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**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 2002-03 fishing years**

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## EXECUTIVE SUMMARY

Coburn, R.P.; Doonan, I.J.; McMillan, P.J. (2005). 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 2002–03 fishing years.

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Descriptions of black oreo and smooth oreo fisheries are presented with data from the 1977–78 to the 2002–03 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 roughly 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 reported annual catch of more than about 1000 t from 1977–78 to 2002–03 is provided below. The fisheries are ordered from large to small, based on the average annual catch from the three most recent years (2000–01 to 2002–03).

Fishery	Largest annual catch (t)	Annual catch trends over time	Average recent annual catch (t)	Unstandardised average recent catch rate (t/tow)
<b>(a) Black oreo</b>				
OEO 3A	15 400, 80–81	Declined, then about 3000 t for 17 years, then declined	1 700	5.6
Pukaki Rise (east)	3 100, 80–81 1 900, 97–98	Declined Fishing resumed in 1994–95. Fluctuated	100	3.2
OEO 4	5 000, 80–81	Declined	700	–
Southland	2 100, 83–84	Fluctuated. Overall declined	400	2.7
Snares	2 300, 92–93	Declined	100	–
Pukaki Rise (west)	1 200, 84–85	Declined	less than 100	–
Puysegur	1 800, 91–92	Declined due to fishery closure	0	–
<b>(b) Smooth oreo</b>				
OEO 4	7 600, 87–88	Remained at 4–5 000 t up to recent years	4 600	10.1
Southland	4 200, 85–86	Fluctuated	1 900	2.8
Pukaki Rise (east)	2 000, 99–00	Declined	1 300	2.5
Macquarie Ridge	1 300, 01–02	Fluctuated	1 200	4.4
OEO 3A	5 900, 87–88	Slow decline	1 100	4.1
Bounty Plateau	1 300, 94–95	Fluctuated	900	6.4
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 p.a.). Recent is 2000–01 to 2002–03

## 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 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 OEO2003/02 (oreo stock assessment).

## 2. OBJECTIVE

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 2002–03 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 McMillan et al. (2002) by including new data from the 2002–03 fishing year and revised data from the 2001–02 fishing year for OEO 1, OEO 3A, OEO 4, and OEO 6. The oreo management areas (OEO 1 to OEO 6) are shown in Figure 1.

The patterns of oreo fishing over time in the New Zealand Exclusive Economic Zone (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 2002–03 (with a threshold value of 10 tows per cell) were summed to provide a picture of fishing over the extent of the known fishery and tows from the last three fishing years, 1999–2000 to 2002–03, with a threshold value of 5 tows per cell, were also analysed to provide an indication of recent activity. The cumulative catch of black oreo and of 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 2002–03 (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, 1999–2000 to 2002–03, with a threshold value of 5 t per cell, were also analysed to provide an indication of recent activity.

Management areas OEO 1 and OEO 6 cover large geographical regions and parts of these areas were fished spasmodically or for only a short period. 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 (east) with new, expanded boundaries, Pukaki Rise (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, Doonan et al. 1995, Hicks et al. 2002).

### 3.1 Data sources

Commercial tow-by-tow estimated catch data 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 were not included in this analysis. Estimated catch from tow-by-tow data averaged 81% of reported landed catch for OEO 1, 87% for OEO 3A, 89% for OEO 4, and 82% for OEO 6, over the last 10 fishing years (1993–94 to 2002–03) (Tables 1 and 2).

All catches in this report are expressed in tonnes (t) and all CPUE are 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 a summary and in figures and tables.

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 (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) 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 sum of the number of tows targeting OEO.

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. More detailed information on the OEO 3A and OEO 4 black and smooth oreo stocks, including stock structure, abundance, and sustainable catch levels, was provided in past stock assessments (e.g., Annala et al. 2004).

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

New figures (8–26) show the mean annual estimated catch and the mean annual unstandardised CPUE of black oreo and smooth oreo separately from each fishery for the last three fishing years. New analyses examined recent trends in total catches and catch distribution for the main oreo fisheries 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 (2000–01 to 2002–03). Bounty Plateau smooth oreo appeared to be an expanding fishery so it was included as well. 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 (2000–01 to 2002–03). For black oreo the fisheries included OEO 3A (minus catches from Southland) and Pukaki Rise (east). For smooth oreo this included OEO 4, Southland, Pukaki Rise (east), Macquarie Ridge, OEO 3A (minus catches from

Southland), and Bounty Plateau. A series of plots for each fishery present the estimated catch history, the distribution of relative accumulated catch from an eight fishing year period following the introduction of GPS (post-GPS reference fishing years, 1992–93 to 1999–2000) and the relative accumulated catch from the last three fishing years (2000–01 to 2002–03). 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 2002–03) shows that most of the trawls were in OEO 3A, OEO 4, Southland, Pukaki Rise (east), Puysegur, Macquarie Ridge, Snares, Wairarapa, and Auckland Island hills (Figure 2). The distribution of trawls for the last three fishing years (2000–01 to 2002–03) is shown in Figure 3 and has a similar overall pattern, although OEO 4 east of Chatham Island, Southland, Pukaki Rise (east) and Macquarie Ridge possibly had more effort. In the last three fishing years there was little effort in Puysegur, presumably because of a voluntary no-fishing arrangement with fishers. There was recent effort off the Fiordland coast (Figure 3).

The plot of black oreo catches from 1977–78 to 2002–03 showed the importance of OEO 3A, with smaller contributions from OEO 4, Southland, Pukaki Rise (east) Puysegur, and Snares (Figure 4). Black oreo catches from the last three fishing years had a similar distribution, although the east end of OEO 4 and the Pukaki Rise (east) fisheries had larger catches (Figure 5).

Smooth oreo catches from 1977–78 to 2002–03 showed the importance of OEO 3A, OEO 4, and to a lesser extent Southland over time, with smaller contributions from other areas (Figure 6). In the last three fishing years there were substantial amounts taken from some of the other areas, including Pukaki Rise (east), Macquarie Ridge, and Bounty Plateau (Figure 7).

Comparison of the plots of the number of trawls that caught or targeted oreos (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 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 seamount complex near 180 degrees on the north Chatham Rise and the Wairarapa coast where there were some substantial catches of smooth oreo.

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

##### Summary

This is primarily a target oreo fishery on flat bottom and dropoffs along the eastern 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 and OEO 6 with data from 7146 tows. Peak catch was 5302 t in 1985–86. Catches from 1986–87 to 2002–03 have fluctuated with another high of 4786 in 1991–92 and a low of 265 t in 1988–89. Catch rates of smooth oreo and unspecified oreo were mostly higher in the mid 1980s and early 1990s than in recent fishing years. Catch rates of black oreo declined in the mid 1980s, but there are too few target tows to analyse for other times.

### **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 oreo in seven fishing years (Table 6).

### **Target species**

The main target species was oreo, but a small percentage of oreo was caught by tows that targeted orange roughy. The target species switched from mainly black oreo to mainly smooth oreo in 1987-88. A substantial percentage of unspecified oreo target was reported from 1990-91 on (Table 7).

### **Catch and catch rate**

Annual reported 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 (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 derive long-term trends in CPUE. A relatively unbroken series of target tows for smooth oreo from 1984-85 on shows an inconsistent trend in target catch rate, although the last 10 fishing years had low values compared with previous fishing years. Target catch rate of unspecified oreo from 1991-92 onward also showed an inconsistent, but generally downward trend (Table 9).

## **4.1.2 OEO 1 - Puysegur**

### **Summary**

This fishery occurs on the hills and slopes of the Puysegur Bank area where 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. Oreo target catch rates were variable, and were low for smooth oreo compared to other smooth oreo fisheries. 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.

### **Area**

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

### **Nation**

Fishing was carried out entirely by New Zealand vessels, apart from eight tows by the Japanese in the 1980s (Tables 10 and 12).

### **Vessels**

Vessels in the fishery were mainly under 2000 t (Table 11).



### **Target species**

Oreos were largely a bycatch of the orange roughy fishery, except in 1990–91 when tows catching oreos mainly targeted black oreo and unspecified oreo, and from 1997–98 when orange roughy were no longer targeted due to the closure of the orange roughy fishery (Table 12).

### **Catch and catch rate**

Catches of black oreo were higher than those for smooth oreo up to 1992–93, after which smooth oreo predominated. Peak oreo catch was in 1991–92 (Table 13). Catch per tow data from targeted tows are available for few years and are variable. Smooth oreo catch rate ranged from 0.28 to 7.64 t per tow (Table 14).

## **4.1.3 OEO 1 – Snares**

### **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 seven fishing years. Black oreo catch peaked at 2298 t in 1992–93. There are insufficient data to infer trends in target CPUE for black oreo and smooth oreo.

### **Area**

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

### **Nation**

This fishery was carried out entirely by New Zealand vessels (Table 15).

### **Vessels**

A few mainly medium sized (1000–2000 t) vessels carried out this fishery (Table 16).

### **Target species**

Orange roughy was the target in early years but this switched in later years to oreos. Oreos were the main target in 9 of the 13 years, including the last 7 (Table 17).

### **Catch and catch rate**

Black oreo was the main oreo species reported caught. Oreo catch peaked in 1992–93 at 2298 t of black oreo and 720 t of smooth oreo, but catches from the last eight fishing years have been much lower (Table 18). 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).

## **4.1.4 OEO 1 – Wairarapa**

### **Summary**

Oreo was taken mainly as a bycatch in 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 332 in 2002–03 (see Table 23).

### **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 were involved in the first three fishing years of the fishery, but the rest of the series was carried out by New Zealand vessels (Table 20).

### **Vessels**

The New Zealand vessels were mainly under 1000 t (Table 21).

### **Target species**

Oreos were caught mainly during target fishing for orange roughy. There was some target fishing for OEO and SSO from 1995–96 on (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. Smooth oreo catch jumped to 813 t in 2000–01, then fell back to 332 t in 2002–03 (Table 23). Before 1999–2000, catch rates for OEO and SSO were low, at less than 3 t per tow (Table 24).

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

### **Summary**

Oreo was caught 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. Insufficient data are available to characterise separate fisheries within this area, or to infer trends in CPUE for black oreo and smooth oreo.

### **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). New Zealand vessels were mainly under 1000 t.

### **Target species**

Oreos were caught mainly during target fishing for orange roughy. There was some targeting of OEO and SSO from 1995–96 onwards (Table 27).

### **Catch and catch rate**

Smooth oreo was the main oreo species caught in this fishery, 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).

## **4.1.6 OEO 6 – Auckland Island hills**

### **Summary**

This is a target hill fishery for smooth oreo and orange roughy and was carried out mainly by New Zealand vessels from 1990–91 on. The highest smooth oreo catch was 658 t in 1998–99. There were insufficient target catch rate data to derive long-term trends in CPUE.

**Area**

This fishery lies north of the Auckland Islands, between 49° 25.9' S–51° 37.5' S and 164° 11.3' E–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, but oreo was caught mostly as a bycatch of orange roughy target fishing for the remainder of the time (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 (Table 33). There are insufficient data to derive long-term trends in CPUE (Table 34).

**4.1.7 OEO 6 – Bounty Plateau****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 1282 t in 1994–95. There are insufficient target tows to derive long-term trends in CPUE.

**Area**

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

**Nation**

Soviet vessels undertook some trawling in the early 1980s, with a peak of 59 tows in 1983–84; mainly New Zealand vessels were involved from 1990–91 onward (Tables 35 and 37).

**Vessels**

Most vessels fishing in this area were over 1000 t, except from 1995–96 to 1996–97 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, with similar catches of each species in 1983–84. New Zealand vessels targeted mainly smooth oreo and unspecified oreo, but there was some targeting of orange roughy after 1993–94 (Table 37).

**Catch and catch rate**

The Soviet catch in 1983–84 was 628 t of black oreo and 525 t of smooth oreo. 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 (Table 38). From 1993–94 onwards, target CPUE for smooth oreo and unspecified oreo appears variable (Table 39).

#### 4.1.8 OEO 6 – Pukaki Rise (east)

##### 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 1994–95. The target species switched to orange roughy in 1995–96 and 1996–97. Soviet black oreo target CPUE showed a downward trend. New Zealand unspecified oreo target CPUE had a declining trend and smooth oreo target CPUE was variable.

##### Area

This fishery lies between 47° 58.6' S–50° 37.3' S and 173° 20.8' E–176° 23.9' E (see Figure 2).

##### Nation

This fishery involved mainly Soviet vessels from 1978–79 to 1985–86 and New Zealand vessels from 1994–95 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

Soviet vessels mostly targeted black oreo from 1980–81 to 1985–86 and New Zealand vessels targeted unspecified oreo or smooth oreo from 1994–95 on, except in 1995–96 and 1996–97 when orange roughy was the main target species (Table 42).

##### Catch and catch rate

There were two years of substantial catch of black oreo (1980–81 and 1981–82) by Soviet vessels and increasing catches of black oreo and smooth oreo were reported by New Zealand vessels from 1994–95 on (Table 43). There was a declining trend in target CPUE for black oreo from 1980–81 to 1984–85. Target catch per tow for unspecified oreo declined from 1994–95 on but remained relatively high and smooth oreo target CPUE was variable (Table 44).

#### 4.1.9 OEO 6 – Pukaki Rise (west)

##### Summary

This is a flat bottom and dropoff target oreo fishery along the north slope of the Pukaki Rise. Korean and Soviet vessels took substantial catches in 1983–84 and 1984–85, but recent catches were small and there was a low level of fishing effort by all nations. Main target species was black oreo or other species. The peak black oreo catch of 1196 t was in 1984–85. There was little New Zealand fishing in the area, and there are insufficient data available to infer trends in target CPUE.

##### Area

This fishery lies between 47° 55.5' S–49° 43.2' S and 167° 52.1' E–173° 16.5' E (see Figure 2).

##### Nation

Koreans and Soviets dominated in early years. Various nationalities fished in other years, including Norway and New Zealand (Table 45).

##### Vessels

Large Soviet vessels (over 2000 t) were used from 1978–79 to 1983–84 and small Korean vessels (under 1000 t) from 1983–84 to 1985–86. Various sized vessels fished from 1987–88 onwards (Table 46).

### **Target species**

There was target fishing for species other than oreos or orange roughy throughout the time series. Black oreo and other species were targeted during the main period of fishing from 1977–78 to 1985–86. There was some target fishing for orange roughy in 1992–93 and 1995–96, and some target fishing for OEO in the last five fishing years with an increase in 2001–02 and 2002–03 (Table 47).

### **Catch and catch rate**

Substantial catches of black oreo were made in 1983–84, with a peak catch of 1196 t in 1984–85. The largest smooth oreo catch (849 t) was made in 2001–02 (Table 48). There are insufficient data to infer trends in oreo target CPUE (Table 49).

## **4.1.10 OEO 6 – Macquarie Ridge**

### **Summary**

This is a developing New Zealand fishery on hills and dropoffs. The main target was unspecified oreo, but there was also some orange roughy target fishing. Smooth oreo was the main catch with the largest catch made in 2001–02 (1253 t).

### **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**

This fishery was carried out almost entirely by New Zealand vessels (Table 50).

### **Vessels**

Mainly medium sized (up to 2000 t) vessels (Table 51).

### **Target species**

There were few (less than 50 per year) target tows before 1996–97. From 1996–97 on, the main target was OEO or SSO with some (6–21%) orange roughy target tows (Table 52).

### **Catch and catch rate**

Substantial catches of smooth oreo were made from 1996–97 on (Table 53). Target CPUE for unspecified oreo and smooth oreo was variable (Table 54).

## **4.1.11 OEO 3A and OEO 4 – South Chatham Rise**

### **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.

### **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 55). The OEO 4 fishery was predominantly Soviet up to 1984–85 and New Zealand thereafter (Table 56).

## 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) (Tables 57 and 58).

## Target species

Soviet vessels (mainly) fishing in OEO 3A initially targeted unspecified oreo, then black oreo, then black oreo and smooth oreo. New Zealand vessels 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 decrease in the smooth oreo target fishing) because of a voluntary catch limit of 1300 t smooth oreo introduced in 1998–99 (Table 59). In OEO 4, Soviet vessels initially targeted unspecified oreo, then black oreo, smooth oreo, and increasingly orange roughy. New Zealand vessels mostly targeted orange roughy (Table 60).

## 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 to 1997–98. In the last five fishing years the catch of smooth oreo was lower because of the catch limit for that species (Table 61). In OEO 4, black oreo catches were predominant in only 1979–80 and 1980–81 with smooth oreo then predominant (Table 62). In OEO 4, smooth oreo catches decreased in 2001–02 and 2002–03, presumably due to the lower TACC.

Target catch per tow for black oreo in OEO 3A declined initially, but fluctuated in later fishing years while smooth oreo catch per tow generally declined from 1979–80 to 1996–97 then appeared to have stabilised (Table 63). Target catch per tow for black oreo in OEO 4 fluctuated, and there is insufficient data in the last 12 years of the fishery to comment. Target catch per tow for smooth oreo appeared to have declined in the early years (1979–80 to 1990–91), but fluctuated in later years (Table 64).

## 4.2 Summary plots

The relative sizes for the black oreo and smooth oreo fisheries in the last three fishing years (2000–01 to 2002–03) are shown in Figure 8. There were only two black oreo fisheries over 1000 t per annum: OEO 3A (1700 t) and Pukaki Rise (east) (1100 t). Smooth oreo fisheries close to or more than 1000 t per annum ranked from large to small included: OEO 4 (4600 t), Southland (1900 t), Pukaki Rise (east) (1300 t), Macquarie Ridge (1200 t), OEO 3A (1100 t), and Bounty Plateau (900 t). Mean annual unstandardised catch rates (t/tow) for each of the fisheries in the last three fishing years (2000–01 to 2002–03) are shown in Figure 9. For black oreo, OEO 3A had the highest catch rates followed by Pukaki Rise (east) then Southland. For smooth oreo the catch rates in OEO 4 (10.1 t/tow) were a lot higher than those of any of the other fisheries, and ranked large to small: Bounty Plateau, Macquarie Ridge, OEO 3A, Wairarapa, Southland, Pukaki Rise (east).

The largest and longest-established of the black oreo fisheries is OEO 3A (Figure 10) which had very high reported catches in the early 1980s, (15 400 t in 1980–81). 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 for the post-GPS period (1992–93 to 1999–2000) and for the last three fishing years (2000–01 to 2002–03) appeared very similar except for a reduced importance of catches from the east end of the area in the last three fishing years (Figure 11).

The Pukaki Rise (east) black oreo fishery operated in the early to mid 1980s but then was not fished again until the mid 1990s (Figure 12). 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 (Figure 13).

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 14). 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 15 and 16).

The Southland smooth oreo fishery started in the mid 1980s and shows fluctuating levels of catch with relatively high catches in the last few fishing years (Figure 17). Comparison of the catch distributions suggested more catches near the centre of the area and to the east into deeper water in the last three fishing years compared to the post-GPS period (Figure 18).

The Pukaki Rise (east) smooth oreo fishery had some small catches in the mid 1980s but the modern fishery started in the mid 1990s. Catches declined in the last two fishing years (Figure 19). 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 (Figure 20). This was a similar change to that for black oreo from the same area except that there was more smooth oreo catch taken from the north slope of Pukaki Rise.

The Macquarie Ridge smooth oreo fishery is relatively recent and catches appear to be increasing (Figure 21). Catches were taken from about the same areas in the post-GPS period as in the last three fishing years (Figure 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 1980s and late 1980s to early 1990s. Catches subsequently declined and were further constrained by reduced catch limits in the last few fishing years (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).

The Bounty Plateau smooth oreo fishery is mostly a recent fishery with a small increase in catches in the last two fishing years (Figure 25). Comparison of the catch distributions suggested more catches in the north in deeper water in the last three fishing years compared to the post-GPS period (Figure 26).

## 5. ACKNOWLEDGMENTS

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## 6. REFERENCES

- Annala, J.H.; Sullivan, K.J.; Smith, N.W.McL.; Griffiths, M.H.; Todd, P.R.; Mace, P.M.; Connell, A.M. (Comps) (2004). Report from the Fishery Assessment Plenary, April 2004: stock assessments and yield estimates. 690 p. (Unpublished report held in NIWA library, Wellington.)
- Coburn, R.P.; Doonan, I.J.; McMillan, P.J. (1999). Black oreo abundance indices from standardised catch per unit of effort data for OEO 3A. *New Zealand Fisheries Assessment Research Document 99/32*. 18 p. (Unpublished report held in NIWA library, Wellington.)
- Coburn, R.P.; Doonan, I.J.; McMillan, P.J. (2001a). Smooth oreo abundance indices from standardised catch per unit of effort data for OEO 4. *New Zealand Fisheries Assessment Report 2001/11*. 39 p.
- Coburn, R.P.; Doonan, I.J.; McMillan, P.J. (2001b). Black oreo abundance indices from standardised catch per unit of effort data for OEO 4. *New Zealand Fisheries Assessment Report 2001/39*. 24 p.

- Doonan, I.J.; McMillan, P.J.; Coburn, R.P.; Hart, A.C.; Cordue, P.L. (1995). Assessment of smooth oreo for 1995. New Zealand Fisheries Assessment Research Document 95/12. 31 p. (Unpublished report held in NIWA library, Wellington.)
- Hicks, A.C.; Doonan, I.J.; McMillan, P.J.; Coburn, R.P.; Hart, A.C. (2002). Assessment of OEO 3A black oreo for 2002–03. *New Zealand Fisheries Assessment Report 2002/63*. 58 p.
- McMillan, P.J.; Coburn, R.P.; Hart, A.C.; Doonan, I.J. (2002). Descriptions of black oreo and smooth oreo fisheries in OEO 1, OEO 3A, OEO 4, and OEO 6 from 1977–78 to the 2000–01 fishing year. *New Zealand Fisheries Assessment Report 2002/40*. 54 p.



**Table 1: Total reported oreo catch (t) for oreo management areas OEO 1 and OEO 6, total 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	3 443	5 737	5 453	82	95
2002-03†	3 034	2 156	6 115	5 400	71	88

Source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2002-03. \*, 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 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	1 901	5 402	4 898	62	91

Source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2002-03. \*, 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 2002-03 and TACs (t) from 1986-87 to 2002-03.**

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

Source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2002-03. \*, 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 2002-03 and TACs (t) from 1982-83 to 2002-03.**

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

Source: FSU from 1977-78 to 1987-88; QMS/ITD from 1988-89 to 2002-03. \*, 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. NA, unknown nationality; DOM, New Zealand; JAP, Japanese; KOR, Korean; NOR, Norwegian; RUS, Soviet/Russian. PAN, Panamanian; BZE, Belizean; POL, Polish.**

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

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

	NA	< 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

**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 catching oreos, by fishing year. OEO, unspecified oreo; SSO, smooth oreo; BOE, black oreo; ORH, orange roughy; Other, other species.**

	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	538	535	82	13	4	0	1

**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	1 588	481

**Table 9: Southland. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	OEO	n	SSO	n	BOE	n
1977-78	6.59	314	0	0	0	0
1978-79	0	0	0	0	3.91	28
1979-80	6.59	72	0.19	3	0.20	10
1980-81	0	0	0	0	0	0
1981-82	0	0	0	0	0	0
1982-83	0	0	0	0	0	1
1983-84	0	0	3.37	274	5.69	224
1984-85	0	0	6.71	89	5.47	152
1985-86	3.68	51	6.83	566	3.48	180
1986-87	0	0	1.74	43	2.26	58
1987-88	0	0	4.57	192	2.39	28
1988-89	0.12	3	7.51	17	7.09	7
1989-90	8.61	10	3.85	151	0	0
1990-91	10.02	25	4.98	124	0	1
1991-92	9.27	163	8.97	291	4.27	12
1992-93	4.69	105	2.69	229	4.28	2
1993-94	4.94	138	2.07	51	1.69	20
1994-95	5.54	146	1.22	12	1.40	5
1995-96	6.57	219	2.13	49	5.36	49
1996-97	4.25	273	1.61	206	4.24	52
1997-98	3.32	156	2.59	90	4.67	3
1998-99	3.59	248	2.57	129	1.20	27
1999-00	2.84	155	2.36	289	1.08	16
2000-01	5.76	290	1.71	76	2.25	27
2001-02	3.69	489	2.48	221	2.57	40
2002-03	3.61	441	4.95	70	3.31	24

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

	DOM	JAP
1983-84	0	100
1984-85	0	0
1985-86	0	100
1986-87	0	100
1987-88	0	0
1988-89	0	0
1989-90	100	0
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

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

	NA	< 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	-

**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

**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

**Table 14: Puysegur. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1983-84	0	0	0	0	0	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	0	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	0.50	6	0	0
1990-91	13.5	56	0.53	22	8.35	81
1991-92	0	2	0.86	44	4.81	8
1992-93	2.98	69	1.95	42	7.29	32
1993-94	5.41	17	0.50	3	0	0
1994-95	4.57	48	0	0	0	0
1995-96	7.75	43	0.28	8	0	0
1996-97	6.60	43	0	0	0	0
1997-98	4.63	4	0	0	0	0
1998-99	17.74	11	0	0	0	0
1999-00	7.58	25	1.61	59	0	0
2000-01	0	0	7.64	32	0	0
2001-02	0	0	0	0	0	0
2002-03	0	0	0	0	0	0

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

	<u>DOM</u>
1990-91	100
1991-92	100
1992-93	100
1993-94	100
1994-95	100
1995-96	100
1996-97	100
1997-98	100
1998-99	100
1999-00	100
2000-01	100
2001-02	100
2002-03	100

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

	<u>NA &lt; 1 000 t</u>	<u>1000-2000 t</u>	<u>&gt; 2 000 t</u>	<u>n</u>
1990-91	0	0	100	0
1991-92	0	43	57	0
1992-93	0	30	62	8
1993-94	0	9	46	45
1994-95	0	22	76	2
1995-96	0	46	54	0
1996-97	0	18	82	0
1997-98	0	66	34	0
1998-99	0	64	36	0
1999-00	0	10	90	0
2000-01	0	0	100	0
2001-02	0	90	10	1
2002-03	0	16	84	0



**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	70	70	100	0	0	0	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	74	62

**Table 19: Snares. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	OEO		SSO		BOE	
		n		n		n
1990-91	19.5	8	0.09	2	0	0
1991-92	0	0	8.80	9	0	0
1992-93	6.98	143	1.55	38	7.52	63
1993-94	10.32	53	3.96	10	2.90	5
1994-95	5.33	33	0	0	1.26	3
1995-96	9.17	47	0.91	12	2.93	4
1996-97	9.78	61	0.17	6	3.00	1
1997-98	2.76	47	2.02	11	2.00	3
1998-99	5.24	58	4.37	19	1.64	8
1999-00	3.36	53	3.46	60	2.00	5
2000-01	2.24	61	0	0	3.15	3
2001-02	5.93	55	1.31	9	4.25	2
2002-03	1.93	70	0	0	0	0

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

	DOM	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

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

	NA	< 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

**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

**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

**Table 24: Wairarapa. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1980-81	0	0	0	0	0	0
1981-82	0	0	0	0	0	0
1982-83	1.08	1	0	0	0	0
1983-84	0	0	0	0	0	0
1984-85	0	0	1.32	6	0	0
1985-86	0	0	1.38	20	0	0
1986-87	0.03	1	0	0	0	0
1987-88	0	0	0	0	0	0
1988-89	0	0	0.45	2	0	0
1989-90	0	0	1.68	58	0	0
1990-91	0.45	9	1.93	24	0	0
1991-92	0.20	2	0.90	20	0	0
1992-93	0	0	0.86	43	0	0
1993-94	0	0	0.34	10	0	0
1994-95	0.10	1	0.56	13	0	0
1995-96	0.49	40	0.47	22	0	0
1996-97	0.26	60	0.70	18	0	0
1997-98	0.37	81	1.51	20	0	0
1998-99	0.82	31	0.56	19	0	0
1999-00	1.12	28	2.11	40	0	0
2000-01	8.09	66	3.16	102	0	0
2001-02	3.65	68	2.60	34	0	0
2002-03	3.86	21	4.01	63	0	0

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

	NA	AUS	DOM	JAP	KOR	NOR	PAN	RUS
1977-78	0	0	0	0	100	0	0	0
1978-79	58	0	0	40	1	0	0	0
1979-80	0	0	0	99	1	0	0	0
1980-81	0	0	0	88	12	0	0	0
1981-82	0	0	0	18	1	0	0	80
1982-83	0	0	99	0	1	0	0	0
1983-84	0	0	10	3	0	0	0	87
1984-85	0	0	80	20	0	0	0	0
1985-86	0	0	100	0	0	0	0	0
1986-87	0	0	98	1	1	0	0	0
1987-88	0	0	53	47	0	0	0	0
1988-89	0	0	98	1	0	0	0	0
1989-90	0	0	94	0	6	0	0	0
1990-91	0	0	88	1	0	11	0	0
1991-92	0	0	100	0	0	0	0	0
1992-93	0	0	98	0	0	2	0	0
1993-94	0	0	100	0	0	0	0	0
1994-95	0	0	100	0	0	0	0	0
1995-96	0	0	100	0	0	0	0	0
1996-97	0	0	100	0	0	0	0	0
1997-98	0	0	100	0	0	0	0	0
1998-99	0	0	99	0	0	0	1	0
1999-00	0	0	100	0	0	0	0	0
2000-01	0	0	100	0	0	0	0	0
2001-02	0	0	88	0	0	0	11	0
2002-03	0	4	96	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. NA, unknown tonnage class. – data from fewer than four vessels.**

	NA	< 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

**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

**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

**Table 29: 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 Table 7 for abbreviations.**

	OEO	n	SSO	n	BOE	n
1977-78	0	0	0	0	0	0
1978-79	0	0	0	0	0	0
1979-80	0	0	0	0	0	0
1980-81	0	0	0	0	0	0
1981-82	0	0	0	0	0	0
1982-83	0	0	0	0	0	0
1983-84	0	0	12.04	2	0	0
1984-85	0	0	0	0	0	0
1985-86	0	0	0.27	10	0.38	1
1986-87	0	0	0	0	0	0
1987-88	0	0	0.69	2	0	0
1988-89	9.30	1	1.35	7	2.79	3
1989-90	5.07	2	1.50	6	0	0
1990-91	8.00	1	1.45	4	0	0
1991-92	0.30	1	0	0	0	0
1992-93	6.00	2	0.72	1	0	0
1993-94	2.30	2	0	1	0	0
1994-95	1.00	1	0	0	0	0
1995-96	1.06	61	22.00	1	0	0
1996-97	1.11	131	9.73	59	0	0
1997-98	0.49	65	7.23	11	0	0
1998-99	2.25	9	4.55	27	10.00	1
1999-00	0.68	7	5.64	26	0	0
2000-01	30.00	1	6.71	29	0.44	8
2001-02	0	0	0.60	1	0	0
2002-03	20.98	4	5.41	18	0	0

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

	BZE	DOM	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

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

	NA	< 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	1	-

**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	80	61	65	11	0	24	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	245	0



**Table 34: Auckland Island hills. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1981-82	0	0	3.33	3	15.00	2
1982-83	0	0	0	0	0	0
1983-84	0	0	0	0	0	0
1984-85	0	0	0	0	0	0
1985-86	0	0	0	0	0.37	2
1986-87	0	0	0	0	0	0
1987-88	0	0	0	0	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	0	0	0	0
1990-91	0	0	0	0	0	0
1991-92	0	0	0	0	0	0
1992-93	0	0	4.56	54	0	0
1993-94	0	0	4.03	9	0	0
1994-95	1.58	85	1.04	81	0	0
1995-96	2.28	9	2.88	20	0	0
1996-97	0.80	12	6.34	12	0	0
1997-98	2.14	23	0	0	0	0
1998-99	3.41	64	1.06	13	0	0
1999-00	3.31	76	2.34	14	0	0
2000-01	5.02	22	0.85	12	0	0
2001-02	4.30	34	10.39	9	0	0
2002-03	3.96	52	2.47	9	0	0

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

	<u>NA</u>	<u>BZE</u>	<u>DOM</u>	<u>JAP</u>	<u>RUS</u>
1980-81	13	0	0	0	87
1981-82	0	0	0	0	0
1982-83	0	0	0	0	0
1983-84	0	0	0	0	100
1984-85	0	0	0	0	0
1985-86	0	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	0	100	0	0
1994-95	0	0	100	0	0
1995-96	0	0	100	0	0
1996-97	0	0	100	0	0
1997-98	0	0	100	0	0
1998-99	0	18	82	0	0
1999-00	0	0	100	0	0
2000-01	0	0	100	0	0
2001-02	0	0	100	0	0
2002-03	0	0	100	0	0

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

	NA	< 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	8	92	0	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
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	235	202	60	26	0	14	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
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	1 161	2

**Table 39: Bounty Plateau. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	OEO		SSO		BOE	
	t	n	t	n	t	n
1981-82	0	0	0	0	0	0
1982-83	0	0	0	0	0	1
1983-84	0	0	15.37	25	15.63	33
1984-85	0	0	0	0	0	0
1985-86	0	0	0	1	0	1
1986-87	0	0	0	0	0	0
1987-88	0	0	8.84	2	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	0	0	0	0
1990-91	0	0	3.33	6	0	0
1991-92	0	0	0	0	0	0
1992-93	8.10	10	0	0	0	0
1993-94	55.00	1	16.61	23	0	0
1994-95	11.19	68	5.67	87	0	0
1995-96	5.28	119	14.11	8	0	0
1996-97	3.49	160	0	0	0	0
1997-98	1.66	77	2.56	45	0	0
1998-99	6.73	69	2.18	181	0	0
1999-00	5.85	54	8.11	47	0	0
2000-01	3.51	45	3.86	50	0	0
2001-02	3.31	17	6.44	113	0	0
2002-03	4.63	142	8.55	60	0	0

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

	NA	DOM	JAP	RUS
1978-79	0	0	0	100
1979-80	0	0	0	100
1980-81	69	0	0	31
1981-82	18	0	0	82
1982-83	0	0	0	100
1983-84	0	0	0	100
1984-85	0	0	3	97
1985-86	0	0	0	100
1986-87	0	0	0	0
1987-88	0	0	100	0
1988-89	0	0	0	0
1989-90	0	100	0	0
1990-91	0	100	0	0
1991-92	0	0	0	0
1992-93	0	100	0	0
1993-94	0	100	0	0
1994-95	0	100	0	0
1995-96	19	81	0	0
1996-97	0	100	0	0
1997-98	1	99	0	0
1998-99	0	100	0	0
1999-00	0	100	0	0
2000-01	0	100	0	0
2001-02	0	100	0	0
2002-03	0	100	0	0

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

	NA	< 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	0	0	100	5
1984-85	0	0	0	100	4
1985-86	0	0	0	100	3
1986-87	0	0	0	0	0
1987-88	0	0	0	100	-
1988-89	0	0	0	0	0
1989-90	0	81	19	0	-
1990-91	0	100	0	0	-
1991-92	0	0	0	0	0
1992-93	0	47	53	0	-
1993-94	0	100	0	0	-
1994-95	0	0	100	0	-
1995-96	0	7	74	19	3
1996-97	0	23	66	11	6
1997-98	0	13	79	8	5
1998-99	0	34	66	0	7
1999-00	0	64	36	0	5
2000-01	0	35	65	0	6
2001-02	0	38	62	0	5
2002-03	0	30	70	0	5

**Table 42:** Pukaki Rise (east). 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	4	0	0	0	0	0	100
1979-80	2	0	0	0	0	0	100
1980-81	587	573	4	1	93	0	2
1981-82	476	476	12	3	85	0	0
1982-83	106	106	0	0	100	0	0
1983-84	85	84	8	41	49	0	1
1984-85	175	172	0	5	93	0	2
1985-86	9	9	0	22	78	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	4	3	0	75	0	0	25
1990-91	2	2	50	50	0	0	0
1991-92	0	0	0	0	0	0	0
1992-93	2	1	0	0	50	50	0
1993-94	1	1	100	0	0	0	0
1994-95	29	29	100	0	0	0	0
1995-96	333	88	22	5	0	69	5
1996-97	606	97	14	2	0	84	0
1997-98	588	407	57	6	7	30	1
1998-99	450	400	72	8	9	11	0
1999-00	662	631	49	31	15	5	0
2000-01	694	675	43	46	7	2	1
2001-02	416	402	75	9	13	3	0
2002-03	545	535	57	17	24	2	0

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

	Catch (t)		
	OEO	SSO	BOE
1978-79	0	0	5
1979-80	0	0	0
1980-81	62	2	3 144
1981-82	0	41	1 830
1982-83	0	0	402
1983-84	0	229	212
1984-85	0	59	364
1985-86	0	1	19
1986-87	0	0	0
1987-88	0	2	0
1988-89	0	0	0
1989-90	0	0	0
1990-91	0	1	15
1991-92	0	0	0
1992-93	0	1	2
1993-94	0	2	2
1994-95	0	119	210
1995-96	0	1 167	1 146
1996-97	53	1 465	1 898
1997-98	104	1 079	1 917
1998-99	0	1 138	1 055
1999-00	4	2 022	958
2000-01	3	1 916	1 047
2001-02	0	1 073	895
2002-03	1	786	1 490

**Table 44: Pukaki Rise (east). Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1978-79	0	0	0	0	0	0
1979-80	0	0	0	0	0	0
1980-81	2.83	22	0.32	4	5.65	547
1981-82	2.40	59	1.34	13	4.14	404
1982-83	0	0	0	0	3.79	106
1983-84	1.84	7	6.29	35	1.68	42
1984-85	0	0	1.15	9	2.21	163
1985-86	0	0	0.39	2	2.68	7
1986-87	0	0	0	0	0	0
1987-88	0	0	0.80	2	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	0.05	3	0	0
1990-91	11.40	1	0.50	1	0	0
1991-92	0	0	0	0	0	0
1992-93	0	0	0	0	1.45	1
1993-94	4.00	1	0	0	0	0
1994-95	11.34	29	0	0	0	0
1995-96	9.77	72	6.06	16	0	0
1996-97	7.20	82	4.35	15	0	0
1997-98	6.51	334	1.35	34	2.19	39
1998-99	5.50	322	0.63	37	6.40	41
1999-00	5.57	327	3.33	203	3.15	101
2000-01	5.25	301	2.86	322	3.26	52
2001-02	4.98	311	1.90	38	3.58	53
2002-03	5.11	311	1.48	95	2.97	129

**Table 45: Pukaki Rise (west). Percentage oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.**

	NA	DOM	JAP	KOR	NOR	PAN	RUS
1977-78	100	0	0	0	0	0	0
1978-79	36	0	5	0	0	0	58
1979-80	96	0	4	0	0	0	0
1980-81	0	0	0	0	0	0	100
1981-82	60	0	0	0	0	0	40
1982-83	0	0	0	0	0	0	100
1983-84	0	0	0	51	0	0	49
1984-85	0	0	0	100	0	0	0
1985-86	0	0	0	100	0	0	0
1986-87	0	0	0	0	0	0	0
1987-88	0	0	100	0	0	0	0
1988-89	0	0	0	0	0	0	0
1989-90	0	8	0	0	92	0	0
1990-91	0	84	0	0	16	0	0
1991-92	0	0	0	0	100	0	0
1992-93	0	94	0	0	6	0	0
1993-94	0	0	0	0	100	0	0
1994-95	0	45	0	0	55	0	0
1995-96	0	90	0	0	10	0	0
1996-97	0	77	0	0	20	0	4
1997-98	0	62	0	0	20	18	0
1998-99	0	98	0	0	0	2	0
1999-00	0	69	0	13	0	18	0
2000-01	0	99	0	0	0	1	0
2001-02	0	99	0	0	0	1	0
2002-03	0	99	0	0	0	1	0

**Table 46: Pukaki Rise (west). Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. NA, unknown tonnage class. – data from fewer than four vessels.**

	NA	< 1 000 t	1000–2000 t	> 2 000 t	n
1977–78	100	0	0	0	0
1978–79	4	0	1	95	4
1979–80	96	0	4	0	–
1980–81	0	0	0	100	–
1981–82	0	5	0	95	–
1982–83	0	0	0	100	0
1983–84	0	51	0	49	4
1984–85	0	100	0	0	–
1985–86	0	100	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	8	74	18	–
1990–91	0	0	100	0	–
1991–92	0	3	55	42	–
1992–93	0	41	57	2	–
1993–94	0	55	45	0	–
1994–95	0	53	10	38	6
1995–96	0	16	61	23	4
1996–97	0	81	19	0	5
1997–98	0	15	29	56	7
1998–99	0	42	25	33	6
1999–00	0	68	14	18	7
2000–01	0	0	99	1	–
2001–02	0	1	98	1	–
2002–03	0	0	99	1	–

**Table 47: Pukaki Rise (west). 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	1	0	0	0	0	0	100
1978–79	17	8	24	0	24	0	53
1979–80	4	0	0	0	0	0	100
1980–81	7	5	0	14	57	0	29
1981–82	6	4	0	17	50	0	33
1982–83	3	3	0	0	100	0	0
1983–84	87	80	0	28	64	1	7
1984–85	125	43	0	1	34	0	66
1985–86	30	30	0	10	90	0	0
1986–87	0	0	0	0	0	0	0
1987–88	12	12	0	100	0	0	0
1988–89	0	0	0	0	0	0	0
1989–90	3	1	0	33	0	0	67
1990–91	24	0	0	0	0	0	100
1991–92	13	0	0	0	0	0	100
1992–93	21	2	10	0	0	43	48
1993–94	5	0	0	0	0	0	100
1994–95	22	1	5	0	0	5	91
1995–96	15	2	13	0	0	20	67
1996–97	20	1	5	0	0	0	95
1997–98	26	1	0	0	4	0	96
1998–99	11	5	36	9	0	0	55
1999–00	37	10	16	11	0	0	73
2000–01	42	21	50	0	0	0	50
2001–02	130	107	82	0	0	0	18
2002–03	137	119	87	0	0	0	13

**Table 48: Pukaki Rise (west). Catch of unspecified oreo, smooth oreo and black oreo by fishing year. See Table 7 for abbreviations.**

	Catch (t)		
	OEO	SSO	BOE
1977-78	3	0	0
1978-79	6	0	11
1979-80	0	3	0
1980-81	0	0	5
1981-82	0	0	12
1982-83	0	0	21
1983-84	0	321	800
1984-85	0	252	1 196
1985-86	0	29	51
1986-87	0	0	0
1987-88	0	230	0
1988-89	0	0	0
1989-90	0	0	0
1990-91	0	1	2
1991-92	1	2	1
1992-93	1	28	18
1993-94	0	0	0
1994-95	0	2	2
1995-96	0	7	7
1996-97	1	9	1
1997-98	0	2	4
1998-99	0	2	2
1999-00	0	14	18
2000-01	0	309	6
2001-02	0	849	52
2002-03	0	394	72

**Table 49: Pukaki Rise (west). Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	OEO	n	SSO	n	BOE	n
1977-78	0	0	0	0	0	0
1978-79	1.34	4	0	0	0	4
1979-80	0	0	0	0	0	0
1980-81	0	0	0	1	0.43	4
1981-82	0	0	0	1	2.84	3
1982-83	0	0	0	0	6.84	3
1983-84	0	0	3.10	24	10.61	56
1984-85	0	0	0.48	1	9.23	42
1985-86	0	0	0.89	3	1.85	27
1986-87	0	0	0	0	0	0
1987-88	0	0	19.16	12	0	0
1988-89	0	0	0	0	0	0
1989-90	0	0	0.02	1	0	0
1990-91	0	0	0	0	0	0
1991-92	0	0	0	0	0	0
1992-93	12.5	2	0	0	0	0
1993-94	0	0	0	0	0	0
1994-95	0.60	1	0	0	0	0
1995-96	3.50	2	0	0	0	0
1996-97	7.45	1	0	0	0	0
1997-98	0	0	0	0	0.20	1
1998-99	0.61	4	0	1	0	0
1999-00	2.94	6	1.15	4	0	0
2000-01	14.62	21	0	0	0	0
2001-02	8.32	107	0	0	0	0
2002-03	3.85	119	0	0	0	0



**Table 50: Macquarie Ridge. Percentage oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.**

	BZE	DOM
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

**Table 51: Macquarie Ridge. Percentage oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. NA, unknown tonnage class. - data from fewer than four vessels.**

	NA	< 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	-

**Table 52: 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	345	324	79	15	0	6	0

**Table 53: 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	1 081	76

**Table 54: Macquarie Ridge. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	OEO		SSO		BOE	
	t per tow	n	t per tow	n	t per tow	n
1990-91	8.81	18	0	0	0	0
1991-92	0	0	0	0	0	0
1992-93	6.20	5	0.20	3	0	0
1993-94	0	0	0	0	0	0
1994-95	3.18	14	0	1	0	0
1995-96	6.48	4	3.43	25	0	0
1996-97	3.67	67	6.31	78	0	0
1997-98	3.48	117	4.55	42	0	0
1998-99	3.00	112	3.47	64	1.35	2
1999-00	5.29	163	1.99	71	0	0
2000-01	3.30	203	3.84	135	0	0
2001-02	3.46	158	5.30	121	0	0
2002-03	3.50	273	3.53	51	0	0

**Table 55: OEO 3A, excluding data from the Southland fishery. Percentage of oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.**

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

**Table 56: OEO 4. Percentage of oreo catch (combined) by nation and fishing year. See Table 5 for abbreviations.**

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

**Table 57: OEO 3A, excluding data from the Southland fishery. Percentage of oreo catch (combined) by vessel tonnage class by fishing year. NA, unknown tonnage class, n is the number of vessels. - data from fewer than four vessels.**

	NA	< 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	64	34	2	14

**Table 58: OEO 4. Percentage of oreo catch (combined) by vessel tonnage class and number of vessels (n), by fishing year. NA, unknown tonnage class.**

	NA	< 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

**Table 59: 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	544	210	31	4	3	27	35

**Table 60: 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	2 518	134	2	3	0	86	9

Table 61: 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	823	888

**Table 62: 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	4 014	858



**Table 63: OEO 3A, excluding data from the Southland fishery. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1977-78	7.87	168	0	0	0	0
1978-79	7.53	1	0	0	0	0
1979-80	7.62	346	15.53	166	5.07	824
1980-81	8.95	666	4.70	75	6.43	1 914
1981-82	7.18	44	2.50	58	6.30	871
1982-83	0	0	8.16	147	4.58	1 404
1983-84	13.39	2	3.69	434	3.25	1 427
1984-85	1.30	13	7.43	353	2.91	663
1985-86	3.93	9	4.43	389	3.27	330
1986-87	0	0	3.97	503	3.38	812
1987-88	5.43	17	5.61	776	2.29	768
1988-89	4.26	319	6.78	600	2.92	351
1989-90	6.29	125	3.35	1 067	4.27	105
1990-91	8.13	181	2.54	1 413	4.78	91
1991-92	8.11	138	7.72	194	4.93	150
1992-93	7.58	501	2.52	403	2.95	82
1993-94	6.50	794	2.38	188	5.54	232
1994-95	5.53	789	1.91	178	4.63	59
1995-96	3.66	1 506	1.92	186	3.36	140
1996-97	3.42	1 400	1.86	220	6.02	139
1997-98	3.16	931	3.56	467	6.00	9
1998-99	5.22	475	2.43	128	3.75	412
1999-00	4.10	447	4.03	43	3.73	293
2000-01	3.78	455	3.13	102	4.57	211
2001-02	4.58	358	5.45	50	8.61	63
2002-03	6.70	169	5.69	24	7.09	17

**Table 64: OEO 4. Target catch per tow (t per tow) by species and number of target tows (n) by fishing year. See Table 7 for abbreviations.**

	<u>OEO</u>	<u>n</u>	<u>SSO</u>	<u>n</u>	<u>BOE</u>	<u>n</u>
1977-78	9.32	856	0	0	0	0
1978-79	3.49	33	0	0	2.88	116
1979-80	10.62	275	14.21	44	7.66	26
1980-81	6.33	724	8.84	37	4.96	304
1981-82	5.74	235	5.57	316	4.23	704
1982-83	0	0	3.95	397	3.72	277
1983-84	0	0	4.81	558	2.89	286
1984-85	0	0	3.75	607	1.82	261
1985-86	14.84	5	4.32	525	2.53	191
1986-87	2.58	3	4.15	708	2.27	285
1987-88	1.60	2	4.70	765	2.30	155
1988-89	3.33	91	4.62	318	7.13	75
1989-90	3.65	28	3.49	557	0	0
1990-91	8.76	79	3.80	375	5.68	2
1991-92	11.77	26	5.27	219	4.00	4
1992-93	6.77	56	7.10	120	0	1
1993-94	4.35	26	2.55	38	2.67	3
1994-95	5.00	64	10.21	76	0	0
1995-96	7.11	83	9.16	154	0	1
1996-97	6.84	161	5.80	292	13.55	1
1997-98	5.68	269	8.90	130	0	0
1998-99	5.36	252	6.80	328	6.05	16
1999-00	5.74	71	8.06	400	0	2
2000-01	10.58	50	9.45	336	13.67	3
2001-02	7.06	165	12.36	68	0	0
2002-03	10.01	47	11.27	86	0.09	1

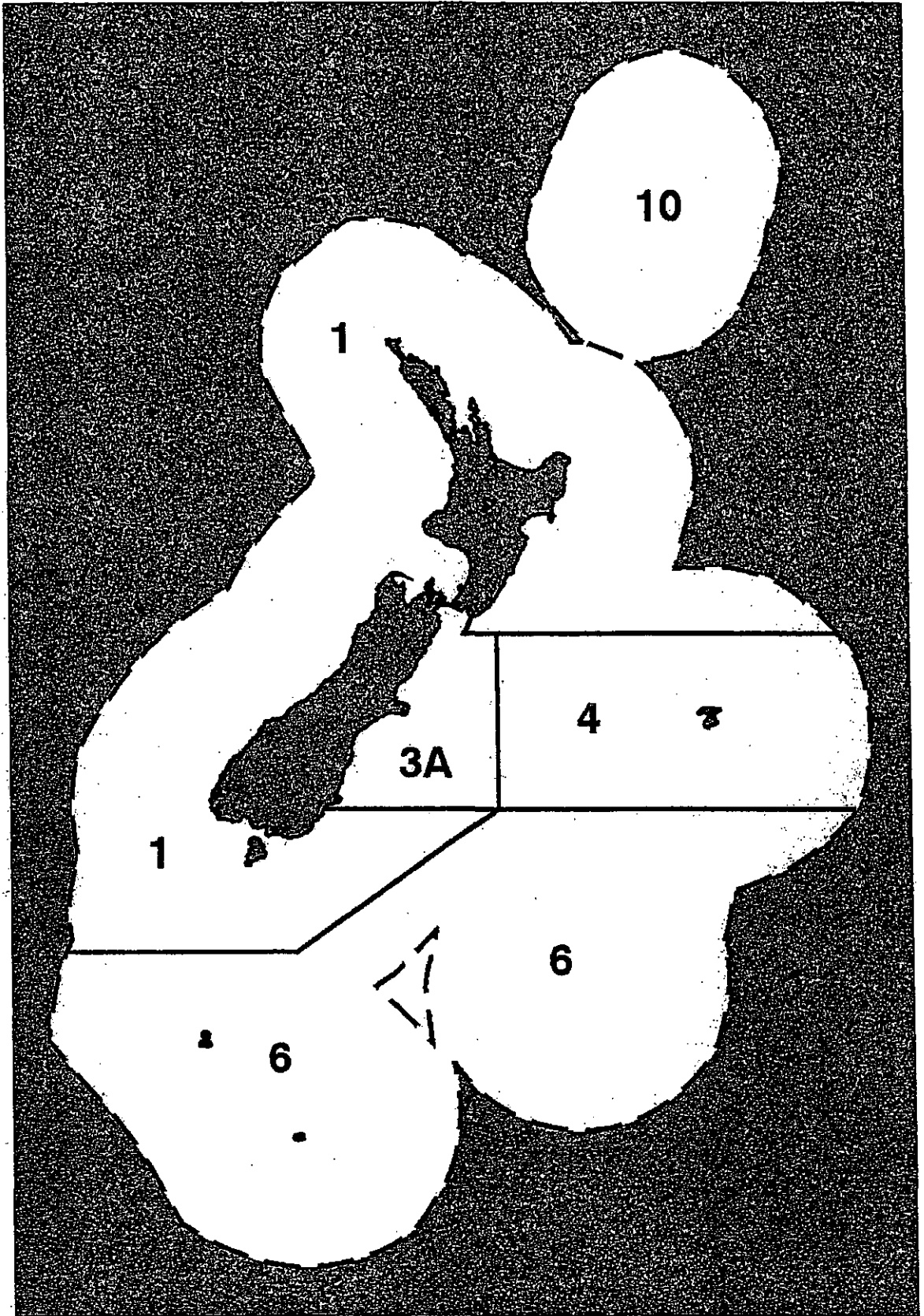
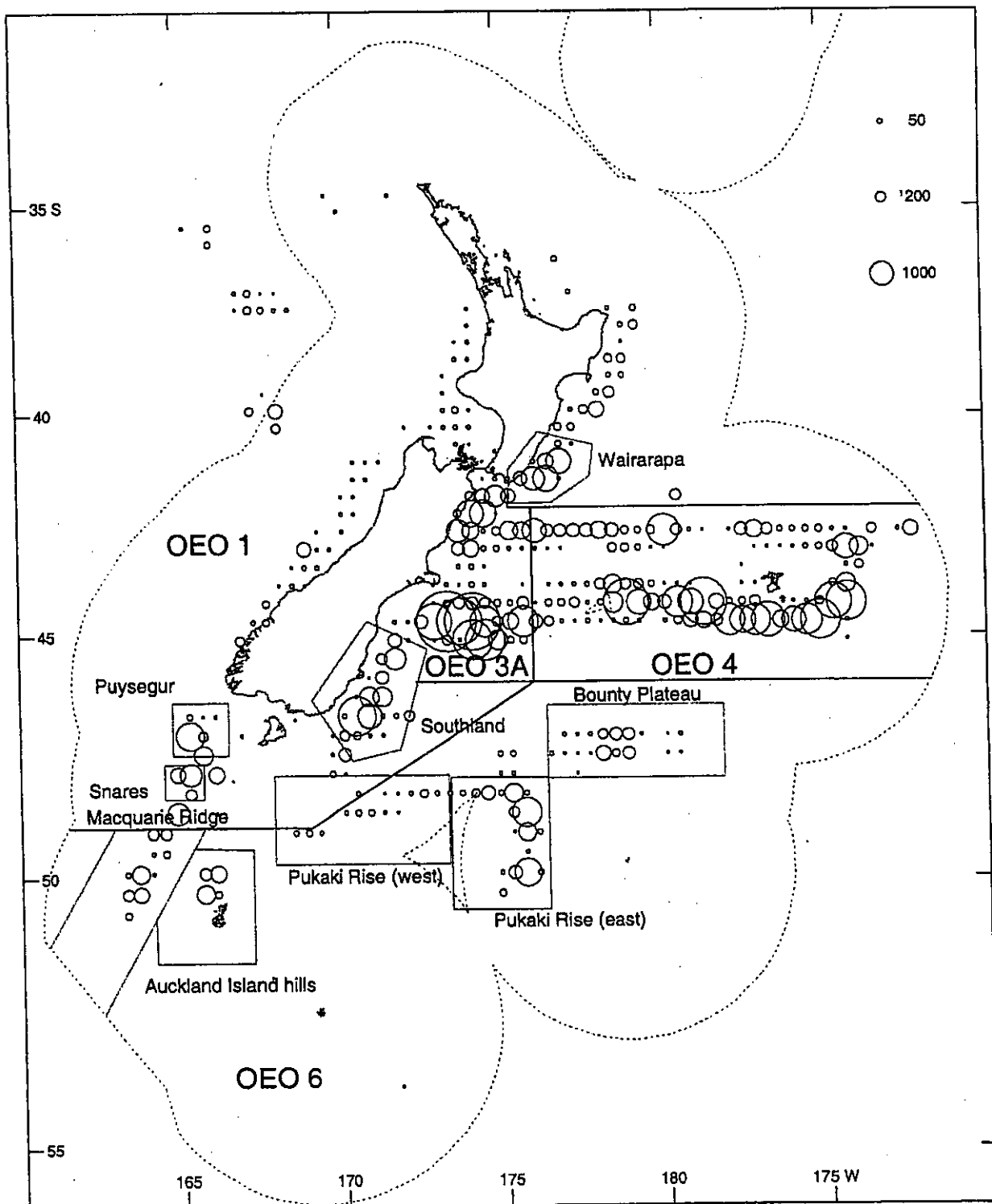


Figure 1: Oreo management areas (thick black lines). The dashed line is the 200 n. mile EEZ.



**Figure 2:** Boundaries of OEO 1, OEO 3A, OEO 4, OEO 6 (thick solid lines), and fisheries (polygons marked with thin solid lines) defined in the text. The number of trawls that caught or targeted oreos from 1977-78 to 2002-03 are 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. The dashed line marks the EEZ.

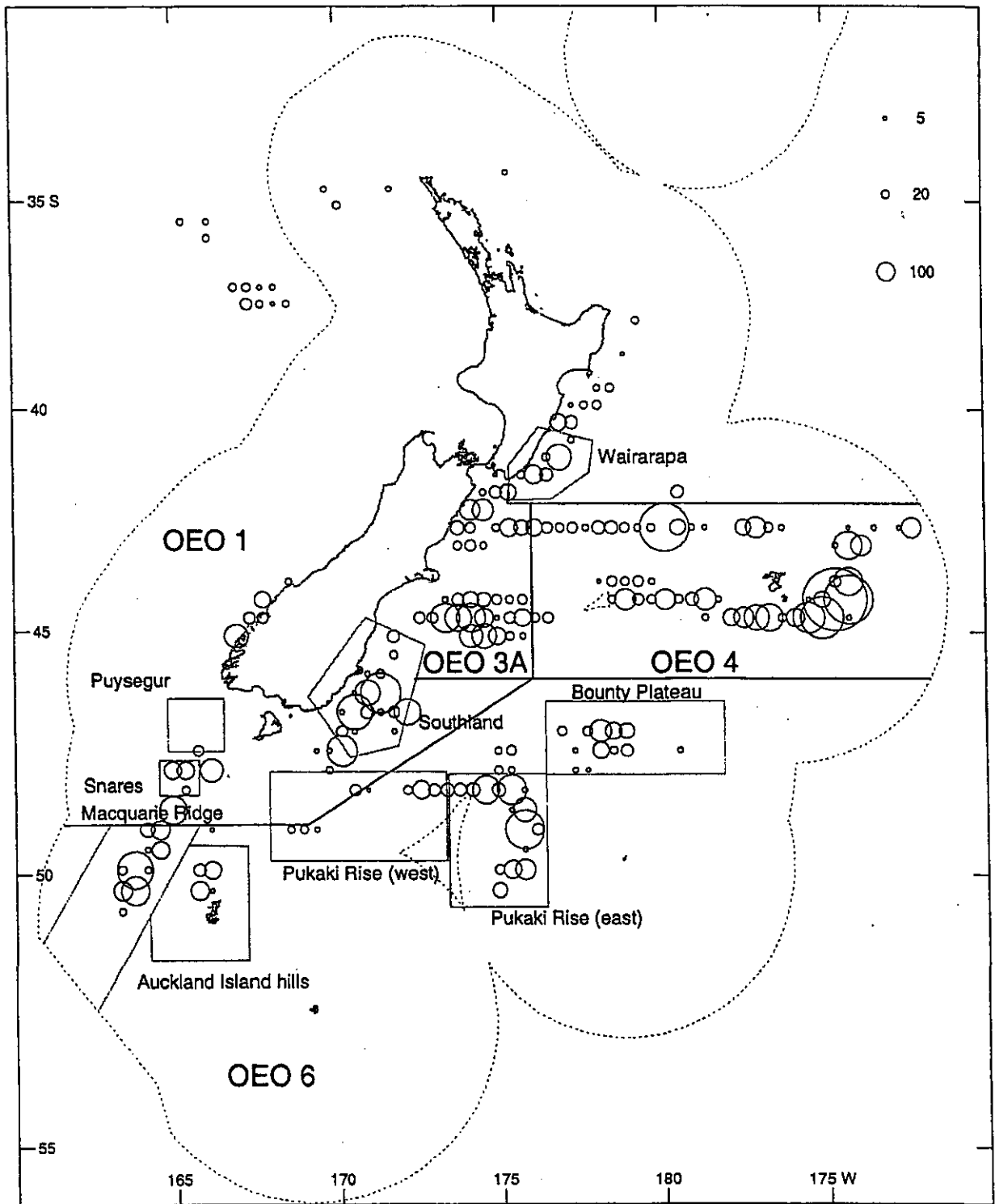


Figure 3: The number of trawls that caught or targeted oreos from 2000–01 to 2002–03 summed for each 0.4 x 0.4 degree cell (for 5 or more trawls per cell) and plotted as a circle at the centre of each cell. Circle area (see inset) is proportional to the number of trawls per cell. Fewer than 5 trawls per cell were not plotted. The dashed line marks the EEZ.

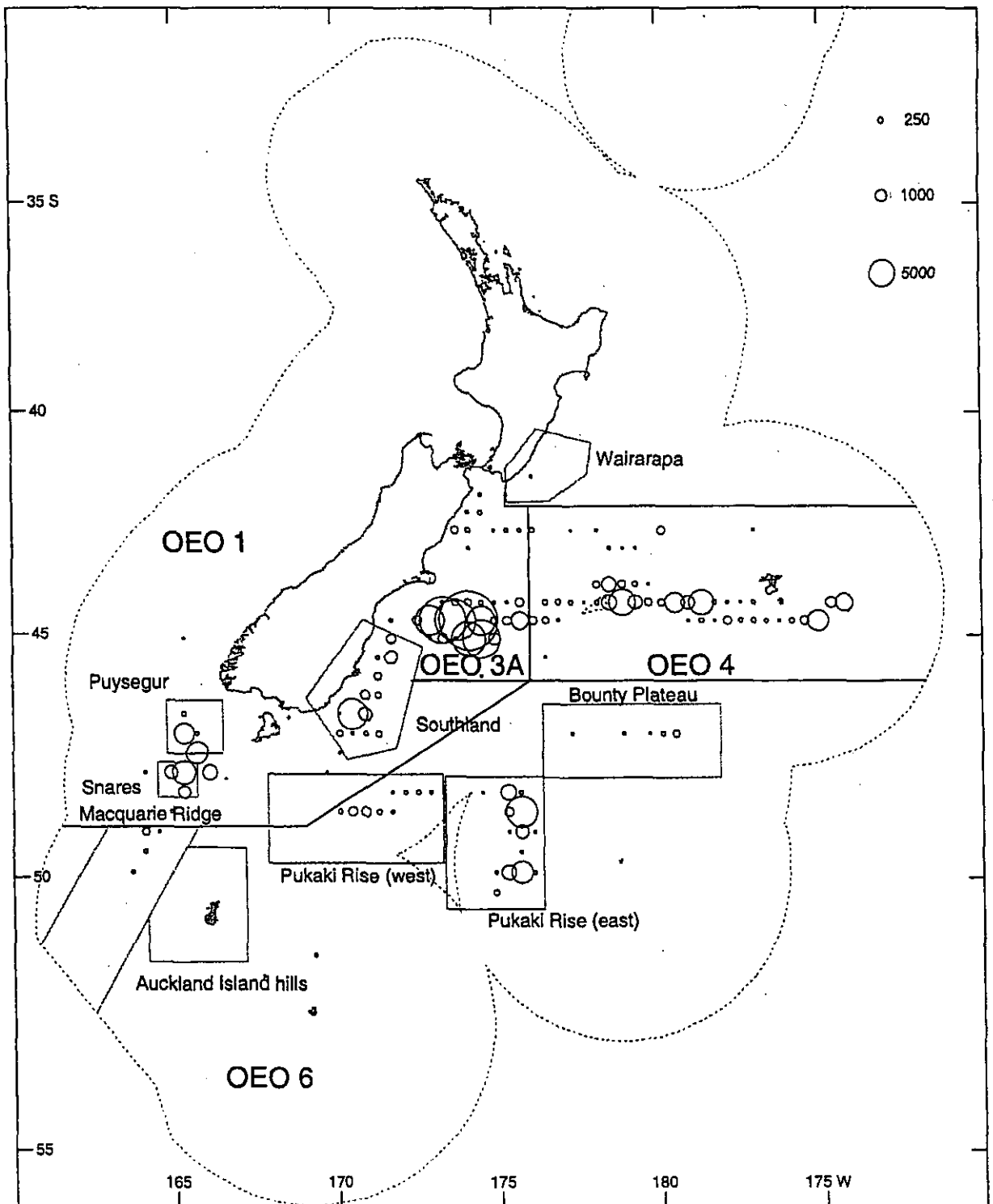
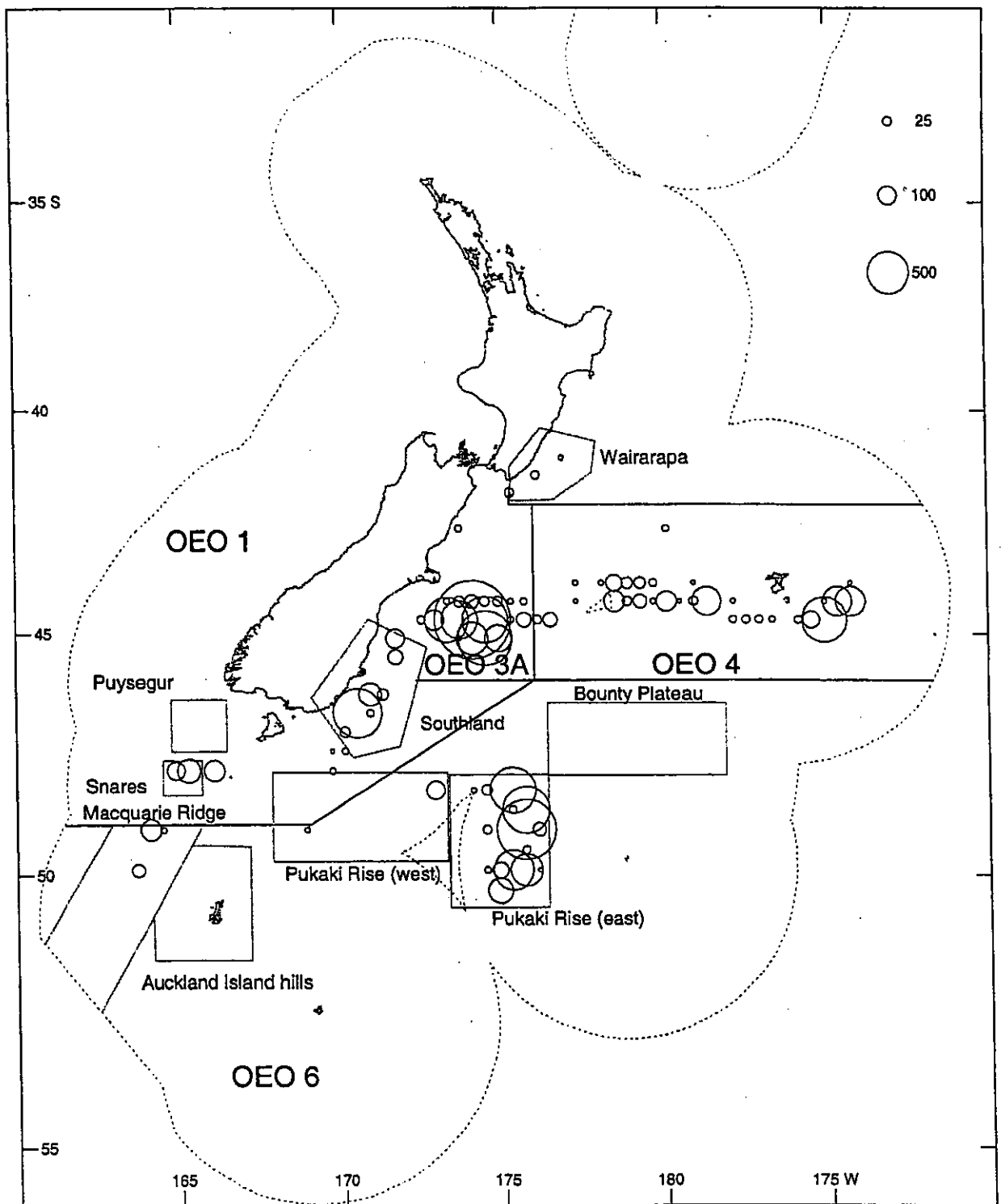


Figure 4: Black oreo catches (t) from 1977-78 to 2002-03 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell. The dashed line marks the EEZ.



**Figure 5: Black oreo catches (t) from 2000–01 to 2002–03 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. The dashed line marks the EEZ.**

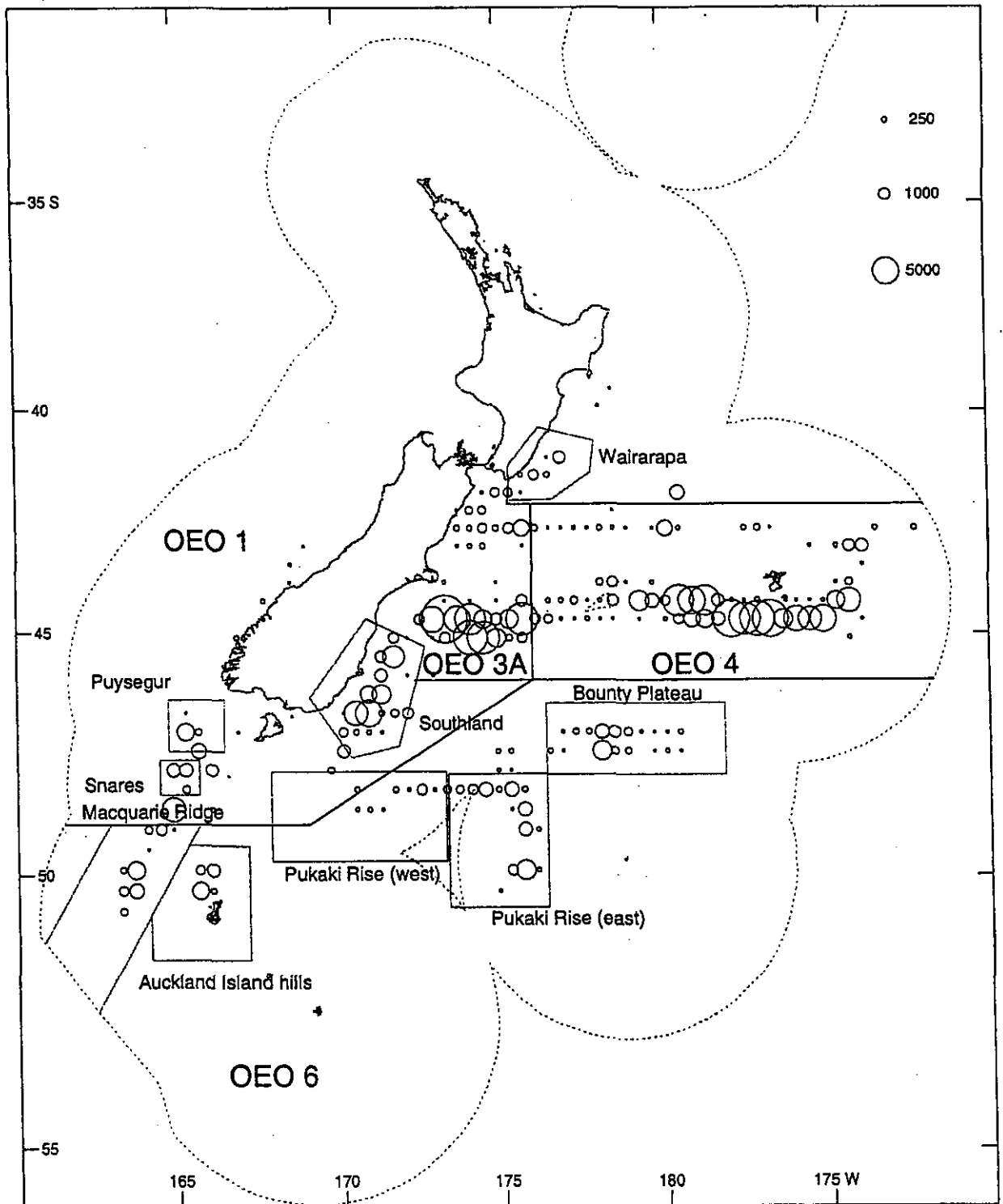


Figure 6: Smooth oreo catches (t) from 1977-78 to 2002-03 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 40 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell. The dashed line marks the EEZ.



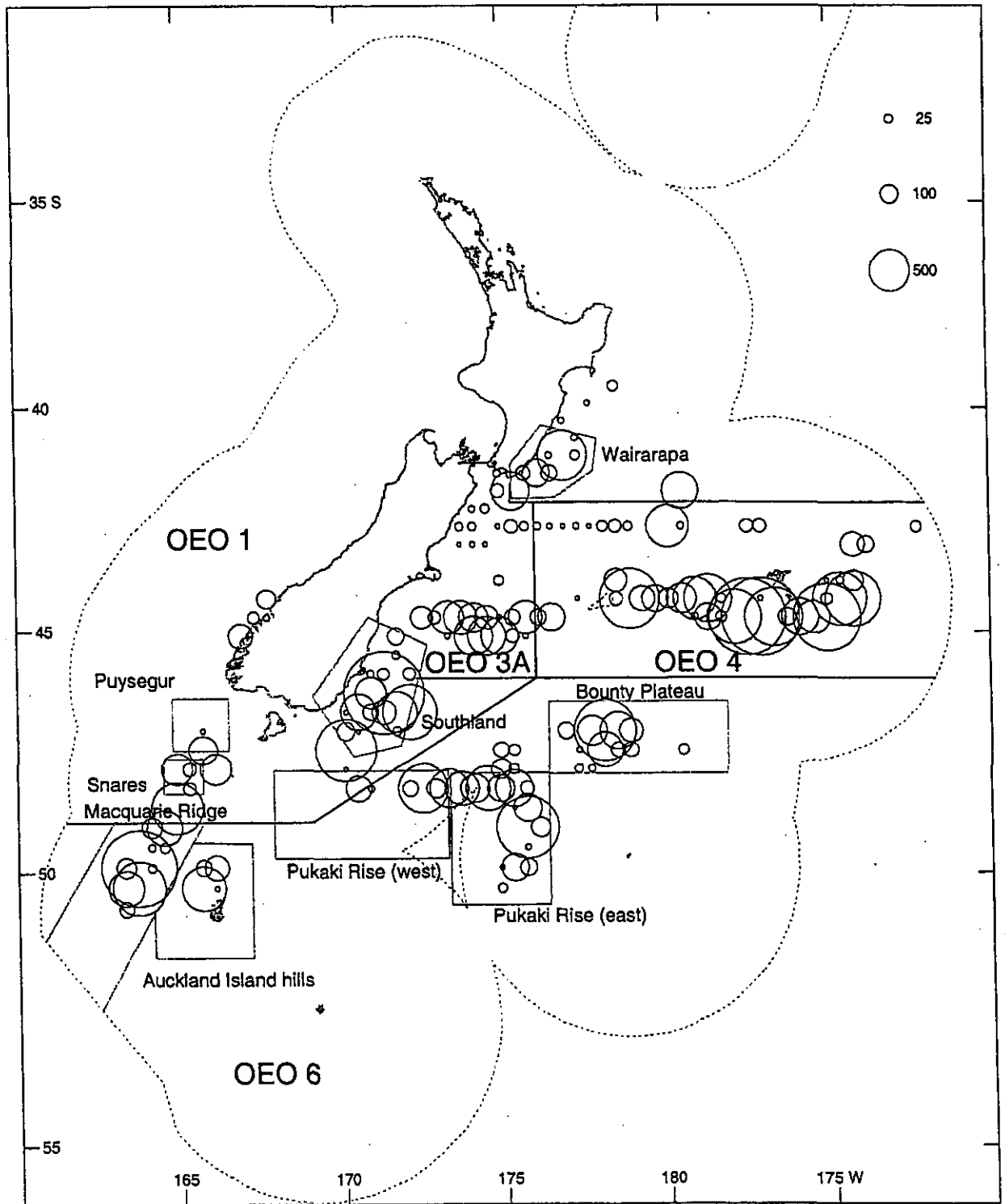


Figure 7: Smooth oreo catches (t) from 2000-01 to 2002-03 summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. Catch was plotted only for cells where at least 5 t of black oreo was caught. Circle size (see inset) is proportional to the size of the catch (t) from each cell. The dashed line marks the EEZ.

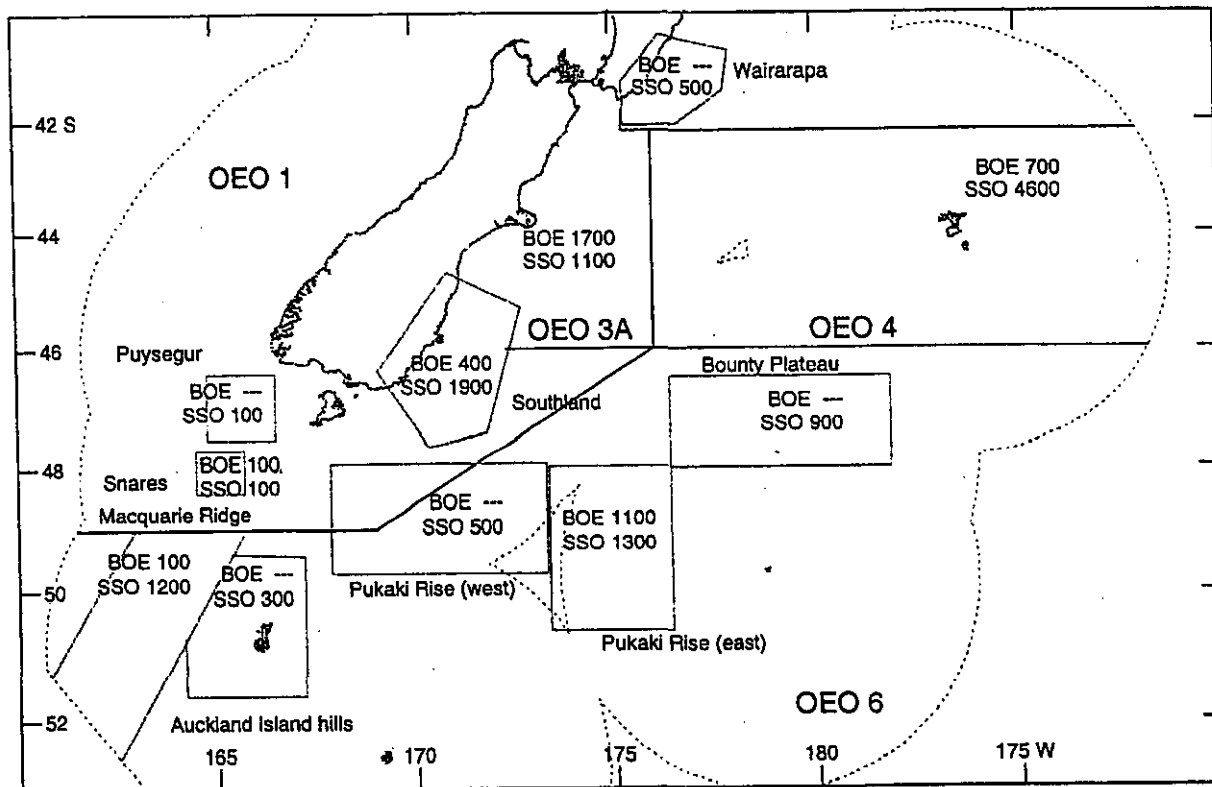


Figure 8: Mean annual estimated catch (t) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2000-01 to 2002-03. —, catch less than 100 t. The dashed line marks the EEZ.

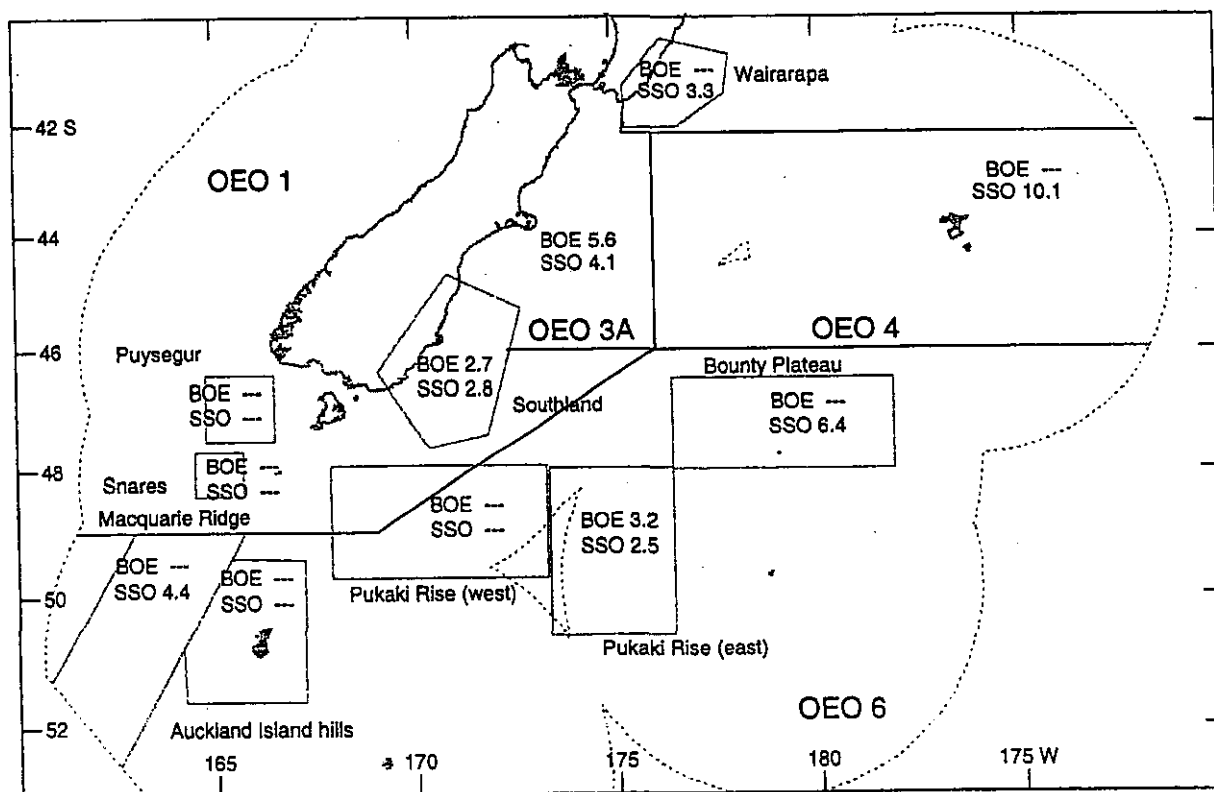


Figure 9: Mean annual unstandardised CPUE (t/tow) of black oreo (upper numbers) and smooth oreo (lower numbers) by fishing area from 2000-01 to 2002-03, taken from tows that target fished for black oreo or smooth oreo. —, insufficient data (fewer than 50 target tows). The dashed line marks the EEZ.

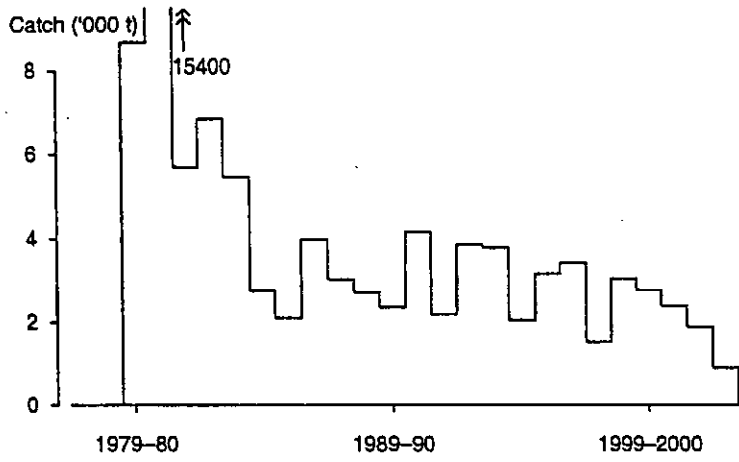


Figure 10: Black oreo annual estimated catch (t) from OEO 3A (minus catch from Southland).

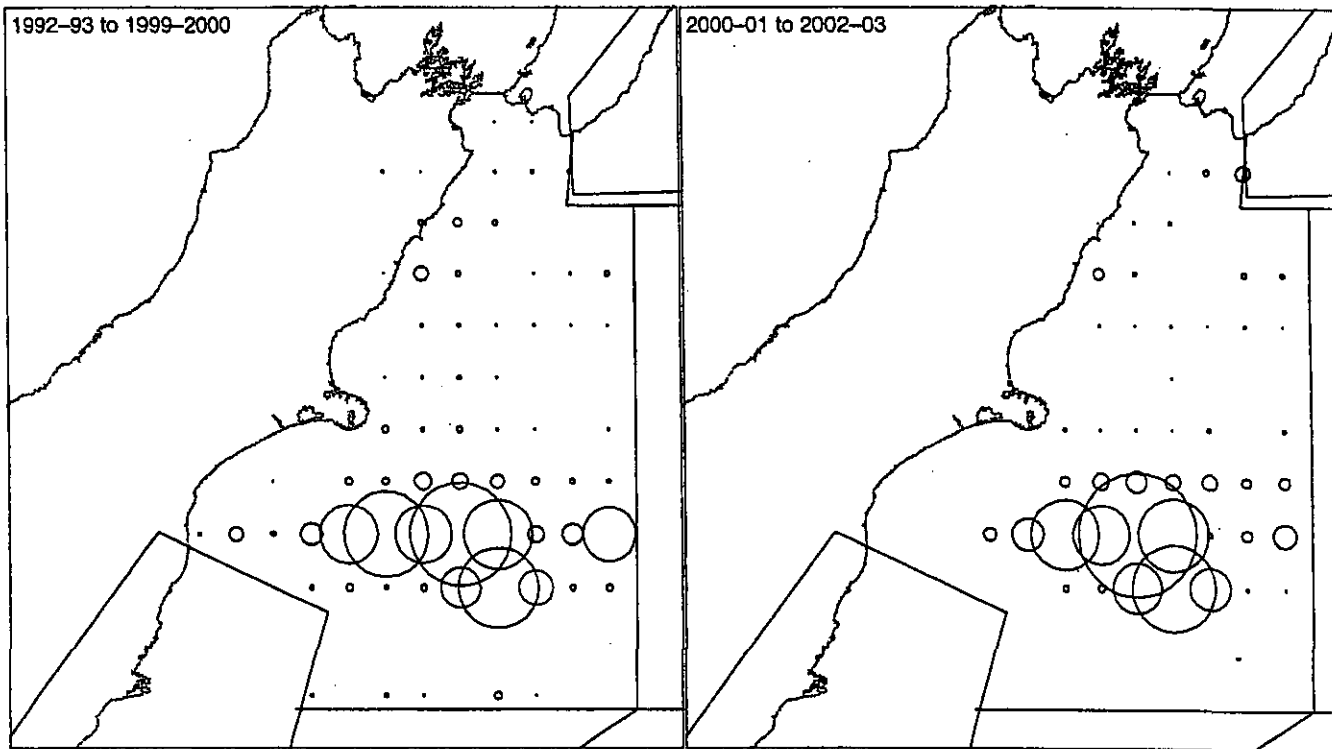


Figure 11: Black oreo from OEO 3A (minus catch from Southland) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell.

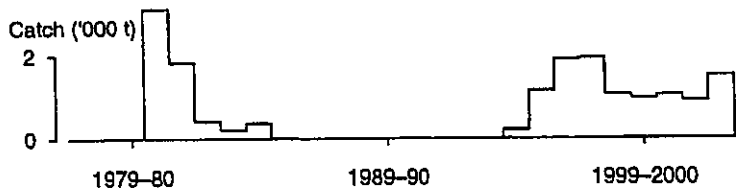


Figure 12: Black oreo annual estimated catch (t) from Pukaki Rise (east).

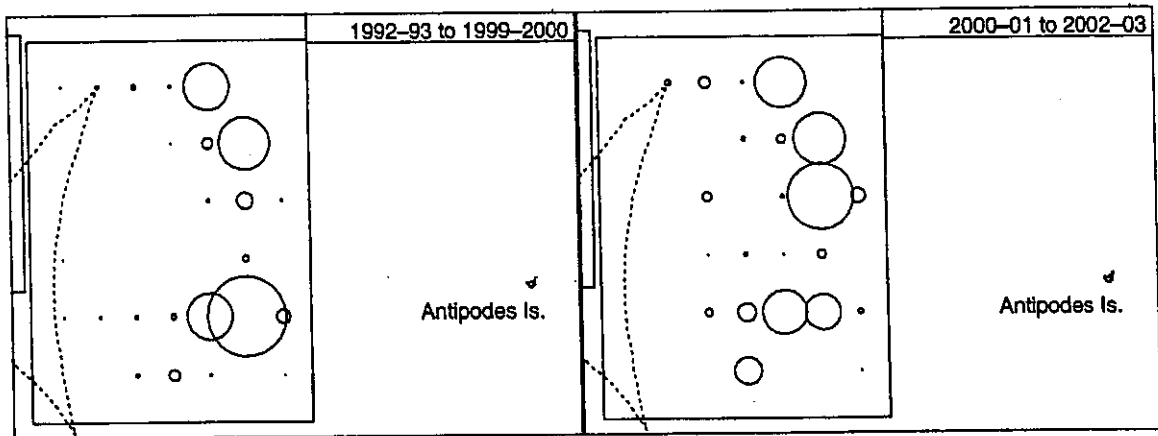


Figure 13: Black oreo from Pukaki Rise (east) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. The dashed line marks the EEZ.

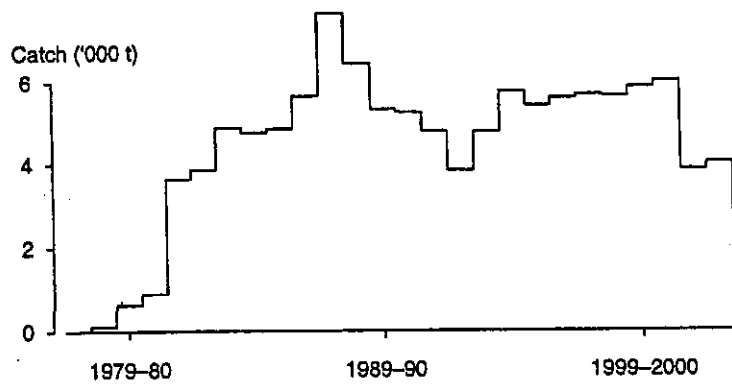


Figure 14: Smooth oreo annual estimated catch (t) from OEO 4.

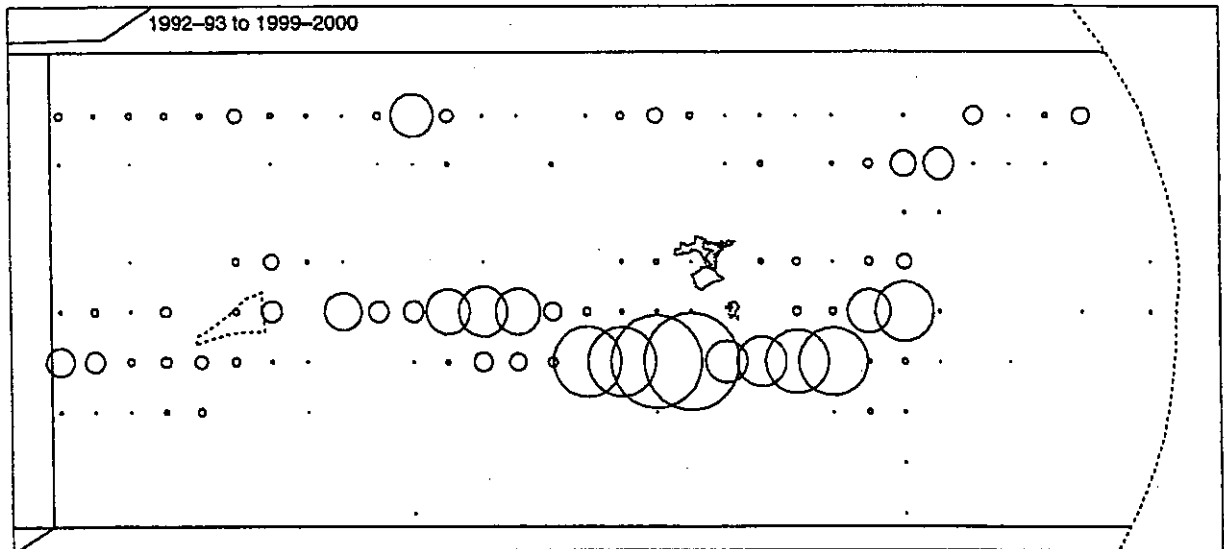


Figure 15: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. The dashed line marks the EEZ.

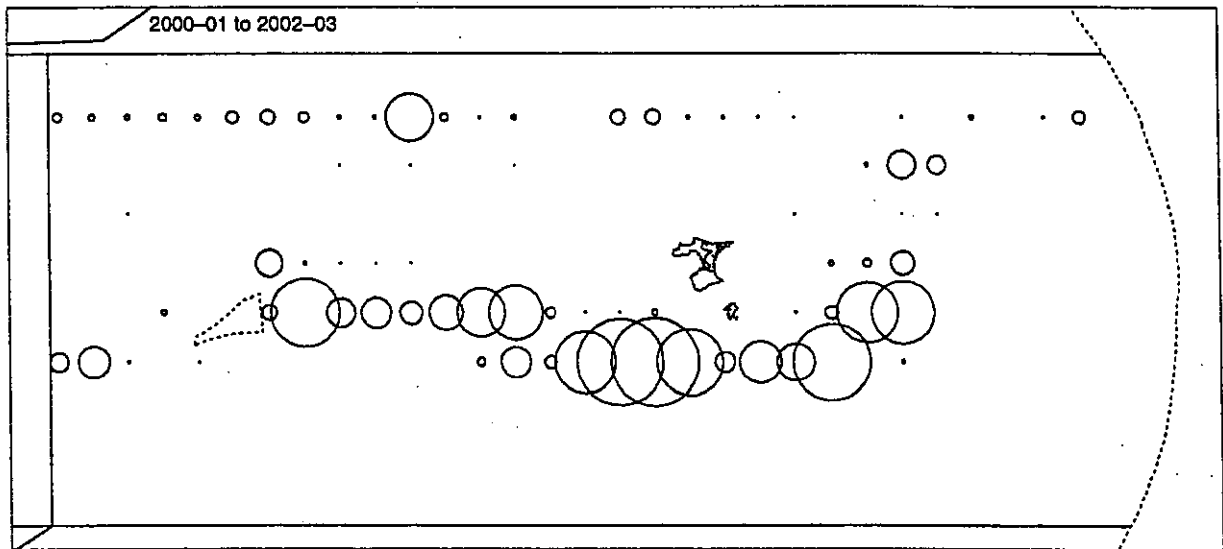


Figure 16: Smooth oreo OEO 4 relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. The dashed line marks the EEZ.

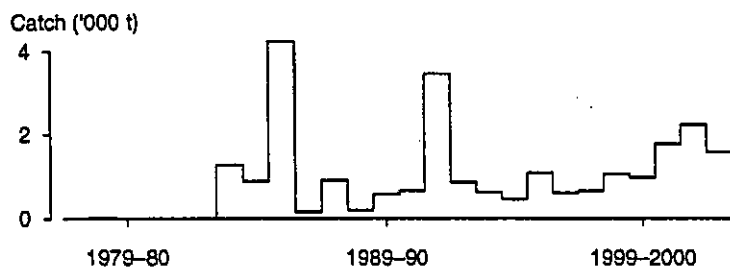


Figure 17: Smooth oreo annual estimated catch (t) from Southland.

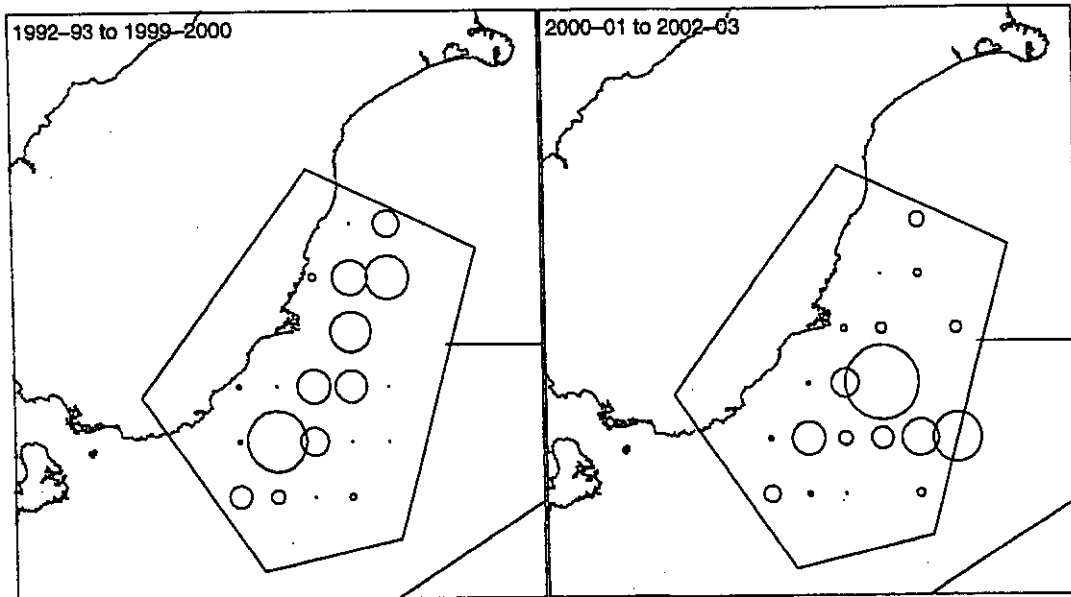


Figure 18: Smooth oreo Southland relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell.

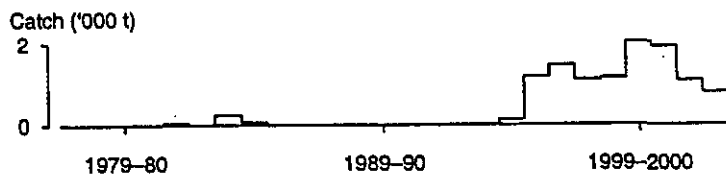


Figure 19: Smooth oreo annual estimated catch (t) from Pukaki Rise (east).

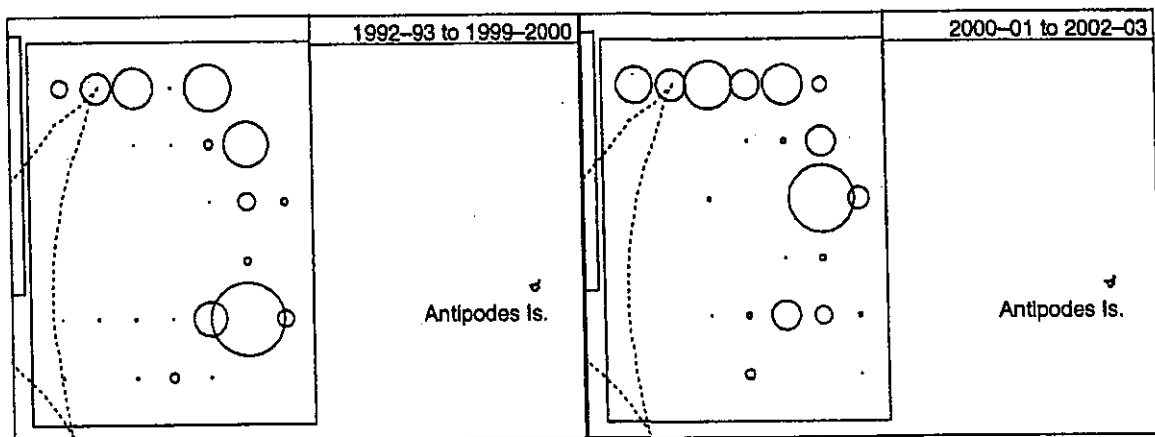


Figure 20: Smooth oreo Pukaki Rise (east) relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. The dashed line marks the EEZ.

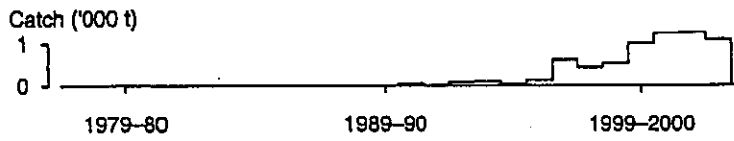


Figure 21: Smooth oreo annual estimated catch (t) from Macquarie Ridge.

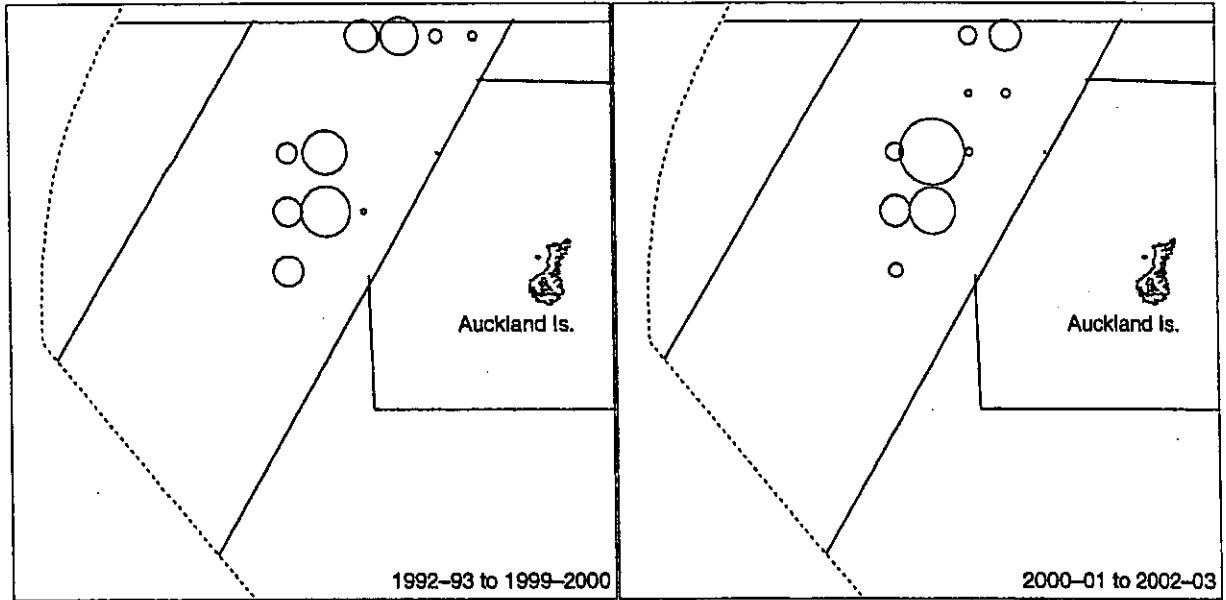


Figure 22: Smooth oreo Macquarie Ridge relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell. The dashed line marks the EEZ.

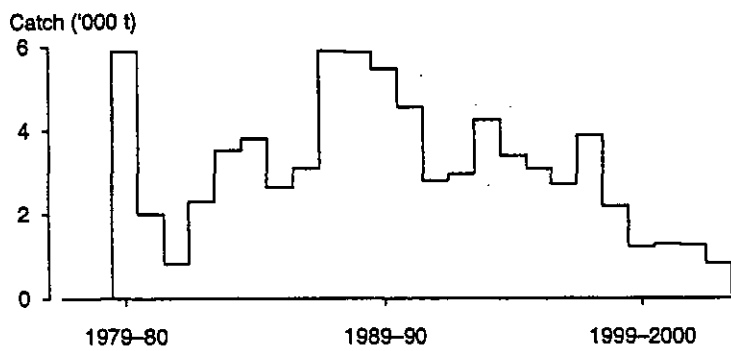


Figure 23: Smooth oreo annual estimated catch (t) from OEO 3A (minus Southland).

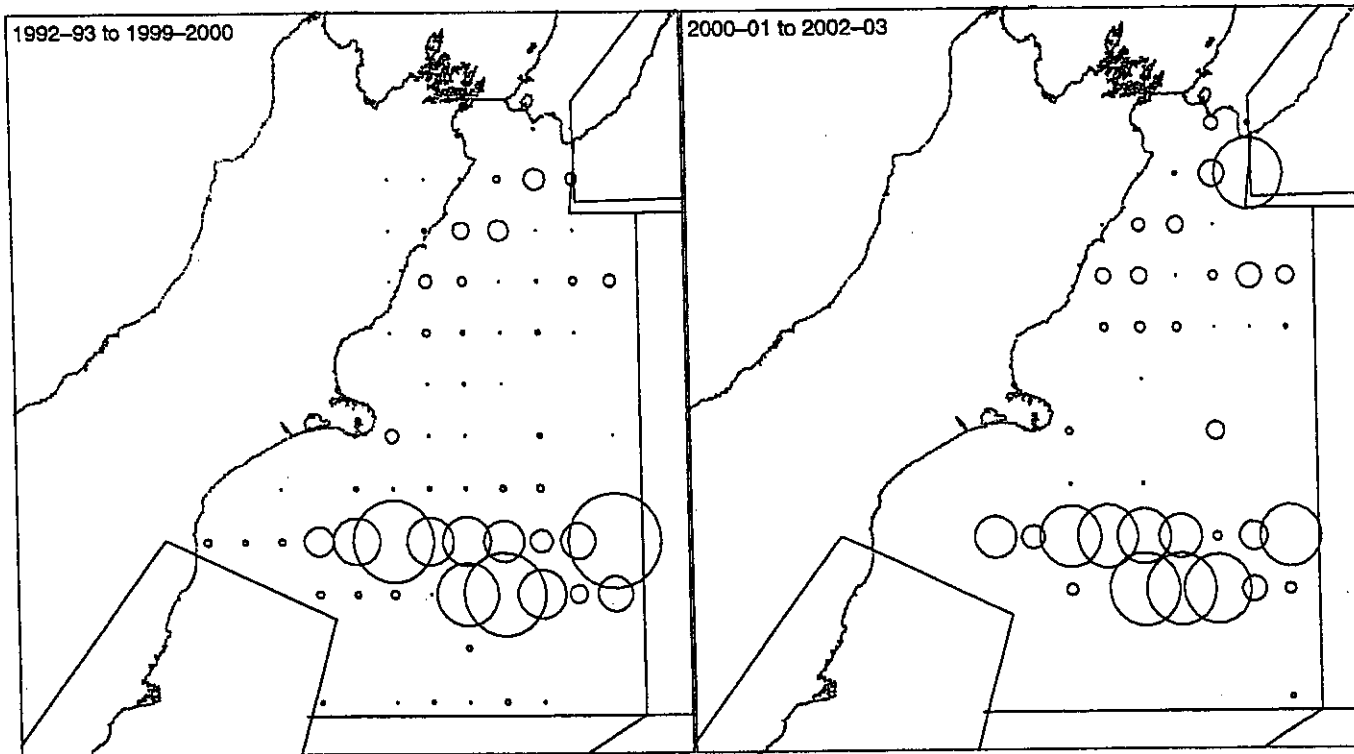


Figure 24: Smooth oreo OEO 3A relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell.

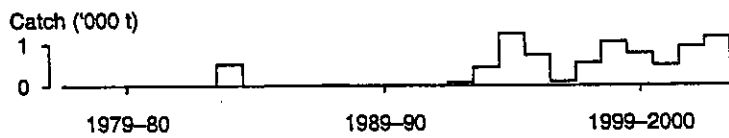


Figure 25: Smooth oreo annual estimated catch (t) from Bounty Plateau.

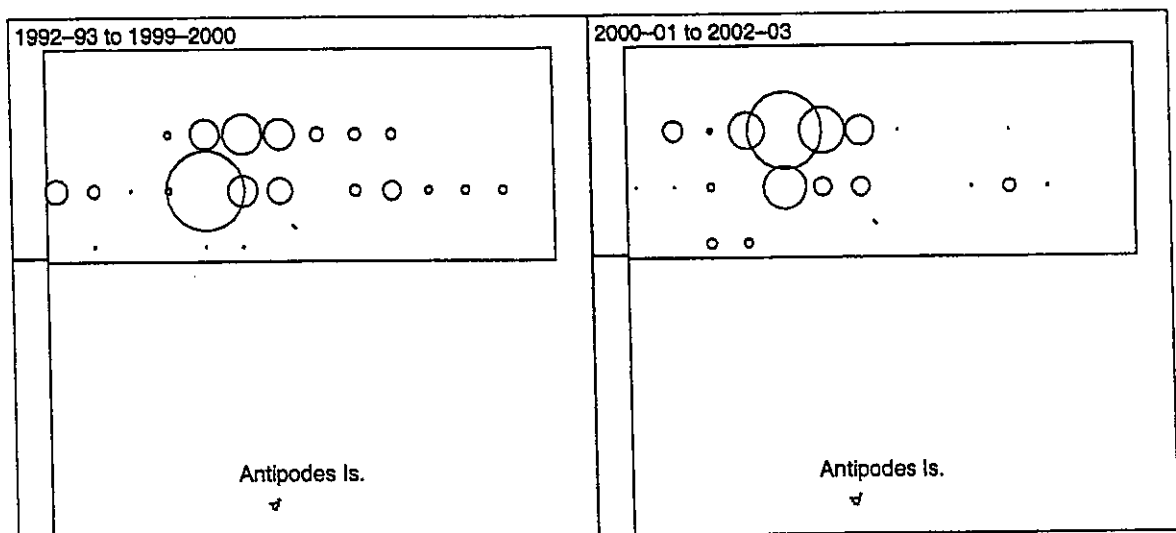


Figure 26: Smooth oreo Bounty Plateau relative catch distribution summed for each 0.4 x 0.4 degree cell and plotted as a circle at the centre of each cell.