999-00	84	84	30	70	0	0	0
2000-01	33	32	0	97	0	0	3
2001-02	1	0	0	0	0	0	100
2002-03	1	0	0	0	0	0	100
2003-04	66	66	100	0	0	0	0
2004-05	77	61	78	1	0	21	0

Table 13: Puysegur. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1983-84	0	0	0
1984-85	0	0	0
1985-86	0	0	0
1986-87	0	0	0
1987-88	0	0	0
1988-89	0	0	0
1989-90	0	178	660
1990-91	15	403	1 687
1991-92	147	477	1 806
1992-93	271	417	1 214
1993-94	18	1 022	884
1994-95	0	459	69
1995-96	0	445	165
1996-97	3	244	126
1997-98	19	0	0
1998-99	6	190	0
1999-00	0	168	154
2000-01	0	246	2
2001-02	0	0	0
2002-03	0	0	0
2003-04	0	121	150
2004-05	0	110	111

Table 14: Puysegur. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1989–90	–	0	0.50	6	–	0	0.50	6
1990–91	13.50	56	0.53	22	8.35	81	10.40	159
1991–92	0	2	0.86	44	4.81	8	3.66	54
1992–93	2.98	69	1.95	42	7.29	32	4.69	143
1993–94	5.41	17	0.50	3	–	0	4.75	20
1994–95	4.57	48	–	0	–	0	4.57	48
1995–96	7.75	43	0.28	8	–	0	6.73	51
1996–97	6.60	43	–	0	–	0	6.60	43
1997–98	4.62	4	–	0	–	0	4.62	4
1998–99	17.74	11	–	0	–	0	17.74	11
1999–00	7.58	25	1.61	59	–	0	3.84	84
2000–01	–	0	7.64	32	–	0	7.69	32
2001–02	–	0	–	0	–	0	–	0
2002–03	–	0	–	0	–	0	–	0
2003–04	4.10	66	–	0	–	0	4.10	66
2004–05	3.23	60	6.31	1	–	0	3.28	61

Table 15: Snares. Percentage of oreo catch (combined) by nation and fishing year. See Tables 5 & 10 for abbreviations.

	NZ	UKR
1990–91	100	0
1991–92	100	0
1992–93	100	0
1993–94	100	0
1994–95	100	0
1995–96	100	0
1996–97	100	0
1997–98	100	0
1998–99	100	0
1999–00	100	0
2000–01	100	0
2001–02	100	0
2002–03	100	0
2003–04	0	100
2004–05	78	22

Table 16: Snares. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1990–91	0	0	100	0	–
1991–92	0	43	57	0	–
1992–93	0	30	62	8	5
1993–94	0	9	46	45	6
1994–95	0	22	76	2	5
1995–96	0	46	54	0	4
1996–97	0	18	82	0	–
1997–98	0	66	34	0	4
1998–99	0	64	36	0	5
1999–00	0	10	90	0	–
2000–01	0	0	100	0	–
2001–02	0	90	10	1	4
2002–03	0	15	85	0	4
2003–04	0	0	0	100	–
2004–05	0	0	78	22	4

Table 17: Snares. The number of tows where oreos were caught, number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1990–91	20	10	40	10	0	50	0
1991–92	21	9	0	43	0	57	0
1992–93	387	244	37	10	16	37	0
1993–94	343	68	15	3	1	80	0
1994–95	61	36	54	0	5	41	0
1995–96	127	63	37	9	3	49	2
1996–97	92	68	66	7	1	25	1
1997–98	68	61	69	16	4	10	0
1998–99	87	85	67	22	9	2	0
1999–00	119	118	45	50	4	1	0
2000–01	64	64	95	0	5	0	0
2001–02	67	66	82	13	3	0	1
2002–03	73	73	100	0	0	0	0
2003–04	3	3	100	0	0	0	0
2004–05	18	14	78	0	0	22	0

Table 18: Snares. Catch of unspecified oreo, smooth oreo, and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1990–91	0	38	189
1991–92	0	99	274
1992–93	0	720	2 298
1993–94	10	656	1 687
1994–95	5	114	181
1995–96	0	237	561
1996–97	12	251	455
1997–98	60	76	83
1998–99	0	324	105
1999–00	0	279	266
2000–01	0	69	79
2001–02	0	247	120
2002–03	0	77	66
2003–04	0	1	3
2004–05	0	13	15

Table 19: Snares. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	<u>OEO</u> <u>n</u>		<u>SSO</u> <u>n</u>		<u>BOE</u> <u>n</u>		<u>All OEO</u> <u>n</u>	
1990–91	19.50	8	0.09	2	–	0	15.64	10
1991–92	–	0	8.08	9	–	0	17.65	9
1992–93	6.98	143	1.55	38	7.52	63	7.93	244
1993–94	10.32	53	3.96	10	2.90	5	9.19	68
1994–95	5.33	33	–	0	1.26	3	5.00	36
1995–96	9.17	47	0.91	12	2.92	4	7.43	63
1996–97	9.78	61	0.17	6	3.00	1	9.20	68
1997–98	2.76	47	2.02	11	2.00	3	2.68	61
1998–99	5.24	58	4.37	19	1.64	8	4.96	85
1999–00	3.36	53	3.46	60	2.00	5	4.55	118
2000–01	2.24	61	–	0	3.15	3	2.31	64
2001–02	5.93	55	1.31	9	4.25	2	5.53	66
2002–03	1.96	73	–	0	–	0	1.96	73
2003–04	1.30	3	–	0	–	0	1.30	3
2004–05	1.76	14	–	0	–	0	1.76	14

Table 20: Wairarapa. Percentage oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.

	NZ	JAP	RUS
1980–81	0	0	100
1981–82	0	11	89
1982–83	89	11	0
1983–84	100	0	0
1984–85	100	0	0
1985–86	100	0	0
1986–87	100	0	0
1987–88	100	0	0
1988–89	100	0	0
1989–90	100	0	0
1990–91	100	0	0
1991–92	100	0	0
1992–93	100	0	0
1993–94	100	0	0
1994–95	100	0	0
1995–96	100	0	0
1996–97	100	0	0
1997–98	100	0	0
1998–99	100	0	0
1999–00	100	0	0
2000–01	100	0	0
2001–02	100	0	0
2002–03	100	0	0
2003–04	100	0	0
2004–05	100	0	0

Table 21: Wairarapa. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1980–81	0	100	0	0	–
1981–82	0	0	0	100	–
1982–83	0	19	71	11	7
1983–84	0	100	0	0	6
1984–85	0	100	0	0	7
1985–86	0	100	0	0	6
1986–87	0	100	0	0	5
1987–88	0	100	0	0	4
1988–89	0	100	0	0	5
1989–90	0	99	1	0	6
1990–91	0	100	0	0	7
1991–92	0	100	0	0	7
1992–93	0	100	0	0	6
1993–94	0	100	0	0	11
1994–95	0	100	0	0	9
1995–96	0	100	0	0	7
1996–97	0	99	1	0	9
1997–98	0	100	0	0	6
1998–99	0	100	0	0	7
1999–00	0	100	0	0	5
2000–01	0	100	0	0	4
2001–02	0	100	0	0	6
2002–03	0	100	0	0	5
2003–04	0	100	0	0	4
2004–05	0	100	0	0	5

Table 22: Wairarapa. The number of tows where oreos were caught, the number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1980–81	1	0	0	0	0	0	100
1981–82	48	0	0	0	0	100	0
1982–83	137	1	1	0	0	79	20
1983–84	956	0	0	0	0	93	7
1984–85	472	6	0	1	0	95	4
1985–86	75	20	0	27	0	64	9
1986–87	165	1	1	0	0	68	31
1987–88	76	0	0	0	0	86	14
1988–89	80	2	0	3	0	94	4
1989–90	122	58	0	48	0	48	5
1990–91	193	33	5	12	0	78	5
1991–92	320	22	1	6	0	89	4
1992–93	308	43	0	14	0	84	2
1993–94	288	10	0	3	0	77	19
1994–95	250	14	0	5	0	90	4
1995–96	181	62	22	12	0	58	8
1996–97	155	78	39	12	0	25	25
1997–98	160	101	51	13	0	31	6
1998–99	136	50	23	14	0	51	12
1999–00	163	68	17	25	0	49	9
2000–01	236	168	28	43	0	25	4
2001–02	122	102	56	28	0	12	4
2002–03	122	84	17	52	0	23	8
2003–04	54	37	13	56	0	24	7
2004–05	86	30	8	27	0	48	17

Table 23: Wairarapa. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1980–81	0	1	0
1981–82	0	24	0
1982–83	151	28	1
1983–84	158	51	0
1984–85	13	62	4
1985–86	0	45	0
1986–87	0	74	2
1987–88	0	27	1
1988–89	0	25	1
1989–90	0	180	0
1990–91	2	138	9
1991–92	2	112	15
1992–93	2	138	1
1993–94	13	85	11
1994–95	8	88	2
1995–96	9	59	1
1996–97	9	34	5
1997–98	3	82	1
1998–99	0	70	3
1999–00	2	129	6
2000–01	15	813	42
2001–02	0	344	9
2002–03	0	332	8
2003–04	0	69	0
2004–05	1	71	2

Table 24: Wairarapa. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1982–83	1.07	1	–	0	–	0	1.07	1
1983–84	–	0	–	0	–	0	–	0
1984–85	–	0	1.32	6	–	0	1.32	6
1985–86	–	0	1.38	20	–	0	1.38	20
1986–87	0.02	1	–	0	–	0	0.02	1
1987–88	–	0	–	0	–	0	–	0
1988–89	–	0	0.45	2	–	0	0.45	2
1989–90	–	0	1.68	58	–	0	1.68	58
1990–91	0.45	9	1.93	24	–	0	1.53	33
1991–92	0.20	2	0.90	20	–	0	0.84	22
1992–93	–	0	0.86	43	–	0	0.86	43
1993–94	–	0	0.34	10	–	0	0.34	10
1994–95	0.10	1	0.56	13	–	0	0.53	14
1995–96	0.49	40	0.47	22	–	0	0.50	62
1996–97	0.26	60	0.70	18	–	0	0.39	78
1997–98	0.37	81	1.51	20	–	0	0.06	101
1998–99	0.82	31	0.56	19	–	0	0.74	50
1999–00	1.12	28	2.11	40	–	0	1.72	68
2000–01	8.09	66	3.16	102	–	0	5.12	168
2001–02	3.65	68	2.60	34	–	0	3.39	102
2002–03	3.86	21	4.01	63	–	0	3.97	84
2003–04	0.61	7	1.97	30	–	0	1.71	37
2004–05	0.05	7	2.86	23	–	0	2.22	30

Table 25: OEO 1 north of 45° S excluding Wairarapa. Percentage of oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations. AUS, Australia; PAN, Panama.

	UN	AUS	BZE	DOM	JAP	KOR	NOR	PAN	RUS
1977–78	0	0	0	0	0	100	0	0	0
1978–79	58	0	0	0	40	1	0	0	0
1979–80	0	0	0	0	99	1	0	0	0
1980–81	0	0	0	0	88	12	0	0	0
1981–82	0	0	0	0	18	1	0	0	80
1982–83	0	0	0	99	0	1	0	0	0
1983–84	0	0	0	10	3	0	0	0	87
1984–85	0	0	0	80	20	0	0	0	0
1985–86	0	0	0	100	0	0	0	0	0
1986–87	0	0	0	98	1	1	0	0	0
1987–88	0	0	0	53	47	0	0	0	0
1988–89	0	0	0	98	1	0	0	0	0
1989–90	0	0	0	94	0	6	0	0	0
1990–91	0	0	0	88	1	0	11	0	0
1991–92	0	0	0	100	0	0	0	0	0
1992–93	0	0	0	98	0	0	2	0	0
1993–94	0	0	0	100	0	0	0	0	0
1994–95	0	0	0	100	0	0	0	0	0
1995–96	0	0	0	100	0	0	0	0	0
1996–97	0	0	0	100	0	0	0	0	0
1997–98	0	0	0	100	0	0	0	0	0
1998–99	0	0	0	99	0	0	0	1	0
1999–00	0	0	0	100	0	0	0	0	0
2000–01	0	0	0	100	0	0	0	0	0
2001–02	0	0	0	88	0	0	0	11	0
2002–03	0	4	0	96	0	0	0	0	0
2003–04	0	36	0	64	0	0	0	0	0
2004–05	0	0	2	98	0	0	0	0	0

Table 26: OEO 1 north of 45° S excluding Wairarapa. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	0	100	0	0	–
1978–79	58	1	40	0	5
1979–80	0	1	99	0	–
1980–81	0	12	70	18	–
1981–82	0	1	17	82	–
1982–83	0	100	0	0	–
1983–84	0	10	0	90	4
1984–85	0	80	0	20	13
1985–86	0	97	3	0	8
1986–87	0	99	0	1	10
1987–88	0	99	1	0	10
1988–89	0	58	41	1	13
1989–90	0	46	54	0	9
1990–91	0	53	47	1	12
1991–92	0	77	23	0	7
1992–93	0	97	3	0	13
1993–94	0	85	0	14	14
1994–95	0	97	3	0	13
1995–96	0	95	5	0	9
1996–97	0	83	17	0	10
1997–98	0	94	6	0	9
1998–99	0	86	14	1	10
1999–00	0	100	0	0	9
2000–01	0	70	30	0	5
2001–02	0	27	62	11	7
2002–03	0	98	2	0	6
2003–04	0	90	10	0	7
2004–05	0	86	14	0	8

Table 27: OEO 1 north of 45° S excluding Wairarapa. The number of tows where oreos were caught, the number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	11	0	0	0	0	0	100
1978-79	189	0	0	0	0	0	100
1979-80	186	0	0	0	0	0	100
1980-81	9	0	0	0	0	0	100
1981-82	95	0	0	0	0	6	94
1982-83	20	0	0	0	0	30	70
1983-84	230	2	0	1	0	71	28
1984-85	368	0	0	0	0	55	45
1985-86	293	11	0	3	0	83	13
1986-87	255	0	0	0	0	84	16
1987-88	304	2	0	1	0	83	16
1988-89	103	11	1	7	3	69	20
1989-90	63	8	3	10	0	84	3
1990-91	93	5	1	4	0	88	6
1991-92	108	1	1	0	0	94	5
1992-93	156	3	1	1	0	94	4
1993-94	256	3	1	0	0	89	9
1994-95	224	1	0	0	0	77	22
1995-96	179	62	34	1	0	47	18
1996-97	333	190	39	18	0	32	11
1997-98	183	76	36	6	0	49	9
1998-99	160	37	6	17	1	66	11
1999-00	252	33	3	10	0	75	12
2000-01	317	38	0	9	3	82	6
2001-02	129	1	0	1	0	87	12
2002-03	146	22	3	12	0	66	19
2003-04	112	25	21	2	0	70	8
2004-05	124	2	0	2	0	72	27

Table 28: OEO 1 north of 45° S excluding Wairarapa. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1977-78	1	0	0
1978-79	0	0	11
1979-80	0	0	5
1980-81	0	0	0
1981-82	0	7	6
1982-83	7	0	0
1983-84	6	28	23
1984-85	8	14	8
1985-86	4	55	6
1986-87	0	38	3
1987-88	1	21	3
1988-89	7	32	16
1989-90	0	66	6
1990-91	1	41	27
1991-92	1	113	40
1992-93	8	89	17
1993-94	13	94	11
1994-95	11	7	45
1995-96	9	119	1
1996-97	54	693	3
1997-98	4	121	2
1998-99	2	165	15
1999-00	10	164	12
2000-01	0	344	5
2001-02	1	34	3
2002-03	0	238	2
2003-04	0	13	1
2004-05	0	14	2

Table 29: Mean catch rates. OEO 1 north of 45° S excluding Wairarapa. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. —, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1983–84	—	0	12.04	2	—	0	18.68	2
1984–85	—	0	—	0	—	0	—	0
1985–86	—	0	0.27	10	0.38	1	0.37	11
1986–87	—	0	—	0	—	0	—	0
1987–88	—	0	0.69	2	—	0	0.69	2
1988–89	9.30	1	1.35	7	2.79	3	2.54	11
1989–90	5.70	2	1.50	6	—	0	2.63	8
1990–91	8.00	1	1.45	4	—	0	3.36	5
1991–92	0.30	1	—	0	—	0	0.30	1
1992–93	6.00	2	0.72	1	—	0	4.24	3
1993–94	2.30	2	0	1	—	0	1.87	3
1994–95	1.00	1	—	0	—	0	1	1
1995–96	1.06	61	22.00	1	—	0	1.40	62
1996–97	1.11	131	9.73	59	—	0	3.78	190
1997–98	0.49	65	7.23	11	—	0	1.47	76
1998–99	2.25	9	4.55	27	10.00	1	4.14	37
1999–00	0.68	7	5.64	26	—	0	4.89	33
2000–01	30.00	1	6.71	29	0.44	8	6.00	38
2001–02	—	0	0.60	1	—	0	0.60	1
2002–03	20.98	4	5.41	18	—	0	8.24	22
2003–04	0	23	0	2	—	0	0	25
2004–05	—	0	0.42	2	—	0	0.42	2

Table 30: Auckland Island hills. Percentage oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations. BZE, Belize.

	BZE	NZ	RUS
1981–82	0	0	100
1982–83	0	0	0
1983–84	0	0	0
1984–85	0	0	0
1985–86	0	0	100
1986–87	0	0	0
1987–88	0	0	0
1988–89	0	0	0
1989–90	0	0	0
1990–91	0	100	0
1991–92	0	0	0
1992–93	0	100	0
1993–94	0	100	0
1994–95	0	100	0
1995–96	0	100	0
1996–97	0	100	0
1997–98	0	100	0
1998–99	1	99	0
1999–00	0	100	0
2000–01	0	100	0
2001–02	0	100	0
2002–03	0	100	0
2003–04	0	100	0
2004–05	0	100	0

Table 31: Auckland Island hills. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1981–82	0	0	0	100	–
1982–83	0	0	0	0	0
1983–84	0	0	0	0	0
1984–85	0	0	0	0	0
1985–86	0	0	0	100	–
1986–87	0	0	0	0	0
1987–88	0	0	0	0	0
1988–89	0	0	0	0	0
1989–90	0	0	0	0	0
1990–91	0	0	100	0	–
1991–92	0	0	0	0	0
1992–93	0	15	0	85	–
1993–94	0	11	0	88	–
1994–95	0	56	44	0	4
1995–96	0	100	0	0	4
1996–97	0	74	4	22	6
1997–98	0	68	31	0	4
1998–99	0	22	78	0	5
1999–00	0	2	98	1	–
2000–01	0	0	100	0	–
2001–02	0	1	98	0	–
2002–03	0	0	99	0	–
2003–04	0	0	96	4	–
2004–05	0	0	100	0	–

Table 32: Auckland Island hills. The number of tows where oreos were caught, the number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1981–82	6	5	0	50	33	0	17
1982–83	0	0	0	0	0	0	0
1983–84	0	0	0	0	0	0	0
1984–85	0	0	0	0	0	0	0
1985–86	3	2	0	0	67	0	33
1986–87	0	0	0	0	0	0	0
1987–88	0	0	0	0	0	0	0
1988–89	0	0	0	0	0	0	0
1989–90	0	0	0	0	0	0	0
1990–91	2	0	0	0	0	100	0
1991–92	0	0	0	0	0	0	0
1992–93	68	54	0	79	0	18	3
1993–94	103	9	0	9	0	91	0
1994–95	260	166	33	31	0	36	0
1995–96	177	29	5	11	0	84	0
1996–97	109	24	11	11	0	78	0
1997–98	153	23	15	0	0	85	0
1998–99	218	77	29	6	0	64	0
1999–00	168	90	45	8	0	44	2
2000–01	81	34	27	15	0	58	0
2001–02	85	43	40	11	0	49	0
2002–03	97	73	66	9	0	25	0
2003–04	58	41	67	3	0	28	2
2004–05	12	8	50	17	0	33	0

Table 33: Auckland Island hills. Catch of unspecified oreo, smooth oreo, and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1981–82	0	10	35
1982–83	0	0	0
1983–84	0	0	0
1984–85	0	0	0
1985–86	0	30	2
1986–87	0	0	0
1987–88	0	0	0
1988–89	0	0	0
1989–90	0	0	0
1990–91	0	0	0
1991–92	0	0	0
1992–93	0	315	0
1993–94	28	274	1
1994–95	0	555	4
1995–96	0	508	1
1996–97	10	267	0
1997–98	5	318	3
1998–99	0	658	1
1999–00	0	552	0
2000–01	0	200	0
2001–02	0	365	1
2002–03	0	268	0
2003–04	0	198	0
2004–05	0	42	0

Table 34: Auckland Island hills. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1981–82	–	0	3.33	3	15	2	9	5
1982–83	–	0	–	0	–	0	–	0
1983–84	–	0	–	0	–	0	–	0
1984–85	–	0	–	0	–	0	–	0
1985–86	–	0	–	0	0.37	2	15.18	2
1986–87	–	0	–	0	–	0	–	0
1987–88	–	0	–	0	–	0	–	0
1988–89	–	0	–	0	–	0	–	0
1989–90	–	0	–	0	–	0	–	0
1990–91	–	0	–	0	–	0	–	0
1991–92	–	0	–	0	–	0	–	0
1992–93	–	0	4.56	54	–	0	4.56	54
1993–94	–	0	4.03	9	–	0	4.03	9
1994–95	1.58	85	1.04	81	–	0	1.32	166
1995–96	2.28	9	2.88	20	–	0	2.69	29
1996–97	0.80	12	6.34	12	–	0	3.57	24
1997–98	2.14	23	–	0	–	0	2.14	23
1998–99	3.43	64	1.06	13	–	0	3.03	77
1999–00	3.31	76	2.34	14	–	0	3.16	90
2000–01	5.02	22	0.85	12	–	0	3.55	34
2001–02	4.30	34	10.39	9	–	0	5.57	43
2002–03	3.50	64	2.47	9	–	0	3.38	73
2003–04	3.13	39	14.50	2	–	0	3.69	41
2004–05	5.38	6	0.20	2	–	0	4.09	8

Table 35: Bounty Plateau. Percentage oreo catch (combined) by nation and fishing year. See Table 5, 10, 30 for abbreviations.

	UN	BZE	NZ	JAP	RUS	UKR
1980–81	13	0	0	0	87	0
1981–82	0	0	0	0	0	0
1982–83	0	0	0	0	0	0
1983–84	0	0	0	0	100	0
1984–85	0	0	0	0	0	0
1985–86	0	0	0	0	0	0
1986–87	0	0	0	0	0	0
1987–88	0	0	0	100	0	0
1988–89	0	0	0	0	0	0
1989–90	0	0	0	0	0	0
1990–91	0	0	100	0	0	0
1991–92	0	0	0	0	0	0
1992–93	0	0	100	0	0	0
1993–94	0	0	100	0	0	0
1994–95	0	0	100	0	0	0
1995–96	0	0	100	0	0	0
1996–97	0	0	100	0	0	0
1997–98	0	0	100	0	0	0
1998–99	0	18	82	0	0	0
1999–00	0	0	100	0	0	0
2000–01	0	0	100	0	0	0
2001–02	0	0	100	0	0	0
2002–03	0	0	100	0	0	0
2003–04	0	0	98	0	0	2
2004–05	0	0	99	0	0	1

Table 36: Bounty Plateau. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels or where combined catch was less than 1 t.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1980–81	0	0	0	100	–
1981–82	0	0	0	0	0
1982–83	0	0	0	0	–
1983–84	0	0	0	100	–
1984–85	0	0	0	0	0
1985–86	0	0	0	0	–
1986–87	0	0	0	0	0
1987–88	0	0	0	100	0
1988–89	0	0	0	0	0
1989–90	0	0	0	0	0
1990–91	0	0	100	0	0
1991–92	0	0	0	0	0
1992–93	0	0	100	0	0
1993–94	0	13	0	87	–
1994–95	0	23	77	0	5
1995–96	0	77	23	0	–
1996–97	0	64	36	0	–
1997–98	0	49	30	21	6
1998–99	0	41	59	0	8
1999–00	0	42	58	0	5
2000–01	0	26	74	0	5
2001–02	0	5	95	0	4
2002–03	0	7	93	0	5
2003–04	0	3	94	2	5
2004–05	0	0	99	1	5

Table 37: Bounty Plateau. The number of tows where oreos were caught, the number of oreo target tows (OEO, SSO, BOE) and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1980-81	8	8	38	62	0	0	0
1981-82	0	0	0	0	0	0	0
1982-83	1	1	0	0	100	0	0
1983-84	59	58	0	42	56	0	2
1984-85	0	0	0	0	0	0	0
1985-86	2	2	0	50	50	0	0
1986-87	0	0	0	0	0	0	0
1987-88	2	2	0	100	0	0	0
1988-89	0	0	0	0	0	0	0
1989-90	0	0	0	0	0	0	0
1990-91	6	6	0	100	0	0	0
1991-92	0	0	0	0	0	0	0
1992-93	10	10	100	0	0	0	0
1993-94	24	24	4	96	0	0	0
1994-95	162	155	42	54	0	4	0
1995-96	154	127	77	5	0	17	1
1996-97	170	160	94	0	0	6	0
1997-98	203	122	38	22	0	40	0
1998-99	338	250	20	54	0	26	0
1999-00	139	101	39	34	0	27	0
2000-01	136	95	33	37	0	30	0
2001-02	152	130	11	74	0	13	1
2002-03	277	230	61	22	0	17	0
2003-04	273	244	75	15	0	11	0
2004-05	410	388	57	38	0	5	0

Table 38: Bounty Plateau. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1980-81	3	0	0
1981-82	0	0	0
1982-83	0	0	0
1983-84	0	525	628
1984-85	0	0	0
1985-86	0	0	0
1986-87	0	0	0
1987-88	0	18	0
1988-89	0	0	0
1989-90	0	0	0
1990-91	0	20	78
1991-92	0	0	0
1992-93	0	81	0
1993-94	0	434	3
1994-95	30	1 252	0
1995-96	48	732	2
1996-97	464	98	0
1997-98	51	544	8
1998-99	0	1 059	9
1999-00	0	765	1
2000-01	0	492	2
2001-02	0	931	1
2002-03	48	1 366	2
2003-04	53	1 244	7
2004-05	0	1 930	15

Table 39: Bounty Plateau. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. —, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1980–81	1.07	3	0.10	5	—	0	0.46	8
1981–82	—	0	—	0	—	0	—	0
1982–83	—	0	—	0	0	1	0	1
1983–84	—	0	15.37	25	15.63	33	19.63	58
1984–85	—	0	—	0	—	0	—	0
1985–86	—	0	0	1	0	1	0	2
1986–87	—	0	—	0	—	0	—	0
1987–88	—	0	8.84	2	—	0	8.84	2
1988–89	—	0	—	0	—	0	—	0
1989–90	—	0	—	0	—	0	—	0
1990–91	—	0	3.33	6	—	0	16.33	6
1991–92	—	0	—	0	—	0	—	0
1992–93	8.10	10	—	0	—	0	8.10	10
1993–94	55.00	1	16.61	23	—	0	18.21	24
1994–95	11.19	68	5.67	87	—	0	8.09	155
1995–96	5.28	119	14.11	8	—	0	5.86	127
1996–97	3.49	160	—	0	—	0	3.49	160
1997–98	1.66	77	2.56	45	—	0	1.99	122
1998–99	6.73	69	2.18	181	—	0	3.46	250
1999–00	5.85	54	8.11	47	—	0	6.90	101
2000–01	3.51	45	3.86	50	—	0	3.70	95
2001–02	3.31	17	6.44	113	—	0	6.04	130
2002–03	4.99	170	8.55	60	—	0	5.92	230
2003–04	5.06	204	6.19	40	—	0	5.24	244
2004–05	4.64	233	5.45	155	—	0	4.98	388

Table 40: Pukaki Rise. Percentage of oreo catch (combined) by nation and fishing year. See Table 5, 10 for abbreviations.

	UN	DOM	JAP	KOR	NOR	RUS	UKR
1978–79	26	0	0	0	0	74	0
1979–80	0	0	0	0	0	100	0
1980–81	68	0	0	0	0	32	0
1981–82	19	0	0	0	0	81	0
1982–83	0	0	0	0	0	100	0
1983–84	0	0	0	37	0	63	0
1984–85	0	0	1	77	0	22	0
1985–86	0	0	0	67	0	33	0
1986–87	0	0	0	0	0	0	0
1987–88	0	0	100	0	0	0	0
1988–89	0	100	0	0	0	0	0
1989–90	0	50	0	0	50	0	0
1990–91	0	99	0	0	1	0	0
1991–92	0	96	0	0	4	0	0
1992–93	0	99	0	0	1	0	0
1993–94	0	39	0	0	61	0	0
1994–95	0	100	0	0	0	0	0
1995–96	19	81	0	0	0	0	0
1996–97	0	100	0	0	0	0	0
1997–98	1	99	0	0	0	0	0
1998–99	0	100	0	0	0	0	0
1999–00	0	100	0	0	0	0	0
2000–01	0	100	0	0	0	0	0
2001–02	0	100	0	0	0	0	0
2002–03	0	100	0	0	0	0	0
2003–04	0	95	0	0	0	0	5
2004–05	0	98	0	1	0	0	2

Table 41: Pukaki Rise. Percentage of oreo catch (combined) by vessel tonnage class by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1978–79	0	0	0	100	–
1979–80	0	0	0	100	–
1980–81	0	1	0	99	8
1981–82	0	0	0	100	5
1982–83	0	0	0	100	6
1983–84	0	37	0	63	9
1984–85	0	77	0	23	5
1985–86	0	67	0	33	–
1986–87	0	0	0	0	–
1987–88	0	0	0	100	–
1988–89	0	100	0	0	–
1989–90	0	42	58	0	–
1990–91	0	57	43	0	–
1991–92	0	0	100	0	–
1992–93	0	43	57	0	5
1993–94	0	40	0	60	–
1994–95	0	0	100	0	–
1995–96	0	7	74	19	–
1996–97	0	24	66	11	6
1997–98	0	16	76	8	6
1998–99	0	37	63	0	8
1999–00	0	65	35	0	5
2000–01	0	32	68	0	6
2001–02	0	26	74	0	5
2002–03	0	25	75	0	5
2003–04	0	12	83	6	6
2004–05	0	10	78	12	8

Table 42: Pukaki Rise. The number of tows where oreos were caught, the number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1978–79	15	8	27	0	27	0	47
1979–80	2	0	0	0	0	0	100
1980–81	596	580	4	1	93	0	3
1981–82	481	479	12	3	84	0	0
1982–83	109	109	0	0	100	0	0
1983–84	172	164	4	34	57	1	4
1984–85	299	215	0	3	69	0	28
1985–86	28	28	0	14	86	0	0
1986–87	0	0	0	0	0	0	0
1987–88	14	14	0	100	0	0	0
1988–89	1	0	0	0	0	100	0
1989–90	6	4	0	67	0	0	33
1990–91	9	3	11	22	0	11	56
1991–92	6	0	0	0	0	33	67
1992–93	20	6	20	5	5	45	25
1993–94	3	1	33	0	0	0	67
1994–95	37	31	78	5	0	5	11
1995–96	347	94	22	5	0	67	6
1996–97	612	100	14	2	0	83	0
1997–98	606	417	57	6	7	30	1
1998–99	486	429	67	12	9	12	0
1999–00	695	663	49	32	15	4	0
2000–01	753	725	44	45	7	2	1
2001–02	533	511	79	7	10	2	2
2002–03	693	679	66	14	19	1	1
2003–04	731	706	79	10	7	3	0
2004–05	831	733	61	23	4	12	0

Table 43: Pukaki Rise. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1978–79	6	0	15
1979–80	0	0	0
1980–81	62	2	3 151
1981–82	0	41	1 841
1982–83	0	0	423
1983–84	0	555	997
1984–85	0	309	1 548
1985–86	0	14	46
1986–87	0	0	0
1987–88	0	232	0
1988–89	0	0	0
1989–90	0	0	0
1990–91	0	12	16
1991–92	0	1	14
1992–93	0	51	20
1993–94	0	2	8
1994–95	0	119	210
1995–96	0	1 174	1 151
1996–97	53	1 493	1 898
1997–98	104	1 194	1 920
1998–99	0	1 225	1 055
1999–00	4	2 069	981
2000–01	3	2 309	1 048
2001–02	0	1 921	939
2002–03	1	1 236	1 557
2003–04	0	1 518	1 387
2004–05	0	1 303	1 521

Table 44: Pukaki Rise. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. —, no data.

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1978–79	1.34	4	—	0	0	4	0.67	8
1979–80	—	0	—	0	—	0	—	0
1980–81	2.83	22	0.26	5	5.59	553	5.44	580
1981–82	2.40	59	1.24	14	4.14	406	3.92	479
1982–83	—	0	—	0	3.88	109	3.88	109
1983–84	1.84	7	5.09	59	6.78	98	9.35	164
1984–85	—	0	1.08	10	3.65	205	4.00	215
1985–86	—	0	0.70	4	1.86	24	2.13	28
1986–87	—	0	—	0	—	0	—	0
1987–88	—	0	16.54	14	—	0	16.54	14
1988–89	—	0	—	0	—	0	—	0
1989–90	—	0	0.04	4	—	0	0.04	4
1990–91	11.4	1	3.25	2	—	0	7.48	3
1991–92	—	0	—	0	—	0	—	0
1992–93	9.50	4	10.00	1	1.45	1	8.25	6
1993–94	4.00	1	—	0	—	0	4.00	1
1994–95	11.34	29	0.02	2	—	0	10.61	31
1995–96	9.10	78	6.06	16	—	0	8.65	94
1996–97	7.26	85	4.35	15	—	0	7.11	100
1997–98	6.52	343	1.35	34	2.14	40	5.97	417
1998–99	5.45	327	1.60	57	5.84	45	5.15	429
1999–00	5.47	341	3.16	220	3.18	102	4.49	663
2000–01	5.73	333	2.78	340	3.26	52	4.53	725
2001–02	5.81	419	1.86	39	3.58	53	5.57	511
2002–03	4.63	454	1.47	96	2.97	129	4.11	679
2003–04	4.30	581	2.37	76	2.72	49	4.08	706
2004–05	3.23	508	3.15	191	2.15	34	3.74	733

Table 45: Macquarie Ridge. Percentage oreo catch (combined) by nation and fishing year. See Table 5, 30 for abbreviations.

	BZE	NZ
1990–91	0	100
1991–92	0	0
1992–93	0	100
1993–94	0	100
1994–95	0	100
1995–96	0	100
1996–97	0	100
1997–98	0	100
1998–99	11	89
1999–00	0	100
2000–01	0	100
2001–02	0	100
2002–03	0	100
2003–04	0	100
2004–05	0	100

Table 46: Macquarie Ridge. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1990–91	0	0	100	0	–
1991–92	0	0	0	0	0
1992–93	0	76	24	4	–
1993–94	0	7	89	0	–
1994–95	0	0	100	0	–
1995–96	0	100	0	0	4
1996–97	0	100	0	0	–
1997–98	0	89	11	0	–
1998–99	0	49	51	0	6
1999–00	0	5	95	0	–
2000–01	0	0	100	0	–
2001–02	0	7	93	0	–
2002–03	0	7	93	0	–
2003–04	0	0	100	0	–
2004–05	0	0	100	0	–

Table 47: Macquarie Ridge. The number of tows where oreos were caught, the number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1990–91	19	18	95	0	0	5	0
1991–92	0	0	0	0	0	0	0
1992–93	24	8	21	13	0	67	0
1993–94	12	0	0	0	0	100	0
1994–95	16	15	88	6	0	6	0
1995–96	32	29	13	78	0	9	0
1996–97	183	145	37	43	0	21	0
1997–98	182	159	64	23	0	13	0
1998–99	206	178	54	31	1	14	0
1999–00	256	234	64	28	0	9	0
2000–01	405	338	50	33	0	16	0
2001–02	297	279	53	41	0	6	0
2002–03	349	328	79	15	0	6	0
2003–04	230	215	69	24	0	7	0
2004–05	193	190	29	69	0	2	0

Table 48: Macquarie Ridge. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1990–91	0	46	128
1991–92	0	0	0
1992–93	0	80	49
1993–94	0	98	23
1994–95	0	38	15
1995–96	0	122	17
1996–97	220	615	45
1997–98	189	442	24
1998–99	0	531	158
1999–00	0	1 007	53
2000–01	0	1 240	75
2001–02	0	1 253	37
2002–03	0	1 083	79
2003–04	0	810	99
2004–05	0	431	88

Table 49: Macquarie Ridge. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1990–91	8.81	18	–	0	–	0	8.81	18
1991–92	–	0	–	0	–	0	–	0
1992–93	6.20	5	0.20	3	–	0	3.95	8
1993–94	–	0	–	0	–	0	–	0
1994–95	3.18	14	0	1	–	0	2.97	15
1995–96	6.48	4	3.43	25	–	0	4.08	29
1996–97	3.67	67	6.31	78	–	0	5.23	145
1997–98	3.48	117	4.55	42	–	0	3.76	159
1998–99	3.00	112	3.47	64	1.35	2	3.37	178
1999–00	5.29	163	1.99	71	–	0	4.33	234
2000–01	3.30	203	3.84	135	–	0	3.54	338
2001–02	3.46	158	5.30	121	–	0	4.32	279
2002–03	3.46	277	3.53	51	–	0	3.50	328
2003–04	3.54	158	4.44	56	9	1	4.07	215
2004–05	2.13	56	2.34	134	–	0	2.65	190

Table 50: OEO 3A, excluding data from the Southland fishery. Percentage of oreo catch (combined) by nation and fishing year. See Table 5, 10, 25 for abbreviations.

	UN	NZ	JAP	KOR	NOR	PAN	RUS	UKR
1977–78	3	0	0	0	0	0	97	0
1978–79	99	0	1	0	0	0	0	0
1979–80	2	0	1	0	0	0	97	0
1980–81	4	0	0	0	0	0	96	0
1981–82	0	0	1	0	0	0	99	0
1982–83	0	1	1	1	0	0	98	0
1983–84	0	2	6	6	0	0	86	0
1984–85	0	6	16	4	0	0	73	0
1985–86	0	17	16	16	0	0	51	0
1986–87	0	26	5	14	0	0	55	0
1987–88	0	48	17	9	0	0	26	0
1988–89	0	67	11	9	0	0	13	0
1989–90	0	91	2	7	0	0	0	0
1990–91	0	96	0	1	3	0	1	0
1991–92	0	97	0	3	0	0	0	0
1992–93	0	100	0	0	0	0	0	0
1993–94	0	96	0	4	0	0	0	0
1994–95	0	96	0	4	0	0	0	0
1995–96	3	93	0	3	0	0	0	0
1996–97	0	96	0	4	0	0	0	0
1997–98	0	98	0	2	0	0	0	0
1998–99	0	86	0	14	0	1	0	0
1999–00	0	99	0	1	0	0	0	0
2000–01	0	100	0	0	0	0	0	0
2001–02	0	100	0	0	0	0	0	0
2002–03	0	99	0	0	0	1	0	0
2003–04	0	97	0	0	0	1	0	3
2004–05	0	96	0	0	0	0	0	4

Table 51: OEO 4. Percentage of oreo catch (combined) by nation and fishing year. See Table 5, 10 for abbreviations. POL, Poland.

	UN	NZ	JAP	KOR	NOR	POL	RUS	UKR
1977-78	41	0	0	0	0	0	59	0
1978-79	2	0	2	0	0	0	96	0
1979-80	0	0	1	0	0	0	99	0
1980-81	0	0	1	0	0	2	97	0
1981-82	0	0	1	0	0	0	99	0
1982-83	0	17	9	0	0	0	74	0
1983-84	0	25	23	4	0	0	48	0
1984-85	0	31	29	5	0	0	34	0
1985-86	0	42	32	5	0	0	21	0
1986-87	0	59	25	0	0	0	16	0
1987-88	0	76	15	6	0	0	4	0
1988-89	0	84	11	2	0	0	4	0
1989-90	0	95	5	0	0	0	0	0
1990-91	0	98	0	2	0	0	0	0
1991-92	0	99	0	0	1	0	0	0
1992-93	0	100	0	0	0	0	0	0
1993-94	0	100	0	0	0	0	0	0
1994-95	0	97	0	0	3	0	0	0
1995-96	0	99	0	0	1	0	0	0
1996-97	0	100	0	0	0	0	0	0
1997-98	0	98	0	0	2	0	0	0
1998-99	0	99	0	0	1	0	0	0
1999-00	0	96	0	3	0	0	0	0
2000-01	0	100	0	0	0	0	0	0
2001-02	0	100	0	0	0	0	0	0
2002-03	0	100	0	0	0	0	0	0
2003-04	0	96	0	0	0	0	0	4
2004-05	0	92	0	5	0	0	0	3

Table 52: OEO 3A, excluding data from the Southland fishery. Percentage of oreo catch (combined) by vessel tonnage class by fishing year. UN, unknown tonnage class, n is the number of vessels. – data from fewer than four vessels.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	0	0	0	100	4
1978–79	0	1	0	99	–
1979–80	1	11	0	88	16
1980–81	4	21	0	75	21
1981–82	0	19	0	81	10
1982–83	0	27	1	72	12
1983–84	0	27	15	59	19
1984–85	0	24	15	60	22
1985–86	0	38	15	48	26
1986–87	0	25	16	59	22
1987–88	0	29	29	41	22
1988–89	0	26	50	24	25
1989–90	0	36	62	2	19
1990–91	0	55	44	1	18
1991–92	0	47	52	0	16
1992–93	0	50	35	14	17
1993–94	0	61	35	4	18
1994–95	0	45	55	0	17
1995–96	0	66	31	3	22
1996–97	0	83	17	0	19
1997–98	0	93	5	1	21
1998–99	0	78	19	3	18
1999–00	0	63	36	1	16
2000–01	0	56	43	0	13
2001–02	0	49	51	0	11
2002–03	0	56	43	2	13
2003–04	0	66	27	7	15
2004–05	0	50	44	6	12

Table 53: OEO 4. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. UN, unknown tonnage class.

	UN	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	34	0	0	66	9
1978–79	2	0	0	98	8
1979–80	0	1	0	99	7
1980–81	0	3	0	97	12
1981–82	0	5	1	94	11
1982–83	0	6	22	72	17
1983–84	0	6	39	55	15
1984–85	0	12	49	39	20
1985–86	0	22	43	35	20
1986–87	0	24	46	30	19
1987–88	0	22	64	15	18
1988–89	0	23	62	15	15
1989–90	1	32	63	5	10
1990–91	0	57	42	0	11
1991–92	0	52	47	1	6
1992–93	0	56	44	0	6
1993–94	0	48	46	6	8
1994–95	0	54	35	10	11
1995–96	0	53	43	4	8
1996–97	0	63	19	18	7
1997–98	0	64	19	17	10
1998–99	0	70	16	13	17
1999–00	0	45	46	8	12
2000–01	0	35	62	3	12
2001–02	0	28	71	0	8
2002–03	0	31	66	3	13
2003–04	0	27	61	12	11
2004–05	0	35	60	4	12

Table 54: OEO 3A, excluding data from the Southland fishery. Number of tows where oreos were caught, number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	179	168	94	0	0	0	6
1978-79	4	1	25	0	0	0	75
1979-80	1 786	1 336	19	9	46	0	25
1980-81	3 152	2 655	21	2	61	1	15
1981-82	1 033	973	4	6	84	3	3
1982-83	1 811	1 551	0	8	78	10	4
1983-84	2 343	1 863	0	19	61	9	12
1984-85	1 496	1 029	1	24	44	22	9
1985-86	1 430	728	1	27	23	43	6
1986-87	1 768	1 315	0	28	46	22	3
1987-88	2 004	1 561	1	39	38	19	3
1988-89	1 677	1 270	19	36	21	22	2
1989-90	1 740	1 297	7	61	6	23	3
1990-91	2 231	1 685	8	63	4	16	9
1991-92	1 046	482	13	19	14	47	7
1992-93	1 455	986	34	28	6	31	2
1993-94	1 968	1 214	40	10	12	34	4
1994-95	1 435	1 026	55	12	4	23	6
1995-96	2 171	1 832	69	9	6	9	7
1996-97	2 173	1 759	64	10	6	11	8
1997-98	1 983	1 407	47	24	0	11	18
1998-99	1 442	1 015	33	9	29	16	14
1999-00	1 310	783	34	3	22	16	24
2000-01	1 082	768	42	9	20	10	19
2001-02	802	471	45	6	8	15	26
2002-03	564	229	32	4	4	26	34
2003-04	652	259	24	10	6	24	36
2004-05	546	308	36	9	12	27	17

Table 55: OEO 4. Number of tows where oreos were caught, number of oreo target tows and percentage of tows by target species for all tows catching oreos, by fishing year. See Table 7 for abbreviations.

	n.total	n.target	Target species (%)				
			OEO	SSO	BOE	ORH	Other
1977-78	872	856	98	0	0	0	2
1978-79	297	149	11	0	39	14	36
1979-80	567	345	49	8	5	5	34
1980-81	2 144	1 065	34	2	14	25	25
1981-82	1 442	1 255	16	22	49	9	4
1982-83	1 738	674	0	23	16	60	1
1983-84	1 420	844	0	39	20	36	5
1984-85	2 088	868	0	29	13	55	3
1985-86	1 918	721	0	27	10	59	3
1986-87	2 254	996	0	31	13	52	3
1987-88	2 546	922	0	30	6	55	9
1988-89	2 949	484	3	11	3	83	1
1989-90	2 119	585	1	26	0	68	4
1990-91	1 756	456	4	21	0	69	6
1991-92	1 709	249	2	13	0	76	9
1992-93	1 472	177	4	8	0	87	1
1993-94	2 216	67	1	2	0	96	1
1994-95	2 032	140	3	4	0	88	5
1995-96	1 361	238	6	11	0	80	3
1996-97	1 521	454	11	19	0	65	5
1997-98	2 042	399	13	6	0	71	10
1998-99	2 236	596	11	15	1	59	14
1999-00	1 901	473	4	21	0	67	8
2000-01	1 911	389	3	18	0	73	7
2001-02	1 874	233	9	4	0	85	2
2002-03	2 527	141	2	3	0	86	9
2003-04	2 523	286	6	5	0	81	8
2004-05	2 325	372	6	10	0	78	6

Table 56: OEO 3A, excluding data from the Southland fishery. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1977-78	1 360	0	0
1978-79	8	0	0
1979-80	511	5 882	8 683
1980-81	4 065	1 998	15 434
1981-82	0	795	5 698
1982-83	7	2 293	6 862
1983-84	103	3 524	5 463
1984-85	53	3 812	2 748
1985-86	0	2 639	2 082
1986-87	0	3 105	3 982
1987-88	0	5 894	3 038
1988-89	1	5 871	2 715
1989-90	25	5 462	2 363
1990-91	13	4 554	4 160
1991-92	24	2 808	2 189
1992-93	661	2 963	3 856
1993-94	206	4 253	3 782
1994-95	173	3 404	2 049
1995-96	797	3 089	3 152
1996-97	502	2 730	3 423
1997-98	43	3 887	1 529
1998-99	8	2 183	3 043
1999-00	3	1 209	2 762
2000-01	19	1 278	2 394
2001-02	2	1 237	1 885
2002-03	3	963	1 019
2003-04	50	796	1 014
2004-05	1	1 137	1 160

Table 57: OEO 4. Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.

	Catch (t)		
	OEO	SSO	BOE
1977–78	8 150	0	0
1978–79	0	106	546
1979–80	1 549	626	2 882
1980–81	2 710	898	5 017
1981–82	0	3 623	3 594
1982–83	60	3 864	2 117
1983–84	15	4 863	1 280
1984–85	8	4 758	1 654
1985–86	0	4 846	980
1986–87	0	5 659	1 154
1987–88	0	7 644	895
1988–89	0	6 430	1 094
1989–90	26	5 339	439
1990–91	65	5 256	793
1991–92	7	4 790	1 696
1992–93	1 053	3 844	1 344
1993–94	548	4 765	1 556
1994–95	109	5 760	619
1995–96	42	5 428	364
1996–97	1	5 603	531
1997–98	3	5 677	693
1998–99	7	5 650	845
1999–00	19	5 877	626
2000–01	43	6 008	803
2001–02	3	3 861	515
2002–03	26	4 091	862
2003–04	260	5 098	973
2004–05	5	6 014	852

Table 58: OEO 3A, excluding data from the Southland fishery. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. –, no data.

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>	<u>All OEO</u>	<u>n</u>
1977–78	7.87	168	–	0	–	0	7.87	168
1978–79	7.53	1	–	0	–	0	7.53	1
1979–80	7.62	346	15.53	166	5.07	824	9.12	1 336
1980–81	8.95	666	4.70	75	6.43	1 914	7.42	2 655
1981–82	7.18	44	2.50	58	6.30	871	6.59	973
1982–83	–	0	8.16	147	4.58	1 404	5.78	1 551
1983–84	13.39	2	3.69	434	3.25	1 427	4.63	1 863
1984–85	1.30	13	7.43	353	2.91	663	6.12	1 029
1985–86	3.93	9	4.43	389	3.27	330	5.52	728
1986–87	–	0	3.97	503	3.38	812	5.15	1 315
1987–88	5.43	17	5.61	776	2.29	768	5.23	1 561
1988–89	4.26	319	6.78	600	2.92	351	5.60	1 270
1989–90	6.29	125	3.35	1 067	4.27	105	4.78	1 297
1990–91	8.13	181	2.54	1 413	4.78	91	4.83	1 685
1991–92	8.11	138	7.72	194	4.93	150	8.53	482
1992–93	7.58	501	2.52	403	2.95	82	6.80	986
1993–94	6.50	794	2.38	188	5.54	232	6.09	1 214
1994–95	5.53	789	1.91	178	4.63	59	5.14	1 026
1995–96	3.66	1 506	1.92	186	3.36	140	3.66	1 832
1996–97	3.42	1 400	1.86	220	6.02	139	3.61	1 759
1997–98	3.16	931	3.56	467	6.00	9	3.64	1 407
1998–99	5.22	475	2.43	128	3.75	412	4.98	1 015
1999–00	4.10	447	4.03	43	3.73	293	4.52	783
2000–01	3.78	455	3.13	102	4.57	211	4.40	768
2001–02	4.58	358	5.45	50	8.61	63	5.70	471
2002–03	7.13	180	5.69	24	8.42	25	7.56	229
2003–04	5.11	154	4.20	67	7.08	38	6.12	259
2004–05	4.59	194	5.91	50	7.70	64	6.92	308

Table 59: OEO 4. Mean catch rates. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Tables 7 & 9 for abbreviations. —, no data.

	OEO	n	SSO	n	BOE	n	All OEO	n
1977–78	9.32	856	—	0	—	0	9.32	856
1978–79	3.49	33	—	0	2.88	116	3.66	149
1979–80	10.62	275	14.21	44	7.66	26	10.85	345
1980–81	6.33	724	8.84	37	4.96	304	6.45	1 065
1981–82	5.74	235	5.57	316	4.23	704	5.63	1 255
1982–83	—	0	3.95	397	3.72	277	4.96	674
1983–84	—	0	4.81	558	2.89	286	5.20	844
1984–85	—	0	3.75	607	1.82	261	3.76	868
1985–86	14.84	5	4.32	525	2.53	191	4.49	721
1986–87	2.58	3	4.15	708	2.27	285	3.91	996
1987–88	1.60	2	4.70	765	2.30	155	4.80	922
1988–89	3.33	91	4.62	318	7.13	75	4.84	484
1989–90	3.65	28	3.49	557	—	0	3.65	585
1990–91	8.76	79	3.80	375	5.68	2	4.85	456
1991–92	11.77	26	5.27	219	4.00	4	6.10	249
1992–93	6.77	56	7.10	120	0	1	7.09	177
1993–94	4.34	26	2.55	38	2.67	3	3.46	67
1994–95	5.00	64	10.21	76	—	0	7.84	140
1995–96	7.11	83	9.16	154	0	1	8.46	238
1996–97	6.84	161	5.80	292	13.55	1	6.22	454
1997–98	5.68	269	8.90	130	—	0	6.77	399
1998–99	5.36	252	6.80	328	6.05	16	6.44	596
1999–00	5.74	71	8.06	400	0	2	8.15	473
2000–01	10.58	50	9.45	336	13.67	3	10.19	389
2001–02	7.06	165	12.36	68	—	0	8.73	233
2002–03	10.16	54	11.27	86	0.09	1	11.22	141
2003–04	6.78	150	11.03	132	4.83	4	9.29	286
2004–05	9.84	144	9.80	228	—	0	10.21	372

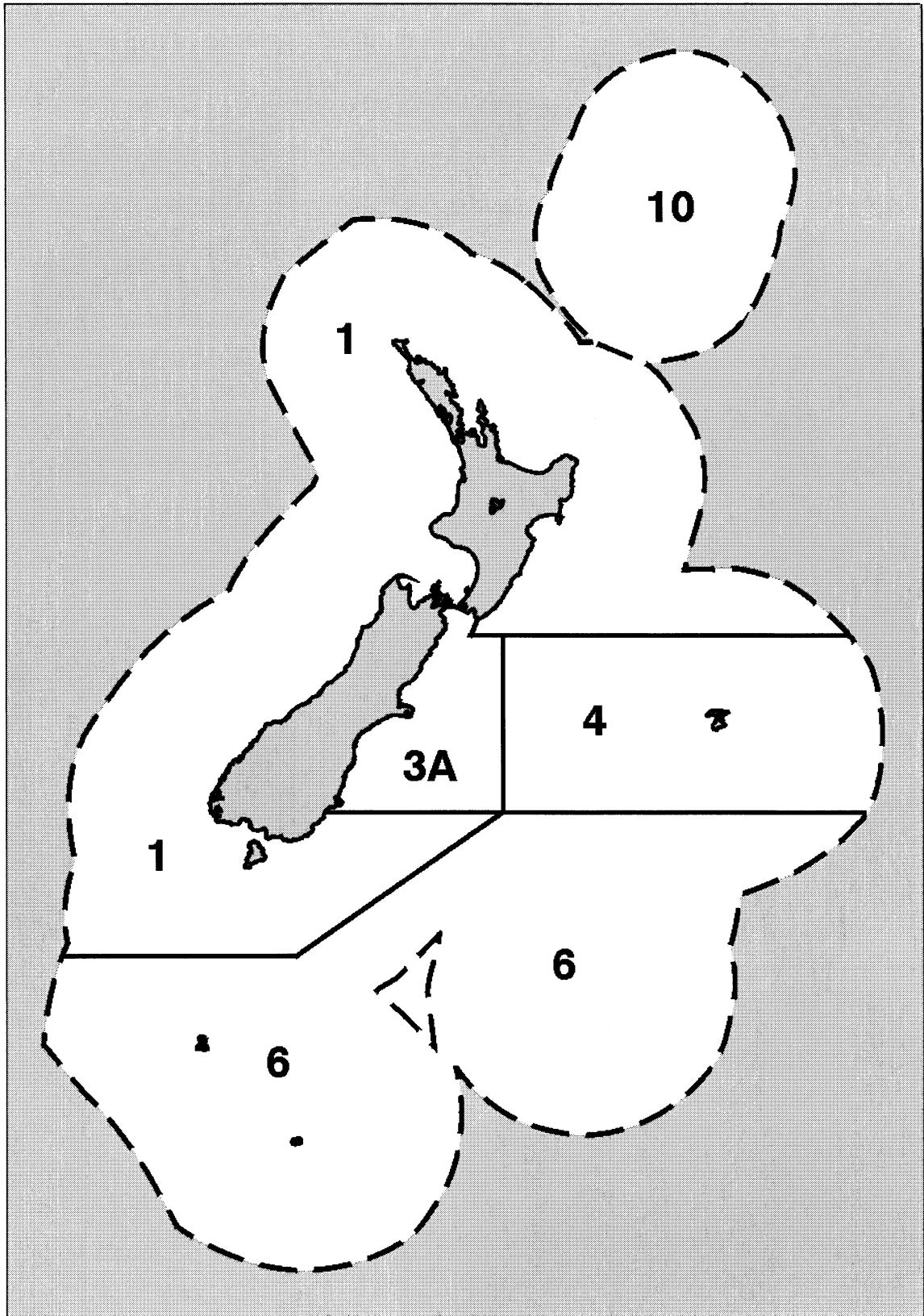


Figure 1: Oreo management areas (thick black lines). The dashed line is the 200 n. mile EEZ.

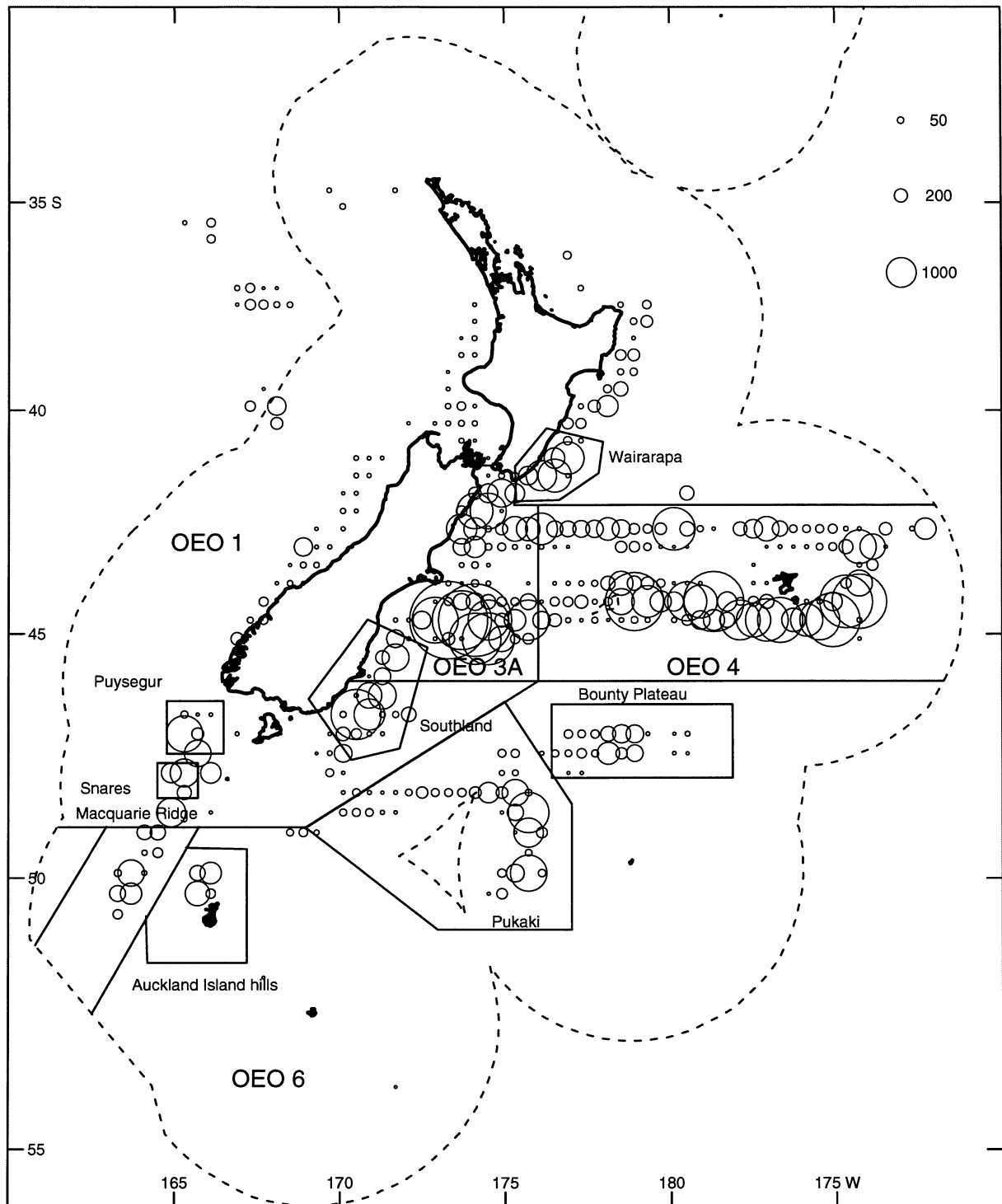


Figure 2: The number of trawls that caught or targeted oreos from 1977–78 to 2004–05 summed for each 0.4 x 0.4 degree cell (for 10 or more trawls per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of trawls per cell. Fewer than 10 trawls per cell were not plotted. Boundaries of OEO 1, OEO 3A, OEO 4, OEO 6 (solid lines), and fisheries (polygons marked with solid lines) defined in the text. The dashed line marks the EEZ.

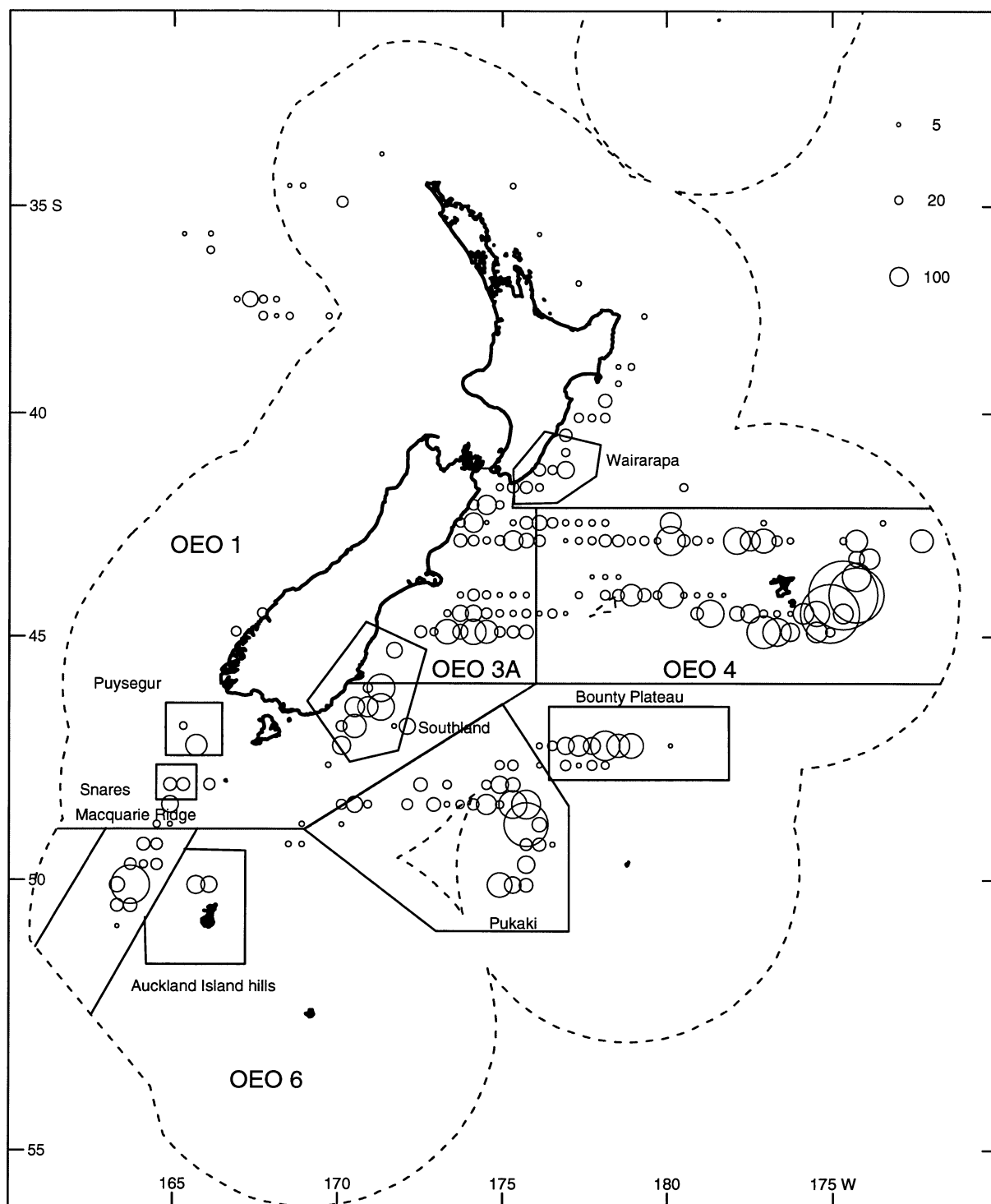


Figure 3: The number of trawls that caught or targeted oreos from 2002–03 to 2004–05 summed for each 0.4 x 0.4 degree cell (for 5 or more trawls per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of trawls per cell. Fewer than 5 trawls per cell were not plotted.

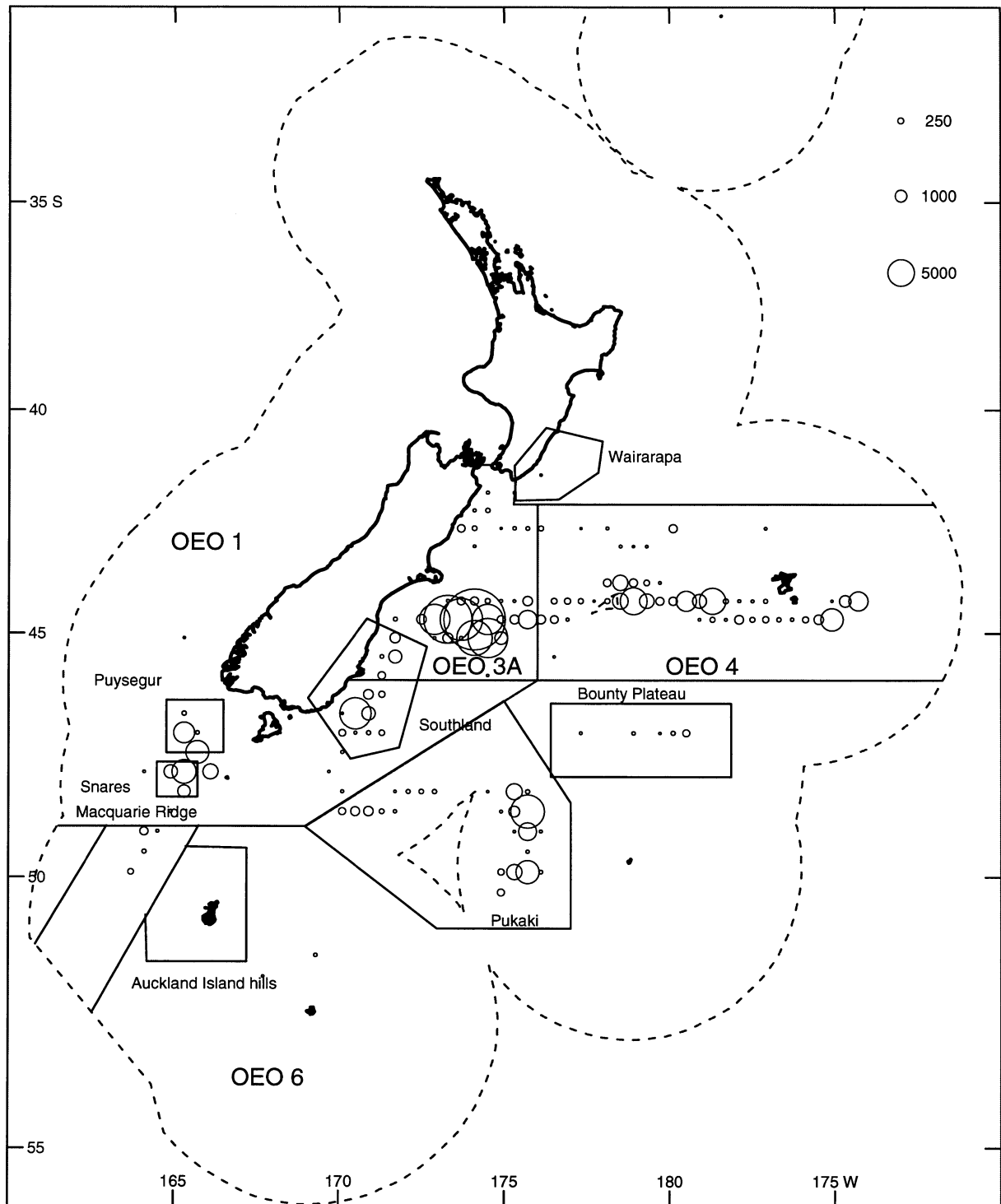


Figure 4: Black oreo catches (t) from 1977–78 to 2004–05 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

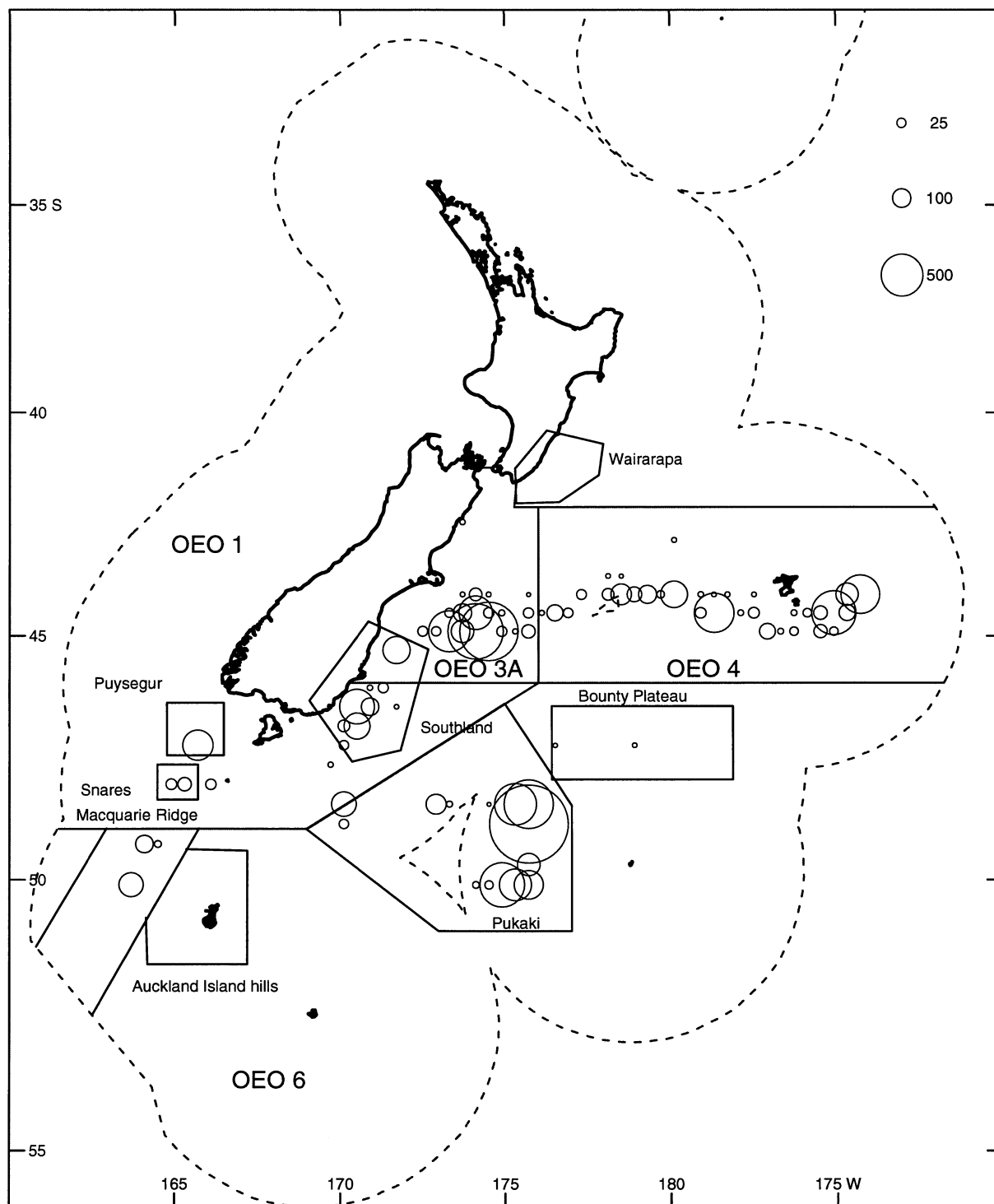


Figure 5: Black oreo catches (t) from 2002–03 to 2004–05 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

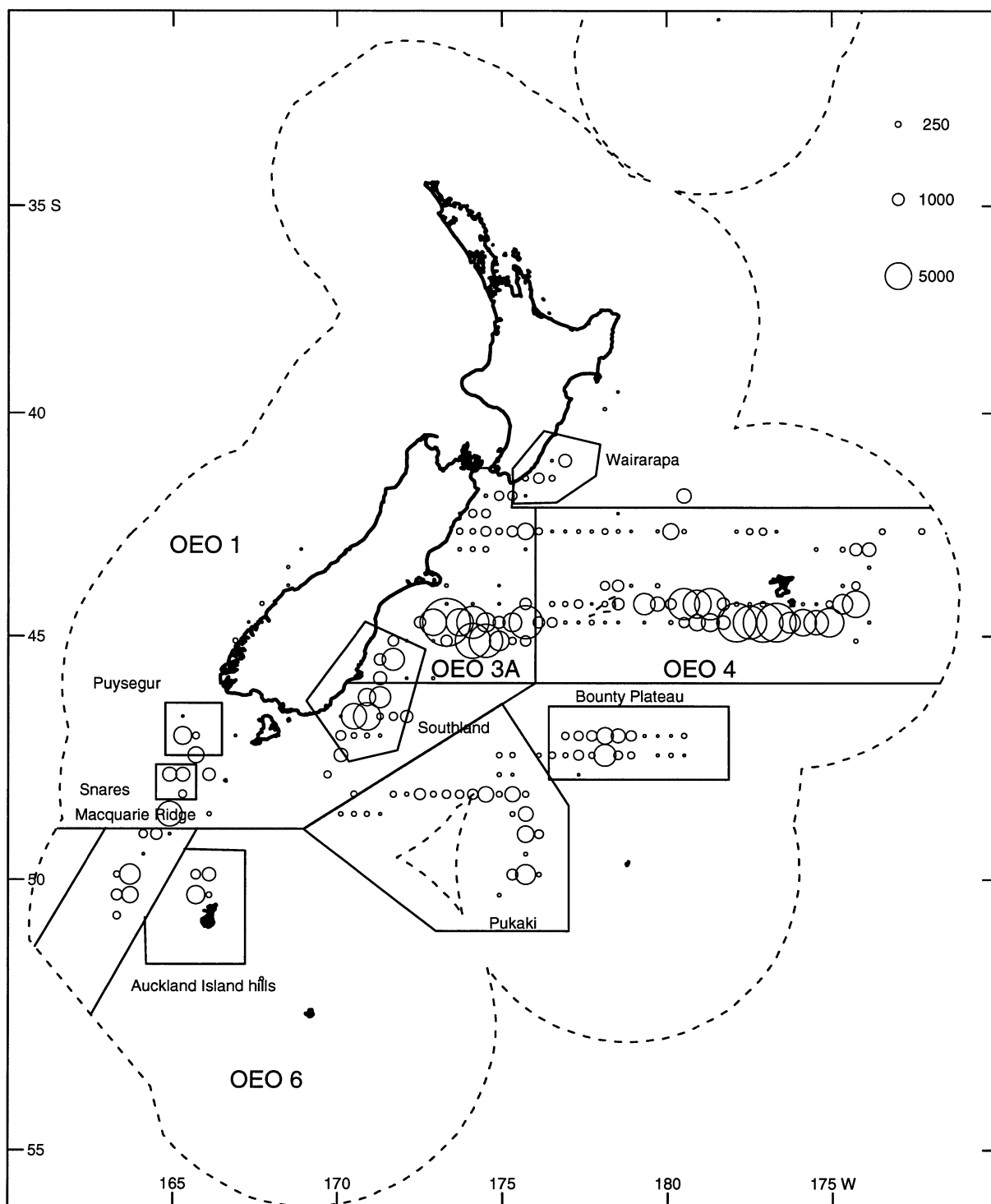


Figure 6: Smooth oreo catches (t) from 1977–78 to 2004–05 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

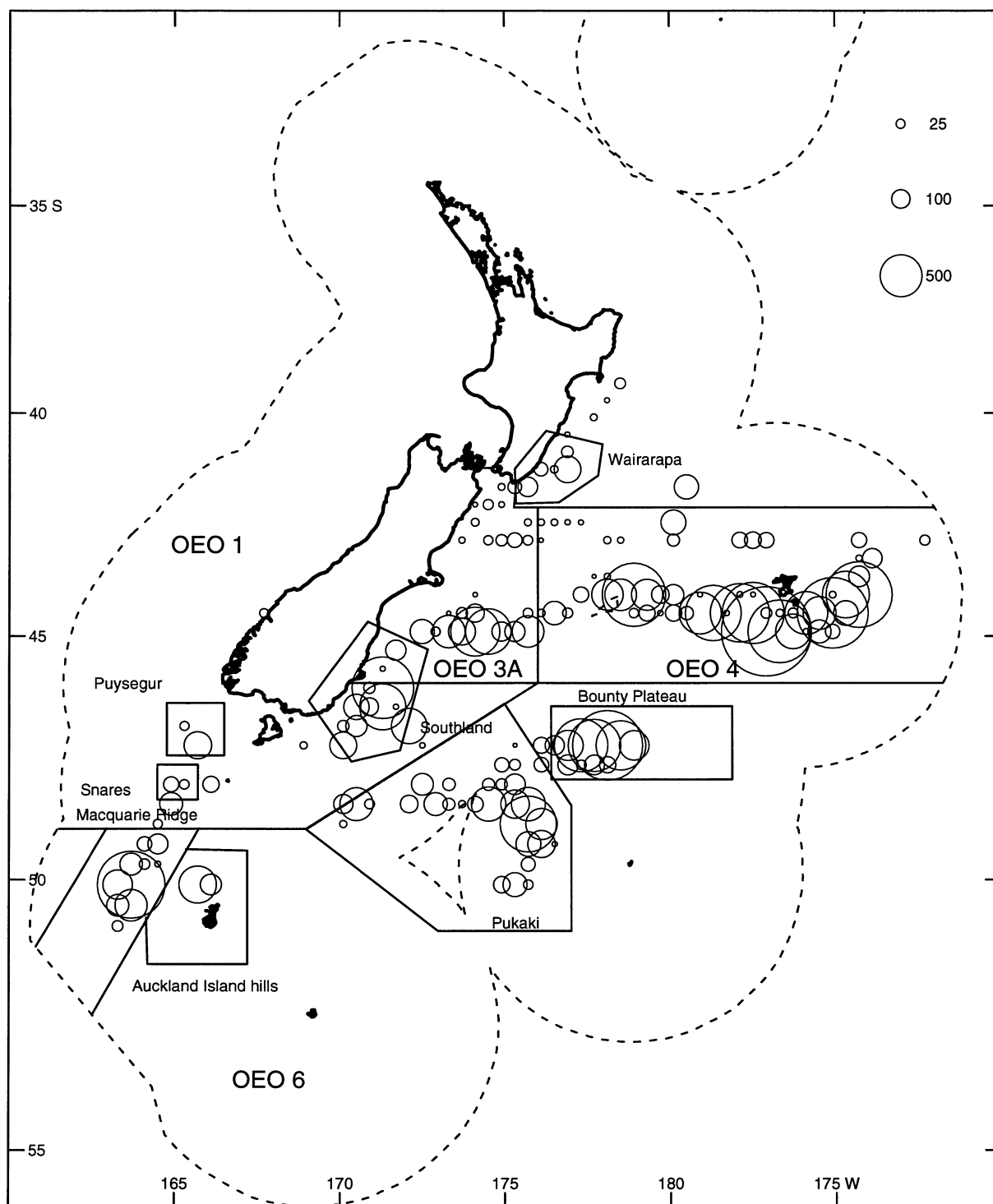


Figure 7: Smooth oreo catches (t) from 2002–03 to 2004–05 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell.

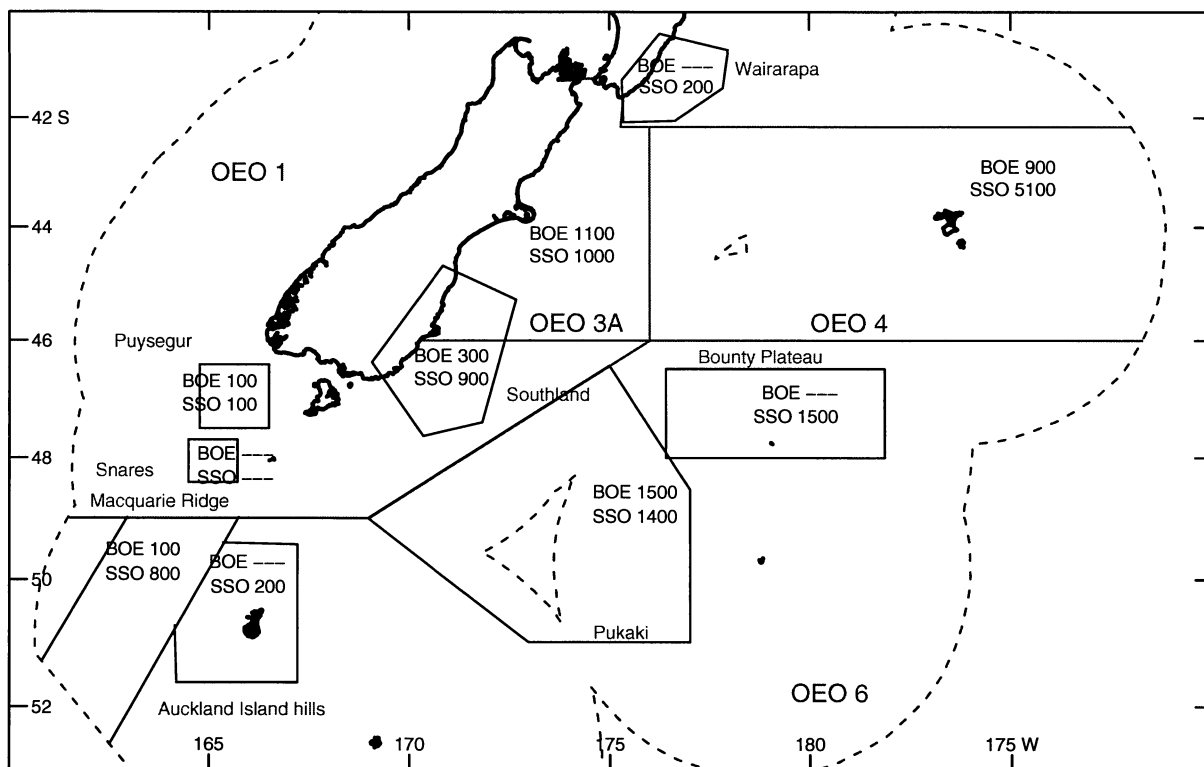


Figure 8: Mean annual estimated catch (t) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2002–03 to 2004–05. ---, catch less than 100 t.

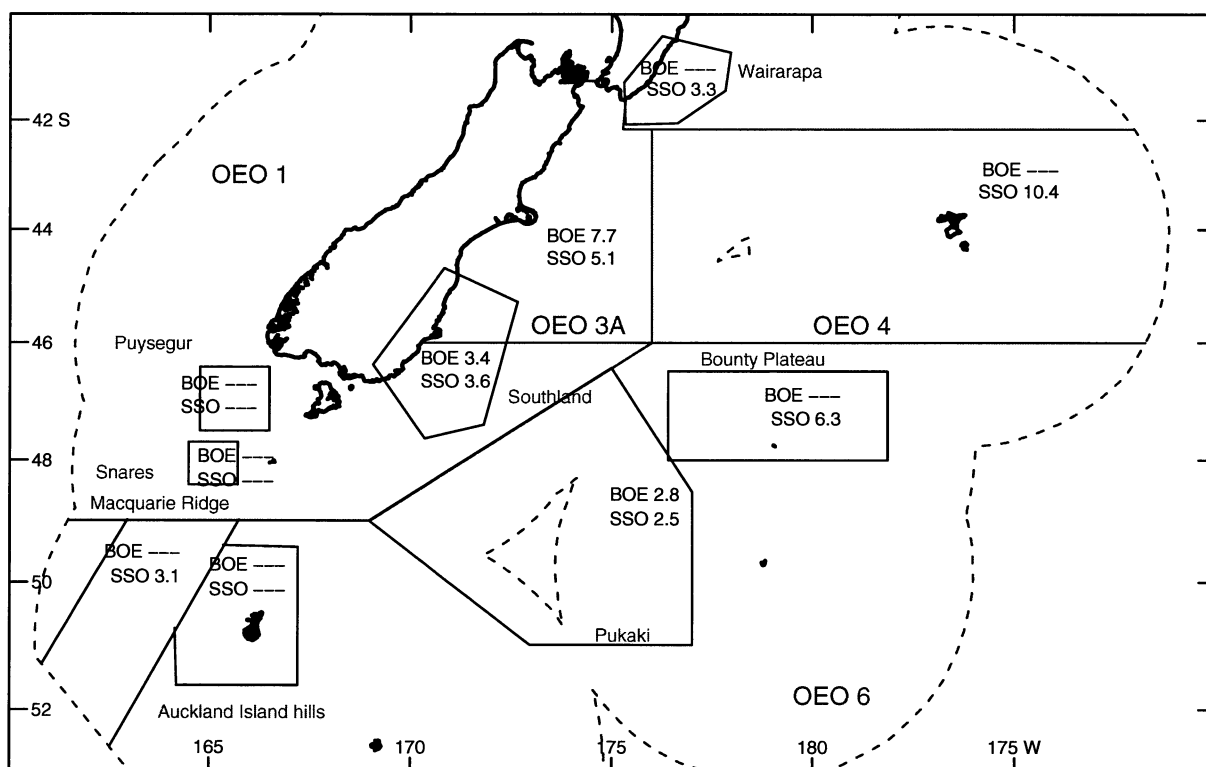


Figure 9: Mean annual unstandardised CPUE (t/tow) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2002–03 to 2004–05, taken from tows that target fished for black oreo or smooth oreo. ---, insufficient data (fewer than 50 target tows).

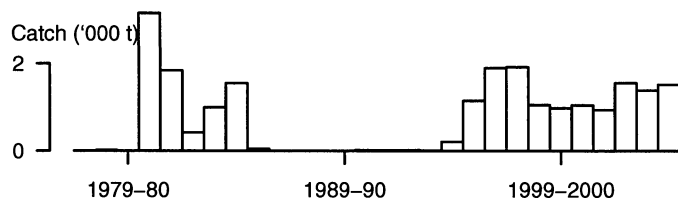


Figure 10: Black oreo annual estimated catch (t) from Pukaki Rise.

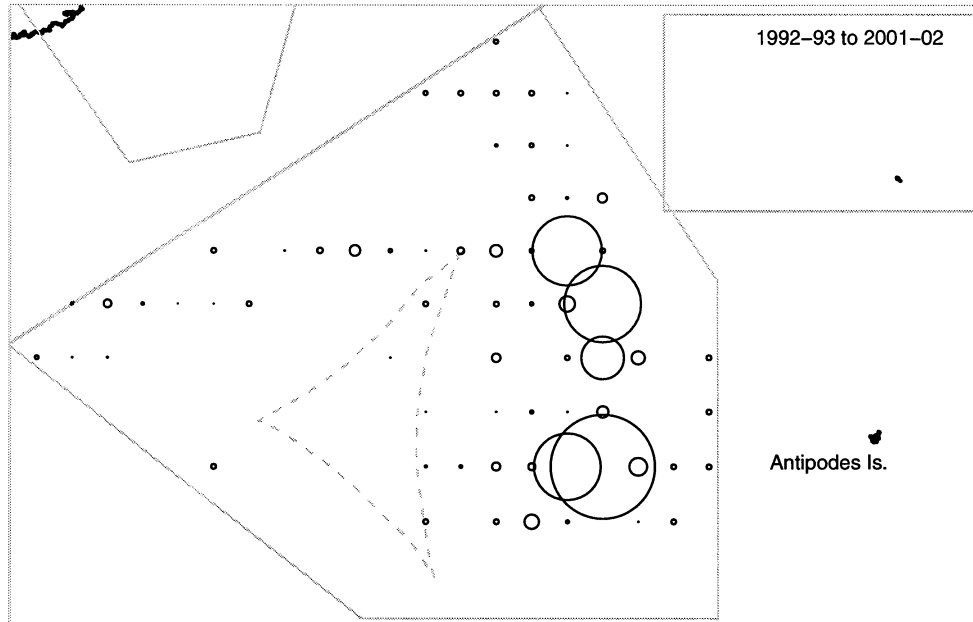


Figure 11: Black oreo from Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02). The dashed line marks the EEZ.

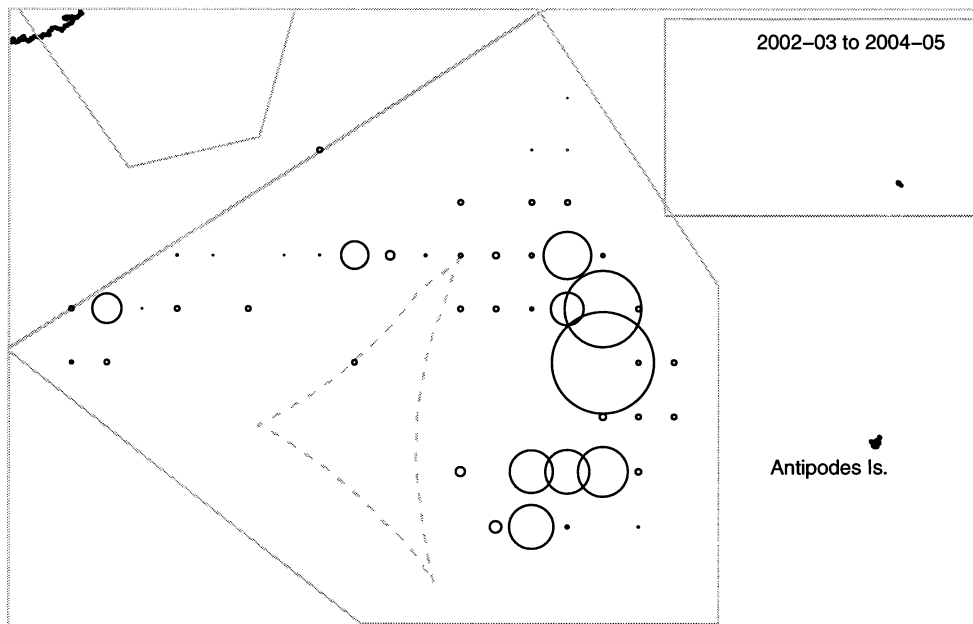


Figure 12: Black oreo from Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2002-03 to 2004-05).. The dashed line marks the EEZ.

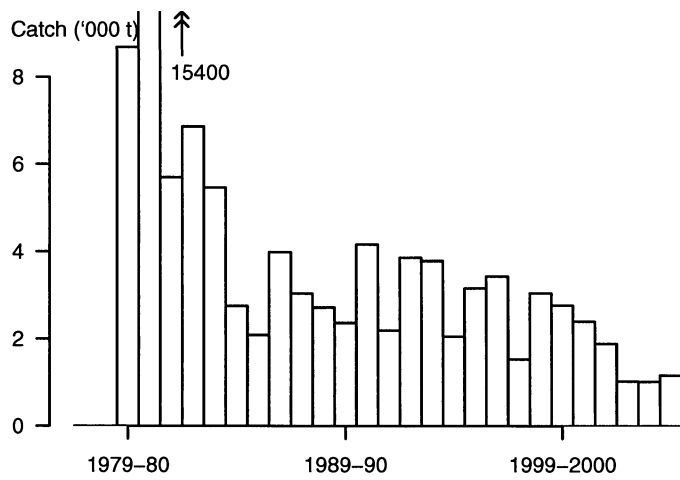


Figure 13: Black oreo annual estimated catch (t) from OEO 3A (minus catch from Southland).

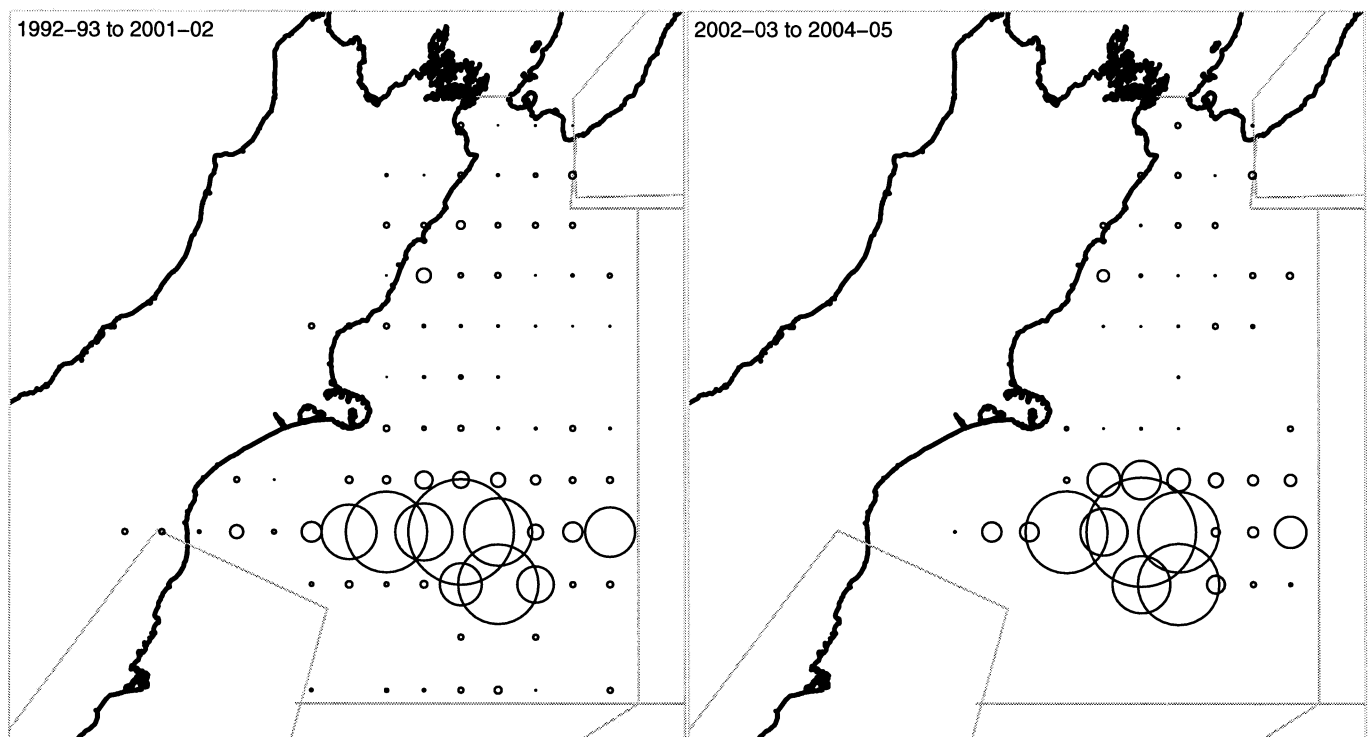


Figure 14: Black oreo from OEO 3A (minus catch from Southland) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02) left panel, and for the recent period (2002-03 to 2004-05) right panel.

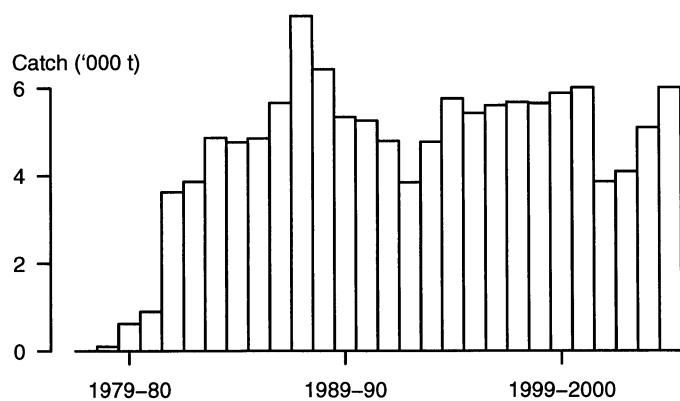


Figure 15: Smooth oreo annual estimated catch (t) from OEO 4.

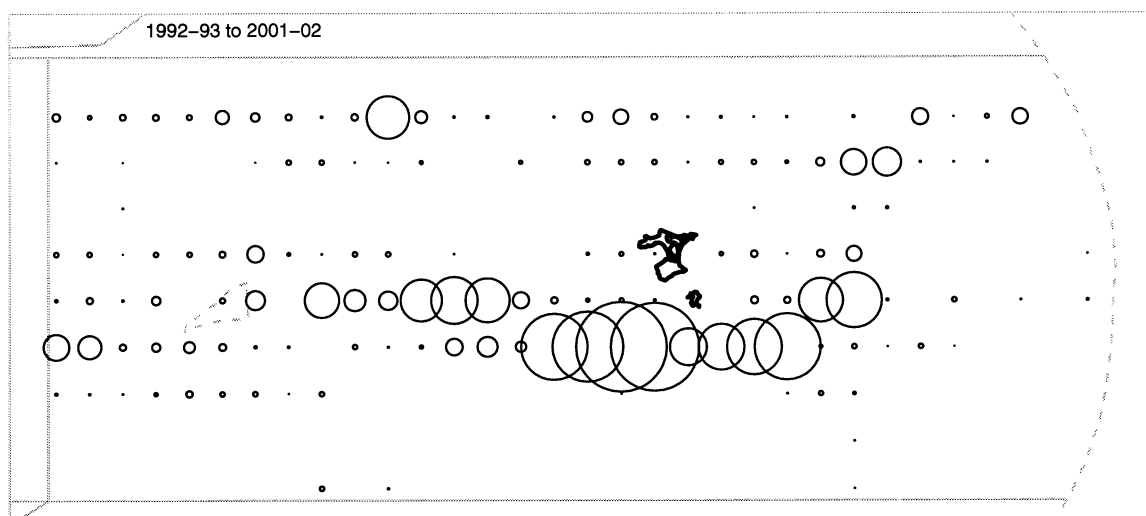


Figure 16: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02).

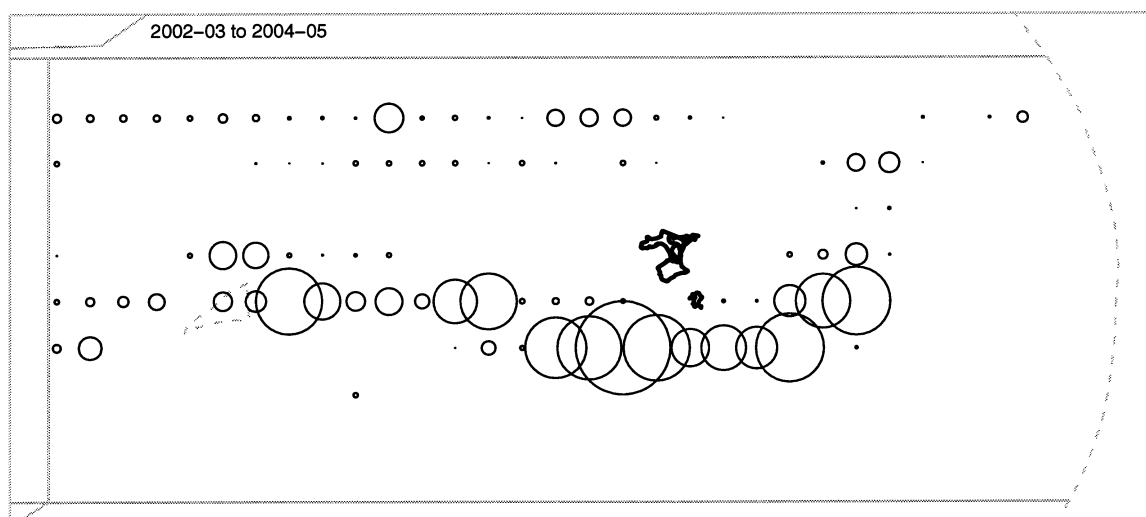


Figure 17: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2002-03 to 2004-05).

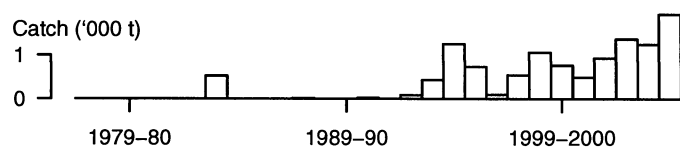


Figure 18: Smooth oreo annual estimated catch (t) from Bounty Plateau.

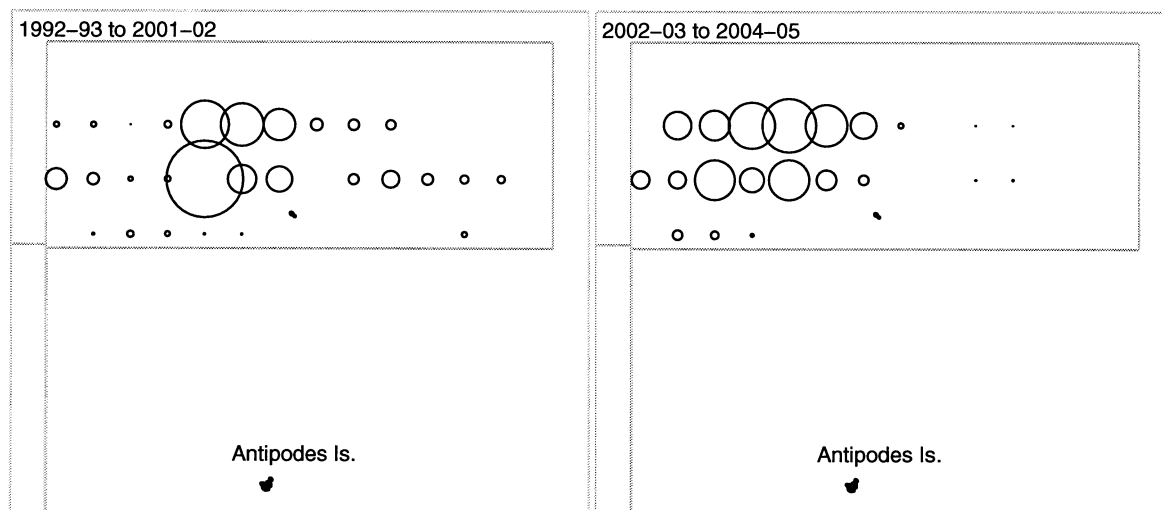


Figure 19: Smooth oreo Bounty Plateau relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02) left panel, and for the recent period (2002-03 to 2004-05) right panel.

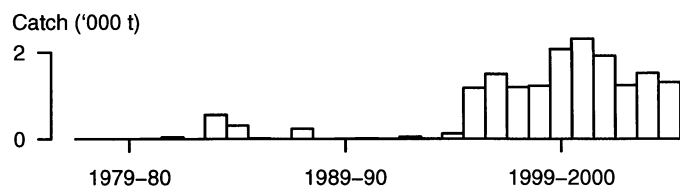


Figure 20: Smooth oreo annual estimated catch (t) from Pukaki Rise.

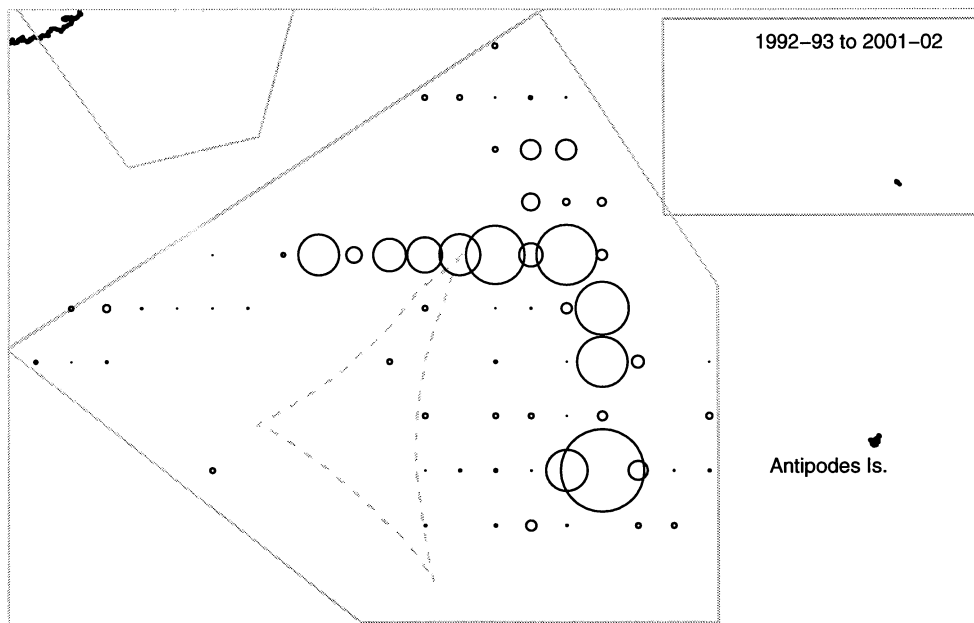


Figure 21: Smooth oreo Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02).

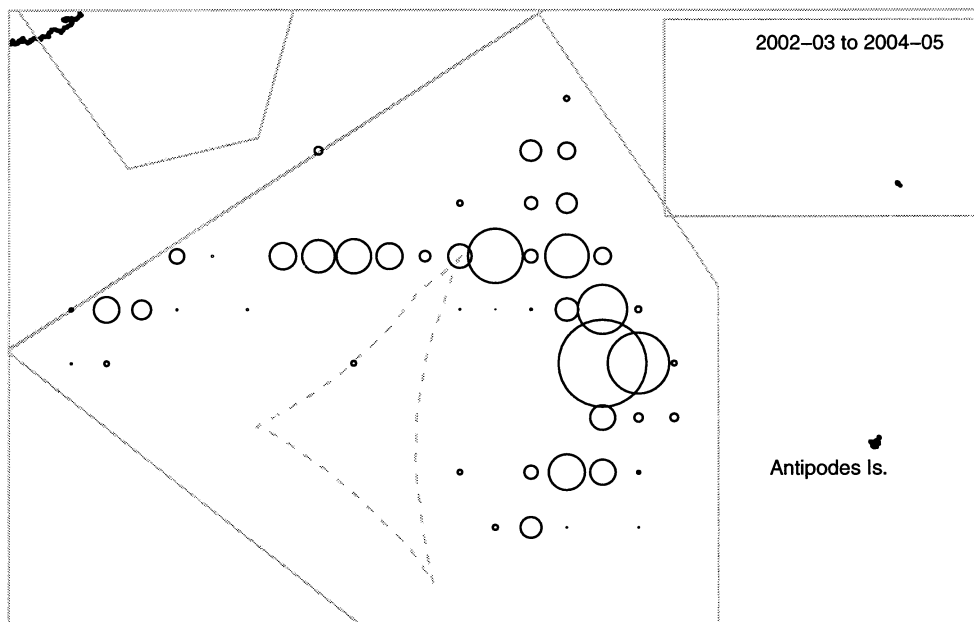


Figure 22: Smooth oreo Pukaki Rise relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the recent period (2002-03 to 2004-05).

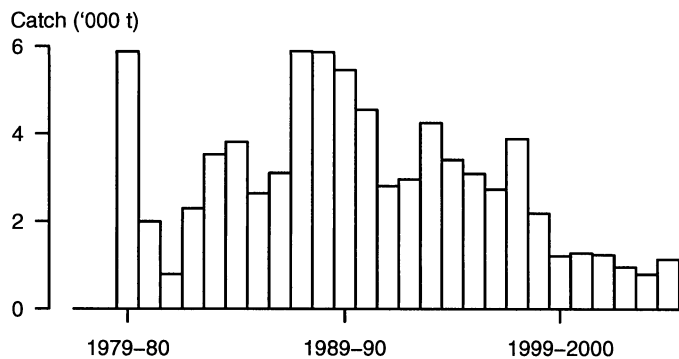


Figure 23: Smooth oreo annual estimated catch (t) from OEO 3A (minus Southland).

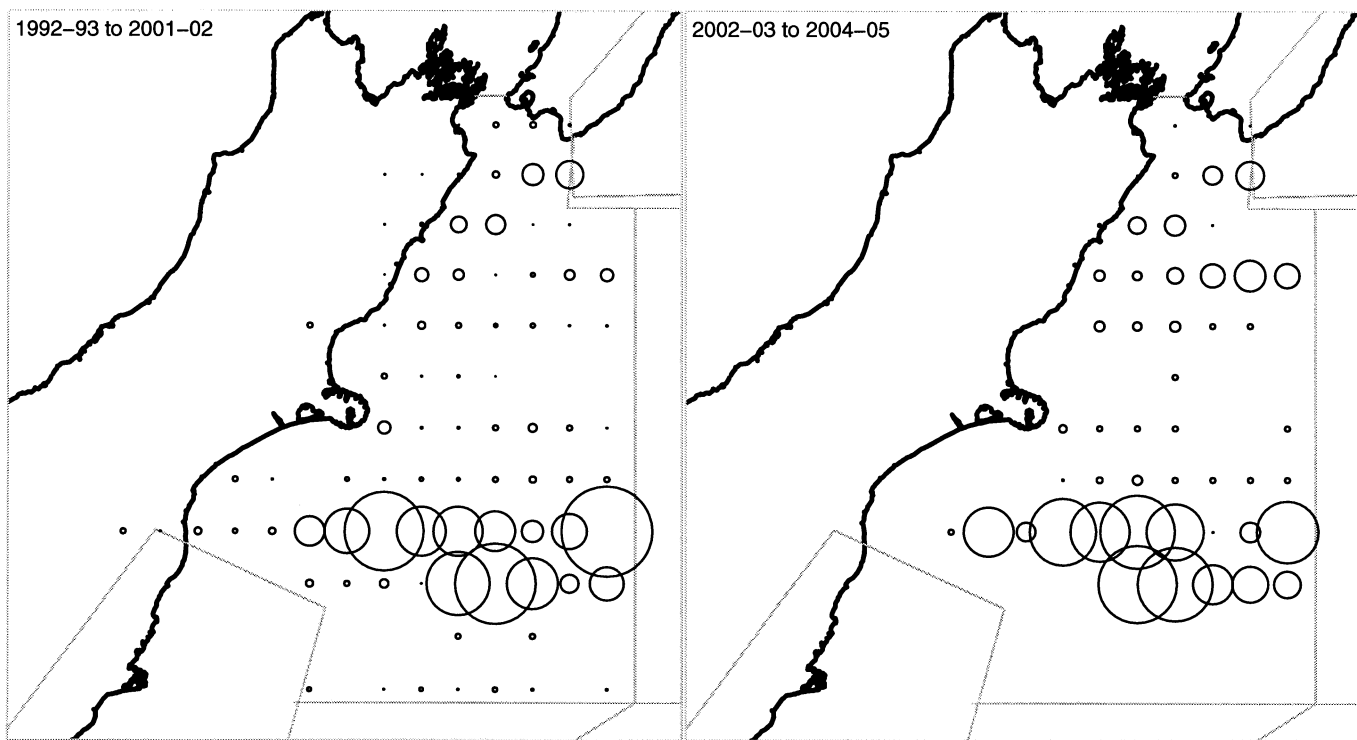


Figure 24: Smooth oreo OEO 3A relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell for the post-GPS reference period (1992-93 to 2001-02) left panel, and for the recent period (2002-03 to 2004-05), right panel.